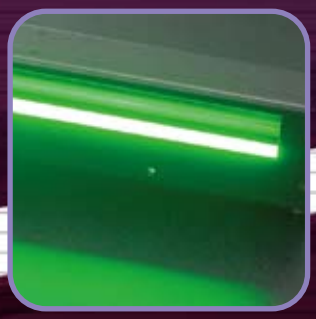
Light Sources / Fibers / LED Illuminations

MV

Machine Vision General Catalog



MORITEX CORPORATION

2009

Allowing you to see what was imperceivable

Approaching the three fields of illumination, lens, and peripherals from a comprehensive system point of view and solving problems efficiently to obtain images necessary for customers. This is the total solution by Moritex. When problems arise, what should be improved? Understanding each individual aspect of the problem and considering it as a whole will present a real solution. Contrary to total optimization, the partial optimization of mutually related illumination, lens, and peripheral items may not produce a good overall result. An optimal image makes visible that which you once could not see. That is our total solution to meet various requirements.

TOTAL SOLUTION
for Machine Vision

Results beyond Customers' Imagination

Capturing images or taking photos under complex restrictions, customers expect optimum images as complete results not just lenses or illumination parts. We believe that the results of our careful consideration of customers' needs and the consequent customer satisfaction prove to be our greatest value. Such friendly, capable customer service by our sales personnel and engineers support Moritex's total solution ideal. The pleasure and excitement of producing results beyond customers' imagination motivates us.

Illuminations

Image Illumination Systems World Share No. 1

Since our founding in 1973, Moritex has existed as a total manufacturer of lighting and lighting related products. Moritex has continually pursued a spirit of uniqueness and advancement. In particular, our image illumination systems using optical fibers have achieved the No. 1 share in the world. Furthermore, our years of experience in the design and manufacturing of optical lenses enables us to provide machine vision systems, combining illumination and lens systems, to manufacturers and suppliers of equipment around the world. Moritex shall conduct further research in order to accurately and precisely respond to the needs of our customers, and shall strive to provide the highest quality machine vision processing systems.

Service & Support

Case Study

Related to Industrial Equipment — Company C

We contacted Moritex and requested that they conduct experiments with an object with a contrast that was difficult to obtain. Moritex experimented with the RGB wavelengths, but was unsuccessful at first. With cooperation from their Yokohama Technical Center, they were able to take various approaches to solve the issue, including measuring the spectral characteristics (reflection) of the object. Using the results, they were able to obtain the desired contrast. This problem was solved thanks to instruction available from Moritex's engineering department.

Related to Industrial Equipment — Company M

We used to conduct our appearance inspections with eye vision or with a stereoscopic microscope, but later adopted a suitable monitor visual inspection system proposed by Moritex. The coordination of the different components from the lenses and lights to the various peripherals exceeded our expectations. Compared to the conventional eye visual checks & microscope observations, the new system increased the work efficiency and reduced operator stress by a great deal.

Related to Semiconductor Processing — Company Y

We inquired about Moritex's lenses and lighting for an alignment and positioning application. What we received was a comprehensive proposal for not only lenses & lighting, but also image processing software and an alignment stage. Because the performance achieved was much higher than what we had expected, we purchased the whole setup. Most likely, if only lenses and lighting were introduced, we wouldn't have been able to achieve our current efficiency and yield.

Related to Semiconductor Manufacturing — Company Y

When we altered our IC mark printing methods, many recognition failures occurred and we asked Moritex to check the system. Moritex found that the problem could be attributed to the deterioration of the optical performance and lighting conditions. The deterioration was caused when the optical system was altered (magnification reduced) according to the transition in chip size. Moritex proposed a plan to improve the image recognition system by changing the lenses & lighting. Consequently, the precision of the recognition increased remarkably and the yield proved to be higher than with the old printing method.

Related to Image Processing (Dealer) — Company A

When we were investigating the use of an automated system for crack detection under transmitted illumination, we discovered a problem with false recognition caused by disruptive, ambient light. After consulting with Moritex, they suggested that we utilize infrared light rays as transmitted illumination and a visible light ray blocking filter for the optical system. This enabled us to detect only the light coming from the cracks without ambient light disturbing the image.

Related to Food Packaging — Company M

For an application where we experienced printed package ID read failures, we consulted Moritex and they found that the ID recognition system would become unstable with certain printing position backgrounds. They promptly conducted a number of inspections in their testing room but were unable to find the optimum wavelength for all background types. To solve this problem, they made and tested a customized light. Using this special light, many different kinds of package IDs could be recognized by the system which proved to be quite stable.

Related to Industrial Products — Company D

We needed to test a UV simulated coaxial light. The manufacturer could not conduct the tests with their standard instruments so we requested that Moritex handle the testing. Although their lineup did not include the necessary test equipment, Moritex accepted our request without hesitation. The test results were good, but we did not adopt the simulated coaxial UV light into our system. Moritex was extremely helpful and enabled us to test new products.

Test Laboratory

Moritex has 11 demo labs in Japan and 5 others throughout the world where you can bring in actual objects and test our lenses, illumination, and even our image processing software. We have created environments available for experimentation whenever necessary. From the various Moritex products, you can select the most appropriate items for your application.

★Convenient in the following cases:

- It is difficult to recognize object because the color or shape has changed.
- You wish to select illumination and lenses with first hand experimentation and to see images provided by image processing software.
- You wish to conduct tests by changing the color (or reflectivity) of LED illumination.
- You wish to know the differences that result from changing the angle or method of illumination because object material often changes.
- You are having difficulty viewing objects, the reason for which is unknown.

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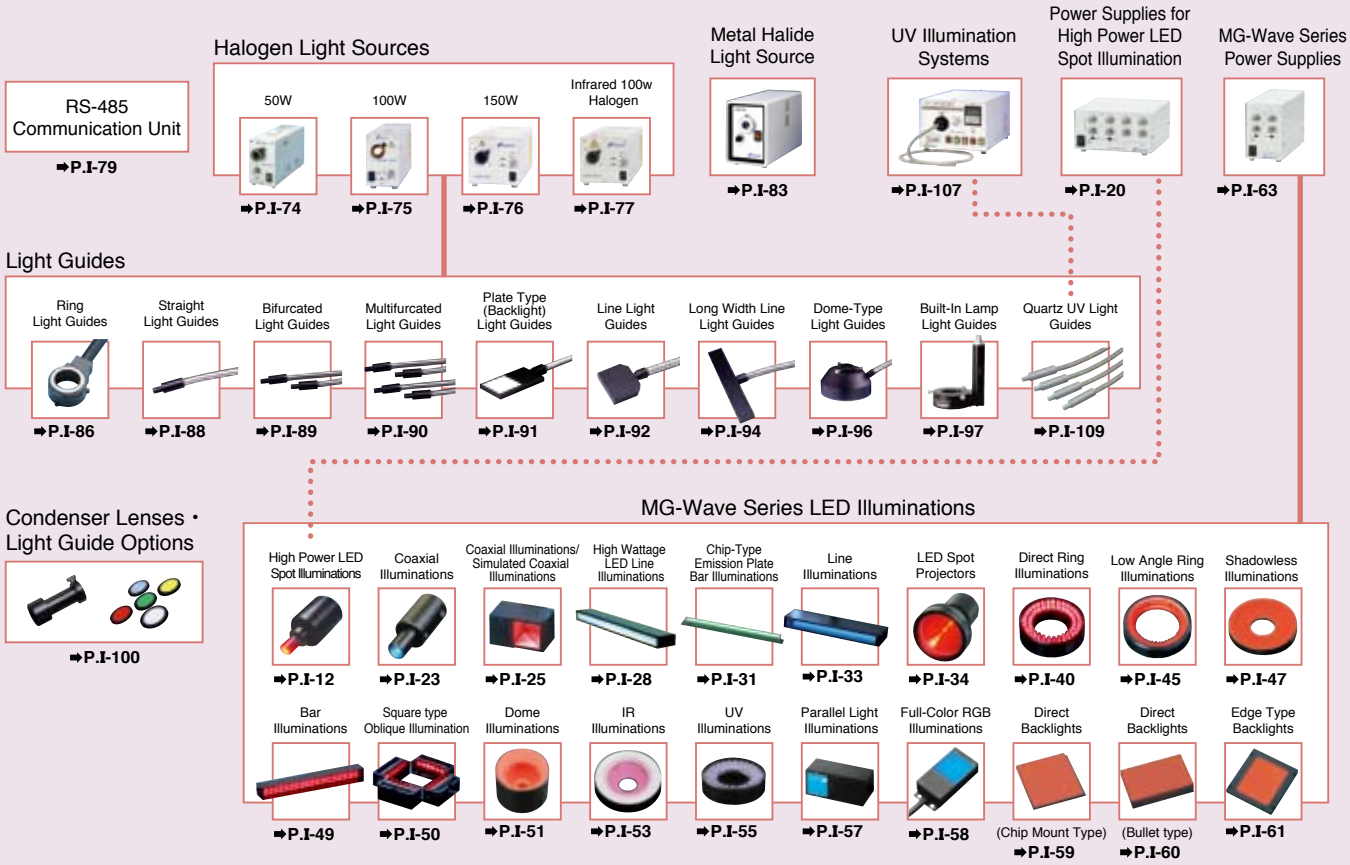
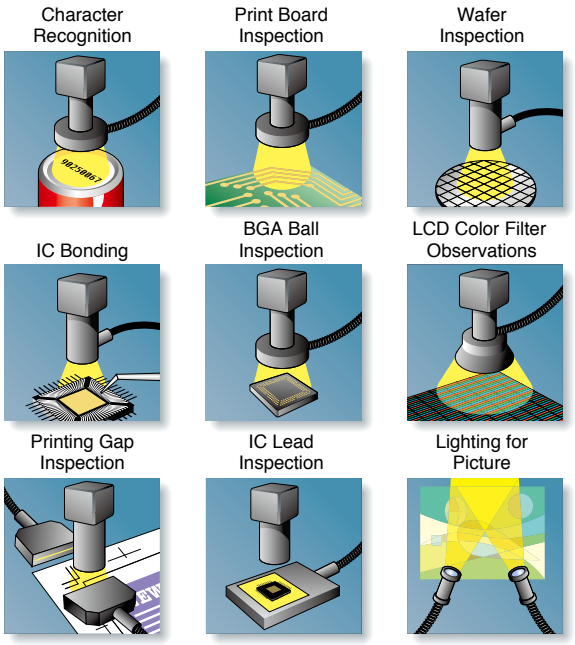
System Flow

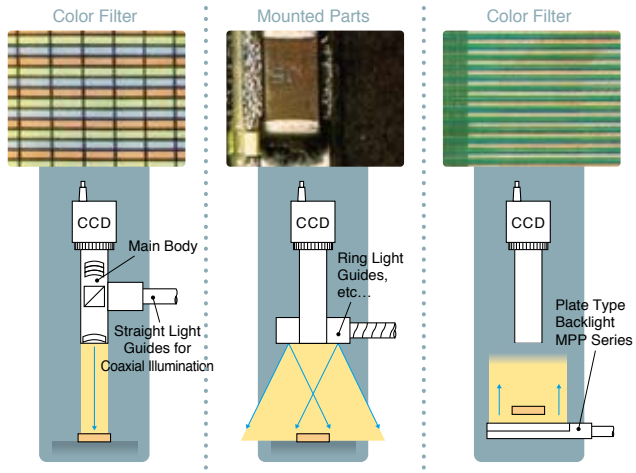
Illumination Related Products



Lighting Pattern



Basics



Coaxial Illumination (Bright Field)

IC Pattern
Silicon Wafer
Hard Disk
LCD Panel
Color Filter
Other Mirror Finished Materials

Epi-Illumination (Dark Field)

Panel Marks, Scratches
Edge Convex Inspection
Soldering Components
Other Mirror
Finished Objects

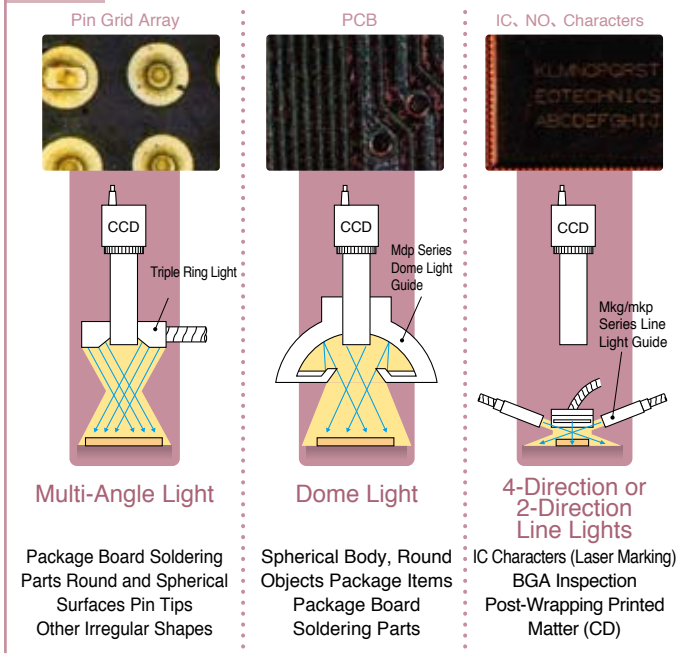
Transmitted Illumination (Backlight)

IC Lead Shape, Pitch
Panel Through Hole,
LCD Panel Electrodes
Other Transparent Objects

Lenses & Peripherals

*See MV General Catalog/ Lens System Peripheral Equipment Section

Application



Multi-Angle Light	Dome Light	4-Direction or 2-Direction Line Lights
Package Board Soldering Parts Round and Spherical Surfaces Pin Tips Other Irregular Shapes	Spherical Body, Round Objects Package Items Package Board Soldering Parts	IC Characters (Laser Marking) BGA Inspection Post-Wrapping Printed Matter (CD)

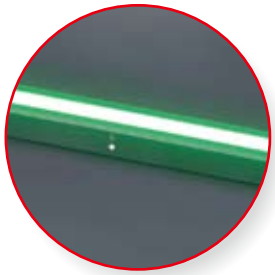
Not all dimensions or tolerances are given in this catalog.
For more detailed information, please request product specifications.

INDEX

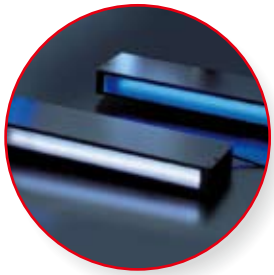
LED Illumination System

MG Wave Series

High Power LED Spot Illuminations/ Power Supplies



Chip-type Emission Plate Bar Illuminations



Line Illuminations

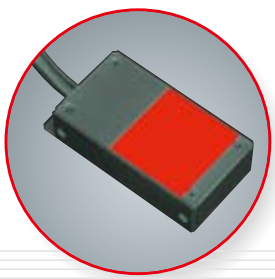
Merits of LED Illumination

High Degree of Freedom in Shape

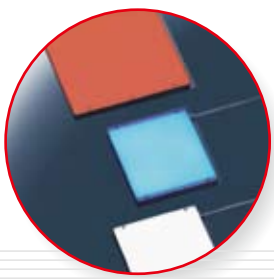
Produces optimal shapes for objects because of the small size element which serves as the light source

Bar Illuminations

Square type Oblique Illuminations



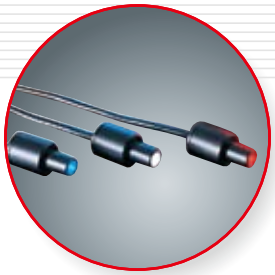
Full-Color RGB Illuminations



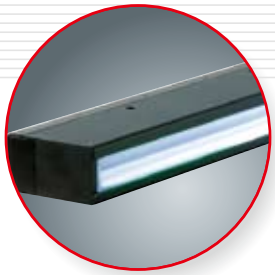
Direct Backlights

(Chip Mount Type)

Coaxial Illuminations



Coaxial/ Simulated Coaxial Illuminations



High Wattage LED Line Illuminations

LED Spot Projectors

Direct Ring Illuminations

Low Angle Ring Illuminations

Shadowless Illuminations

A powerful lineup which meeting all your needs

Long Life Time

A longer life time than other types of illumination and capable of achieving stable images

Reduced Running Costs

Despite necessary implementation costs, following implementation these items are energy and labor-saving

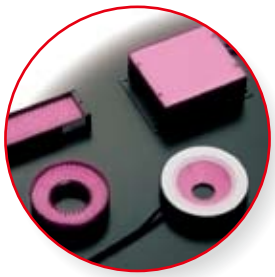
Narrow Range of Wavelengths

Easily creates the contrast necessary for image processing

Good Switching Characteristics

Repeated switching ON/OFF does not cause deterioration but prolongs the life time, unlike other types of illumination

Dome Illuminations

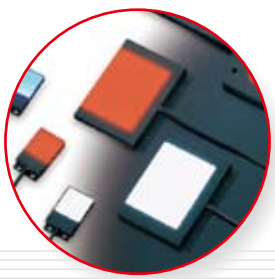


IR Illuminations

UV Illuminations

Parallel Light Illuminations

Direct Backlights
(Bullet Type)



Edge Type Backlights

Power Supplies

Supply Options

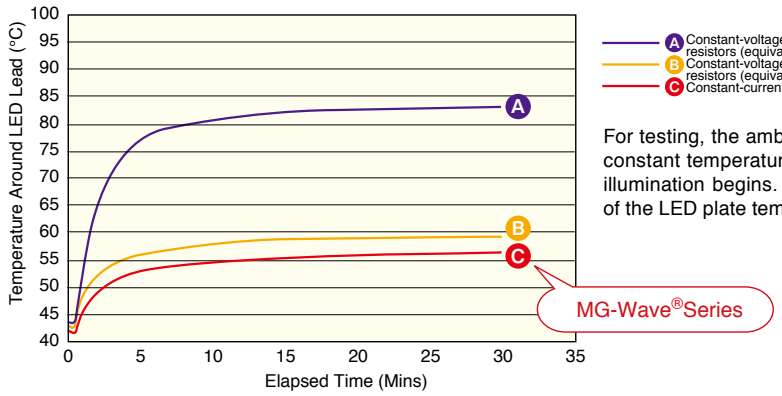
Answers About Moritex's Machine Vision LED Illumination

Constant-Current Sensing Control System Employed

Resistor elimination reducing heat generation by approximately 20˚C

New Development! Completed Patent Application

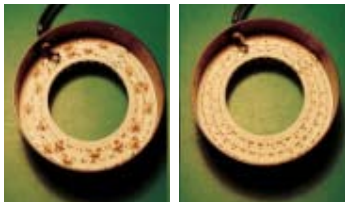
The constant-voltage type LEDs require current limiting resistors which increase heat radiation. To combat this problem,
Moritex's MG Wave Series has employed a constant-current sensing control system that does not require resistors and achieves the world's best thermal characteristics.



A Constant-voltage type white (without heat dissapation) LED: 114 pieces with resistors (equivalent to conventional products)
B Constant-voltage type white (without heat dissapation) LED: 114 pieces with resistors (equivalent to conventional products)
C Constant-current type white (with heat dissapation) LED: 114pieces

For testing, the ambient temperature was maintained at 40°C in a constant temperature oven. After full oven temperature saturation, illumination begins. The graph at left shows the results recorded of the LED plate temperature during 30 minutes.

* See data for comparisons between constant-voltage type and constant current type using MDRL-CW31

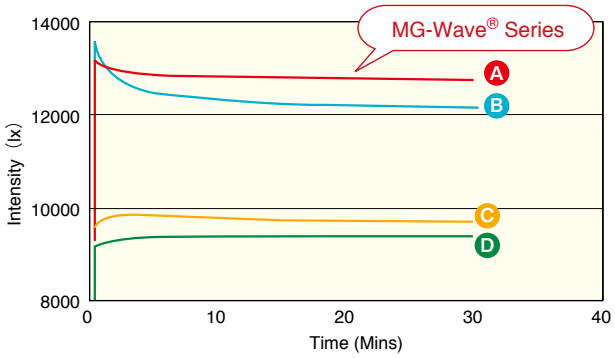


Constant-Voltage Type Base Constant-Current Type Base

Suppression of heat generation enhancing light efficiency

The relationship between heat and luminous energy cannot be ignored in LED illumination.
Unique radiation measures with the above constant-current sensing control system succeeded in greatly suppressing heat generation and enhanced the luminous energy by 40%*

*Comparison with previous Moritex products (Comparisons according to MDRL-CW31)



A Constant-current type white (with heat dissapation) LED: 114 pieces
B Constant-current type white (with heat dissapation) LED: 114 pieces with resistors
C Constant-voltage type white (without heat dissapation) LED: 114 pieces with resistors (equivalent to conventional products)
D Constant-voltage type white (without heat dissapation) LED: 114 pieces with resistors (equivalent to conventional products)

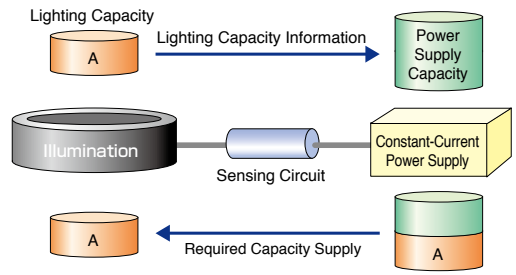
For testing, the ambient temperature was maintained at 40°C in a constant temperature oven. After full oven temperature saturation, illumination begins. The graph at left shows the recorded results of changes during 30 minutes of illumination.

Ease of handling of the constant-voltage type is as standard

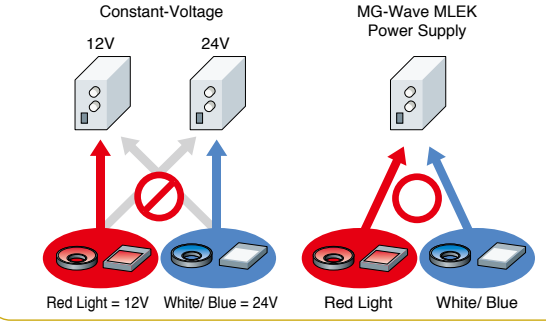
Because of the current limiting resistors on the LED side, the constant-voltage type makes illumination available as long as enough power is supplied. The constant-current type LED units are very effective in solving the heat generation problems, but conventional units need the power supply current to be adjusted according to the number of individual LEDs in order to provide the necessary current capacity. Both systems lack flexibility because the LED units must be used with specific power supplies and conditions cannot easily be changed.

The MG-Wave®Series has employed a patent-pending sensing circuit on the illumination side to send signals to the power supply so that it may control the rated current according to the number of LEDs in each illumination unit. Like the constant-voltage type, Moritex's constant-current LEDs can be used with any power supply as long as they fall within the maximum current capacity of the source.

Schematic diagram of a lighting system and a power source with a detection circuit



RGBW and IR-UV lighting with the same power supply

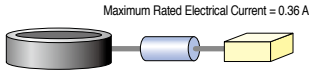


MG+Wave® When Using the MG+Wave Series

★Selection of Electrical Power Supply

STEP 1 Confirmation of Illumination Equipment

Confirm maximum rated electrical current of the illumination equipment being used
(See each page)
Example: For Direct Ring MDRL-CR31
(Red LED, internal diameter 31 mm)



STEP 2 Confirmation of Power Supply

The electrical current capacity is shown by the first 3 digits of the model "MLEK-A080W1LR" in the power supply lineup.
Example: When analog intensity control and 1 channel is required.

The "080" of MLEK-A080W1LR = 0.8 A → Power supply electrical current capacity = 0.8 A

STEP 3 Determine Whether Use Is Possible

Use is possible if the maximum rated current total for the illumination equipment is within the electrical current capacity of the power supply!

Power supply electrical current capacity ≧ Illumination equipment electrical current capacity → Use is possible
Example: 0.8 A ≧ 0.36 A

*Illumination within the electrical current capacity of each power supply can be used.
Example: Illumination 0.8A, power source 0.8A can be used.

★Other Cases ?

Q What about a 2 channel power supply?

A Use is possible if the maximum rated current total of each of the two illumination devices being used is within the power supply electrical current capacity.

Q How many meters of extension cable can be used?

A A limitation exists for the length of the extension cable between the illumination and power supply. As a basic rule, consideration should be given to the stability of the illumination and length up to a maximum of 3 meters should be used.

Q Can a 2-branch cable be used?

A A 2-branch cable cannot be used. For all illumination equipment listed in this catalog,an electrical power supply with 1 channel must be used for 1 piece of equipment.

*Contact Moritex regarding constant-voltage type illumination. These can be manufactured.

High Power LED Spot Illuminations/Coaxial Illuminations

From high brightness to ultra-high brightness, the High Power LED Spot Illumination Series continues to advance and offer even more.
Our vast experience as a lens and illumination company allows us to manufacture a product with high brightness and uniformity through a unique optical design. We are manufacturers of lenses and illumination and that is why we have self-confidence in our work.

A Versatile Lineup

From MCEL to MCEP-070, our 4 Series of Spot LED's are designed for any application you may have whether it requires coaxial or spot illumination.

Ultra-High Brightness ← Illumination Positioning → High Brightness

Line Up

Actual Size

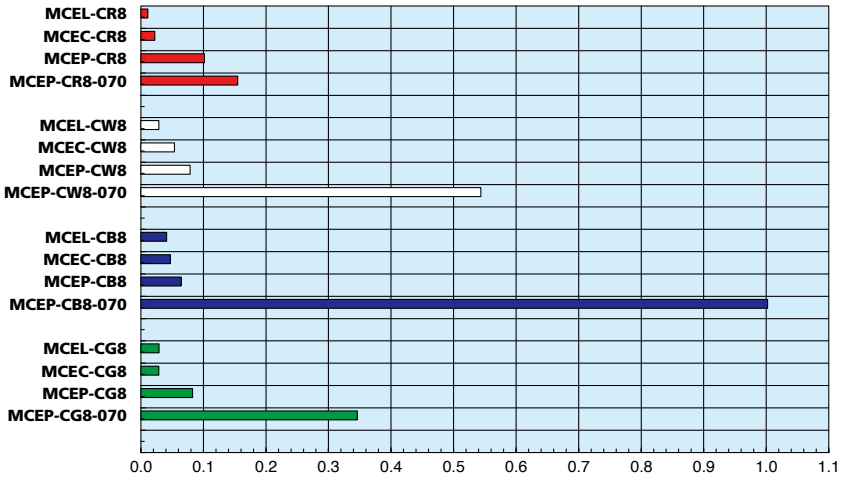
MCEL-C□8 Series

MCEC-C□8 Series

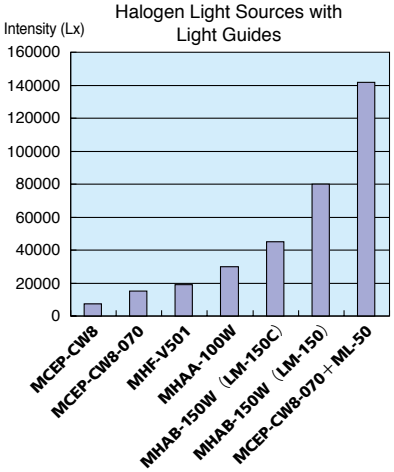
MCEP-C□8 Series

MCEP-C□8-070 Series

Camera Sensitivity Average (Value Relative to LED Peak Wavelength)



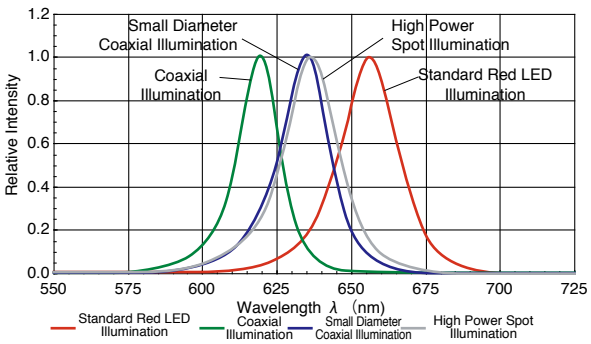
Comparison of Spot LEDs to Halogen Light Sources with Light Guides



Type	Intensity (Lx)
MCEP-CW8	7200
MCEP-CW8-070	15000
MHF-V501	19000
MHAA-100W	30000
MHAB-150W（LM-150C）	45000
MHAB-150W（LM-150）	80000
MCEP-CW8-070＋ML-50	141800

*MCEP-CW8-070+ML-50 is direct without a light guide
*Combination with MSG4-2200S for all types other than MCEP-CW8-070+ML-50
*Fixed illuminance measurement at a total of 50mm width
*The halogen light source average illuminance is according to catalog standards

Red LED Spectral Data



Standard Red LED Illumination : Peak Wavelength λp = 656.7 (nm) Dominant Wavelength λd = 642.7 (nm)
Coaxial Illumination : Peak Wavelength λp = 621.2 (nm) Dominant Wavelength λd = 613.5 (nm)
Small Diameter Coaxial Illumination : Peak Wavelength λp = 635.6 (nm) Dominant Wavelength λd = 625.2 (nm)
High Power Spot Illumination : Peak Wavelength λp = 636.9 (nm) Dominant Wavelength λd = 625.6 (nm)

High Power LED Spot Illuminations

MCEP-C□8-070 Series

Explanation of Model Code

MCEP - C □ 8 – 070

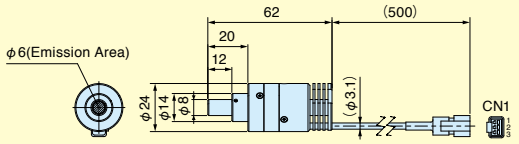
- MCEP - C: Power LED
- □: Emitted Color
  - R Red
  - G Green
  - B Blue
  - W White
- 8: Value for Maximum Rated Electrical Current
- 070

- Illuminance is 1.35 times higher than conventional models.
- Increased efficiency of emission due to a unique heat discharge system (design registration pending).
- Realization of industry-leading*1 illuminance and high uniformity (when using MML) due to a newly developed collimator and optical light transfer rod.
  *1 As of August, 2007

Model	Emitted Color	Dominant Wavelength Range*	Color Temperature	Maximum Related Current IFM (A)	Weight (g)	Product Code
MCEP-CR8-070	● Red	613.5~645nm	--	0.7	45	A-2323
MCEP-CG8-070	● Green	520~550nm	--	0.7	45	A-2324
MCEP-CB8-070	● Blue	460~490nm	--	0.7	45	A-2325
MCEP-CW8-070	○ White	--	4500~10000K	0.7	45	A-2326

* Wavelength of visible light on CIE chromatic coordinates.

MCEP-C□8-070



MLEP-A070

Power Supply (See **P. I-20**)

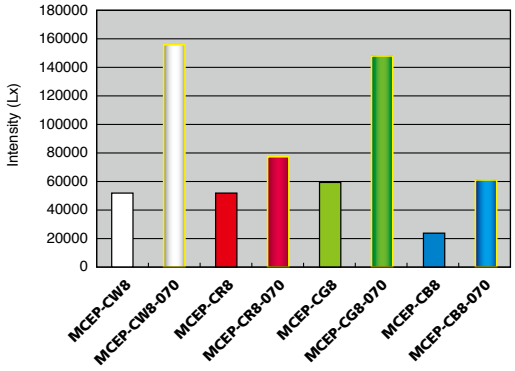
MCEP-ADLG24

Power Supply Light Guide Adaptor (See **P. I-19**)

Use the MML Series for the optimal matching of high power LED spot LED illumination (MCEP Series) and a lens with coaxial incidenct illumination.

A lineup of 47 types of telecentric optical systems with low image distortion offer a variety of supportednumber 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.

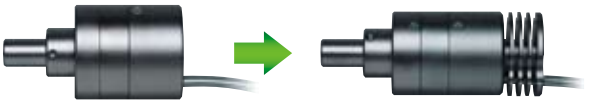
Amazing Brightness



* The illuminance values shown above are intended for use as reference values. They are not guaranteed values.

Unique Heat Discharge Structure

Conventional Product: **MCEP-C*8** New Product: **MCEP-C*8-070**

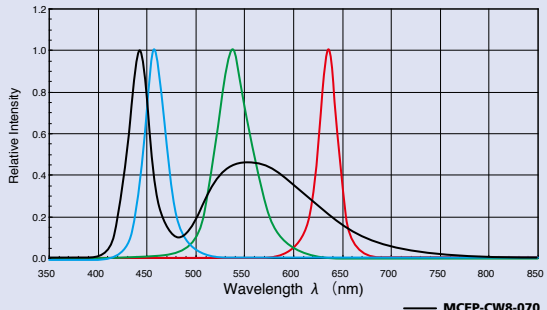


A change to a large electrical current of the LED elements and the suppression of heat discharge are key points for producing efficient illumination
Moritex has improved the efficiency of emission through the use of our unique heat discharge structure (design registration pending)

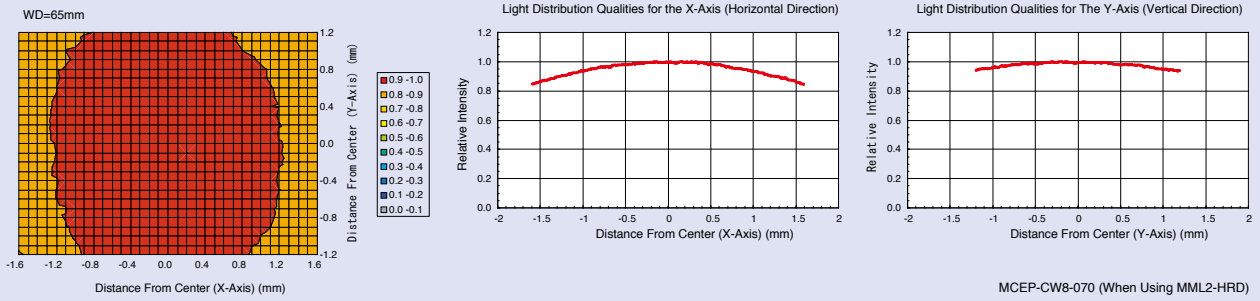
Supported Power Supply Unit

Use the MLEP-A070 Power source. Four types are available including 1channel, 3 channel, digital, and analog.
RoHS and CE compliant

Spectral Characteristic Data



Light Distribution Characteristic



MCEP-CW8-070 (When Using MML2-HRD)

High Power LED Spot Illuminations

MCEP-C □8 Series

Explanation of Model Code

MCEP-C □ 8

Power LED | Emitted Color

R Red　B Blue
G Green　W White

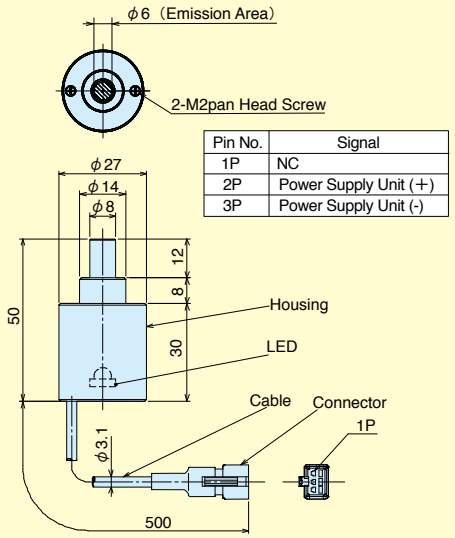
Power Supply(P.I-20 ~)

- High-powered coaxial spot lights compatible with machine micro lenses (MMLs).
- Proprietary collector optics and light guides for maximum illuminance.
- Available in 4 colors: red, green, blue, and white, according to subject and application.
- Compact and lightweight for easy handling.
- Stable illumination when used with a dedicated constant-current power supply.

Model	Emitted Color	Dominant Wavelength Range*	Color Temperature	Maximum Related Current IFM (A)	Weight (g)	Product Code
MCEP-CR8	● Red	613.5~645nm	--	0.35	50	A-2111
MCEP-CG8	● Green	520~550nm	--	0.35	50	A-2115
MCEP-CB8	● Blue	460~490nm	--	0.35	50	A-2113
MCEP-CW8	○ White	All	5000~6000K	0.35	50	A-2112

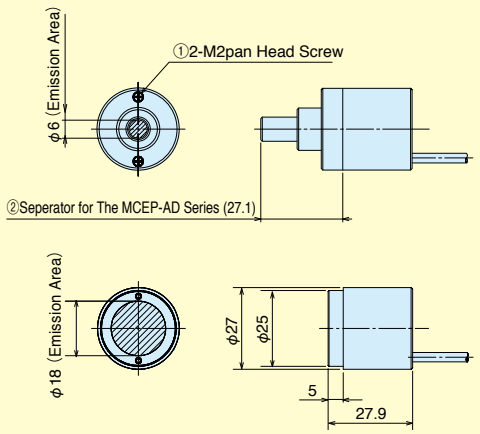
*Wavelength of visible light on CIE chromatic coordinates.

MCEP-CR (CG,CB,CW) 8



Pin No.	Signal
1P	NC
2P	Power Supply Unit (+)
3P	Power Supply Unit (-)

Method to Remove Rod Tip



Can be connected to the MCEP-AD Series by removing the two screws in ① from ②

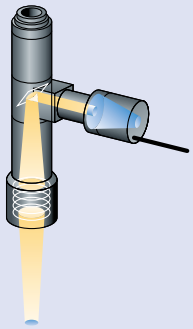
Use the MML Series for the optimal matching of high power LED spot LED illumination (MCEP Series) and a lens with coaxial incidenct illumination.

A lineup of 47 types of telecentric optical systems with low image distortion offer a variety of supportednumber 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

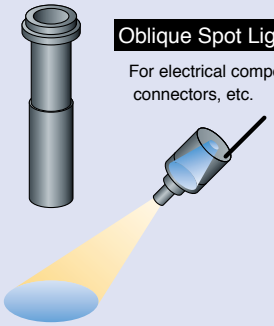
Coaxial Illumination

For wafer, glass panels, etc.



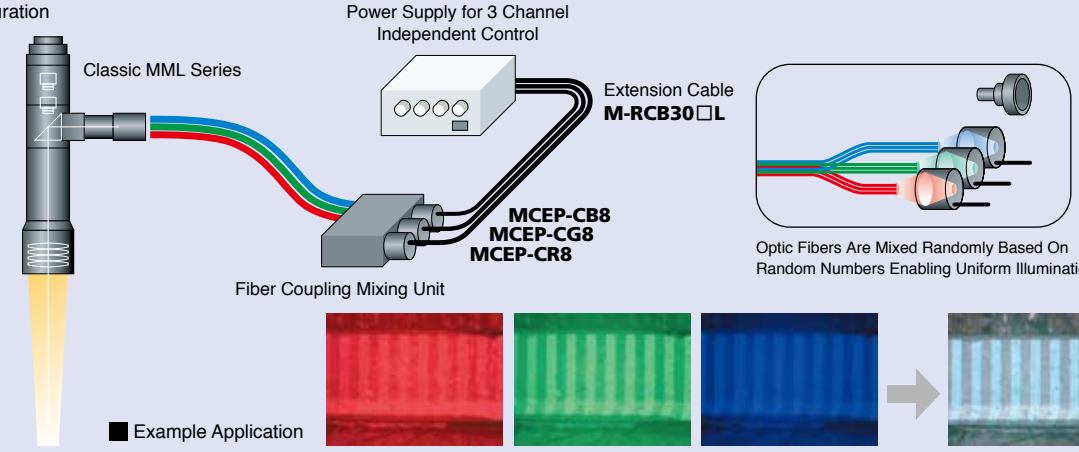
Oblique Spot Lighting

For electrical components, connectors, etc.



Example Application

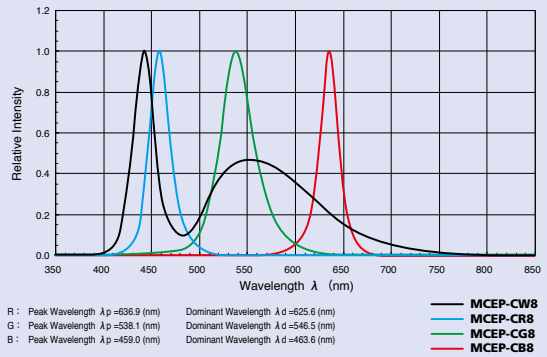
■ Configuration



■ Example Application

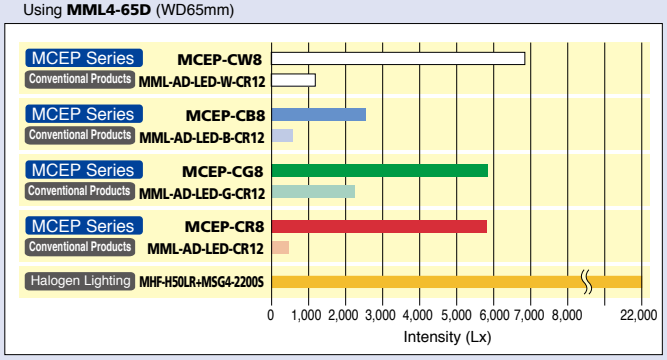
MCEP-CR8 | MCEP-CG8 | MCEP-CB8 | Image After Light Adjustment with Mixing Unit

Spectral Characteristic Data

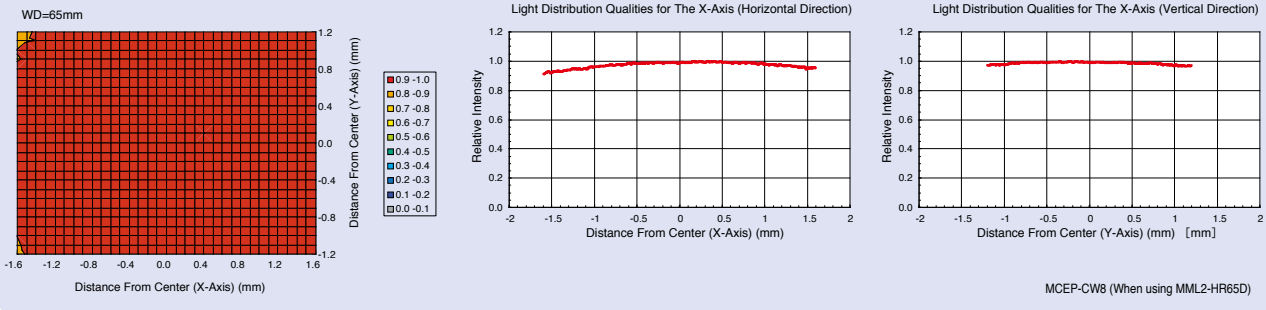


Intensity Comparison Data

Using **MML4-65D** (WD65mm)

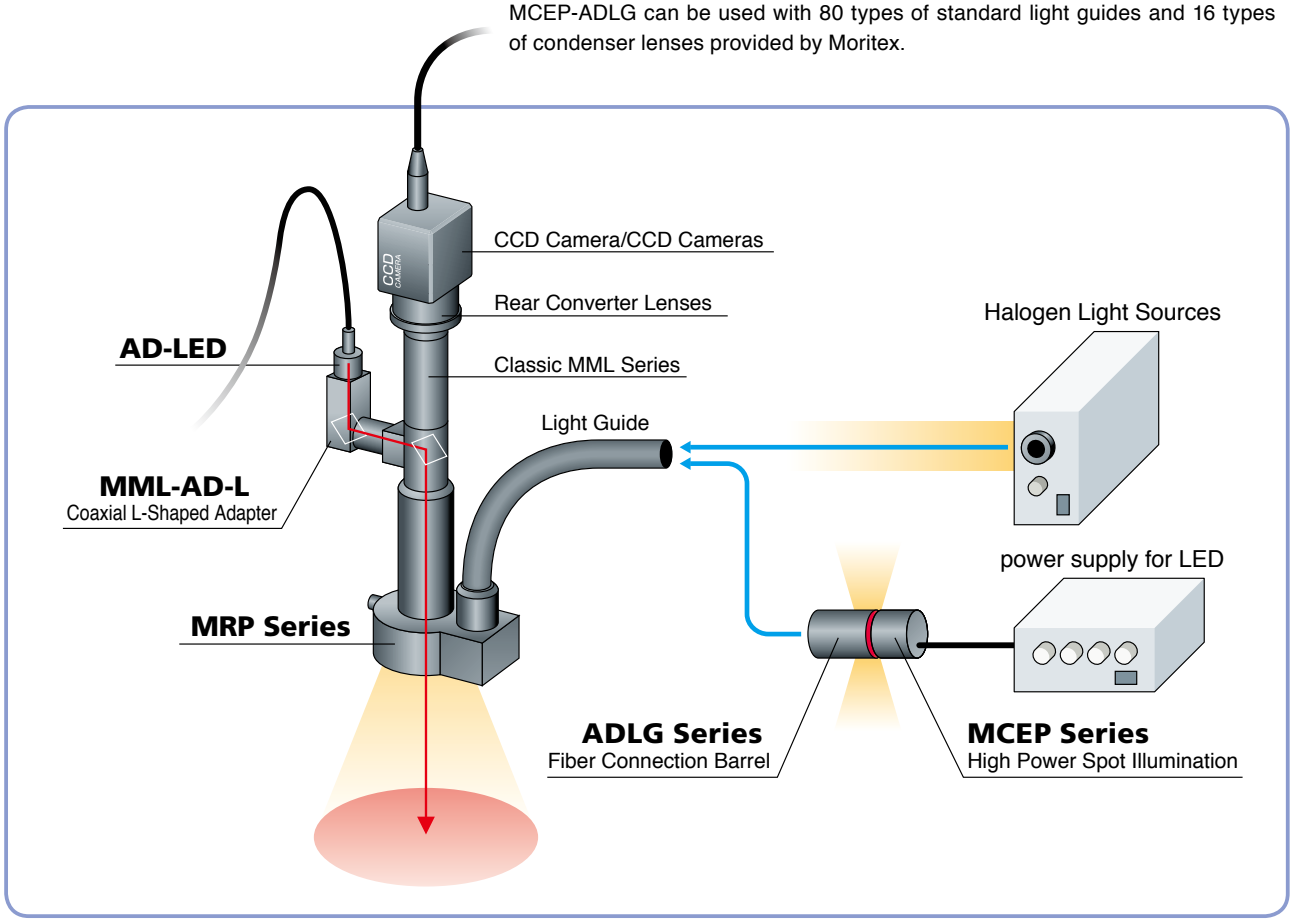


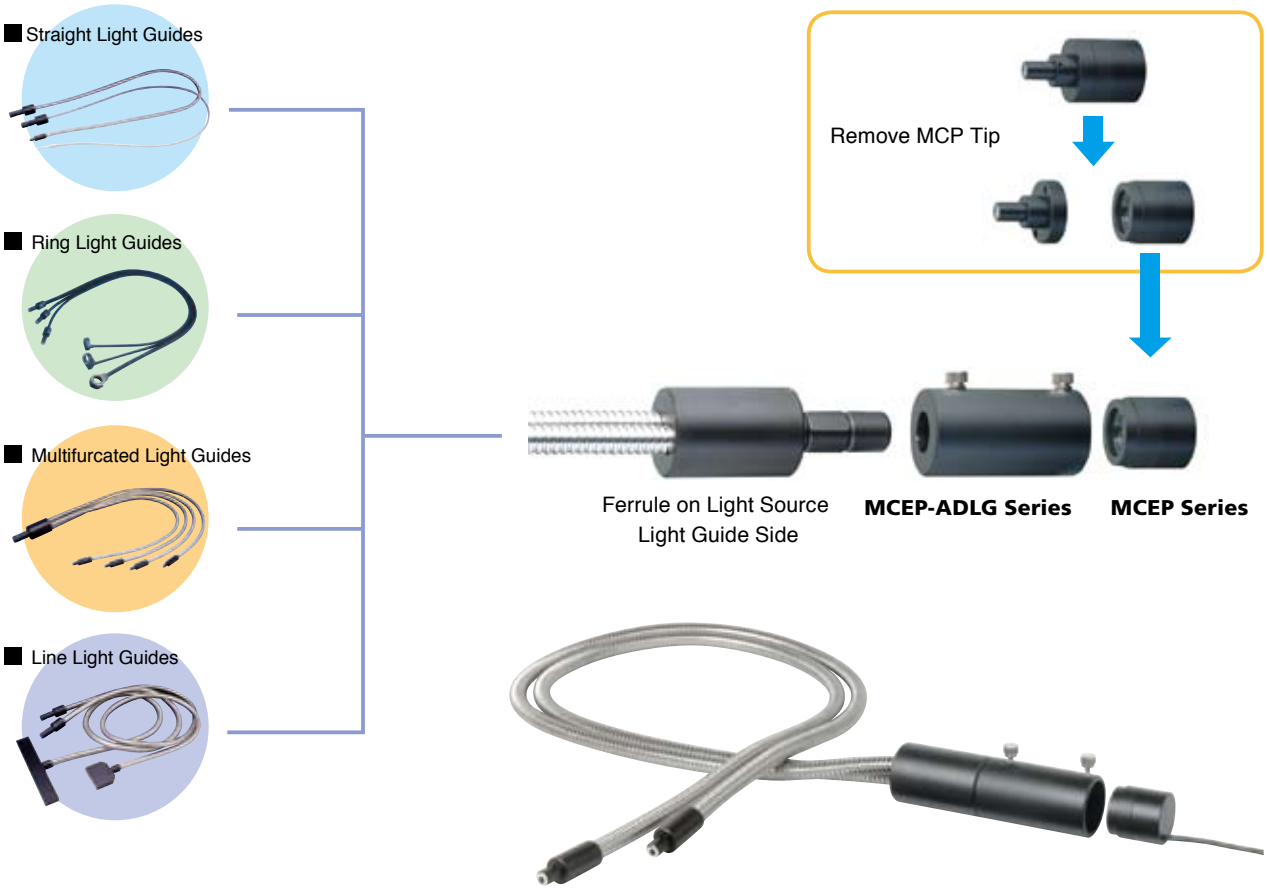
Light Distribution Characteristic



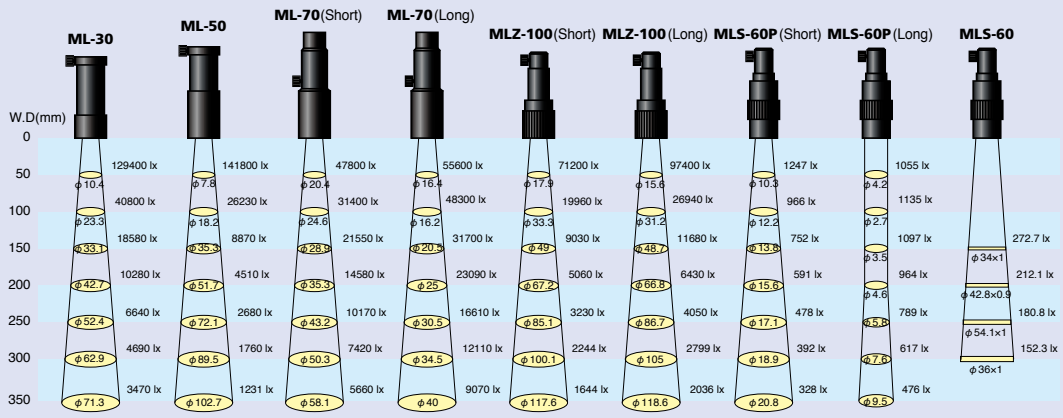
MCEP-CW8 (When using MML2-HR65D)

MCEP-ADLG can be used with 80 types of standard light guides and 16 types of condenser lenses provided by Moritex.





Condenser Lenses



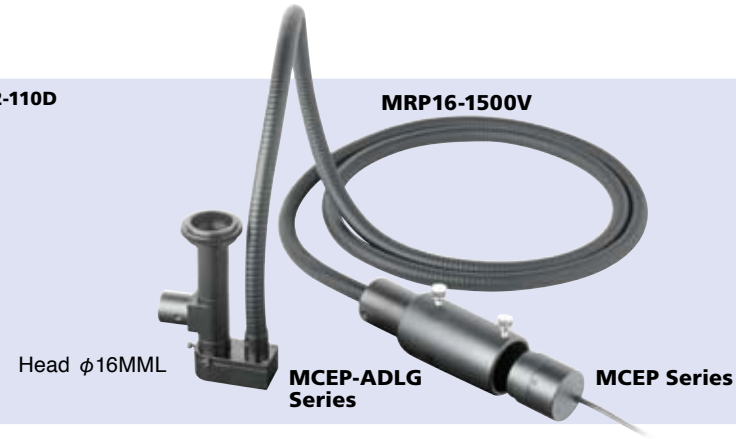
※Measurement values for ML-70, MLZ100, and MLS60P at longest and shortest lens length
※Measurement values for MLS-60 in condensed condition

※Measurement illumination is MCEP-CW8-070

Example Application

MCEP-CB8+MRP16-1500V_MCEL-CB8+MML2-110D

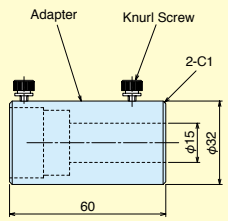
Resistor Chip



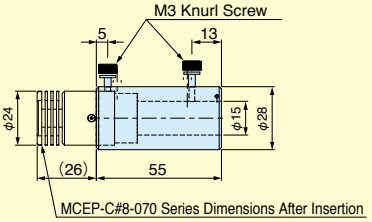
Fiber Connection Options

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.

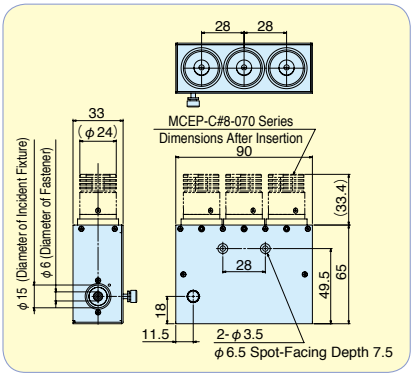
MCEP-ADLG
*For use with MCEP-C□8



MCEP-ADLG24
*For use with MCEP-C□8-070



MCEP-AD3LGC
*For use with both MCEP-C□8, MCEP-C□8-070



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

Model	Type	Weight (g)	Product Code
MCEP-ADLG	1 Light Type	85	A-9001
MCEP-ADLG24	1 Light Type	60	A-9069
MCEP-AD3LGC	3 Light Type	270	A-9070

HIGH POWER

Power Supplies for MCEP/MSPP (A070) Series

MLEP Analog Series

RoHS Directive | CE Marking | Worldwide Power Supply

This constant current power supply is exclusively for the MCEP/MSPP (A070) Series.
As part of Moritex's initiatives towards environmental issues, this power supply was designed in accordance with the Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive), enacted in Europe in July of 2006. In the future, this model will conform to the RoHS Directive.The analog intensity control types 1 channel and 3 channel support multiple input voltages (AC 100 to 240 V) and CE marking.

Model	MLEP-A035W1LR		MLEP-A035W3LR	
Order Code	MLEP-A035W1LR-100V	MLEP-A035W1LR-200V	MLEP-A035W3LR-100V	MLEP-A035W3LR-200V
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	0.35/0.25A (At AC100/ 240V)		0.35/0.25A (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~+45 °C		0~+45 °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	
Product Code	A-2296	A-2297	A-2298	A-2299

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

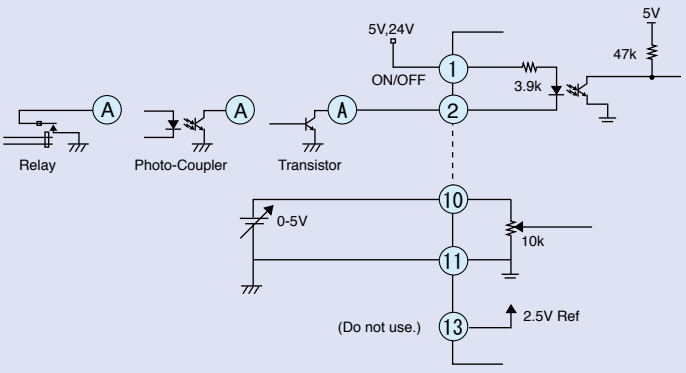
Connection Specifications

With **MLEP-A035W1LR, MLEP-A035W3LR, MLEP-A070W1LR and MLEP-A070W3LR**

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 power supply unit output
6	NC	14	NC
7	NC	15	NC
8	NC		

Input/Output Circuit Diagrams

With **MLEP-A035W1LR, MLEP-A035W3LR, MLEP-A070W1LR and MLEP-A070W3LR**

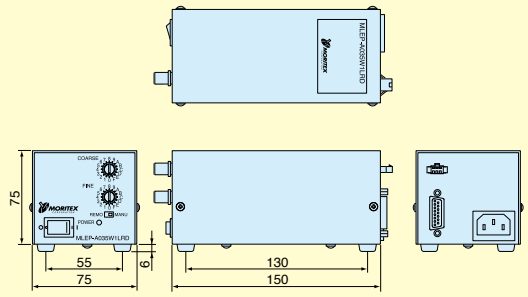


RoHS Directive | CE Marking | Worldwide Power Supply

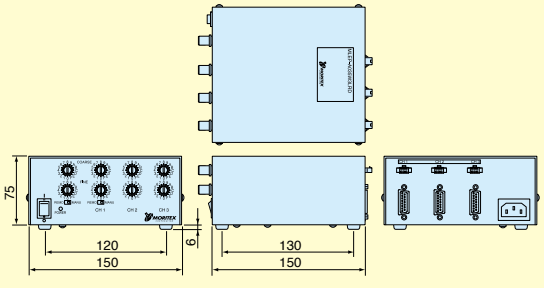
Model	MLEP-A070W1LR		MLEP-A070W3LR	
Order Code	MELP-A070W1LR-100V	MLEP-A070W1LR-200V	MELP-A070W3LR-100V	MLEP-A070W3LR-200V
AC Type	100V	200V	100V	200V
Output	1 channel output max. 700 mA		3 channel output max. 700 mA for each channel	
Input Voltage	AC100 - 240V 50 ／ 60Hz		AC100 - 240V 50 ／ 60Hz	
Input Current	0.35/0.25A (At AC100/ 240V)		0.35/0.25A (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~+45 °C		0~+45 °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	
Product Code	A-2314	A-2315	A-2316	A-2317

*MLEP-A070 Series is for use only with MCEP-C□8-070

MLEP-A035W1LR / MLEP-A035W1LRD
MLEP-A070W1LR / MLEP-A070W1LRD



MLEP-A035W3LR / MLEP-A035W3LRD
MLEP-A070W3LR / MLEP-A070W3LRD



Power Supplies for MCEP/MSPP (A070) Series

MLEP Digital Series

RoHS Directive | CE Marking | Worldwide Power Supply

This constant current power supply is exclusively for the MCEP/MSPP (A070) Series.
As part of Moritex's initiatives towards environmental issues, this power supply was designed in accordance with the Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive), enacted in Europe in July of 2006. In the future, this model will conform to the RoHS Directive.The analog modulation types 1 channel and 3 channel support multiple input voltages (AC 100 to 240 V) and CE marking.

Model	MLEP-A035W1LRD		MLEP-A035W3LRD	
Order Code	MLEP-A035W1LRD-100V	MLEP-A035W1LRD-200V	MLEP-A035W3LRD-100V	MLEP-A035W3LRD-200V
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	0.35/0.25A (At AC100/ 240V)		0.35/0.25A (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~+45 °C		0~+45 °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	
Product Code	A-2240	A-2250	A-2241	A-2251

Model	MLEP-A070W1LRD		MLEP-A070W3LRD	
Order Code	MELP-A070W1LRD-100V	MLEP-A070W1LRD-200V	MELP-A070W3LRD-100V	MLEP-A070W3LRD-200V
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	0.35/0.25A (At AC100/ 240V)		0.35 0.25A (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~+45 °C		0~+45 °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	
Product Code	A-2310	A-2311	A-2312	A-2313

*MLEP-A035 Series is for use only with MCEP-C□8
*MLEP-A070 Series is for use only with MCEP-C□8-070 and MSPP power supply

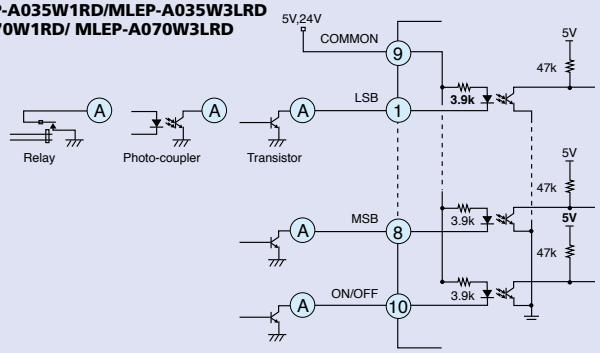
Connection Specifications

With **MLEP-A035W1RD/ MLEP-A035W3LRD MLEP-A070W1RD/ MLEP-A070W3LRD**

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-A035W1RD/MLEP-A035W3LRD MLEP-A070W1RD/ MLEP-A070W3LRD**



Coaxial Illuminations
MCEC-C□8 Series

Explanation of Model Code

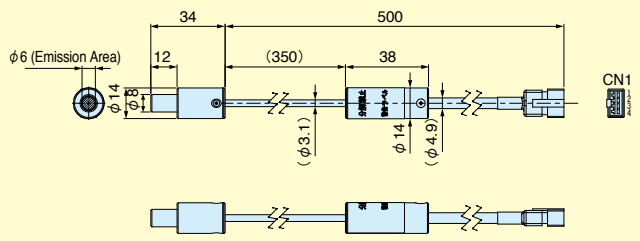
MCEC-C □ 8
- Chip LED
- Emitted Color
  - R Red
  - B Blue
  - G Green
  - W White

- Medium-powered coaxial spot lights compatible with machine micro lenses (MMLs).
- High brightness (Brighter than MCEL-C*8. Refer to Intensity Characteristic Data on **P.I-24**.)
- Compact and low cost solution
- Uses MLEK power supply (see **P.I-63** and later). Uses our Standard Power Supply Unit (MLEK) which is used with all of our ring and backlight LEDs.

* We have given the highest priority to matching this LED with our telecentric MML lenses with coaxial illumination; use for stand-alone reflective illumination is therefore not suitable.

Model	Emitted Color	Maximum Related Current IFM (A)	External Diameter (mm)	Weight (g)	Product Code
MCEC-CR8	● Red	0.12	φ8	50	A-2319
MCEC-CG8	● Green	0.15	φ8	50	A-2320
MCEC-CB8	● Blue	0.15	φ8	50	A-2321
MCEC-CW8	○ White	0.15	φ8	50	A-2322

MCEC-C□8



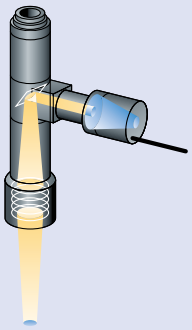
Use the MML Series for the optimal matching of spot LED illumination (MCEC Series) and a lens with coaxial illumination.

A lineup of 47 types of telecentric optical systems with low image distortion offer a variety of supportednumber 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.

Example Application of MCEC

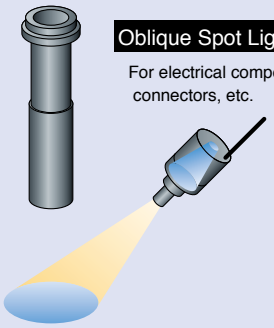
Coaxial Illumination

For wafer, glass panels, etc.

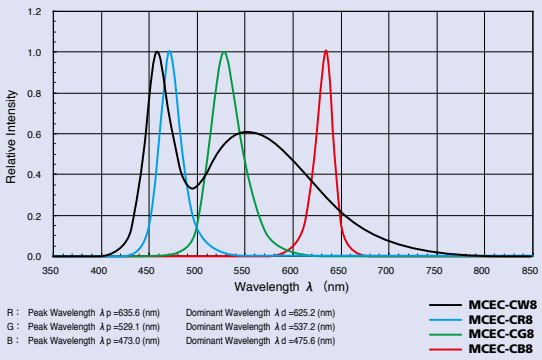


Oblique Spot Lighting

For electrical components, connectors, etc.

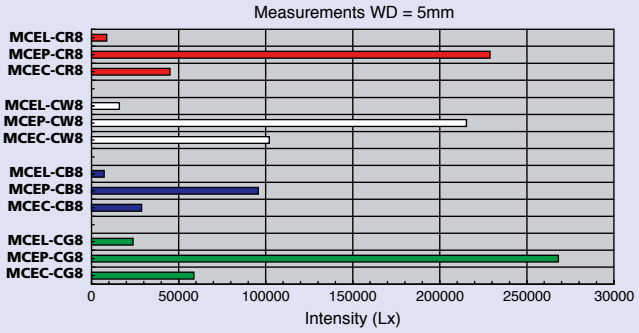


Spectral Characteristic Data

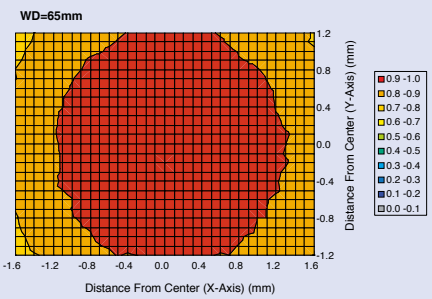


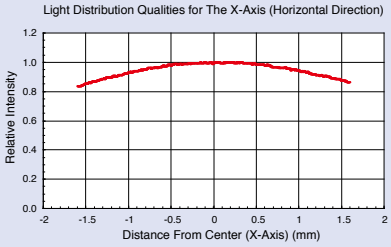
R : Peak Wavelength λp =635.6 (nm) Dominant Wavelength λd =625.2 (nm)
G : Peak Wavelength λp =529.1 (nm) Dominant Wavelength λd =537.2 (nm)
B : Peak Wavelength λp =473.0 (nm) Dominant Wavelength λd =475.6 (nm)

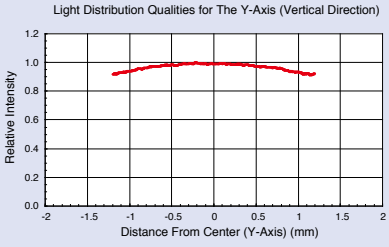
Intensity Comparison Data



Light Distribution Characteris Tic

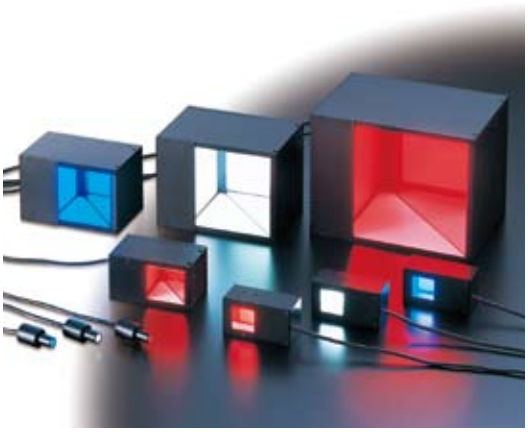






MCEP-CW8 (When Using MML2-HR65D)

Coaxial illuminations/Simulated Coaxial Illuminations
MCEL/MSCL Series



Explanation of Model Code

Coaxial
MCEL-C □ □
Emitted Color: **R** Red, **B** Blue, **G** Green, **W** White
External Diameter

Simulated Coaxial
MSCL-C □ □ – □
Emitted Color: **R** Red, **B** Blue, **G** Green, **W** White
Box Height
Revision Code

Power Supply (**P.I-63**)

■ MCEL series

- Compact coaxial illumination designed for the MML series, ideal for objects with highly reflective surfaces

■ MSCL series

- Produces simulated and uniform coaxial illumination for telecentric MML lenses and other lenses without coaxial episcopic illumination

Coaxial Illumination Lineup

Model	Emitted Color	Maximum Related Current IFM (A)	External Diameter At The End (mm)	Weight (g)	Product Code
MCEL-CR8	Red	0.04	ϕ8	35	A-2108
MCEL-CG8	Green	0.03	ϕ8		A-2142
MCEL-CB8	Blue	0.03	ϕ8		A-2110
MCEL-CW8	White	0.03	ϕ8		A-2109

Simulated Coaxial Illumination Lineup

Model	Emitted Color	Maximum Related Current IFM (A)	Box Height (mm)	Optical Path Length Extension (mm)	Weight (g)	Product Code
MSCL-CR24	Red	0.09	24	6.8	110	A-2099
★ **MSCL-CG24**	Green	0.20	24			A-2143
MSCL-CB24	Blue	0.20	24			A-2101
MSCL-CW24	White	0.20	24			A-2100
MSCL-CR39	Red	0.16	39	1.2	160	A-2093
★ **MSCL-CG39**	Green	0.31	39			A-2144
MSCL-CB39	Blue	0.31	39			A-2095
MSCL-CW39	White	0.31	39			A-2094
MSCL-CR56-B	Red	0.33	56	1.2	320	A-2102
★ **MSCL-CG56-B**	Green	0.66	56			A-2145
MSCL-CB56-B	Blue	0.66	56			A-2104
MSCL-CW56-B	White	0.66	56			A-2103
MSCL-CR74-B	Red	0.62	74	1.2	520	A-2105
★ **MSCL-CG74-B**	Green	1.11	74			A-2146
MSCL-CB74-B	Blue	1.11	74			A-2107
MSCL-CW74-B	White	1.11	74			A-2106
MSCL-CR105-B*	Red	2.14	105	1.2	920	A-2096
★ **MSCL-CG105-B***	Green	2.07	105			A-2147
MSCL-CB105-B*	Blue	2.07	105			A-2098
MSCL-CW105-B*	White	2.07	105			A-2097

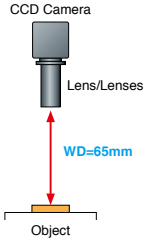
★Made-to-order products.

About Installation

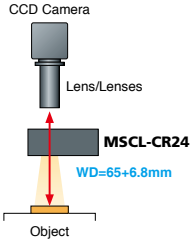
Because glass parts are used in the box, the internal optical path length varies. Be aware of extended optical path distance when installing peripheral equipment

● **When using MSCL-CR24 with WD65mm Lenses**

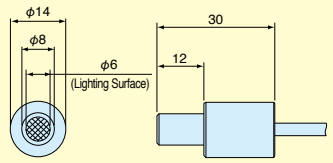
■ Without **MSCL-CR24**



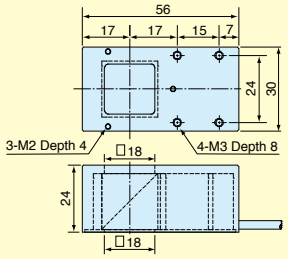
■ With **MSCL-CR24**



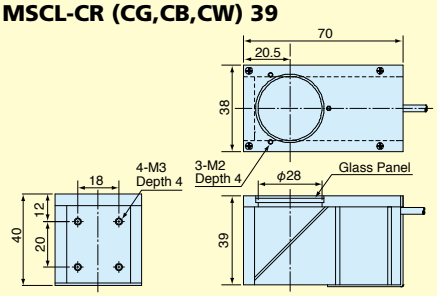
MCEL-CR (CG,CB,CW) 8



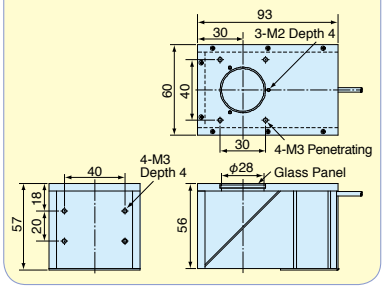
MSCL-CR (CG,CB,CW) 24



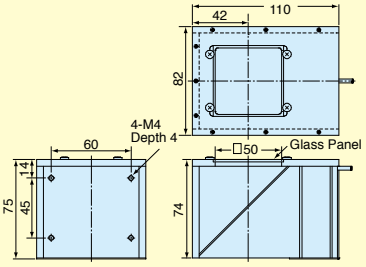
MSCL-CR (CG,CB,CW) 39



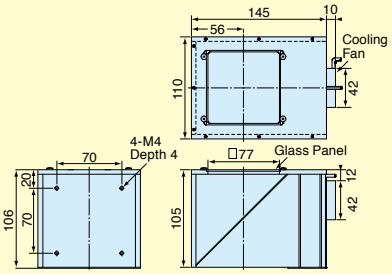
MSCL-CR (CG,CB,CW) 56-B



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



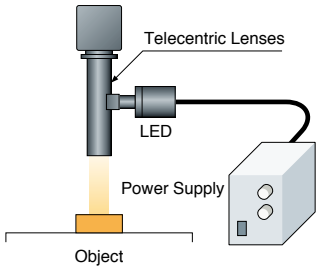
MSCL-CR (CG,CB,CW) 105-B



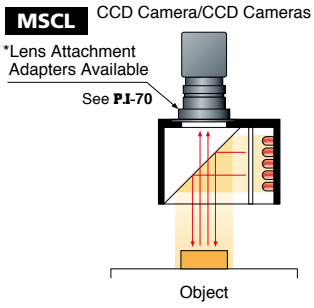
*MLM Series products on **P.I-69** can be attached to MSCL-C* □□-B products

Illumination Structure

MCEL CCD Camera/CCD Cameras



MSCL CCD Camera/CCD Cameras

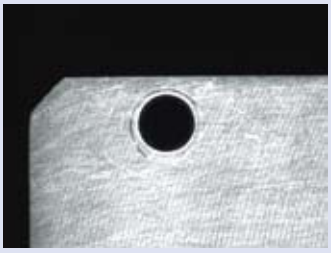


Sample Images

MSCL (Simulated Coaxial Light)

Dry Cell

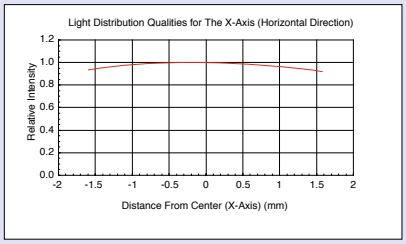
CD (Scratch)



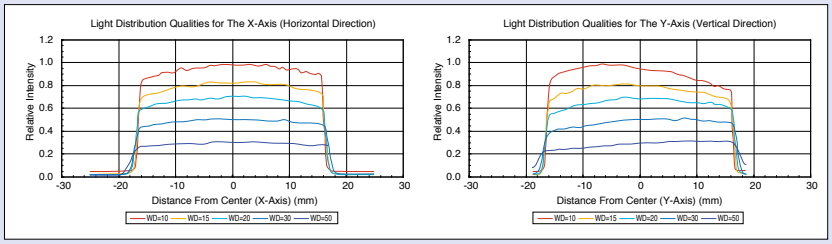
Metal Parts

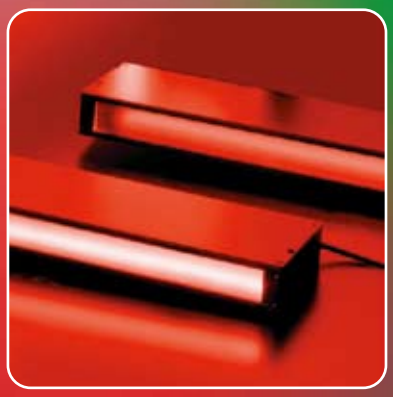
Light Distribution Characteristic

MCEL-CW8



MSCL-CW56-B





Line Illumination Series

From ultra-micro inspection to macro-inspection, our extensive lineup provides outstanding performance

Moritex, a fiber manufacturer, has used its vast lens and optics knowledge and experience to refine its line light guides to achieve optimal performance. In addition, Moritex proposes a total solution using its line CCD lens. Three different series have been prepared, with high brightness and high uniformity being a key point.
Our extensive lineup offers the best match for ever-diversifying line scan systems

High Brightness • High Uniformity • Ease of Mainenance

Ultra-Micro Inspection
Magnification x1

Micro Inspection
Magnification x0.1

Macro Inspection
Magnification x0.01

High Wattage LED Line Illuminations
MLNX-DF Series

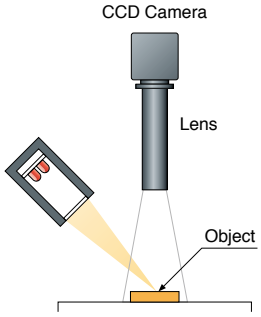
Explanation of Model Code

MLNX – C □ □ – DF – □ CH

- Emitted Color: R Red, G Green, B Blue, W White
- Line Length
- Number of Channels

- High brightness line illumination using high power LED.
- The length of the emission area is in 120 mm increments, and can be extended up to 2880 mm.
- Optical technology that has gained a reputation for excellence in fiber line light products.
- Forced air cooling options will be available for line lights to provide even higher efficiency and a longer life time.
- Illumination units from 120 to 720 mm can be combined and used with the MLEK Series power supply, reducing costs even further.
- Illumination units longer than 840mm can be extended to the limit of 2880mm with the supported power supplies.

Illumination Structure



Model	Emitted Color	Dimensions (mm)		Maximum Related Current IFM (A)	Supported Power Supply Unit	Weight (g)	Product Code
		Effective Emission Area	External Dimension				
★ MLNX-CR120-DF	Red	120	150	0.47	MLEK-A080	540	A-2346
★ MLNX-CG120-DF	Green			0.8			A-2347
★ MLNX-CB120-DF	Blue						A-2348
★ MLNX-CW120-DF	White						A-2349
★ MLNX-CR240-DF	Red	240	270	0.93	MLEK-A230	870	A-2350
★ MLNX-CG240-DF	Green			1.59			A-2351
★ MLNX-CB240-DF	Blue						A-2352
★ MLNX-CW240-DF	White						A-2353
★ MLNX-CR360-DF	Red	360	390	1.39		1300	A-2354
★ MLNX-CG360-DF	Green			2.3			A-2355
★ MLNX-CB360-DF	Blue						A-2356
★ MLNX-CW360-DF	White						A-2357
★ MLNX-CR480-DF	Red	480	510	1.85		1700	A-2358
★ MLNX-CG480-DF-2CH	Green	ch1 : 240 ch2 : 240		ch1 : 1.59ch2 : 1.59	MLEK-D770		A-2359
★ MLNX-CB480-DF-2CH	Blue						A-2360
★ MLNX-CW480-DF-2CH	White						A-2361
★ MLNX-CR600-DF	Red	600	630	2.3	MLEK-A230	2000	A-2362
★ MLNX-CG600-DF-2CH	Green	ch1 : 240 ch2 : 360		ch1 : 1.59 ch2 : 2.3	MLEK-D770	2100	A-2363
★ MLNX-CB600-DF-2CH	Blue						A-2364
★ MLNX-CW600-DF-2CH	White						A-2365
★ MLNX-CR720-DF-2CH	Red	ch1 : 360 ch2 : 360	750	ch1 : 1.39 ch2 : 1.39		2400	A-2366
★ MLNX-CG720-DF-2CH	Green			ch1 : 2.3 ch2 : 2.3			A-2367
★ MLNX-CB720-DF-2CH	Blue						A-2368
★ MLNX-CW720-DF-2CH	White						A-2369

★Made-to-order products.

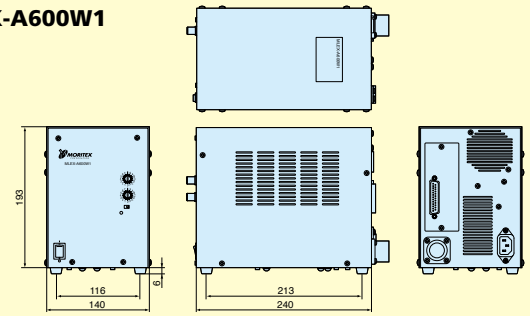
*Illumination units longer than 840mm can be produced and manufactured with the specifications for 1 channel with the use of supported power supplies (in 120mm increments, 2880mm limit). See **P.I-29** for details.

Power Supply for MLVX-DF Series *NEW*

MLEX Series

Power supply for Long LED Line Illumination (longer than 840mm) is now available. It can be used to the specified illuminations to the limit of 2880mm in 120mm increments.

MLEK-A600W1



Model	MLEX-A600W1
Order Code	MLEX-A600W1-100V
AC Type	100V
Output	1 channel output
Input Voltage	AC100 - 240V 50/60Hz
Input Current	4.3/1.8A (At AC100/ 240V)
Surge Current	30A or less (at AC100V) 72A or less (at AC240V)
Operating Temperature	0~+45 °C
Output System	DC Continuous Output
Output Control System	Constant Current Control
External Light Control	Yes (0-5V intensity control/ 8-bit digital)
Output ON/ OFF Function	Yes (Photo-coupler insulation type)
Cooling System	Forcible cooling by fan
Installation	Rubber legs placed on flat surface
Weight	Approximately 4Kg
Product Code	A-2399

Note Power supply for the MLNX-DF Series.
Extension cable used exclusively with this power supply

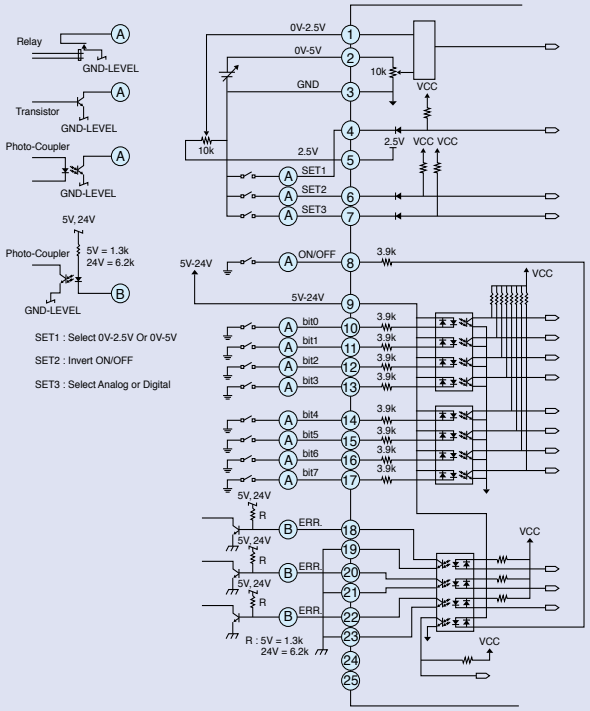
Model	Product Type	Applications	Length	Product Code
M-MS-A03T	extension cable	MLNX-DF	3m	A-2401
M-MS-A05T	extension cable	MLNX-DF	5m	A-2402
★ **M-MS-A10T**	extension cable	MLNX-DF	10m	A-2403

★Made-to-order products.

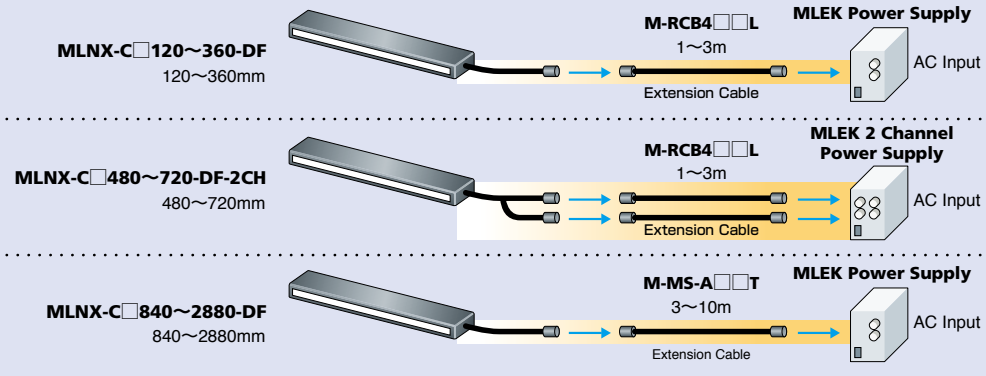
Connection Specifications

No.	Name	No.	Name
1	External VR Intensity Control Signal Output	14	Digital Signal Input bit4
2	External 0-5V Intensity Control Signal Output	15	Digital Signal Input bit5
3	External Input GND	16	Digital Signal Input bit6
4	External 0-5V/ External VR Input Switch Signal	17	Digital Signal Input bit7(MSB)
5	DC2.5V/ Bias Power Output	18	Overcurrent Error Signal Output (O.C.)
6	Illumination ON/OFF Logical Negation(not) Signal Input	19	Overcurrent Error Signal Output (O.E.)
7	External Analog/ Digital Switch Signal	20	Lighting Signal Output (O.C.)
8	Illumination ON/ OFF Signal Input	21	Lighting Signal Output (O.E.)
9	COMMON	22	Overheat Error Signal Output(O.C.)
10	Digital Signal Input bit0 (LSB)	23	Overheat Error Signal Output (O.E.)
11	Digital Signal Input bit1	24	NC
12	Digital Signal Input bit2	25	NC
13	Digital Signal Input bit3		

Input/Output Circuit Diagrams

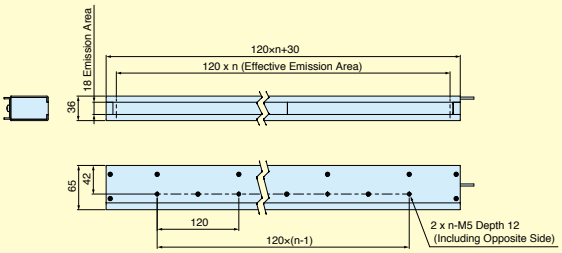


Connection Flow



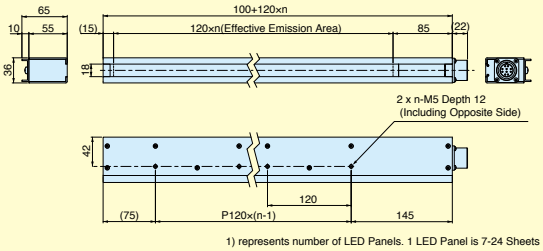
■ Line Length：~720mm

MLNX-CR(CG,CB,CW)□□-DF



■ Line Length：840mm~2880mm

MLNX-CR(CG,CB,CW)□□-DF



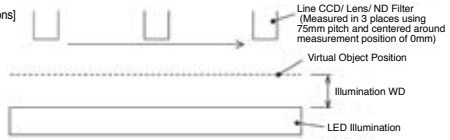
1) represents number of LED Panels. 1 LED Panel is 7-24 Sheets

*Line length of 480mm or greater (excluding 480, 600 red)

Uniform Measurement of High Wattage LED

[Product Name] **MLNX-C 240-DF**
[Measuring Equipment] Exclusive Measuring Equipment of Moritex
Line Sensor：7450bit / 4.7×4.7μm
Lens：ML-L047-200 （Moritex） / ×0.47
ND Filter: Not Used
Lens WD: 198mm

[Measurement Conditions]

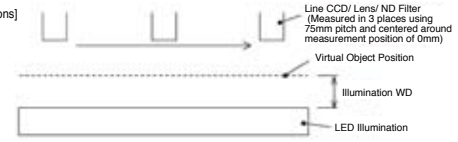


[Measurement Result: Illumination WD = 50mm]

*Total Uniformity =211,min=194,(max-min)/max=8.1%

[Product Name] **MLNX-C 240-DF**
[Measuring Equipment]Exclusive Measuring Equipment of Moritex
Line Sensor：7450bit / 4.7×4.7μm
Lens：ML-L047-200 （Moritex） / ×0.47
ND Filter: Not Used
Lens WD: 198mm

[Measurement Conditions]



[Measurement Result: Illumination WD = 100mm]

*Total Uniformity　max=211,　min=194,　(max-min)/max=8.1%

Chip-Type Emission Plate Line Illuminations

MBRC Series

Explanation of Model Code

MBRC – C □ □ – DF – □ CH

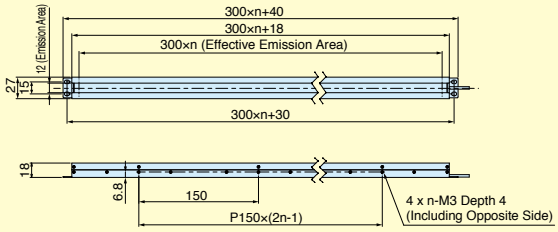
- MBRC: Chip LED
- C □: Emitted Color
  - R Red
  - G Green
  - B Blue
  - W White
- □: Illumination Area Dimensions (Length 、 Width)
- DF: Chip LED
- □ CH: Channel Number

- Uniform line illumination using high brightness chip-type LEDs.
- The length of the emission area is in 150 mm units, and can be extended up to 1200 mm.
- Realization of a slim and lightweight compact design.
- High brightness and high uniformity achieved by high density mounting of chip-type LEDs.

Model	Emitted Color	Dimensions(mm)		Maximum Related Current IFM (A)	Supported Power Supply Unit	Weight (g)	Product Code
		Effective Emission Area	External Dimension				
MBRC-CR15012-DF	Red	150	190	0.5	MLEK-A080	130	A-2370
★ MBRC-CG15012-DF	Green			0.55			A-2371
MBRC-CB15012-DF	Blue						A-2372
MBRC-CW15012-DF	White						A-2373
MBRC-CR30012-DF	Red	300	340	0.99	MLEK-A230	230	A-2374
★ MBRC-CG30012-DF	Green			1.1			A-2375
MBRC-CB30012-DF	Blue						A-2376
MBRC-CW30012-DF	White						A-2377
MBRC-CR60012-DF	Red	600	640	1.98		420	A-2378
★ MBRC-CG60012-DF	Green			2.2			A-2379
★ MBRC-CB60012-DF	Blue						A-2380
MBRC-CW60012-DF	White						A-2381
MBRC-CR90012-DF-2CH	Red	ch1：600 ch2：300	940	ch1：1.98 ch2：0.99	MLEK-D770	620	A-2382
★ MBRC-CG90012-DF-2CH	Green			ch1：2.2 ch2：1.1			A-2383
★ MBRC-CB90012-DF-2CH	Blue						A-2384
MBRC-CW90012-DF-2CH	White						A-2385
★ MBRC-CR120012-DF-2CH	Red	ch1：600 ch2：600	1240	ch1：1.98 ch2：1.98		810	A-2386
★ MBRC-CG120012-DF-2CH	Green			ch1：2.2 ch2：2.2			A-2387
★ MBRC-CB120012-DF-2CH	Blue						A-2388
★ MBRC-CW120012-DF-2CH	White						A-2389

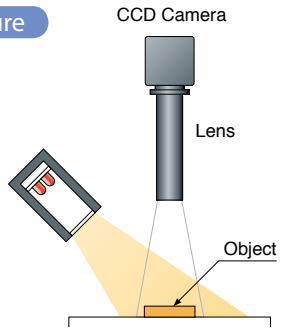
★Made-to-order products.

MBRC-CR(CG,CB,CW)□□12-DF



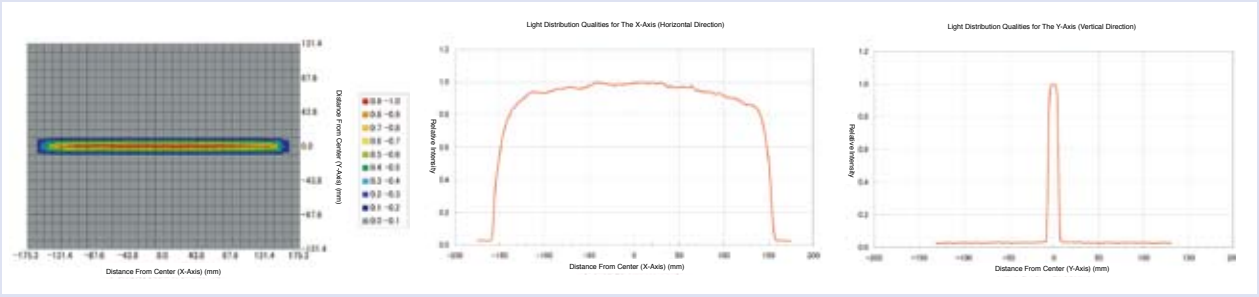
*Cables with 2 branches are required for lines with a length of 900mm or greater

Illumination Structure



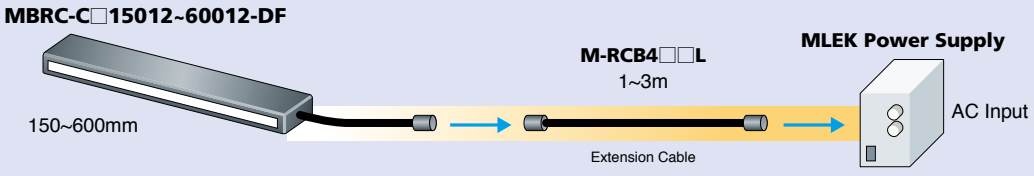
Light Distribution Characteristic Data

MBRC-CW30012-DF

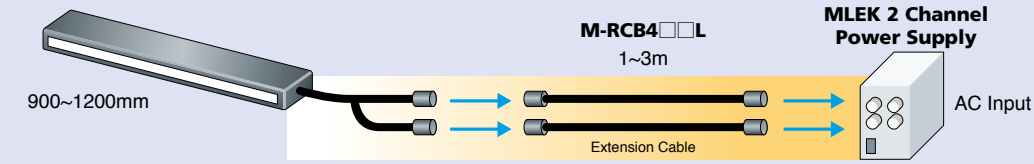


Connection Flow

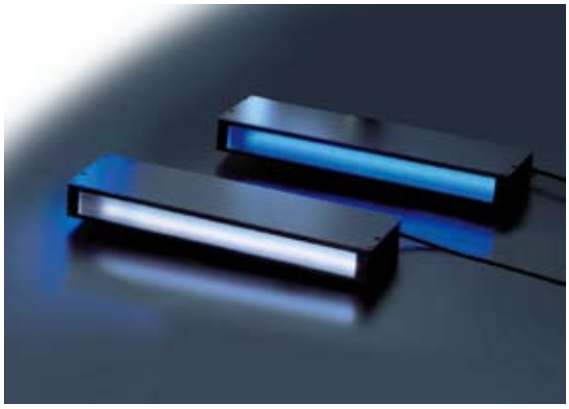
MBRC-C□15012~60012-DF



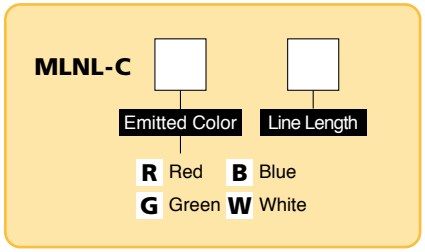
MBRC-C□90012~120012-DF



Line Illuminations
MLNL Series

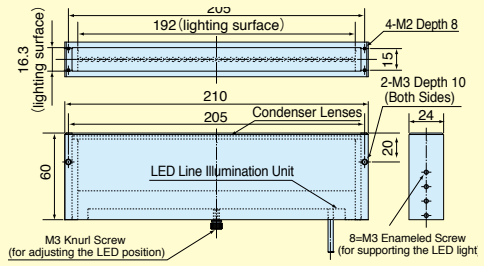


Explanation of Model Code



- These units are ideal for line type illumination and line scan CCD camera illumination.

MLNL-CR (CG,CB,CW) 192



Sample Images

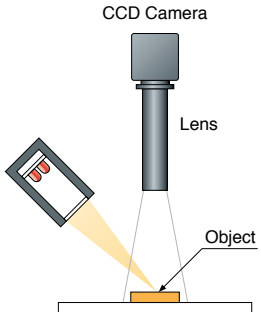
MLNL-CW192

Connector

MLNL-CR192

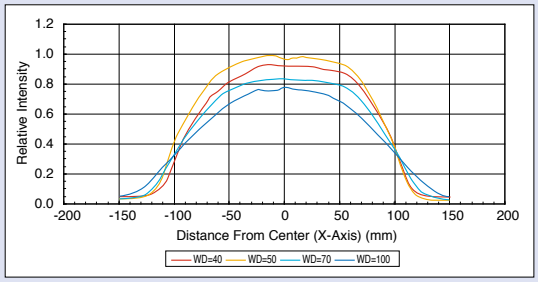
Transparent (Acrylic) Surface Scratch

Illumination Structure



Light Distribution Characteristic

MLNL-CW192



Model	Emitted Color	Maximum Related Current IFM (A)	Line Length (mm)	Weight (g)	Product Code
MLNL-CR192	Red	0.18	192	420	A-2090
★ **MLNL-CG192**	Green	0.36	192		A-2161
MLNL-CB192	Blue	0.36	192		A-2092
MLNL-CW192	White	0.36	192		A-2091

★Made-to-order products.

LED Spot Projectors

MSPP Series

Products Made with Confidence From A Lens and Illumination Manufacturer

MSPP

MSPP-CR/G/B/W42 Wide Area Illumination Type
MSPP-CR/G/B/W74 Narrow Area Illumination Type

IP67

RoHS
RoHS directive compliant

Supports a long working distance of **2m**

- Can be used even when robots are close to inspection targets
- Widens the operating range for robots
- Can be installed to avoid heat sources

Low temperature emission and low energy consumption make it possible to save energy and reduce effects on environment

- Realizes amazing brightness and saving of energy by using LED

IP67 rated

IP (Ingress Protection) is the standard for protection against intrusion of foreign objects and water

- Allows for installation without concern for water droplets and oil mist

variable illumination range

- Offers two types of narrow illumination areas and wide illumination areas The illumination area range can be modified for each type

Ease of maintenance with the possibilty of replacing cover glass

Can connect to a spatter support cable

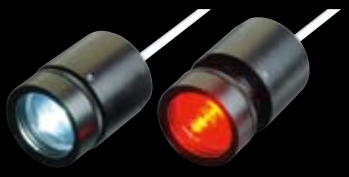
Improves the performance of image processing and contributes to the significant reduction in image defects

Wide Area Illumination Type

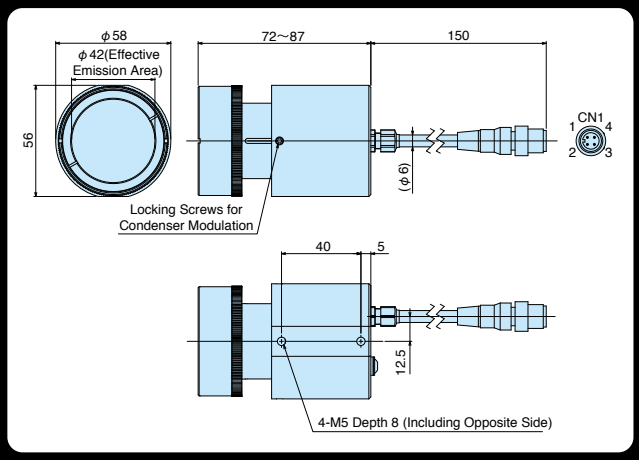
MSPP-CR/G/B/W42

IP67

RoHS
RoHS directive compliant



- Realizes a wide illumination area range and uniformity
  - WD2m ϕ300~900mm
  - WD1m ϕ170~400mm
  - WD0.5m ϕ80~230mm
- Protective Structure Supports IP67.Allows for installation without concern for water droplets and oil mist
- Possibilty of replacing cover glass. Easy to maintain
- Low temperature emission/ Low energy consumption
- Use of of a versatile connector makes it possible to use cables which support spatter
- long life time
- A lineup of AC input power sources with 1 and 3 channel output. External digital of analog control is also possible
- RoHS directive compliant



MSPP Series

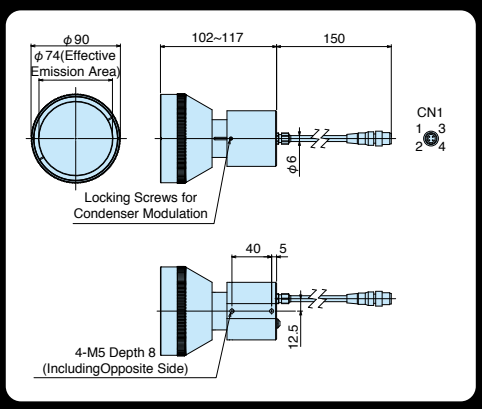
Narrow Area Illumination Type

MSPP-CR/G/B/W74

IP67

RoHS
RoHS directive compliant

- Realizes amazing brightness
  - WD2m At ϕ80mm 2,000Lx (Industry-leading illuminance*)
  - WD2m At ϕ200mm Approximately 800 Lx
- Structure allows for a variable illumination area range. Installation distance and lighting area can be modified flexibly
- Protective Structure Supports IP67.Allows for installation without concern for water droplets and oil mist
- Cover glass can be replaced. Easy to maintain
- Low temperature emission/ Low energy consumption
- Use of of a versatile connector makes it possible to use cables which support spatter
- A lineup of AC input power sources with 1 and 3 channel output. External digital of analog control is also possible
- RoHS directive compliant



* As of September, 2007

Intensity and Illumination Area Range

※Not guaranteed values

MSPP-CR42

WD	Illumination Area Range	Intensity
500	80~230	3790~754
1000	170~400	1070~207
1500	240~600	493~101
2000	300~900	290~57

MSPP-CR74

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

MSPP-CW42

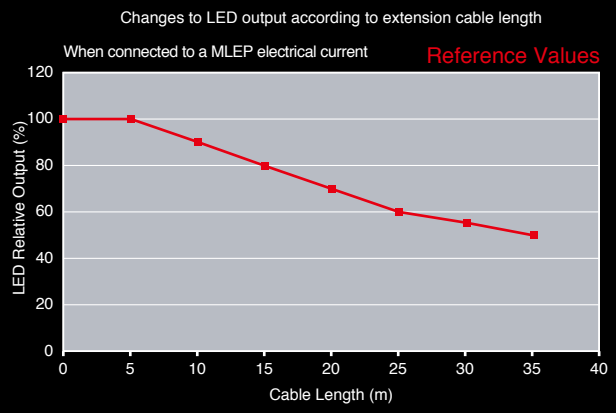
WD	Illumination Area Range	Intensity
500	80~220	8700~1400
1000	100~470	2350~330
1500	150~680	1046~150
2000	200~1000	583~50

MSPP-CW74

WD	Illumination Area Range	Intensity
500	35~100	15700~2600
1000	50~180	7600~840
1500	60~290	3300~390
2000	70~380	2080~240

※Illumination Area Range is 50% or greater for the maximum intensity

Relation Between Cable Length and Intensity

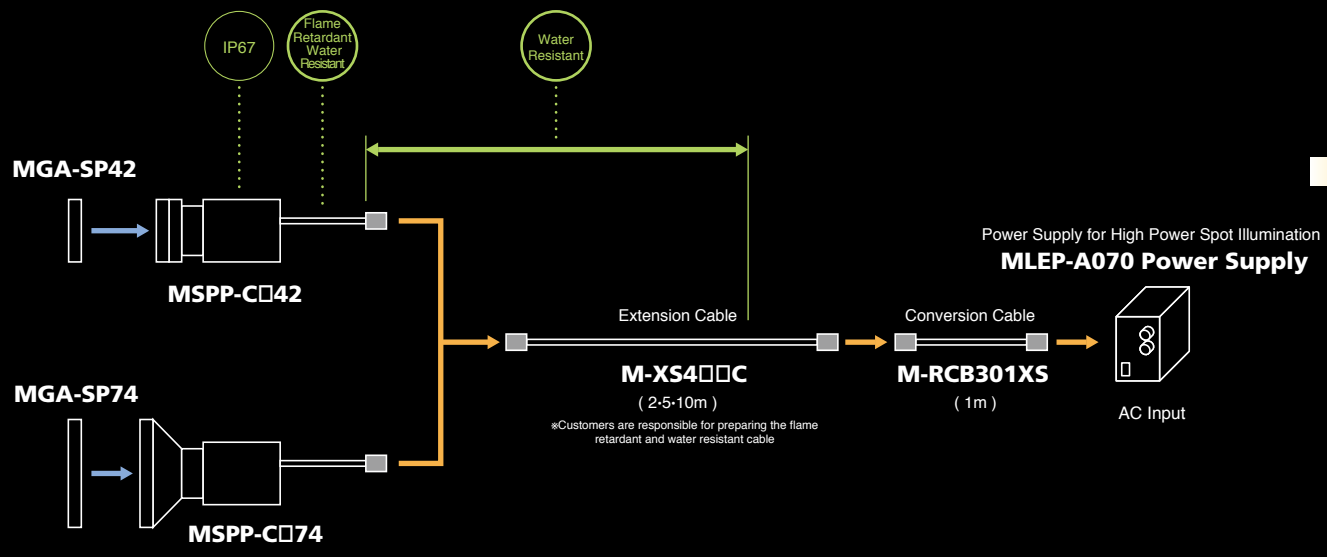


IP67 Leak Test

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 (JISC0920) and the International Organization for Standardization (IEC60529).
IP67 is a level of protection that can withstand being submerged in water at a depth of 1 meter for 30 minutes

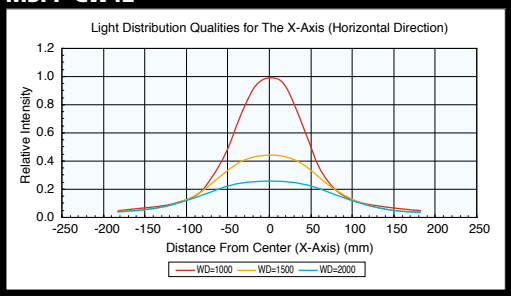
With regard to the condition of 30 minutes in a depth of 1 meter of water, a total inspection was performed for the presence of leaks by using an air pressure of 0.05 MPa for 30 seconds. 0.5 MPa is approximately twice the required condition

MSPP Illumination System Connection Flow

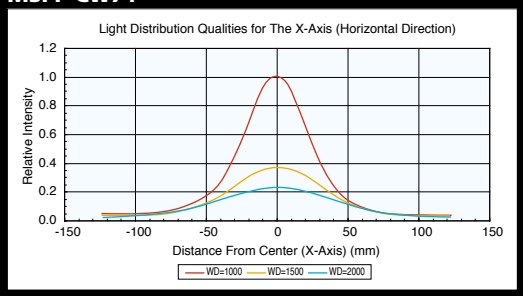


Light Distribution Characteristic Data (Measured In Condensed Condition)

MSPP-CW42



MSPP-CW74



	Model		Product code	Notes
Illumination Area (Wide Type)	**MSPP-CR42**	Red	A-2327	
	MSPP-CW42	White	A-2328	
	MSPP-CB42	Blue	A-2329	
	MSPP-CG42	Green	A-2330	Made-to-order Product
Replacement Cover Glass	**MGA-SP42**	Illumination Option	A-9060	For Maintenance
Illumination Area (Narrow Type)	**MSPP-CR74**	Red	A-2342	
	MSPP-CW74	White	A-2343	
	MSPP-CB74	Blue	A-2344	
	MSPP-CG74	Green	A-2345	Made-to-order Product
Replacement Cover Glass	**MGA-SP74**	Illumination Option	A-9061	For Maintenance
Extension Cable	**M-XS402C**	2m	A-2336	Two Sided Connector,Waterproof
	M-XS405C	5m	A-2337	
	M-XS410C	10m	A-2338	
MSPP-MLEP070 Replacement Cable	**M-RCB301XS**	1m	A-2339	
Power Supply Unit	**MLEP-A070W1LR**		A-2314	Analog, 1Channel Power Supply
	MLEP-A070W3LR		A-2316	Analog, 3Channel Power Supply
	MLEP-A070W1LRD		A-2310	Digital, 1Channel Power Supply
	MLEP-A070W3LRD		A-2312	Digital , 3Channel Power Supply

See **P.I-21**, **22** for details on power supplies

Main Uses
- PCB Board Positioning and Chip Component Inspection
- LCD Feature Alignment, Plastic Package Inspection
- Label Inspection, Mounter, ICT Impress Inspection

Direct Ring Illuminations
MDRL Series

Explanation of Model Code

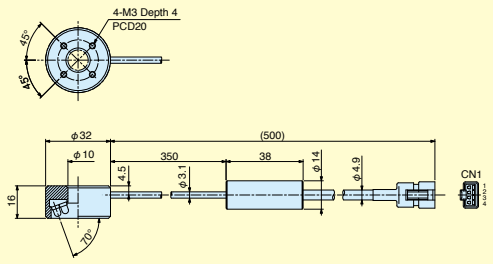
MDRL-C □ □
- □ = Emitted Color: R Red, G Green, B Blue, W White
- □ = Ring Internal Diameter

- High-luminance LEDs deployed at high density to produce 360-degree shadowless illumination.
- Standard type of LED lighting for a wide range of applications.
- Ability to select the model that matches our lenses.

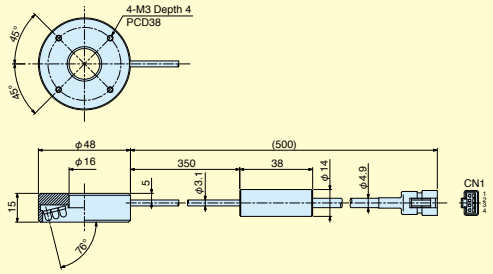
Model	Emitted Color	Maximum Related Current IFM (A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Lighting Angle	Power Supply Weight (g)	Product Code
MDRL-CR10	Red	0.11	φ10	φ32	70°	50	A-2000
★ MDRL-CG10	Green	0.17	φ10	φ32	70°	50	A-2116
MDRL-CB10	Blue	0.17	φ10	φ32	70°	50	A-2002
MDRL-CW10	White	0.17	φ10	φ32	70°	50	A-2001
MDRL-CR16	Red	0.24	φ16	φ48	76°	65	A-2006
★ MDRL-CG16	Green	0.37	φ16	φ48	76°	65	A-2117
MDRL-CB16	Blue	0.37	φ16	φ48	76°	65	A-2008
MDRL-CW16	White	0.37	φ16	φ48	76°	65	A-2007
MDRL-CR28	Red	0.20	φ28	φ50	75°	65	A-2168
★ MDRL-CG28	Green	0.31	φ28	φ50	75°	65	A-2181
MDRL-CB28	Blue	0.31	φ28	φ50	75°	65	A-2167
MDRL-CW28	White	0.31	φ28	φ50	75°	65	A-2169
MDRL-CR31	Red	0.36	φ31	φ66	75°	130	A-2009
★ MDRL-CG31	Green	0.55	φ31	φ66	75°	130	A-2118
MDRL-CB31	Blue	0.55	φ31	φ66	75°	130	A-2011
MDRL-CW31	White	0.55	φ31	φ66	75°	130	A-2010
MDRL-CR36	Red	0.36	φ36	φ66	75°	120	A-2281
★ MDRL-CG36	Green	0.55	φ36	φ66	75°	120	A-2282
MDRL-CB36	Blue	0.55	φ36	φ66	75°	120	A-2283
MDRL-CW36	White	0.55	φ36	φ66	75°	120	A-2284
MDRL-CR50	Red	0.64	φ50	φ90	70°	180	A-2012
★ MDRL-CG50	Green	0.96	φ50	φ90	70°	180	A-2119
MDRL-CB50	Blue	0.96	φ50	φ90	70°	180	A-2014
MDRL-CW50	White	0.96	φ50	φ90	70°	180	A-2013
MDRL-CR56	Red	1.12	φ56	φ120	55°	520	A-2003
★ MDRL-CG56	Green	1.55	φ56	φ120	55°	520	A-2120
MDRL-CB56	Blue	1.55	φ56	φ120	55°	520	A-2005
MDRL-CW56	White	1.55	φ56	φ120	55°	520	A-2004

★Made-to-order products.

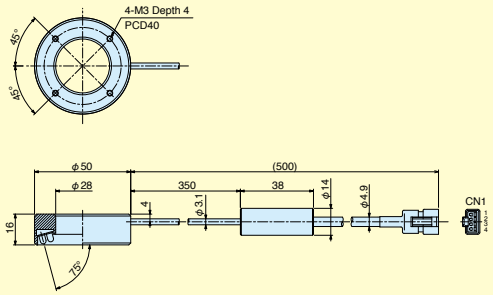
MDRL-CR (CG,CB,CW) 10



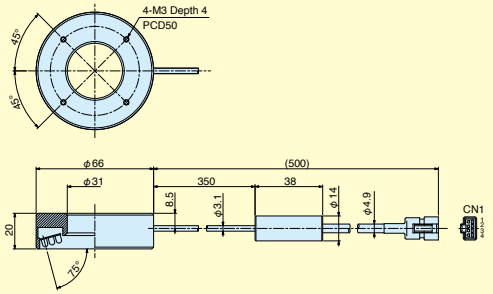
MDRL-CR (CG,CB,CW) 16



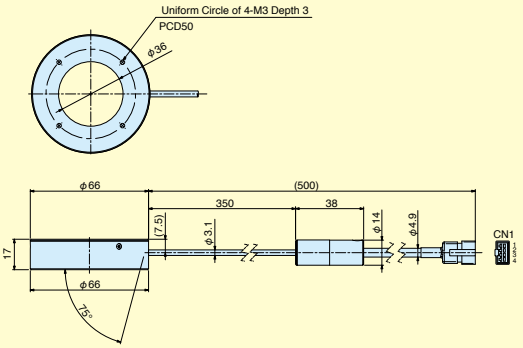
MDRL-CR (CG,CB,CW) 28



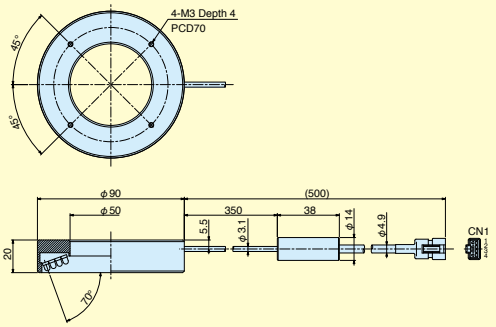
MDRL-CR (CG,CB,CW) 31



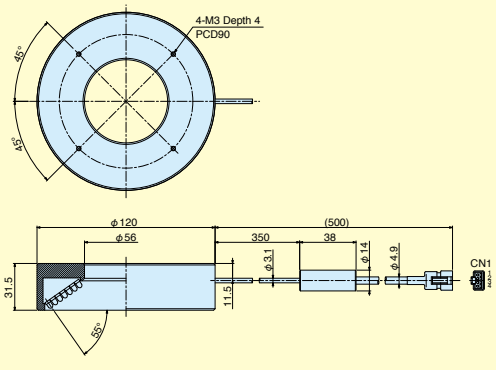
MDRL-CR (CG,CB,CW) 36



MDRL-CR (CG,CB,CW) 50



MDRL-CR (CG,CB,CW) 56

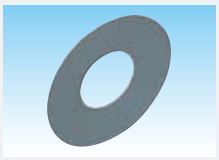


OPTION

Direct Ring Options

Diffusion and polarizing plates are available to prevent the vignetting of images. Adapters for attachment to Moritex Lenses are also available.

Diffuser



Polarizer

Adapters

Lens Attachment Adapter

■ Example images of boards with options

[j1] With no option

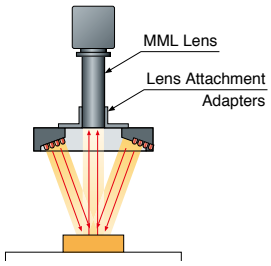
[j2] With diffusion board

[j3] With diffusion board and polarizing filter

In [j1], the vignetted significantly. Attaching a diffusion plate suppressed the vignetting a little [j2] and attaching an additional polarizing plate suppressed it completely [j3].

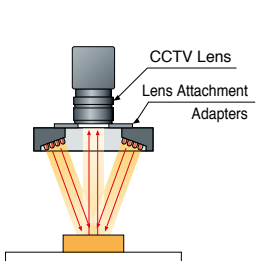
Illumination Structure

For MML Lens



A lens attachment adapter fitting the external diameter of each MML lens is available

For CCTV Lens



A lens attachment adapter fitting the external diameter of each CCTV lens is available

Sample Images

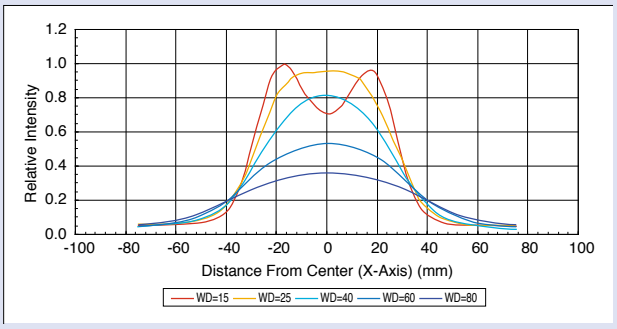
MDRL-CB56

Button Components for Mobile Phone

Grooves On Top of A Pull-Top Can

Light Distribution Characteristic

MDRL-CW31



Main Uses
- PCB Positioning and Chip Component Inspection
- LCD Feature Alignment, Plastic Package Inspection
- Label Inspection, Mounter, ICT Impress Inspection

Direct Ring Illuminations

MDRL Series

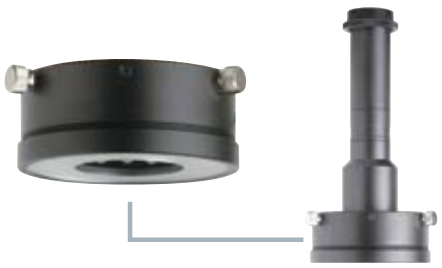
Explanation of Model Code

MDRL-C □ □ – NS

- □ (1st): Emitted Color — R Red, G Green, B Blue, W White
- □ (2nd): Ring Internal Diameter
- NS: Securing Screws

NS Series

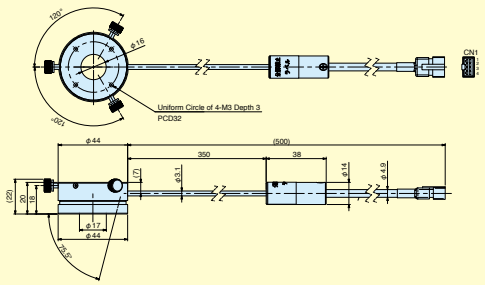
- The products with securing screws have high-intensity LEDs mounted at high densities and can be used easily and conveniently with Moritex MML lenses for illumination from any direction.
- 2 types (φ16 and φ31mm) are available.



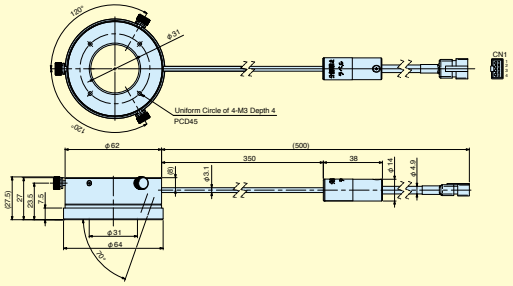
Model	Emitted Color	Maximum Related Current IFM (A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Lighting Angle	Weight (g)	Product Code
MDRL-CR16-NS	Red	0.15	φ16	φ44	75.5°	70	A-2273
★ MDRL-CG16-NS	Green	0.24	φ16	φ44	75.5°	70	A-2274
MDRL-CB16-NS	Blue	0.24	φ16	φ44	75.5°	70	A-2275
MDRL-CW16-NS	White	0.24	φ16	φ44	75.5°	70	A-2276
MDRL-CR31-NS	Red	0.17	φ31	φ62	70°	120	A-2277
★ MDRL-CG31-NS	Green	0.24	φ31	φ62	70°	120	A-2278
MDRL-CB31-NS	Blue	0.24	φ31	φ62	70°	120	A-2279
MDRL-CW31-NS	White	0.24	φ31	φ62	70°	120	A-2280
MDRL-CR35	Red	0.34	φ35	φ70	90°	150	A-2285
★ MDRL-CG35	Green	0.52	φ35	φ70	90°	150	A-2286
MDRL-CB35	Blue	0.52	φ35	φ70	90°	150	A-2287
MDRL-CW35	White	0.52	φ35	φ70	90°	150	A-2288

★Made-to-order products.

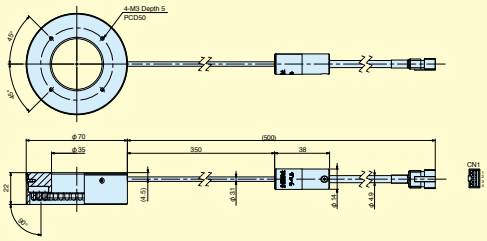
MDRL-CR (CG,CB,CW) 16-NS



MDRL-CR (CG,CB,CW) 31-NS



MDRL-CR (CG,CB,CW) 35

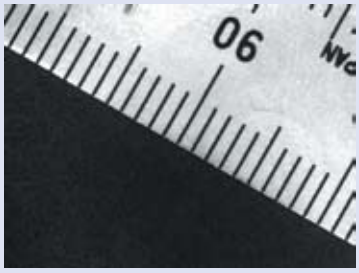


MDRL-C□35 (**Supports long working distances**)

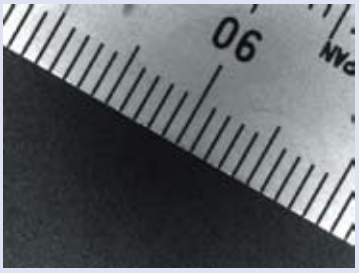
- The direct, long working distance illumination type makes a clear distinction from the conventional direct ring series.
- The recommended working distance is 65 mm or more. If the object surface is reflective, a working distance of about 200mm is acceptable.

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

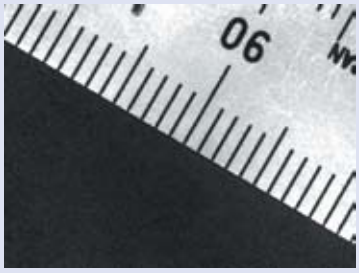
Sample Images



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



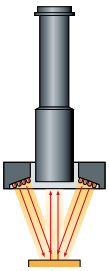
WD=40mm **MDRL-CR35**
Not Much Light At Short WD



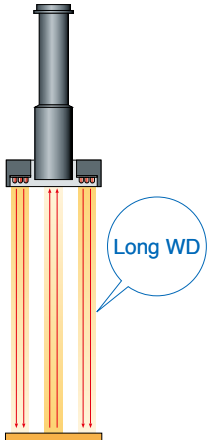
WD=60mm **MDRL-CR35**
Full of Light At This WD

Illumination Structure

MDRL-CR31
Illumination Formation

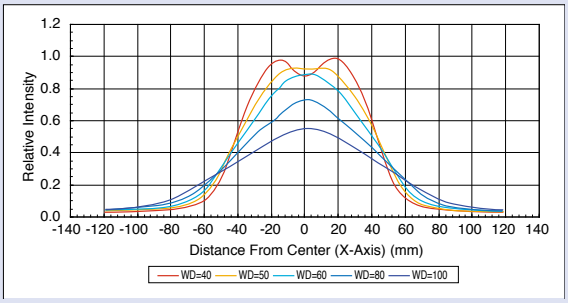


MDRL-CR35
Illumination Formation



Light Distribution Characteristic

MDRL-CW35



Main Uses
- BGA Solder Ball Position, Shape, and Bond Area Inspection
- Laser Marking Recognition
- Wafer and Glass Panel Inspection for Scratches and Stains
- Edge And Laser Marking Inspection

Low Angle Ring Illuminations
MLRL Series

Explanation of Model Code

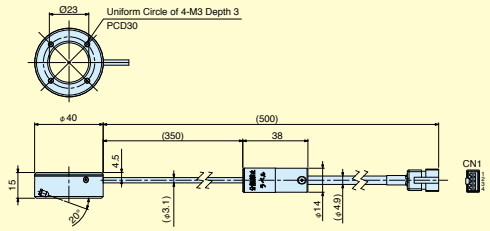
MLRL-C □ □
- □ = Emitted Color: R Red, G Green, B Blue, W White
- □ = Ring Internal Diameter

- No reflection even for shiny due to illumination from a narrow 360 degree angle. This illumination is ideal for surfaces which are uneven (embossed, etc.) or damaged.
- MLRL-CR (G,B,W) 46 is illuminated from an emission angle of 0 degrees.

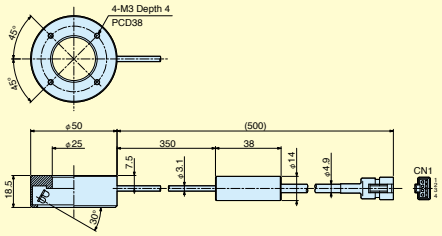
Model	Emitted Color	Maximum Related Current IFM (A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Lighting Angle	Weight (g)	Product Code
MLRL-CR23	Red	0.09	φ23	φ40	20°	40	A-2390
★ MLRL-CG23	Green	0.14	φ23	φ40	20°	40	A-2391
MLRL-CB23	Blue	0.14	φ23	φ40	20°	40	A-2392
MLRL-CW23	White	0.14	φ23	φ40	20°	40	A-2393
MLRL-CR25	Red	0.15	φ25	φ50	30°	70	A-2015
★ MLRL-CG25	Green	0.24	φ25	φ50	30°	70	A-2121
MLRL-CB25	Blue	0.24	φ25	φ50	30°	70	A-2017
MLRL-CW25	White	0.24	φ25	φ50	30°	70	A-2016
MLRL-CR46	Red	0.17	φ46	φ75	0°	80	A-2024
★ MLRL-CG46	Green	0.27	φ46	φ75	0°	80	A-2122
MLRL-CB46	Blue	0.27	φ46	φ75	0°	80	A-2026
MLRL-CW46	White	0.27	φ46	φ75	0°	80	A-2025
MLRL-CR48	Red	0.3	φ48	φ74	30°	110	A-2021
★ MLRL-CG48	Green	0.47	φ48	φ74	30°	110	A-2123
MLRL-CB48	Blue	0.47	φ48	φ74	30°	110	A-2023
MLRL-CW48	White	0.47	φ48	φ74	30°	110	A-2022
MLRL-CR68	Red	0.57	φ68	φ100	30°	190	A-2027
★ MLRL-CG68	Green	0.61	φ68	φ100	30°	190	A-2124
MLRL-CB68	Blue	0.61	φ68	φ100	30°	190	A-2029
MLRL-CW68	White	0.61	φ68	φ100	30°	190	A-2028
MLRL-CR100	Red	0.96	φ100	φ140	15°	320	A-2018
★ MLRL-CG100	Green	1.03	φ100	φ140	15°	320	A-2125
MLRL-CB100	Blue	1.03	φ100	φ140	15°	320	A-2020
MLRL-CW100	White	1.03	φ100	φ140	15°	320	A-2019

★Made-to-order products.

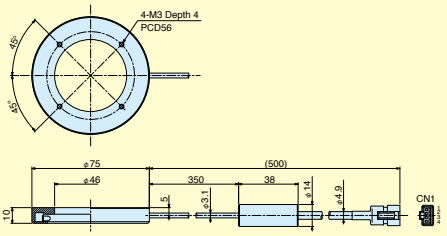
MLRL-CR (CG,CB,CW) 23



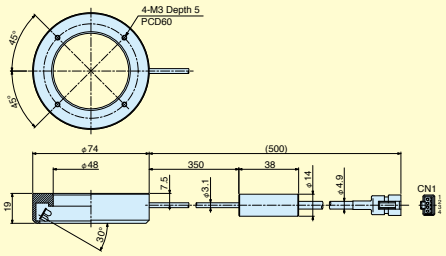
MLRL-CR (CG,CB,CW) 25



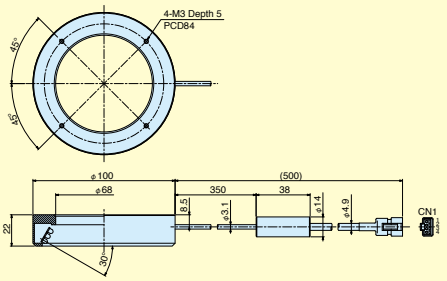
MLRL-CR (CG,CB,CW) 46



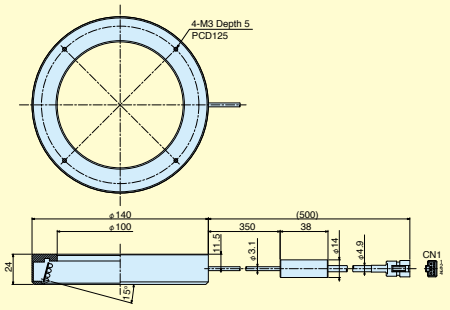
MLRL-CR (CG,CB,CW) 48



MLRL-CR (CG,CB,CW) 68



MLRL-CR (CG,CB,CW) 100



OPTION

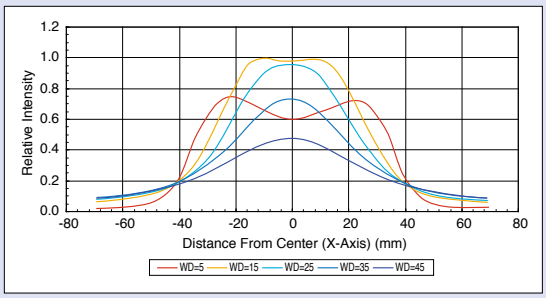
Options for Low Angle Ring Lights

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

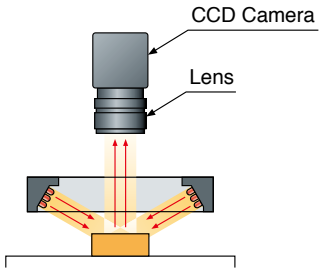
Model	Compatible Light Models	Product Code
MDF-LR25	MRL-CR (CG, CB, CW) 25	A-9015
MDF-LR48	MRL-CR (CG, CB, CW) 48	A-9016
MDF-LR68	MRL-CR (CG, CB, CW) 68	A-9017
MDF-LR100	MRL-CR (CG, CB, CW) 100	A-9018

Light Distribution Characteristic

MLRL-CW68



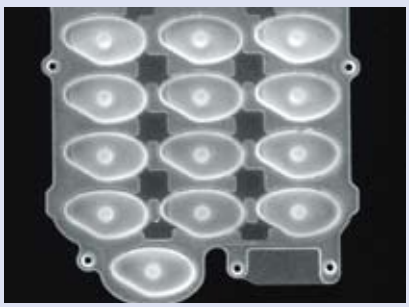
Illumination Structure



Illuminating The Object From A Low Position

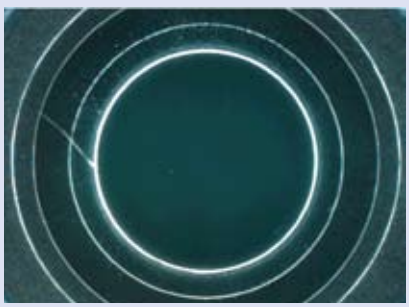
Sample Images

MLRL-CW100



Button Components for Mobile Phone

MLRL-CW68

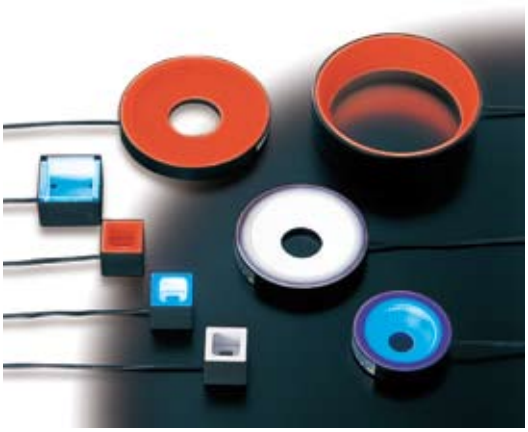


CD Inner Circumferential Scratch

Main Uses
- IC Marking and on-Board Component Inspection
- Cap Side & Internal Inspection For Stains & Markings
- Wafer Surface Inspection
- Solder and Connector Pitch Inspection
- BGA and QFP Inspection

Shadowless Illuminations

MSRL/MSLL/ MSQL Series



- Three types are available: the ring type, the low angle ring type and the low angle square type.
- Soft, uniform, diffused lighting on shiny objects.
- Best for preventing a halo effect. The shadowless, low angle square type is perfect for square shaped objects, such as BGAs and QFPs.

Explanation of Model Code

Shadowless Ring Type LEDs

MSRL-C □ □

□ Emitted Color: **R** Red, **G** Green, **B** Blue, **W** White

□ Ring Internal Diameter

Shadowless, Low Angle Ring Type LEDs

MSLL-C □ □

□ Emitted Color: **R** Red, **G** Green, **B** Blue, **W** White

□ Ring Internal Diameter

Shadowless, Low Angle Square Type LEDs

MSQL-C □ □

□ Emitted Color: **R** Red, **G** Green, **B** Blue, **W** White

□ External Dimension

Lineup of shadowless ring type LEDs

Model	Emitted Color	Maximum Related Current IFM (A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Weight (g)	Product Code
MSRL-CR20	Red	0.32	φ20	φ74	140	A-2042
★ **MSRL-CG20**	Green	0.50	φ20	φ74	140	A-2126
MSRL-CB20	Blue	0.50	φ20	φ74	140	A-2044
MSRL-CW20	White	0.50	φ20	φ74	140	A-2043
MSRL-CR33	Red	0.45	φ33	φ104	210	A-2045
★ **MSRL-CG33**	Green	0.69	φ33	φ104	210	A-2127
MSRL-CB33	Blue	0.69	φ33	φ104	210	A-2047
MSRL-CW33	White	0.69	φ33	φ104	210	A-2046
MSRL-CR44	Red	0.57	φ44	φ123	270	A-2039
★ **MSRL-CG44**	Green	0.80	φ44	φ123	270	A-2128
MSRL-CB44	Blue	0.80	φ44	φ123	270	A-2041
MSRL-CW44	White	0.80	φ44	φ123	270	A-2040

★Made-to-order products.

Lineup of shadowless, low angle ring type LEDs

Model	Emitted Color	Maximum Related Current IFM (A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Weight (g)	Product Code
MSLL-CR109	Red	0.62	φ109	φ136	320	A-2033
★ **MSLL-CG109**	Green	1.10	φ109	φ136	320	A-2129
MSLL-CB109	Blue	1.10	φ109	φ136	320	A-2035
MSLL-CW109	White	1.10	φ109	φ136	320	A-2034

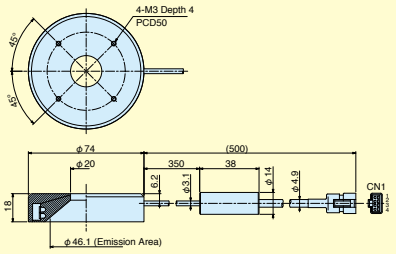
★Made-to-order products.

Lineup of shadowless, low angle square type LEDs

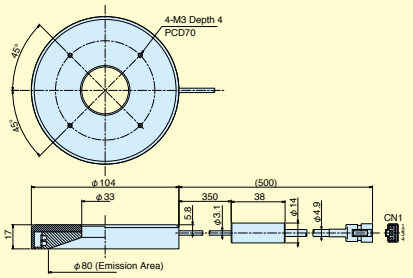
Model	Emitted Color	Maximum Related Current IFM (A)	External Dimensions (mm)	Weight (g)	Product Code
MSQL-CR32	Red	0.09	32×32	80	A-2036
★ **MSQL-CG32**	Green	0.14	32×32	80	A-2130
MSQL-CB32	Blue	0.14	32×32	80	A-2038
MSQL-CW32	White	0.14	32×32	80	A-2037
MSQL-CR48	Red	0.13	48×48	120	A-2030
★ **MSQL-CG48**	Green	0.20	48×48	120	A-2131
MSQL-CB48	Blue	0.20	48×48	120	A-2032
MSQL-CW48	White	0.20	48×48	120	A-2031

★Made-to-order products.

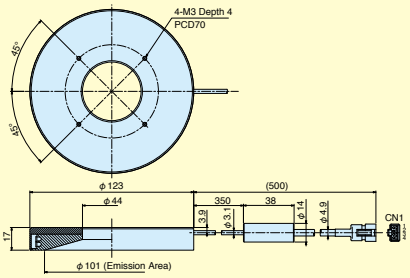
MSRL-CR (CG,CB,CW) 20



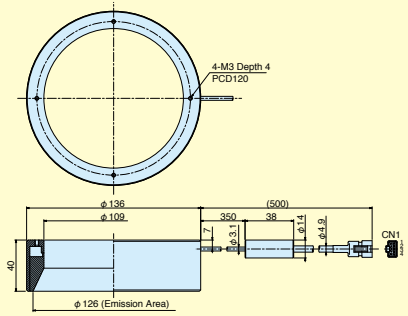
MSRL-CR (CG,CB,CW) 33



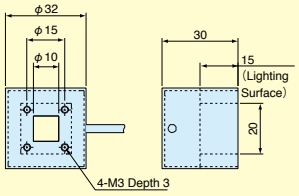
MSRL-CR (CG,CB,CW) 44



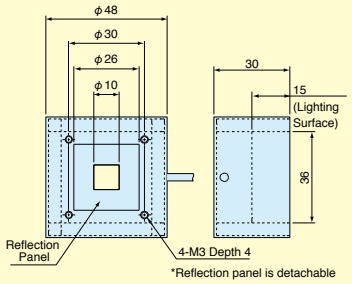
MSLL-CR (CG,CB,CW) 109



MSQL-CR (CG,CB,CW) 32

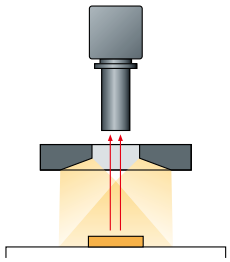


MSQL-CR (CG,CB,CW) 48

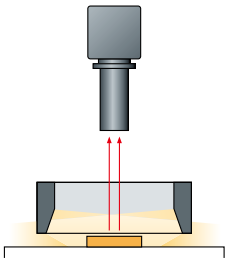


Illumination Structure

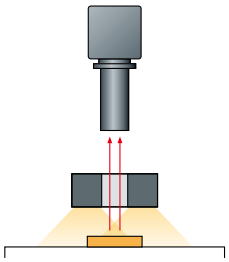
MSRL Series



MSLL Series



MSQL Series

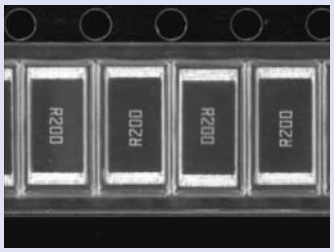


Sample Images

MSLL-CR109

D-Subconnector

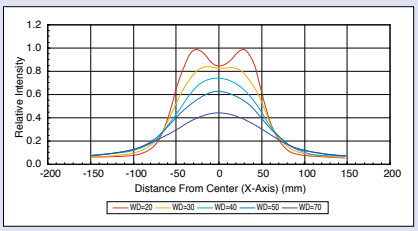
Bottom of Can



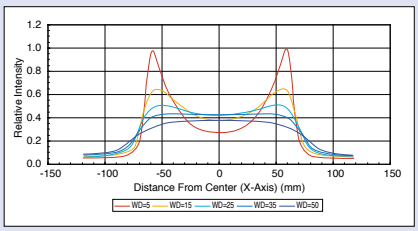
Resistor Chips

Light Distribution Characteristic

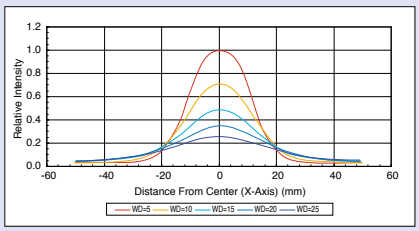
MSRL-CW44



MSLL-CW109

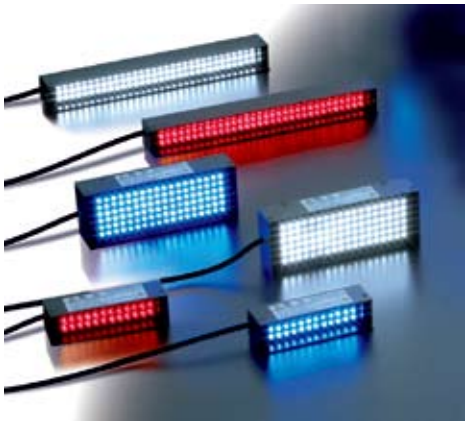


MSQL-CW32



Main Uses
- LED Deffect Detection
- Complicated Shape Recognition
- Molding Crack Inspection
- Electronic Part Shape Recognition and Size Measurement
- Direct-Tube Fluorescent Lamp Replacement

Bar Illuminations
MBRL Series



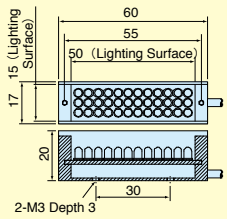
Explanation of Model Code

MBRL-C □ □
- □: Emitted color
- □: Illumination area dimensions (length · width)

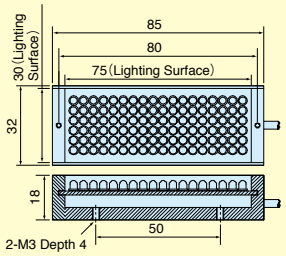
R Red **B** Blue
G Green **W** White

- High-intensity LED lamps are arranged in an array form, and oblique illumination from an arbitrary angle can be achieved, depending on the object

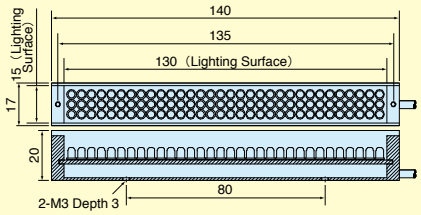
MBRL-CR (CG,CB,CW) 5015



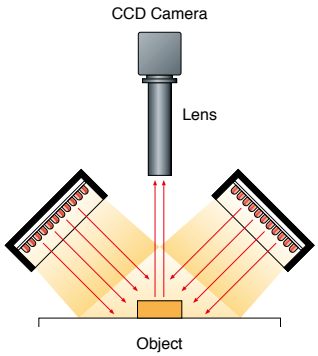
MBRL-CR (CG,CB,CW) 7530



MBRL-CR (CG,CB,CW) 13015



Illumination Structure



Sample Images

MBRL-CW7530 with MDF-BR7530

Wafer Characters

MBRL-CR7530

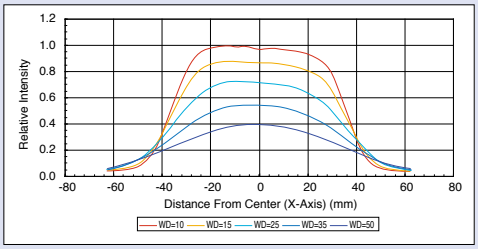
Razor Edge

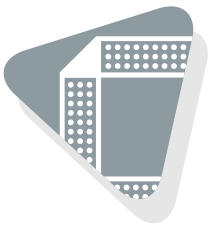
Model	Emitted Color	Maximum Related Current IFM (A)	Illumination Area Dimensions (mm)	Weight (g)	Product Code
MBRL-CR5015	Red	0.13	50×15	50	A-2084
★ MBRL-CG5015	Green	0.26	50×15		A-2148
MBRL-CB5015	Blue	0.26	50×15		A-2086
MBRL-CW5015	White	0.26	50×15		A-2085
MBRL-CR7530	Red	0.36	75×30	120	A-2081
★ MBRL-CG7530	Green	0.52	75×30		A-2149
MBRL-CB7530	Blue	0.52	75×30		A-2083
MBRL-CW7530	White	0.52	75×30		A-2082
MBRL-CR13015	Red	0.32	130×15	85	A-2087
★ MBRL-CG13015	Green	0.53	130×15		A-2160
MBRL-CB13015	Blue	0.53	130×15		A-2089
MBRL-CW13015	White	0.53	130×15		A-2088

★Made-to-order products.

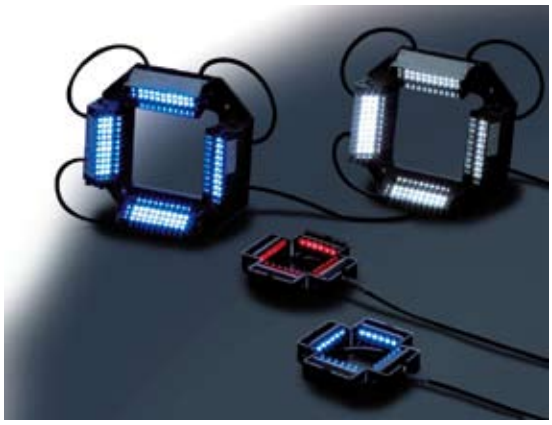
Light Distribution Characteristic

MBRL-CW7530





Square Type Oblique Illuminations
MDQL Series

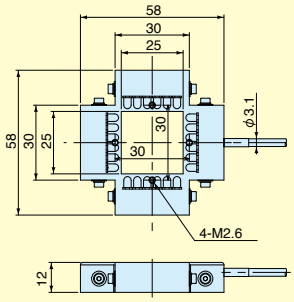


- Bar-shaped illumination from four directions and the possibility of wide-ranging illumination, depending on the angle adjustment.

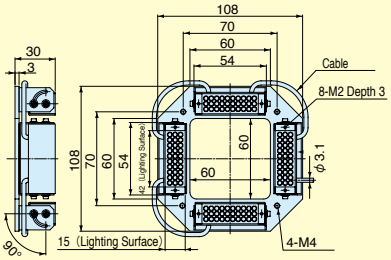
Explanation of Model Code

MDQL-C □ □
- □: Emitted Color — **R** Red, **G** Green, **B** Blue, **W** White
- □: External Dimensions

MDQL-CR (CG,CB,CW) 58

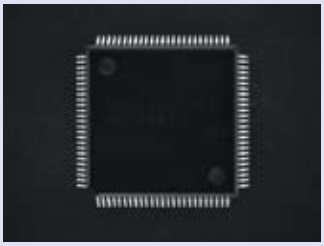


MDQL-CR (CG,CB,CW) 108



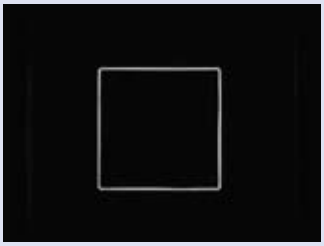
Sample Images

MDQL-CR108+MSCL-CR74+MLMSC74



IC Pins

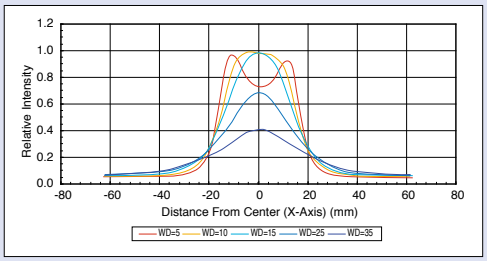
MDQL-CR108



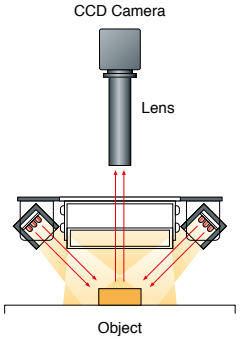
Mirror Edge of Optical Part

Light Distribution Characteristic

MDQL-CW58



Illumination Structure



Model	Emitted Color	Maximum Related Current IFM (A)	Internal Dimensions (mm)	External Dimensions (mm)	Weight (g)	Product Code
MDQL-CR58	Red	0.09	φ25	φ58	55	A-2175
★ **MDQL-CG58**	Green	0.17	φ25	φ58		A-2182
MDQL-CB58	Blue	0.17	φ25	φ58		A-2174
MDQL-CW58	White	0.17	φ25	φ58		A-2176
MDQL-CR108	Red	0.42	φ60	φ108	210	A-2178
★ **MDQL-CG108**	Green	0.84	φ60	φ108		A-2183
MDQL-CB108	Blue	0.84	φ60	φ108		A-2177
MDQL-CW108	White	0.84	φ60	φ108		A-2179

★Made-to-order products.

Dome Illuminations
MDML Series

Explanation of Model Code

MDQL-C □ □
□ Emitted Color
□ External Dimensions

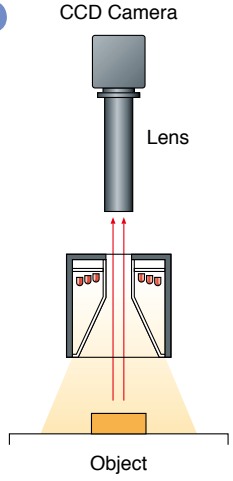
R Red B Blue
G Green W White

- 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.

Model	Emitted Color	Maximum Related Current IFM (A)					Internal Diameter of Dome (mm)	External Diameter of Dome (mm)	Weight (g)	Product Code
		Total	Coaxial Area	Light Transmittance Area	Reflective Area	Low Angle				
MDML-CR50	Red	0.24					ϕ11	ϕ50	130	A-2265
★ MDML-CG50	Green	0.37					ϕ11	ϕ50	130	A-2268
MDML-CB50	Blue	0.37					ϕ11	ϕ50	130	A-2267
MDML-CW50	White	0.37					ϕ11	ϕ50	130	A-2266
MDML-CR94	Red	0.80					ϕ16	ϕ94	530	A-2290
★ MDML-CG94	Green	1.19					ϕ16	ϕ94	530	A-2291
MDML-CB94	Blue	1.19					ϕ16	ϕ94	530	A-2292
MDML-CW94	White	1.19					ϕ16	ϕ94	530	A-2293
MDML-CR156	Red	1.16	0.16	0.36	0.32	0.32	ϕ26	ϕ156	1600	A-2172
★ MDML-CG156	Green	1.86	0.31	0.55	0.50	0.50	ϕ26	ϕ156	1600	A-2184
MDML-CB156	Blue	1.86	0.31	0.55	0.50	0.50	ϕ26	ϕ156	1600	A-2171
MDML-CW156	White	1.86	0.31	0.55	0.50	0.50	ϕ26	ϕ156	1600	A-2173

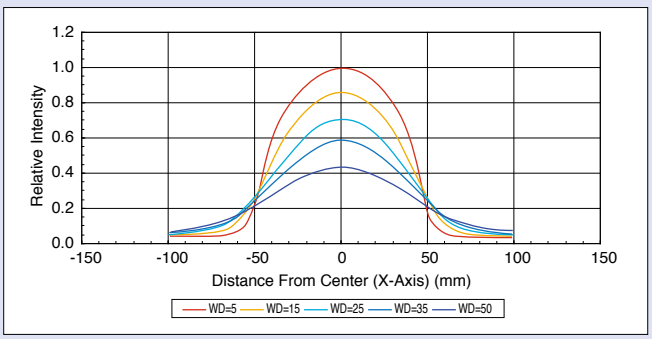
★Made-to-order products.

Illumination Structure

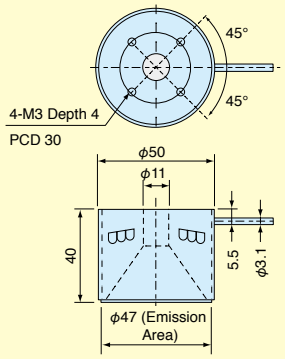


Light Distribution Characteristic

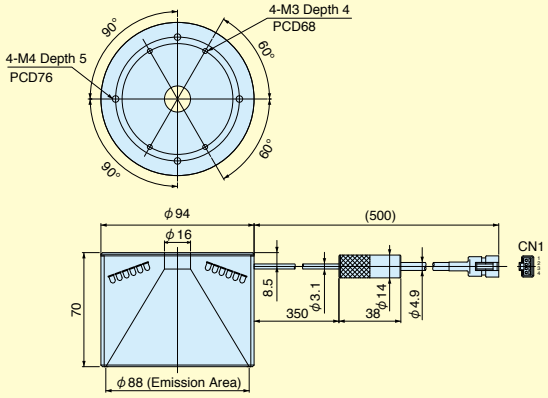
MDML-CW94



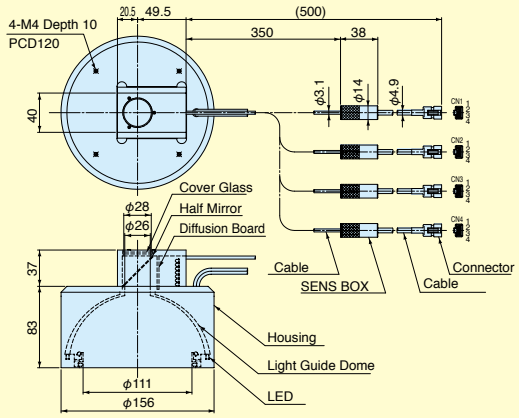
MDML-CR (CG,CB,CW) 50



MDML-CR (CG,CB,CW) 94



MDML-CR (CG,CB,CW) 156

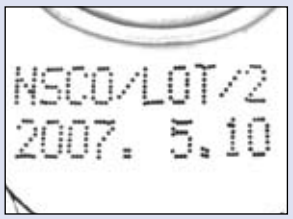


Sample Images

Can cover: It is difficult to recognize the characters under direct ring illumination because of the vignetting of the element and the slope, but clear under dome illumination because of illumination in all directions.

Direct Ring (**MDRL-CW31**)

Image with The Dome Light (**MDML-CR156**)



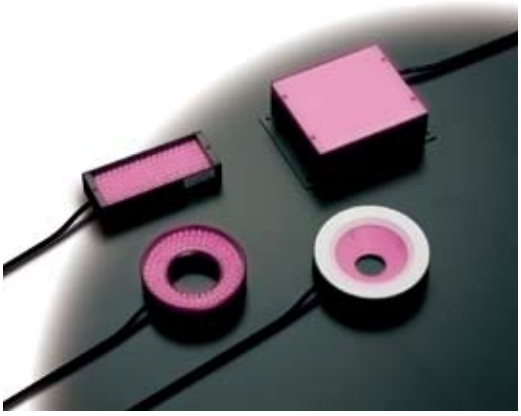
Direct Ring (**MDRL-CW31**)

Mobile phone push button marking: Characters and shapes are unclear because of LED element vignetting.

Characters and shapes are clear in all directions with no LED element vignetting.

IR Illuminations

IR Series



*This shows an image of the lighting condition.

Explanation of Model Code

M □ L – C IR □

- Configuration
  - DR Direct Ring
  - SR Shadowless Ring Type LEDs
  - BR Bar
  - DB Direct Backlight
  - CE Coaxial
- Emitted Color (IR: Infrared)
- See Each Series Explanation of Model Code

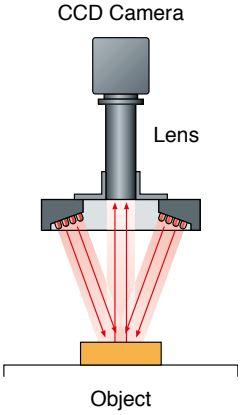
- Provides image recognition at high contrast especially for items that are difficult in visible light. The lighting is also effective for materials that chemically react to visible light rays.

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

Model	Emitted Color	Maximum Related Current IFM (A)	Internal Diameter (mm)	External Diameter (mm)	Weight (g)	Product Code
MDRL-CIR31	Infrared	0.42	φ31	φ66	130	A-2165
MSRL-CIR20	Infrared	0.36	φ20	φ74	140	A-2163
MBRL-CIR7530	Infrared	0.40	75x30 (Illumination area dimensions)		120	A-2164
MDBL-CIR70	Infrared	0.53	70x70 (Illumination area dimensions)		190	A-2166
MCEL-CIR8-2	Infrared	0.06	φ8 External diameter of head		35	A-2318

Illumination Structure

MDRL-CIR31



Sample Images

1.Substrate Pattern Recognition

(For IR, only the pattern is recognized clearly)

image with an IR backlight LED (**MDBL-CIR70**)

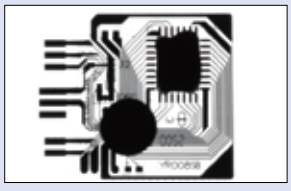
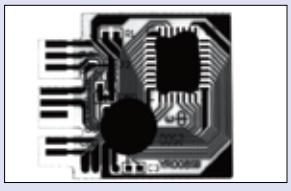


image with a white backlight LED (**MDBL-CW70**)



2.Cheese Package Recognition

(For IR, specific patterns can be made invisible)

image with an IR direct ring LED (**MDRL-CIR31**)

image with a white, direct LED (**MDRL-CW31**)

Models not described on this page can be manufactured by orders.

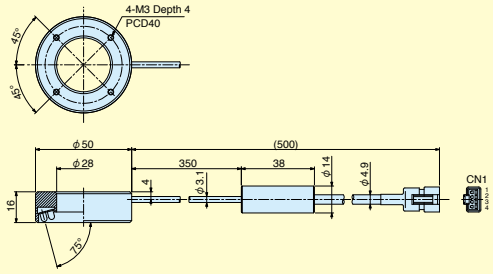
Products that can be made-to-order.

All line-ups of MDRL/MDRL-NS/MLRL/MSRL/MSLL/MSQL/MBRL/MDQL/MDML/MDBL/MEBL/MLNL Series.

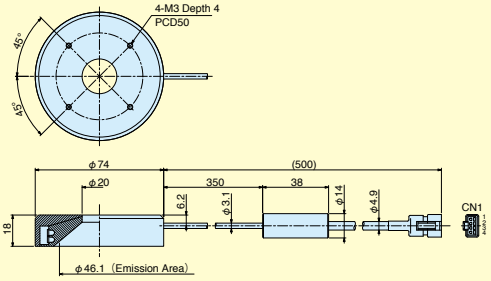
*All Line-Ups of Bullet Type LEDs Can Be Manufactured.

Please contact us for demonstration models.

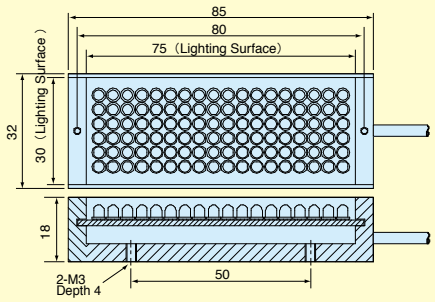
MDRL-CIR31



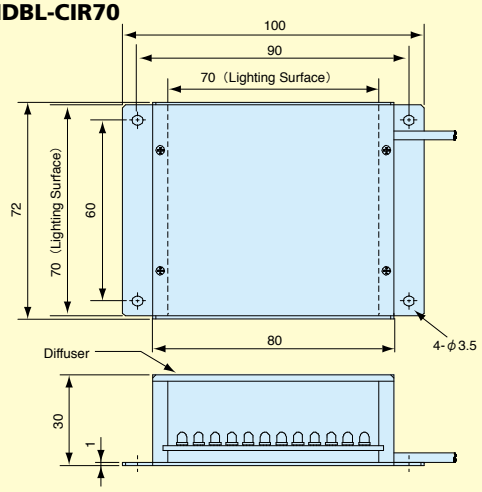
MSRL-CIR20



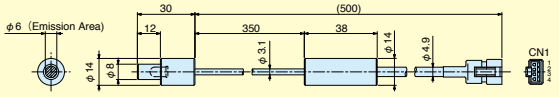
MBRL-CIR7530



MDBL-CIR70

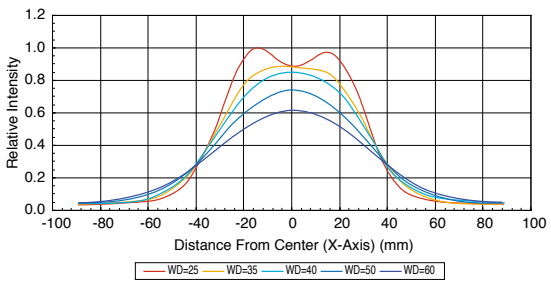


MCEL-CIR8-2

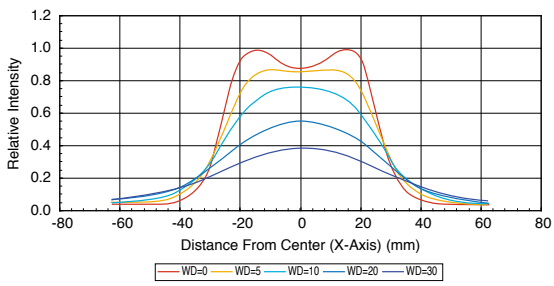


Light Distribution Characteristic

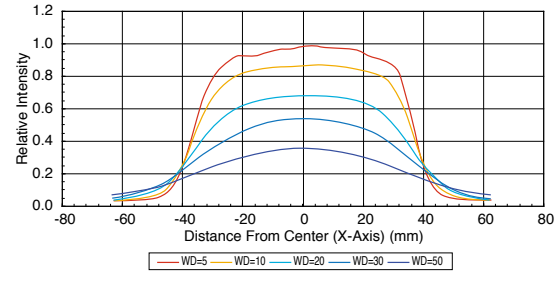
MDRL-CIR31



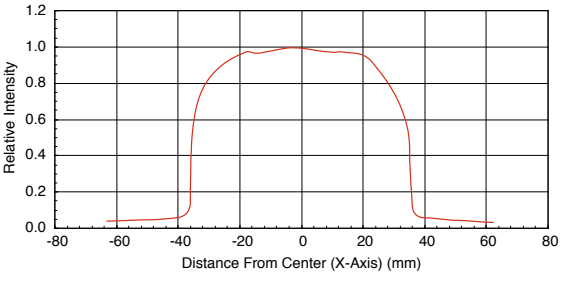
MSRL-CIR20



MBRL-CIR7530



MDBL-CIR70



UV Illuminations
UV Series

*Image of illumination condition

Explanation of Model Code

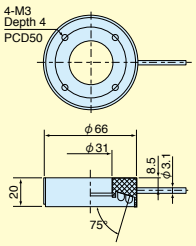
M □ L – C UV □

- Configuration: DR Direct Ring; BR Bar; DQ Square Oblique
- Luminescent Color (UV)
- See Explanation for Each Series

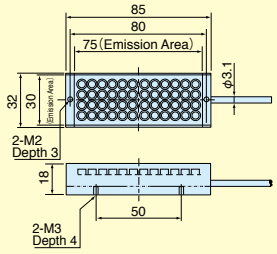
- Provides image recognition at high contrast especially for images that are difficult to recognize with visible light. It is possible to capture the surface of the object more clearly than with visible light.

* Use with a UV light range CCD camera.
* Effective in detection of dirt on glass substrates and dust on CCD elements.
* The peak wavelength is 365nm.

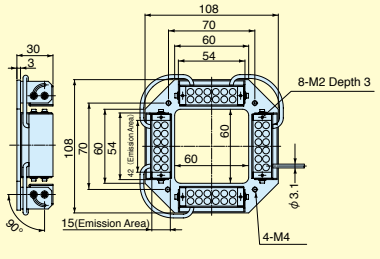
MDRL-CUV31



MBRL-CUV7530



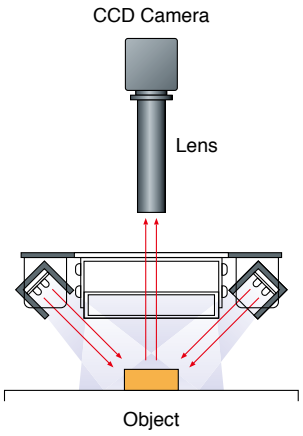
MDQL-CUV108



Model	Emitted Color	Maximum Related Current IFM(A)	Internal Diameter (mm)	External Diameter (mm)	Weight(g)	Product Code
MDRL-CUV31	UV	0.36	ϕ31	ϕ66	130	A-2262
MBRL-CUV7530	UV	0.36	75×30 (Illumination area dimensions)		120	A-2263
MDQL-CUV108	UV	0.36	□60	□108	210	A-2264

Illumination Structure

MDQL-CUV108



Sample Images

Yoghurt Package

Color CCD with White LED

Visible, B/W CCD with White LED

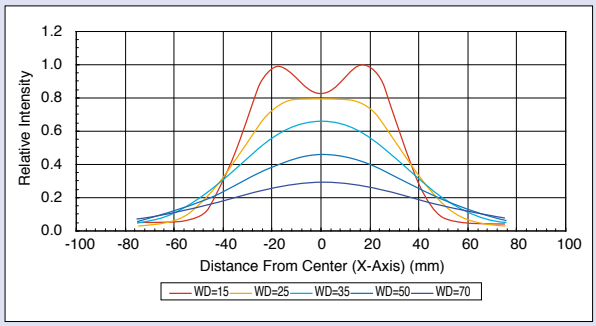
IR-CCD with IR LED

UV-CCD with UV LED

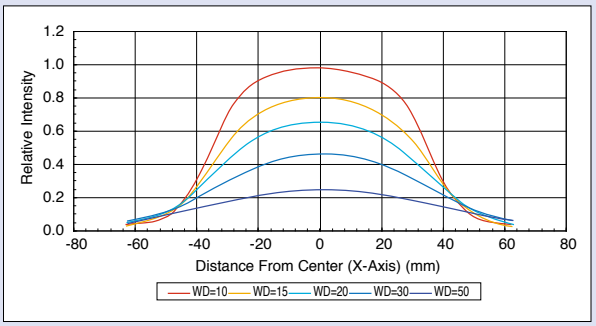
The print pattern not visible under IR can be seen clearly under UV

Light Distribution Characteristic

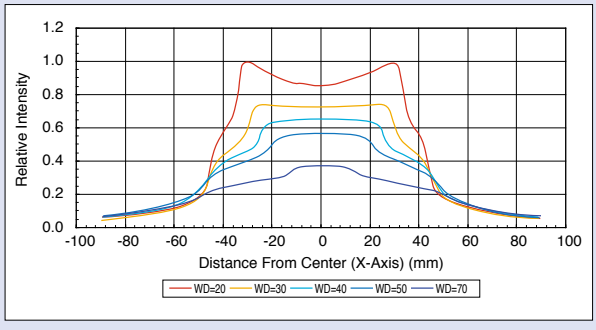
MDRL-CUV31



MBRL-CUV7530



MDQL-CUV108



Parallel Light Illuminations
MCBP Series

Explanation of Model Code

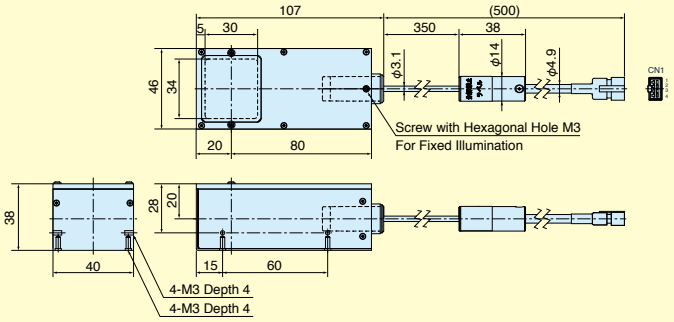
MCBP-C □ □
Emitted Color
Illumination Area Dimensions(Length • Width)
G Green B Blue W White

- Capable of capturing the profile of an image with higher precision than previous backlights which projected light from the rear.

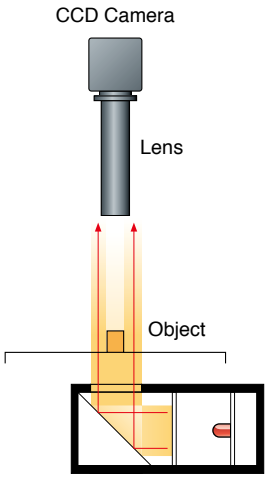
Model	Emitted Color	Maximum Related Current IFM (A)	Illumination Area Dimensions (mm)	Weight (g)	Product Code
★ MCBP-CG3430	Green	0.07	34×30	260	A-2272
MCBP-CB3430	Blue	0.07	34×30	260	A-2271
MCBP-CW3430	White	0.07	34×30	260	A-2270

★Made-to-order products.

MCBP-CG (CB,CW) 3430



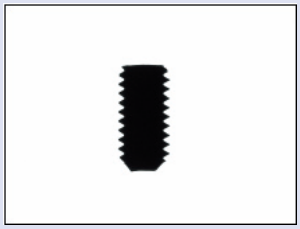
Illumination Structure



Sample Images

Screw

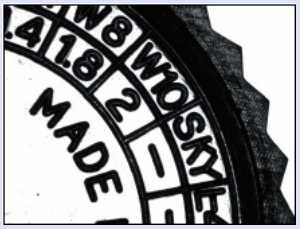
Direct backlight
(**MDBL-CB70**)
Shape unclear because of stray, direct light



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

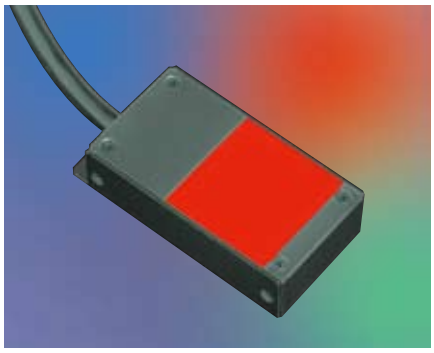
Embossed Characters On Clear Resin

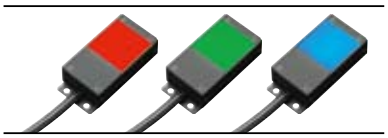
Direct backlight
(**MDBL-CB70**)
Ordinary light transmitted evenly through the entire object.



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

Full-color RGB Illuminations
RGB Series





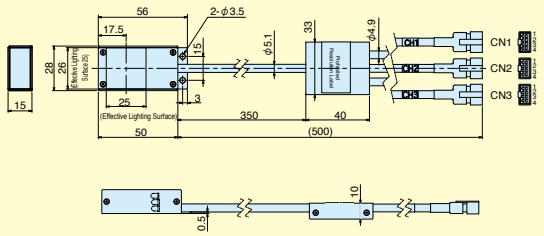
Explanation of Model Code

MEBL-CRGB □ — 3CH
□: Illumination Area Dimensions(Length • Width)

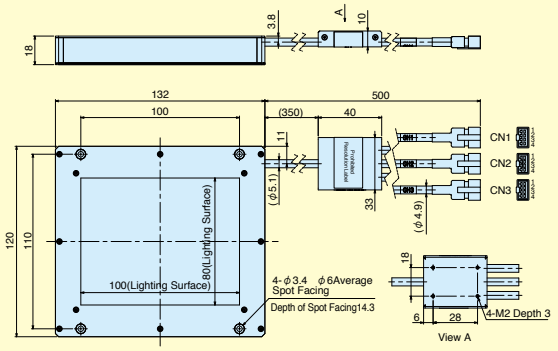
- Multi-color edge type backlight arranged with RGB LEDs in a compact body
- Capable of the individual control of each color (1 channel for each color)
- Optimum for ID inspection, experiment, and color filter inspection

Model	Emitted Color	Maximum Related Current IFM (A)	Dimensions of Illumination Area (mm)	Weight (g)	Product Code
MEBL-CRGB25-3CH	RGB	R : 0.03 G : 0.04 B : 0.04	25 X 25	80	A-2289
MEBL-CRGB10080-3CH	RGB	R : 0.28 G : 0.49 B : 0.49	100 X 80	500	A-2396

MEBL-CRGB25-3CH

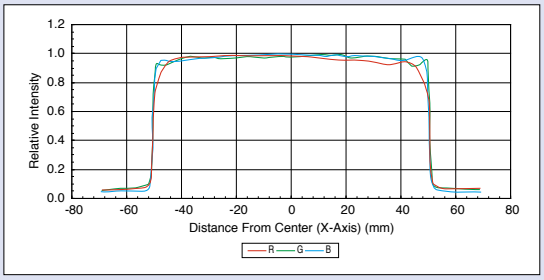


MEBL-CRGB10080-3CH



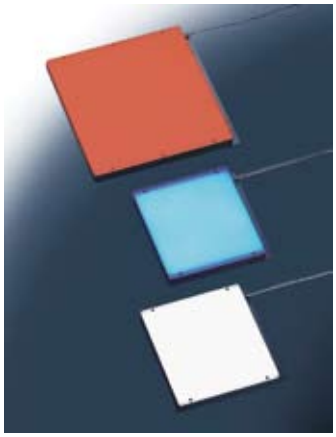
Light Distribution Characteristic

MEBL-CRGB10080-3CH



Main Uses
- Lead Frame Inspection
- Visual Inspection of Electronic Parts
- Bend Lead Inspection for GFPs, QSPs and SOPs
- Inspection of Transparent Films for Dirt
- Various Silhouette Observations

Direct Backlights (Chip Mount Type)
MDBC Series



Explanation of Model Code

Chip Mount Type

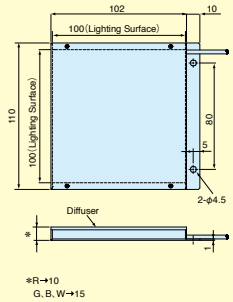
MDBC-C □ □

- Chip-Type
- Emitted Color: **R** Red, **B** Blue, **G** Green, **W** White
- Illumination Area Dimensions(Length • Width)

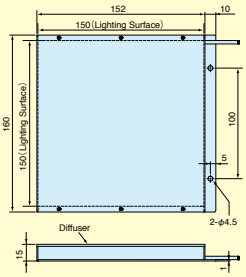
■ MDBC series

- Because of its slim design, the chip mounted type is ideal for saving space

MDBC-CR (CG,CB,CW) 100



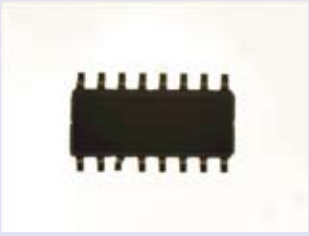
MDBC-CR (CG,CB,CW) 150



Sample Images

Liquid Level Detection In A Beverage Bottle

IC Pins

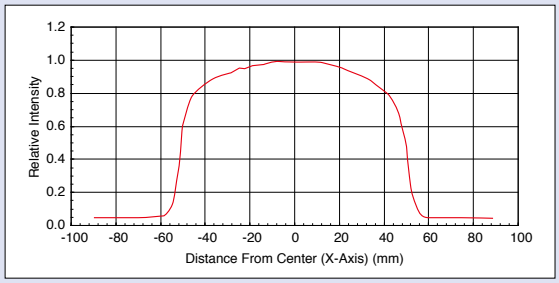


Model	Emitted Color	Maximum Related Current IFM (A)	Dimensions of Illumination Area (mm)	Weight (g)	Product Code
MDBC-CR100	Red	0.81	100×100	170	A-2063
★ **MDBC-CG100**	Green	0.95	100×100		A-2140
MDBC-CB100	Blue	0.95	100×100		A-2065
MDBC-CW100	White	0.95	100×100		A-2064
MDBC-CR150	Red	0.99	150×150	310	A-2060
★ **MDBC-CG150**	Green	2.14	150×150		A-2141
MDBC-CB150	Blue	2.14	150×150		A-2062
MDBC-CW150	White	2.14	150×150		A-2061

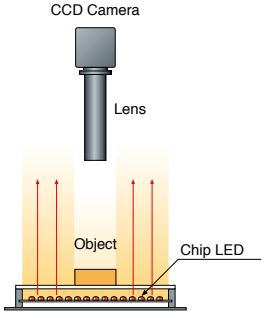
★Made-to-order products.

Light Distribution Characteristic

MDBC-CR150

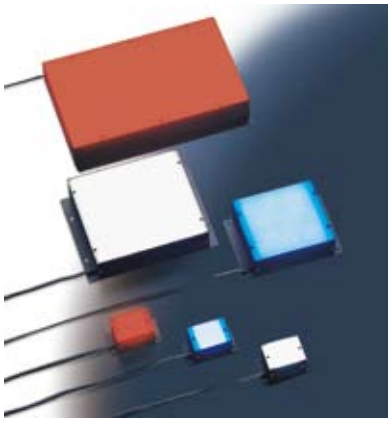


Illumination Structure



Main Uses
- Lead Frame Inspection
- Visual Inspection of Electronic Parts
- Bend Lead Inspection for GFPs, QSPs and SOPs
- Inspection of Transparent Films For Dirt
- Various Silhouette Observations

Direct Backlights (Bullet Type)
MDBL Series



Explanation of Model Code

Bullet Type (Array Type)

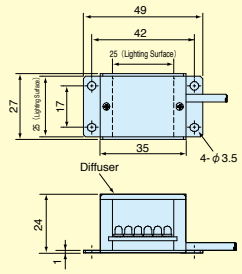
MDBL-C □ □

- □ Emitted Color: **R** Red, **G** Green, **B** Blue, **W** White
- □ Illumination Area Dimensions(Length • Width)

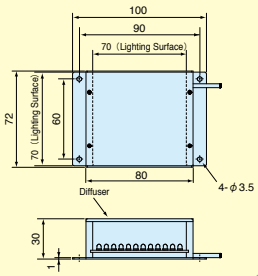
■ MDBL series

- Due to the LCDs mounted immediately beneath the lighting surface in the bullet type, it achieves a higher luminance than the edge type.

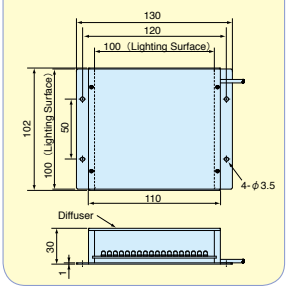
MDBL-CR (CG,CB,CW) 25



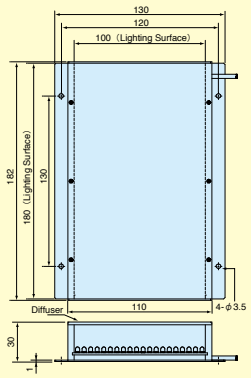
MDBL-CR (CG,CB,CW) 70



MDBL-CR (CG,CB,CW) 100

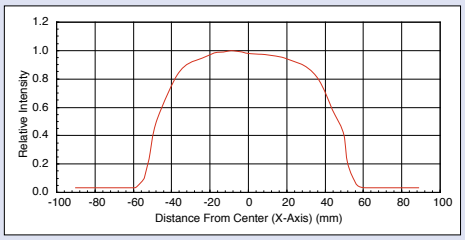


MDBL-CR (CG,CB,CW) 180100



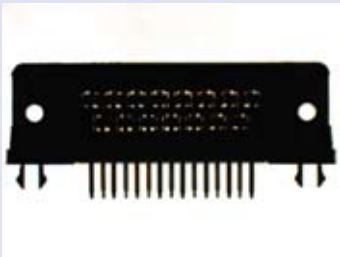
Light Distribution Characteristic

MDBL-CW100



Sample Images

Connector

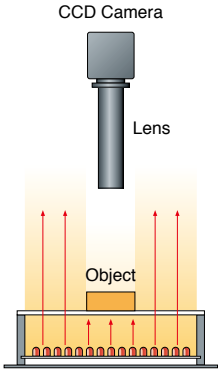


Plaster

Model	Emitted Color	Maximum Related Current IFM (A)	Dimensions of Illumination Area (mm)	Weight (g)	Product Code
MDBL-CR25	Red	0.14	25×25	60	A-2048
★ MDBL-CG25	Green	0.27	25×25		A-2136
MDBL-CB25	Blue	0.27	25×25		A-2150
MDBL-CW25	White	0.27	25×25		A-2049
MDBL-CR70	Red	0.48	70×70	190	A-2051
★ MDBL-CG70	Green	0.96	70×70		A-2137
MDBL-CB70	Blue	0.96	70×70		A-2053
MDBL-CW70	White	0.96	70×70		A-2052
MDBL-CR100	Red	1.43	100×100	290	A-2057
★ MDBL-CG100	Green	1.55	100×100		A-2138
MDBL-CB100	Blue	1.55	100×100		A-2059
MDBL-CW100	White	1.55	100×100		A-2058
MDBL-CR180100	Red	2.30	180×100	520	A-2054
★ MDBL-CG180100	Green	2.30	180×100		A-2139
MDBL-CB180100	Blue	2.30	180×100		A-2056
MDBL-CW180100	White	2.30	180×100		A-2055

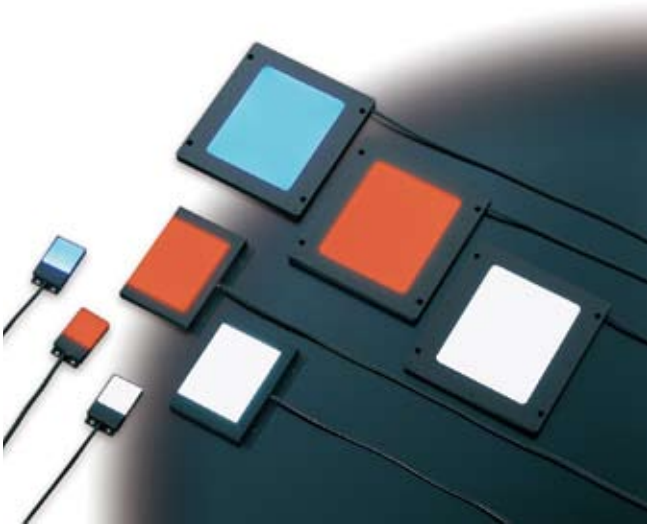
★Made-to-order products.

Illumination Structure



Main Uses
- Lead Frame Inspection
- Visual Inspection of Electronic Parts
- Bend Lead Inspection for GFPs, QSPs and SOPs
- Inspection of Transparent Films for Dirt
- Various Silhouette Observations

Edge Type Backlights
MEBL Series



Explanation of Model Code

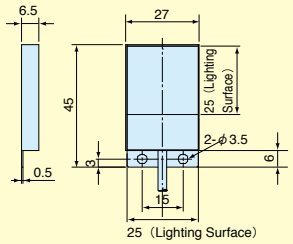
MEBL-C □ □
- □: Emitted Color
  - R Red
  - G Green
  - B Blue
  - W White
- □: Illumination Area Dimensions (Length • Width)

- Does not take up space due to slim, compact design.
- Irradiates a uniform light by means of a unique light transfer diffusion plate

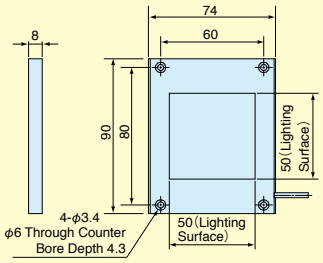
Model	Emitted Color	Maximum Related Current IFM (A)	Dimensions of Illumination Area (mm)	Weight (g)	Product Code
MEBL-CR25	Red	0.03	25×25	45	A-2075
★ MEBL-CG25	Green	0.04	25×25		A-2132
MEBL-CB25	Blue	0.04	25×25		A-2077
MEBL-CW25	White	0.04	25×25		A-2076
MEBL-CR50	Red	0.17	50×50	110	A-2069
★ MEBL-CG50	Green	0.29	50×50		A-2133
MEBL-CB50	Blue	0.29	50×50		A-2071
MEBL-CW50	White	0.29	50×50		A-2070
MEBL-CR7050	Red	0.15	70×50	140	A-2078
★ MEBL-CG7050	Green	0.25	70×50		A-2134
MEBL-CB7050	Blue	0.25	70×50		A-2080
MEBL-CW7050	White	0.25	70×50		A-2079
MEBL-CR10080	Red	0.32	100×80	230	A-2072
★ MEBL-CG10080	Green	0.57	100×80		A-2135
MEBL-CB10080	Blue	0.57	100×80		A-2074
MEBL-CW10080	White	0.57	100×80		A-2073
MEBL-CR145	Red	0.45	145×145	460	A-2187
★ MEBL-CG145	Green	0.8	145×145		A-2189
MEBL-CB145	Blue	0.8	145×145		A-2186
MEBL-CW145	White	0.8	145×145		A-2188

★Made-to-order products.

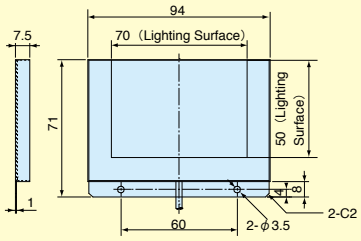
MEBL-CR (CG,CB,CW) 25



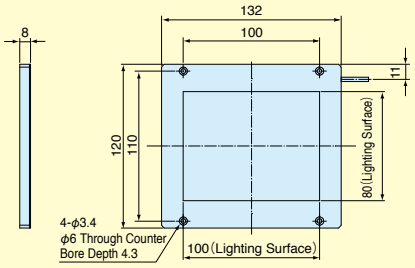
MEBL-CR (CG,CB,CW) 50



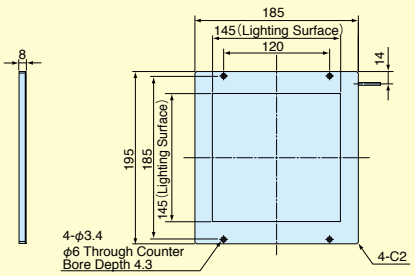
MEBL-CR (CG,CB,CW) 7050



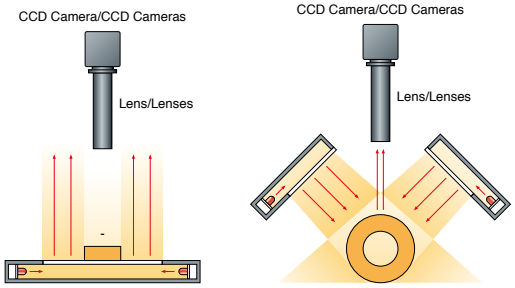
MEBL-CR (CG,CB,CW) 10080



MEBL-CR (CG,CB,CW) 145



Illumination Structure



The MEBL series can also be used as a reflective light for a sample with local reflection.

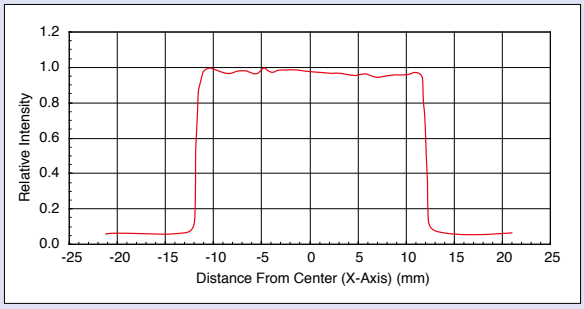
Sample Images

Bottle Liquid Level MEBL-CR145

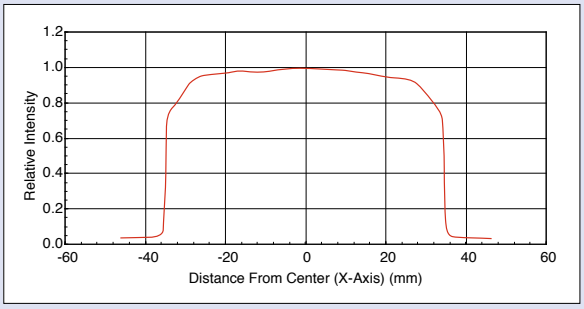
Electrodes On Liquid Crystal Glass MEBL-CW7050

Light Distribution Characteristic

MEBL-CW25



MEBL-CW7050



MG-Wave Series Power Supplies

MLEK Series

RoHS Directive | CE Marking | Worldwide Power Supply

Constant current power supply 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) to be introduced in Europe in July 2006.

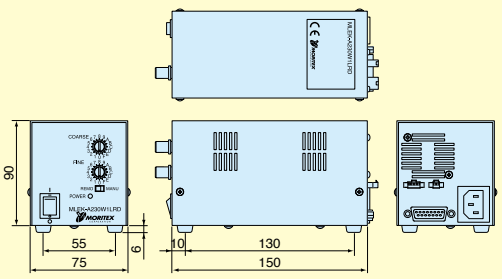
A080W Analog Series

(Supports up to TOTAL 0.8A)

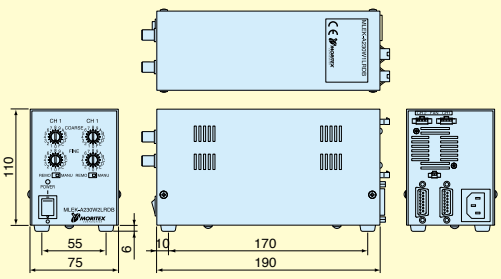
The analog intensity control types 1 channel and 2 channel support multiple input voltages (AC 100 to 240 V) and CE marking.

Model	MLEK-A080W1LR		MLEK-A080W2LR	
Order Code	MLEK-A080W1LR-100V	MLEK-A080W1LR-200V	MLEK-A080W2LR-100V	MLEK-A080W2LR-200V
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~+45 °C		0~+45 °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, control error)		Yes(Photo-coupler insulation, control 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	
product code	A-2300	A-2301	A-2302	A-2303

MLEK-A080W1LR / MLEK-A230W1LR
MLEK-A080W1LRD / MLEK-A230W1LRD



MLEK-A080W2LR / MLEK-A230W2LR
MLEK-A080W2LRD / MLEK-A230W2LRDB



RoHS Directive | CE Marking | Worldwide Power Supply

A230W Analog Series

(Supports up to TOTAL 2.3A)

The analog intensity control types 1 channel and 2 channel support multiple input voltages (AC 100 to 240 V) and CE marking.

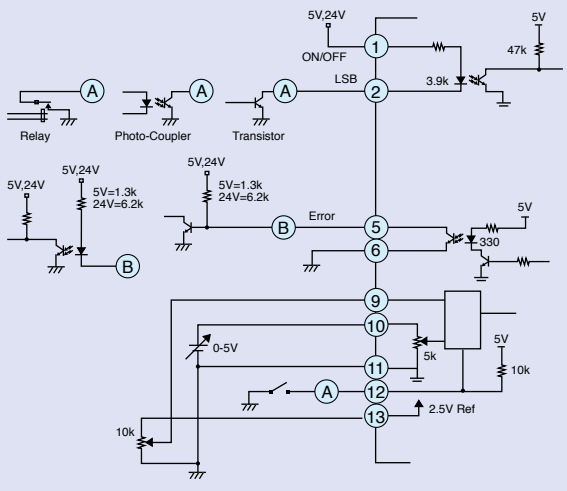
Model	MLEK-A230W1LR		MLEK-A230W2LR	
Order Code	MLEK-A230W1LR-100V	MLEK-A230W1LR-200V	MLEK-A230W2LR-100V	MLEK-A230W2LR-200V
AC Type	100V	200V	100V	200V
Output	1 channel output max. 2.3A (Connects to all lights except MCEP Series only)		2 channel output max. 2.3A for each channel/ Total max. 2.3A (Connects 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~+45 °C		0~+45 °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, control error)		Yes (Photo-coupler insulation, control 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	
Product Code	A-2304	A-2305	A-2306	A-2307

Connection Specifications

For the **A080 Series/ A230W Series**

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	Control error signal (open collector)	13	DC2.5V/ Bias power output
6	Control error signal (open emitter)	14	NC
7	NC	15	NC
8	NC		

Input/Output Circuit Diagrams



A080W Digital Series

(Supports up to TOTAL 0.8A)

The digital intensity control types 1 channel or 2 channel support multiple voltage input (AC100 to 240V) and CE marking.

Model	MLEK-A080W1LRD		MLEK-A080W2LRD	
Order Code	MLEK-A080W1LRD-100V	MLEK-A080W1LRD-200V	MLEK-A080W2LRD-100V	MLEK-A080W2RD-200V
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~+45 °C		0~+45 °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, control error)		Yes(Photo-coupler insulation, control 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	
Product Code	A-2231	A-2252	A-2232	A-2253

A230W Digital Series

(Supports up to TOTAL 2.3A)

The digital intensity control types 1 channel or 2 channel support multiple voltage input (AC100 to 240V) and CE marking.

Model	MLEK-A230W1LRD		MLEK-A230W2LRDB	
Order Code	MLEK-A230W1LRD-100V	MLEK-A230W1LRD-200V	MLEK-A230W2LRDB-100V	MLEK-A230W2LRDB-200V
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~+45 °C		0~+45 °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, control error)		Yes (Photo-coupler insulation, control 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	
Product Code	A-2233	A-2254	A-2234	A-2255

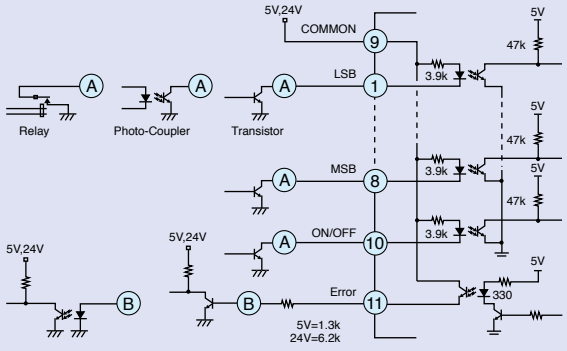
Connection Specifications

For the **A080 Series/ A230W Series**

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

Input/Output Circuit Diagrams

With **A080W Series/ A230W Series**



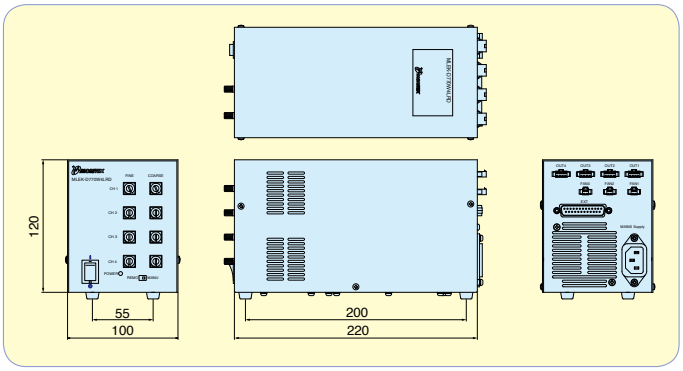
MG-Wave Series Power Supplies

MLEK Series

Multi Channel Series

RoHS Directive | CE Marking | Worldwide Power Supply

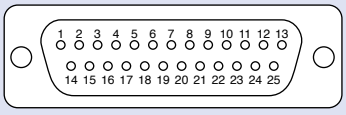
The digital intensity control types 4 channel support multi-voltage input (AC100 to 240V), and is RoHS compliant.
In addition to the conventional 8-bit 256 level intensity control, the digital intensity control types now have the capability of a 10-bit 1024 level intensity control. Complies with CE marking.



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 50/60H z	
Input Current	1.7/0.8A (at AC100/ 240V)	
Surge Current	18A or less (at AC100V) 41A or less (at AC230V)	
Operating Temperature	0~+45 °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	
Product Code	A-2235	A-2256

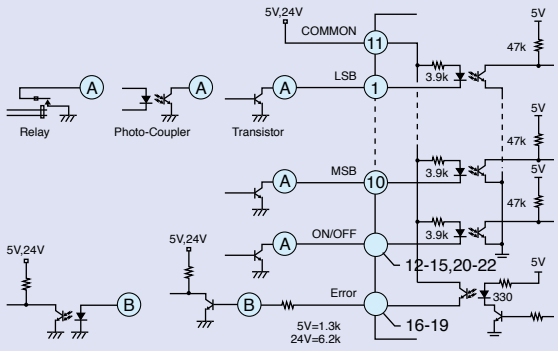
Connection Specifications

No.	Name	No.	Name
1	10-bit digital input 20 (10-bit/ LSB)	14	CH3 Output ON/ OFF signal (input)
2	10-bit digital input 21	15	CH4 Output ON/ OFF signal (input)
3	10-bit digital input 22 (8bit/LSB)	16	CH1 control error signal input
4	10-bit digital input 23	17	CH2 control error signal input
5	10-bit digital input 24	18	CH3 control error signal input
6	10-bit digital input 25	19	CH4 control error signal input
7	10-bit digital input 26	20	CH Select
8	10-bit digital input 27	21	CH Select
9	10-bit digital input 28	22	Write TRG
10	10-bit digital input 29 (MSB)	23	NC
11	COMMON (+)	24	NC
12	CH1 Output ON/ OFF signal (input)	25	NC
13	CH2 Output ON/ OFF signal (input)		



*These products can also be altered to provide four 15-pin D-subconnectors.

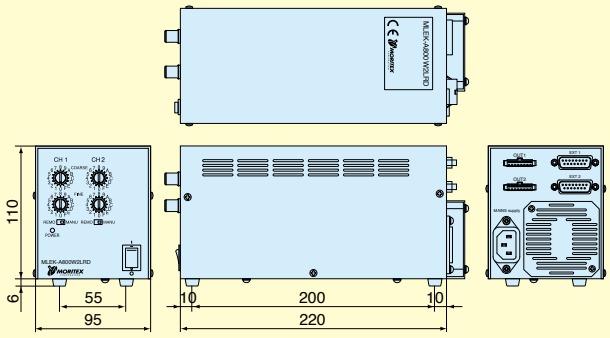
Input/Output Circuit Diagrams



RoHS Directive | CE Marking | Worldwide Power Supply

High wattage Series

The high wattage power supply of digital intensity control types support multiple input voltages (AC100 to 240V), and is RoHS compliant. To support high current power supplies, an 8 PIN output connector is essential. When using standard illumination (4 PIN), use a conversion cable.

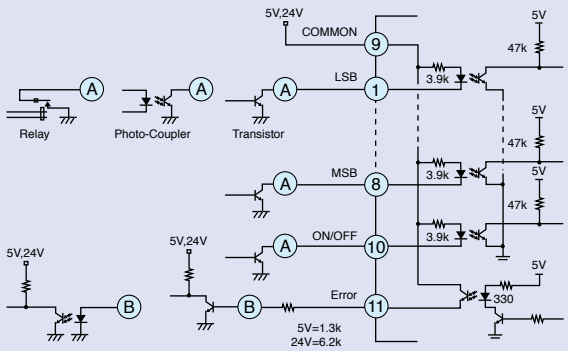


Model	MLEK-A800W2LRD	
Order Code	MLEK-A800W2LRD-100V	MLEK-A800W2LRD-200V
AC Type	100V	200V
Output	2 channel output (Each channel can be independently controlled)	
Input Voltage	AC100V-240V 50/60H z	
Input Current	1.2/ 0.6A (at AC100/ 240V)	
Surge Current	18A or less (at AC100V) 41A or less (at AC230V)	
Operating Temperature	0~+45 °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, control error)	
Cooling System	Forcible cooling by air	
Installation	Rubber legs placed on flat surface	
Weight	Approximately 1.8kg	
Product Code	A-2308	A-2309

Connection Specifications

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

Input/Output Circuit Diagrams



Note

The specification for this power supply 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.

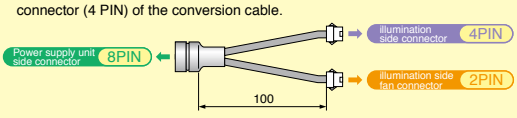
1. Common Matters and Notes

- 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-RCB2**L

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

2. M-RCB8R1LA (4 PIN)

- The following cable is essential when connecting MLEK-A Series illumination with the power supply.
- Connect the 4 PIN connector of the illumination to the illumination side connector (4 PIN) of the conversion cable.



3. Other PIN numbers, etc.

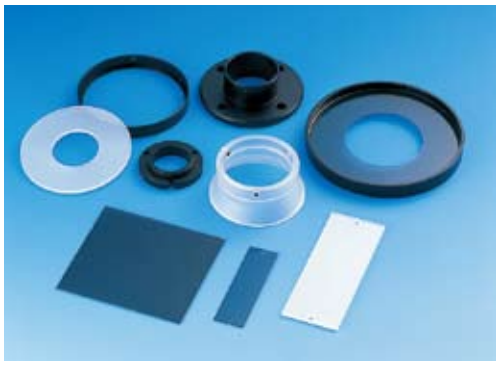
- Only the illumination etc. of the 3 PIN illumination connector cannot be used.

Model	Product Code
M-RCB8R1LA	A-2397

OPTION

Options for the MG-Wave series

Options



Options for Illumination

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

Diffusion Plate: MDF Series

Attachment of the direct illumination type increases reach of the light diffusion plate and reduces reflection and glare from the element.

Model	Product Type	Compatible Light Models	Internal Diameter (mm)	Product Code
MDF-DR10	diffusion plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 10	φ9	A-9010
MDF-DR16	diffusion plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 16	φ14	A-9011
MDF-DR28	diffusion plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 28	φ26	A-9044
MDF-DR31	diffusion plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 31	φ28	A-9012
MDF-DR35	diffusion plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 35	φ35	A-9062
MDF-DR36	diffusion plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 36	φ36	A-9058
MDF-DR50	diffusion plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 50	φ46	A-9013
MDF-DR56	diffusion plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 56	φ54	A-9014
MDF-LR25	diffusion plate for low-angle ring illumination	MLRL-CR (CG,CB,CW) for 25	φ18	A-9015
MDF-LR48	diffusion plate for low-angle ring illumination	MLRL-CR (CG,CB,CW) for 48	φ40	A-9016
MDF-LR68	diffusion plate for low-angle ring illumination	MLRL-CR (CG,CB,CW) for 68	φ54	A-9017
MDF-LR100	diffusion plate for low-angle ring illumination	MLRL-CR (CG,CB,CW) for 100	φ82	A-9018
MDF-BR5015	diffusion plate for bar illumination	MBRL-CR (CG,CB,CW) for 5015	—	A-9019
MDF-BR7530	diffusion plate for bar illumination	MBRL-CR (CG,CB,CW) for 7530	—	A-9020
MDF-BR13015	diffusion plate for bar	MBRL-CR (CG,CB,CW) for 13015	—	A-9021
MDF-DQ108	diffusion plate for square oblique illumination	MDQL-CR (CG,CB,CW) for 108, 4 pieces per set	—	A-9050

Polarizing Plate: MPL Series

Attachment of the illumination system with the lens side and set reduces glare and reflection during image processing.

Model	Product Type	Compatible Light Models	Internal Diameter (mm)	Product Code
MPL-SC56	polarizing plate for simulated coaxial illumination	MSCL-CR (CG,CB,CW) for 56	—	A-9047
MPL-SC74	polarizing plate for simulated coaxial illumination	MSCL-CR (CG,CB,CW) for 74-B	—	A-9048
MPL-SC105	polarizing plate for simulated coaxial illumination	MSCL-CR (CG,CB,CW) for 105-B	—	A-9049
MPL-DR10-B	polarizing plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 10	φ9	A-9022
MPL-DR16-B	polarizing plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 16	φ14	A-9023
MPL-DR28-B	polarizing plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 28	φ26	A-9045
MPL-DR31-B	polarizing plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 31	φ28	A-9024
MPL-DR35	polarizing plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 35	φ35	A-9063
MPL-DR36	polarizing plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 36	φ36	A-9059
MPL-DR50-B	polarizing plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 50	φ46	A-9025
MPL-DR56-B	polarizing plate for direct ring illumination	MDRL-CR (CG,CB,CW) for 56	φ54	A-9026
MPL-BR5015-B	polarizing plate for bar illumination	MBRL-CR (CG,CB,CW) for 5015	—	A-9027
MPL-BR7530-B	polarizing plate for bar illumination	MBRL-CR (CG,CB,CW) for 7530	—	A-9028
MPL-BR13015-B	polarizing plate for bar illumination	MBRL-CR (CG,CB,CW) for 13015	—	A-9029
MPL-DQ108	polarizing plate for square oblique illumination	MDQL-CR (CG,CB,CW) for 108, 4 pieces per set	—	A-9051

Sample Images

Without polarizing plate

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

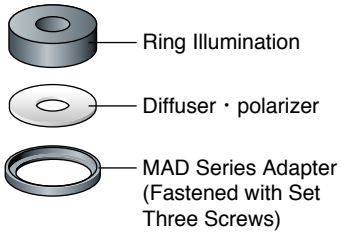
① Attach polarizing plate to the light emitting side of the illumination area
② Attach polarizing filter at end of lens on light-reception side
③ When either the polarizing plate or filter is rotated, luminance distribution of the image is changed. At an arbitrary position regular reflection is cut and produces an image with the glare partly reduced.

Adapter: MAD Series

The MAD series is essential when a diffuser or polarizer is attached to a ring illumination.

Model	Product Type	Compatible Light Models	Product Code
MAD-DR10	plate attachment adapter for direct ring illumination	MDRL-CR（CG,CB,CW）for 10	A-9005
MAD-DR16	plate attachment adapter for direct ring illumination	MDRL-CR（CG,CB,CW）for 16	A-9006
MAD-DR28	plate attachment adapter for direct ring illumination	MDRL-CR（CG,CB,CW）for 28	A-9046
MAD-DR31	plate attachment adapter for direct ring illumination	MDRL-CR（CG,CB,CW）for use with both 31/36	A-9007
MAD-DR35	plate attachment adapter for direct ring illumination	MDRL-CR（CG,CB,CW）for 35	A-9064
MAD-DR50	plate attachment adapter for direct ring illumination	MDRL-CR（CG,CB,CW）for 50	A-9008
MAD-DR56	plate attachment adapter for direct ring illumination	MDRL-CR（CG,CB,CW）for 56	A-9009

How to Use **MAD** Series



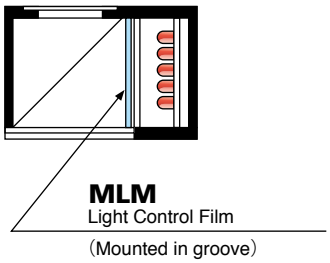
Light Control Film: MLM Series

The MLM series are resin films that transform diffused illumination into parallel illumination. Attached to a simulated coaxial illumination, it makes the light distribution pattern smoother.

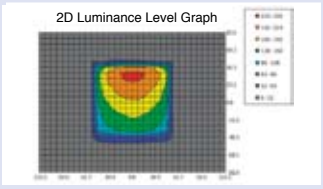
Model	Product Type	Compatible Light Models	Product Code
MLM-SC56	Light control film for simulated coaxial illumination	MSCL-CR（CG,CB,CW）for 56-B	A-9040
MLM-SC74	Light control film for simulated coaxial illumination	MSCL-CR（CG,CB,CW）for 74-B	A-9041
MLM-SC105	Light control film for simulated coaxial illumination	MSCL-CR（CG,CB,CW）for 105-B	A-9042

How to Use **MLM** Series

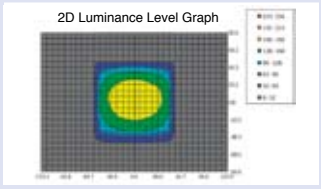
Cross-section of simulated coaxial illumination



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 Options

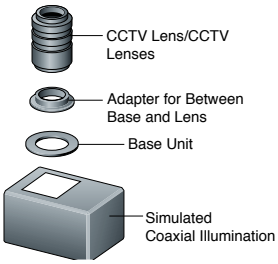
Use the options with Moritex lenses.

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	Product Code
MLA-SCBS	Base for simulated coaxial lens attachment	MSCL-CR (CG,CB,CW) for 24/39/56	A-9036
MLA-SCM255	Adapter for between simulated coaxial illuminating base and lens	for M25.5P0.5 lens	A-9037
MLA-SCM270	Adapter for between simulated coaxial illuminating base and lens	for M27 P0.5 lens	A-9038
MLA-SCM305	Adapter for between simulated coaxial illuminating base and lens	for M30.5P0.5 lens	A-9039

How to Use **MLA-SC** Series



OPTION

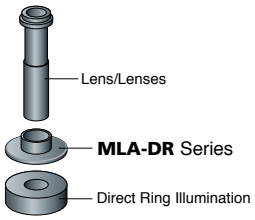
Options for the MG-Wave series

Direct Ring Illumination ⇔ Lens Adapters for MLA-DR Series

Enables small ring illuminations to be attached to lens tips.

Model	Product Type	Compatible Light Models	Product Code
MLA-DR1616	lens attachment adapter	MDRL-CR (CG,CB,CW) 16 and Ø6 lenses	A-9030
MLA-DR3125	lens attachment adapter	MDRL-CR (CG,CB,CW) 31 and Ø25 lenses	A-9031
MLA-DR3130	lens attachment adapter	MDRL-CR (CG,CB,CW) 31 and Ø30 lenses	A-9032
MLA-DR28M255	lens attachment adapter	MDRL-CR (CG,CB,CW) 28 and M25.5P0.5 lenses	A-9065
MLA-DR28M270	lens attachment adapter	MDRL-CR (CG,CB,CW) 28 and M27P0.5 lenses	A-9066
MLA-DR28M305	lens attachment adapter	MDRL-CR (CG,CB,CW) 28 and M30.5P0.5 lenses	A-9067
MLA-DR31M255	lens attachment adapter	MDRL-CR (CG,CB,CW) 31 and M25.5P0.5 lenses	A-9033
MLA-DR31M270	lens attachment adapter	MDRL-CR (CG,CB,CW) 31 and M27P0.5 lenses	A-9034
MLA-DR31M305	lens attachment adapter	MDRL-CR (CG,CB,CW) 31 and M30.5P0.5 lenses	A-9035

How to Use **MLA-DR** Series



Sharp Cut Filer ML-R Series

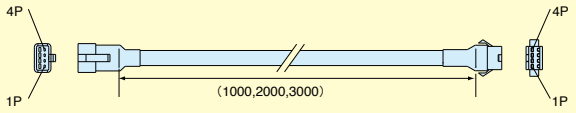
When using red illumination, attachment to the tip of the CCTV lens is effective in preventing ambient light.

Model	Product Type	Size/Qualities	Product Code
ML-R60-25	red filter for attachment to front of lenses	Use with M25.5P0.5 lens	A-8031
ML-R60-27	red filter for attachment to front of lenses	Use with M27 P0.5 lens	A-8032
ML-R60-30	red filter for attachment to front of lenses	Use with M30.5P0.5 lens	A-8033
ML-R64-25	sharp cut filter for attachment to end of lens	Use with M25.5P0.5 lens	A-9055
ML-R64-27	sharp cut filter for attachment to end of lens	Use with M27 P0.5 lens	A-9056
ML-R64-30	sharp cut filter for attachment to end of lens	Use with M30.5P0.5 lens	A-9057

Extension Cables

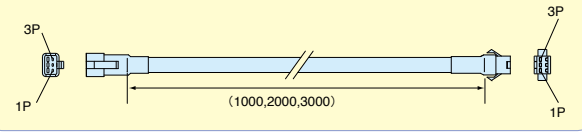
Model	Product Type	Applications	Length	Product Code
M-RCB401L	4-pin type extension cable	• For all illuminations (except MCEP series)	1m	A-2203
M-RCB402L	4-pin type extension cable		2m	A-2204
M-RCB403L	4-pin type extension cable		3m	A-2205
M-RCB301L	3-pin type extension cable	• For MCEP series	1m	A-2215
M-RCB302L	3-pin type extension cable		2m	A-2216
M-RCB303L	3-pin type extension cable		3m	A-2217
M-RCB001L	2-pin type extension cable	• Power supply with in-built illumination fans	1m	A-1027
M-RCB002L	2-pin type extension cable		2m	A-1028
M-RCB003L	2-pin type extension cable		3m	A-1029
MC-EXC-02	Cable for external control of DSUB15P	--	2m	A-8201
MC-EXC-07	Cable for external control of DSUB25P	--	2m	A-9000

M-RCB4L*Straight Connection**

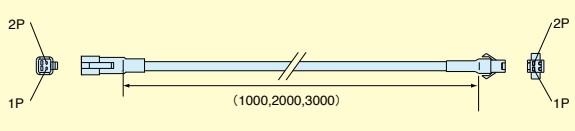


Note: The M-RCB Series extension cables are all robot cables.

M-RCB3L*Straight Connection**



M-RCB0L*Straight Connection**



Other Options

Model	Product Type	Compatible Light Models	Product Code
MCEP-ADLG	adapter for connection with standard light guide	For 8 MCEP-CR (CG, CB, CW)	A-9001
MCEP-ADLG24	adapter for connection with standard light guide	For 8-070 MCEP-CR (CG, CB, CW)	A-9069
MCEP-AD3LGC	RGB mixing unit	Use with both MCEP, MCEP-070 Series	A-9070
MGA-SP42	replacement cover glass	For 42 MSPP-CR (CG, CB, CW)	A-9060
MGA-SP74	replacement cover glass	For 74 MSPP-CR (CG, CB, CW)	A-9061

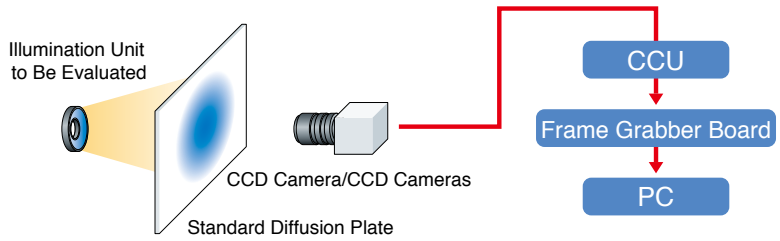
Power Supply Unit Options

Model	Product Type	Product Code
MC-EXC-02	Cable for external control of DSUB15P	A-8201
MC-EXC-07	Cable for external control of DSUB25P	A-9000
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

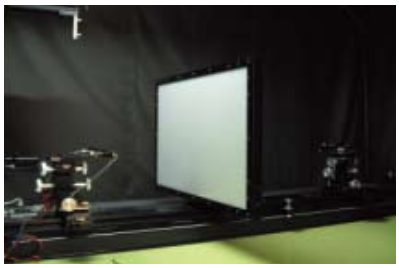
MG-Wave Series

LED Illumination Data

■ Moritex measures the distribution characteristics of lights with CCD cameras close to the operation condition.



■ Equipment for measurement of light distributioncharacteristic

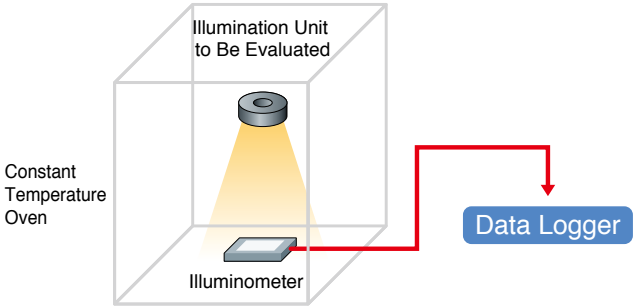


The tested light is installed to face the CCD camera with a standard diffusion plate attached at the position of the working distance at which the measurement is performed. A lens that can cover the whole illumination pattern is attached, and the measurement conducted. The results are uploaded to a computer to obtain the data on 2D luminance level distribution and luminance level variation on the X and Y axes.Measurement data can also be produced using an illuminometer upon request.

	Model	Manufacturer	Model	Notes
1	CCD Camera/CCD Cameras	Sony	XC-ES50	
2	CCD Camera/CCD Cameras	Sony	XC-EI50	IR
3	CCD Camera/CCD Cameras	Sony	XC-EU50	UV
4	Camera Power Supply	Sony	DC-700	
5	Camera Cable	Sony	CCXC-12P05N	5m
6	B&W Monitor	Sony	PVM-146J	14inch
7	CCTV Lens/CCTV Lenses	Moritex	Each model ranging from f6 to f100	
8	MML	Moritex	Each model ranging from x0.18 to x12	
9	Diffuser	Mitsubishi Rayon	#441	
10	Illuminometer	Minolta	T-10M	

*Each of the Moritex lenses can be evaluated. Please inquire.

■ Moritex obtains the temperature characteristics data in the following manner.



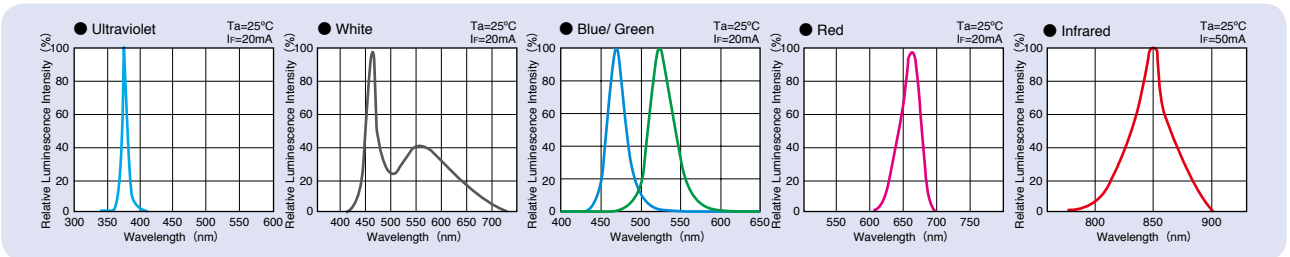
■ Constant temperature bath and other testing instruments

The tested light equipped is installed in the constant-temperature bath with a thermocouple and the illuminometer are. The data is uploaded & imported to a computer to determine the variation in the heat and the light intensity over time.

	Product Name	Manufacturer
1	Thermocouple	General-Purpose Model
2	Data Logger	keyence
3	Power Supply	Kenwood
4	Constant Temperature Oven	Tabai Espec

■ LED Spectral Characteristics

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



Halogen Light Sources

Halogen Light Sources can irradiate all visible light rays from wavelengths of 400 to 750nm with high power, and maintain excellent luminosity. In addition, when combined with a light-guide, they save space and achieve a colorful illumination pattern, making them the standard light source for image processing.

Through the in-house design and manufacture of all products from halogen lamps to light source devices, Moritex has been accumulating data and seeking reliability in the Moritex halogen series. The series provides 50W, 100W, and 150W models with various functions and options.

[Notes]

- **Lamps** — Only compatible lamps can be used.
- **Average Lamp Life** — A number of lamps are powered at the rated voltage until filaments of half of the lamps break. The average life time is calculated based on this time and the peak usage time.
- **Average Illuminance** — Measured as the standard luminance at 50mm from the end of the fibre at the maximum volume when Moritex standard light guide MSG4-2200S is mounted.
- **Notes for Using Plastic Fiber.** — The heat resistance of plastic fibre is up to approximately 70˚C. Do not use over this temperature as the fiber end will melt.

Light Sources and Available Light Gides

Light Source	Light Guide				Other Options
	Plastic		Compound Glass		Internal Filter (*1)
	Fiber Bundle Diameter (Light Source Side)		Standard	Heat Resistant	
	Below 6 Dia.	6 Dia. or More			
MHF-V501	○	○	○	○	○
MHF-LH50	○	○	○	○	○
MHAA-100W	○ *3	KA-03 *3	○	○	○
MHF-LH100	○ *3	KA-03 *3	○	○	○
MHAB-100W-IR	×	×	×	○	×
MHAB-150W	×	×	○	○	△*2
MME-250	×	×	×	○	×

*1 The characteristics may be changed by deterioration under the operating environment.
*2 Deterioration may be caused by use at high output.
*3 This is when the product is used at the environmental temperature of 40˚C or less.

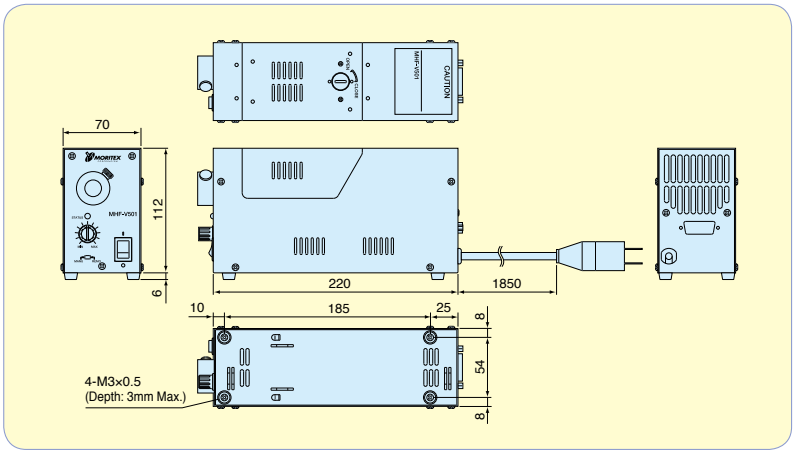
50W Series

MHF-V501

RoHS Directive

Compact and multifunctional 50W Halogen Light Sources at excellent cost and great performance. This unit costs the least and lasts the longest of all our Halogen Light Sources.

- Achieves a compact size, light weight, and low cost
- Equipped with a variety of protection functions
- Environmentally friendly and in compliance with the RoHS Directive



Order Code	MHF-V501
Input Voltage	AC85V–125V (50Hz/60Hz)
Power Consumption	125VA (Max.)
Compatible Lamp*1	LM-50 (12.0V,50W)
Lamp Voltage	DC11.7V±0.2V (Max.)
Average of Lamp Life Time*2	2,000 Hours Nominal
Average Illuminance*3	About 19,000 Lx
Color Temperature	About 3,000K
Installation	Rubber legs placed on flat surface
Weight	Approximately 1.8kg
Operating Temperature and Humidity	0°C - 45°C/20% - 80%RH
Protection Function	Lamp Overcurrent Detection Function: Monitor output, cut off lamp power, LED (RED) on front panel ON Lamp Burn-out Detection Function: Monitor output, LED (RED) on front panel ON Internal High Temperature Detecting Function: Monitor output, cut off lamp power
Product Code	A-0412

OPTION

<Optional Parts>

Cable with External Remote Connector	MC-EXC-02
External Remote Connector	D-SUB15S
Replacement Lamp	LM-50

*1 Only compatible lamps can be used.
*2 Many lamps are powered on at rated current and the time measurements until their filaments blow are normally distributed. The average time from the peak time until the survival ratio of 50% is called the average life.
*3 The average illuminance is at 50mm from the fiber end at the maximum volume when Moritex standard light guide (MSG4-2200S) is attached.

Special Power Supply Unit Specifications

Order Code	MHF-V501-SO	MHF-V501-SC	MHF-V501-D	★MHF-V501-D-SO	★MHF-V501-D-SC
Remarks	Bult-in Shutter (Normally open)	Bult-in Shutter (Normally closed)	With External 8-Bit Digital Dimmer	With External Digital Dimmer and Built-In Shutter (Normally open)	With External Digital Dimmer and Built-In Shutter (Normally closed)
Product Code	A-0414	A-0413	A-0501	A-0503	A-0502

★Made-to-order products.

*For detailed specifications, see P.I-82.

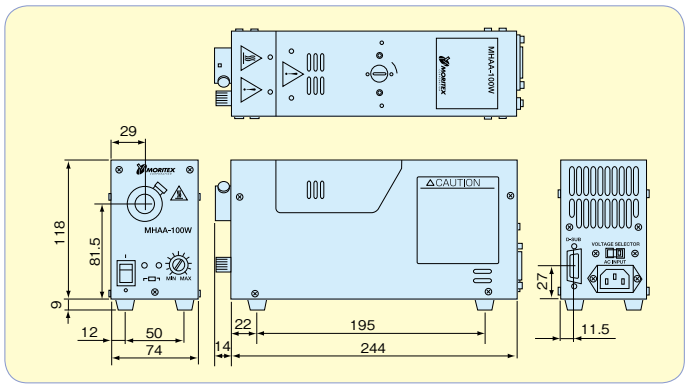
100W Series

MHAA-100W

RoHS Directive | CE Marking | Worldwide Power Supply

The 100W Halogen Light Source is the standard model in the halogen light source series because it exhibits excellent performance in all aspects.

- Worldwide power supply specifications (100/200V switch type)
- Compliance with CE Marking safety standards
- Environmentally friendly and in compliance with the RoHS Directive



Model	MHAA-100W	
Order Code	**MHAA-100W-100V**	**MHAA-100W-200V**
AC Type	100V	200V
Setting At Shipping	Input Voltage Selector: At 115 With 2.0-Meter AC Cable MC-AC 100A	Input Voltage Selector: At 230 With 2.0-Meter AC Cable MC-AC 200A
Input Voltage	AC100-120V/200-240V (50/60Hz)	
Input Voltage Switch*1	Input At AC100: Setting At 115 Input At AC200: Setting At 230	
Input Current (Typ)	2.4A (At AC 100V Input) 1.2A(At AC 200V Input)	
Compatible Lamp*2	LM-100 (12.0V,100W)	
Lamp Voltage	DC11.7V ±0.2V (Max.)	
Average of Lamp Life Time*3	1,000 Hours Nominal	
Average Illuminance*4	Approximately 30,000 Lx	
Color Temperature	3,100K	
Installation	Rubber legs placed on a flat surface	
Weight	Approximately 2.0kg	
Protection Function	Lamp Overcurrent Detection Function: Monitor output, cut off lamp power, LED (RED) on front panel ON Lamp Burn-out Detection Function: Monitor output, LED (RED) on front panel ON Internal High Temperature Detecting Function: Monitor output, cut off lamp power	
Operating Temperature and Humidity	0°C to 45°C :Linear Decrease Down to 80%RH at 31°C and 50%RH at 40°C	
Safety Standard*5	EN61010:2001 EN61000-6-2:2001/EN55011:1998,A1:1999, A2:2002	
Product Code	A-0510	A-0516

OPTION

<Optional Parts>

Cable with External Remote Connector	**MC-EXC-02**
External Remote Connector	**D-SUB15S**
Replacement Lamp	**LM-100**

*1 When the switch is set at 115V, do not apply AC 200V. Doing so may damage the power supply. When the input voltage selector is set at 230V, the device does not run on AC 100V.
*2 Only compatible lamps can be used.
*3 Many lamps are powered on at rated current and the time measurements until their filaments blow are normally distributed. The average time from the peak time until the survival ratio of 50% is called the average life time.
*4 The average luminance is at 50mm from the fiber output at maximum volume when a Moritex standard light guide (MSG4-2200S) is attached.
*5 This is only when the voltage is -200V.
Note: May be unable to use with plastic fibers.
(See table on **P.I-73**.)

■ Special Power Supply Unit Specifications (AC100V Type)

Order Code	MHAA-100W-SO-100V	MHAA-100W-SC-100V	MHAA-100W-D-100V	★MHAA-100W-D-SO-100V	★MHAA-100W-D-SC-100V
Remarks	Bult-in Shutter (Normally Open)	Bult-in Shutter (Normally Open)	With External 8-Bit Digital Dimmer	With External Digital Dimmer and Built-In Shutter (Normally Open)	With External Digital Dimmer and Built-In Shutter (Normally Open)
Product Code	A-0512	A-0511	A-0513	A-0515	A-0514

★Made-to-order products.

*For detailed specifications, see **P.I-82**.

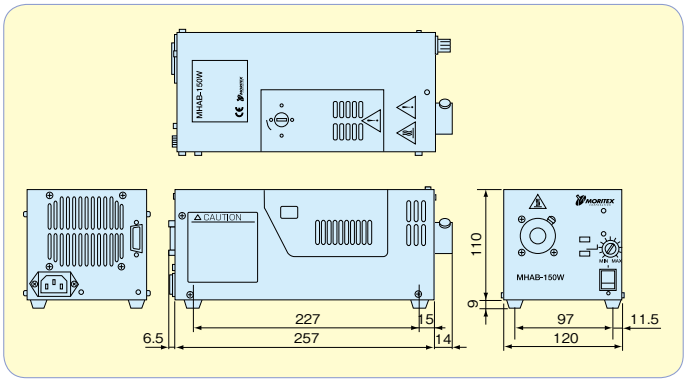
150W Series

MHAB-150W

RoHS Directive | CE Marking | Worldwide Power Supply | Dual Lamp Wattage | Linear Intensity Control (Option)

150W Halogen Light Source of dual wattage, designed for 150W but also available for 100W if a 100W lamp is attached.
The irradiation is the most powerful among the Halogen Light Source Series.
This high-performance model can be provided with an external linear intensity control (option).

- High illuminance model max 80,000 Lux (2.6 times a 100W light source)
- 100W/150W Dual Wattage Lamp
- External linear intensity control option
- Environmentally friendly and in compliance with the RoHS Directive
- Worldwide power supply specifications



Model	MHAB-150W	
Order Code	MHAB-150W-100V	MHAB-150W-200V
AC Type	100V	200V
Setting At Shipping	With 2.0-Meter AC Cable MC-AC 100A	With 2.0-Meter AC Cable MC-AC 200A
Input voltage	AC100V-240V (50Hz/60Hz)	
Compatible Lamp*1	LM-150 LM-150C LM-100	
Lamp Voltage	DC 14.7V±0.2V (Max.) (LM-150 LM-150C) DC 11.7V±0.2V (Max.) (LM-100.)	
Average Lamp Life*2	50 Hours (LM-150), 500 Hours (LM-150C), and 1,000 Hours (LM-100) Nominal	
Average Illuminance*3	Approx. 80,000 Lx (LM-150), 45,000 Lx (LM-150C), and 30,000 Lx (LM-100)	
Color Temperature	3400K (LM-150) 3200K (LM-150C) 3100K (LM-100)	
Installation Method	Rubber legs placed on flat surface	
Weight	Approximately 3.2kg	
Operating Temperature and Humidity	0°C to 45°C:Linear Decrease Down to 80%RH At 31°C and 50%RH At 40°C	
Protection Function	Lamp Overcurrent Detection Function: Monitor output, cut off lamp power, LED (RED) on front panel ON Lamp Burn-out Detection Function: Monitor output, LED (RED) on front panel ON Internal High Temperature Detecting Function: Monitor output, cut off lamp power	
Safety Standard*4	EN61010:2001 EN61000-6-2:2001/EN55011:1998, A1:1999, A2:2002	
Product Code	A-0520	A-0526

OPTION

<Optional Parts>

Cable with External Remote Connector	MC-EXC-02
External Remote Connector	D-SUB15S
Replacement lamp	LM-100, LM-150, LM-150C

*1 Only compatible lamps can be used.
*2 Many lamps are powered on at rated current and the time measurements until their filaments blow are normally distributed. The average time from the peak time until the survival ratio of 50% is called the average life time.
*3 The average luminance is at 50mm from the fiber output at maximum volume when a Moritex standard light guide (MSG4-2200S) is attached.
*4 This is only when the voltage is -200V.
Note: May be unable to use with plastic fibers.

Special Power Supply Unit Specifications (AC100V Type)

Order code	MHAB-150W-C-100V	★MHAB-150W-SO-100V	★MHAB-150W-SC-100V	MHAB-150W-D-100V	★MHAB-150W-D-SO-100V	★MHAB-150W-D-SC-100V	★MHAB-150W-LI-100V
Remarks	Long Life Type	Internal Shutter Attached (Normal Open)	Internal Shutter Attached (Normal Closed)	With External Digital Dimmer	External Digital Modulation & Internal (Normal Open)	External Digital Modulation & Internal (Normal Closed)	Linear Intensity Control
Product Code	A-0521	A-0529	A-0528	A-0522	A-0531	A-0530	A-0523

★Made-to-order products

*For detailed specifications, see P.I-82.

Main uses

Invisible Image Inspection | Void Inspection | SAW Filter (LiNb03 LiTa03) Inspection | MEMS Inspection | Wafer Positioning | PCB Positioning | Image Recognition Through Film | Wire Recognition on TAB Board | Wafer Surface Inspection・OCR | Illumination for Infrared Microscope

Infrared 100W Halogen Light Source

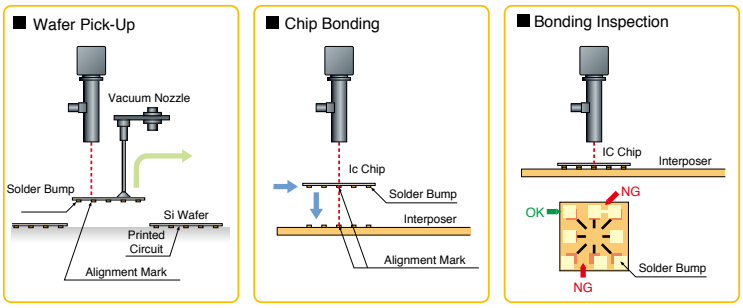
MHAB-100W-IR

- Irradiation of silicon transmission wavelength (1127nm or more) (Patent pending)
- Radiation mechanism due to unique technology

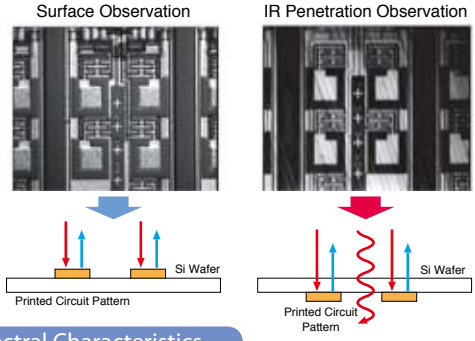
This light source is developed from know-how accumulated over many years and is the global standard in light sources for the monitoring of invisible images. Besides Si, the GaAs compound semi-conductor and LiNbO3LiTaO3 SAW filter, etc. are also effective.

RoHS Directive | CE Marking | Worldwide Power Supply

Example Application



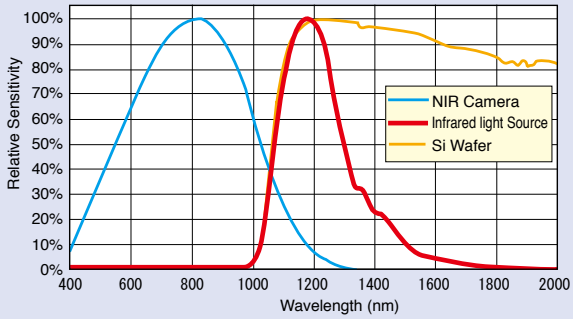
IR Coaxial Penetration Observation



Model	MHAB-100W-IR	
Order Code	MHAB-100W-IR-100V	MHAB-100W-IR-200V
AC Voltage	100V	200V
Setting At Shipping	AC cable: With MC-AC100A-2.0M	AC cable: With MC-AC200A-2.0M
Input Voltage	AC100V-240V(50Hz/60Hz)	
Compatible Lamp*1	LM-100-IR(12.0V/100W)	
Lamp Voltage	DC 10.7± 0.2V(Max.)	
Average Of Lamp Life Time*2	1,000 Hours Nominal	
Installation	Rubber Legs Placed on Flat Surface	
Weight	Approximately 3.2Kg	
Standard Functions	Manual intensity control/ External volume intensity control/ External analog intensity control	
External Dimensions	W120 ×H110 ×D257mm*3	
Product Code	A-0524	A-0527

*1 Example application
*2 Many lamps are powered on at rated current and the time measurements until their filaments blow are normally distributed. The average time from the peak time until the survival ratio of 50% is called the average life time.
*3 Projections are not included.

Spectral Characteristics



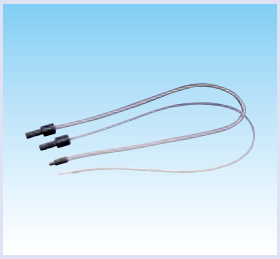
Accessories for IR Systems

●Spare Lamp

Model	LM-100-IR
Specification	IR Reflection Coating for 100W
Product Code	A-8216

●Lens Series for IR System

Model	MML4-80D-IR	MML6-80D-IR	MML8-80D-IR
Specification	For IR x4x6x8		
Product Code	A-0235	A-0236	A-0237



●Heat Resistance Light Guide

model	MSG4-1100S-HR
Specification	Heat Resistant Specification Light Guide
Product Code	A-0637

●Infrared Camera

Model	MC-781P-0030
Specification	2/3" 780H×488pix NIR Sensitivity
Product Code	A-0346

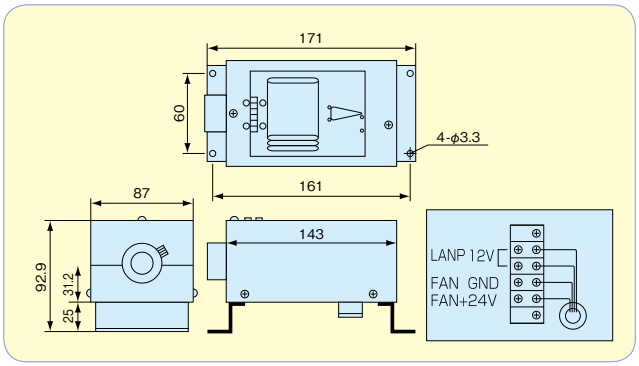
Note: Only heat-resistant light guides can be used.

Lamp House

50W/100W Type

RoHS Directive

Small and lightweight lamp house without power supply unit.
This unit is ideal when there is not enough space to install a lamp house and power supply together. The compact lamp house can be installed with the operation voltage of a lamp, and a cooling fan supplied remotely.



Model	MHF-LH50	MHF-LH100
Compatible Lamp*1	**LM-50**	**LM-100**
Lamp Rated Voltage/Wattage	DC12V/50W	DC12V/100W
Lamp Rated Voltage/Current	DC24V/90mA(Max.)	
Average Lamp Life*2	Approximately 2,000 Hours Nominal	Approximately 1,000 Hours Nominal
Average Illuminance*3	Approximately 20,000Lx	Approximately 32,000Lx
Color Temperature	3,000K	3,100K
Installation	Brackets Placed on Flat Surface	
Weight	0.8kg	
Operating Temperature and Humidity	0°C-45°C/20%-80%RH	
Product Code	A-0466	A-0468

OPTION

<Optional Parts>

Replacement Lamp	LM-50	LM-100
Product Code	A-8203	A-8213

*1 Only compatible lamps can be used.
*2 Many lamps are powered on at rated current and the time measurements until their filaments blow are normally distributed. The average time from the peak time until the survival ratio of 50% is called the average life.
* The average illuminance is measured at 50mm from the fiber end at the maximum intensity when a Moritex standard light guide (MSG4-2200S) is attached.

RS-485 Communication Unit
MCGA-204D

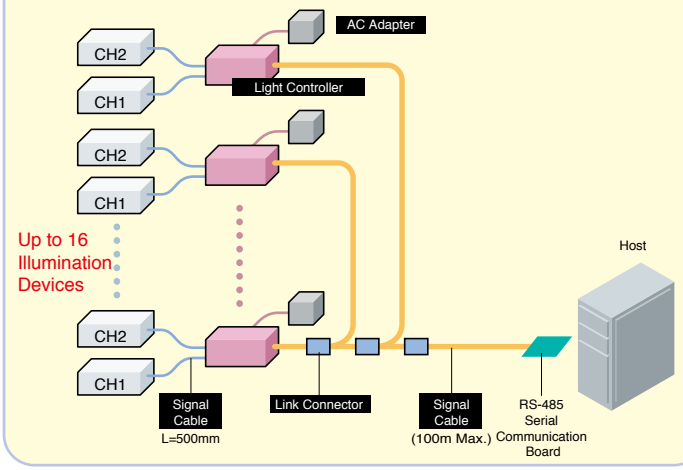
RoHS Directive
CE Marking

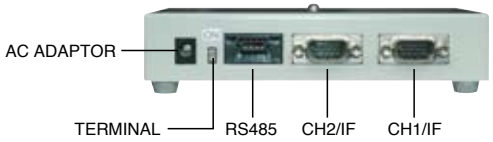
Light controller for the batch control of Moritex standard light sources and power supplies by RS-485 communication

- Single unit for controlling 1 channel or 2 channels
- Batch control of up to 16 channels by unit connection
- Standard light sources and power supplies connectable

(Some older models not supported)

((General configuration))





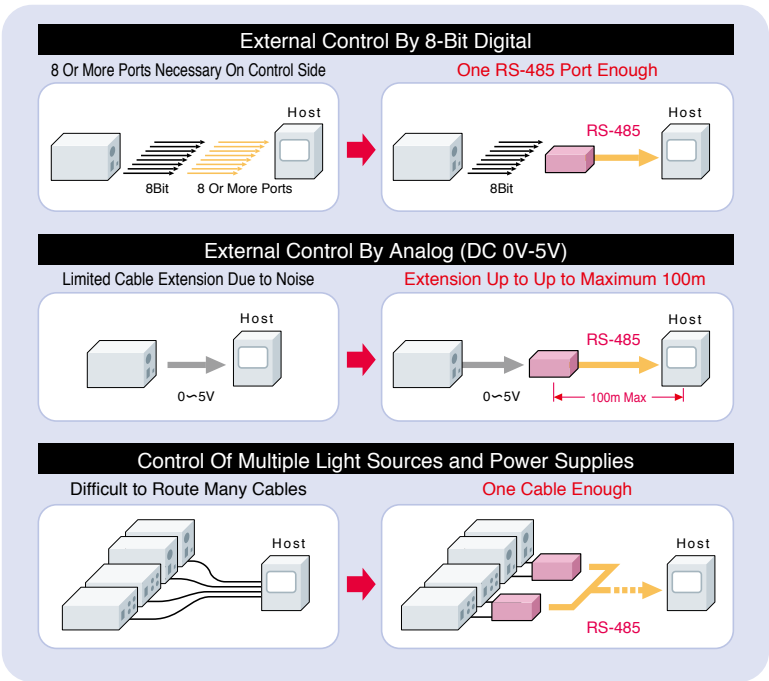
Communication Specifications	
Communication Interface	RS-485
Communication System	Asynchronous, Simplex
Transmission Speed	115.2 (19.2–115.2) Kbps

◆ Capable of connecting to Moritex standard light sources and power supplies

Halogen Light Sources	LED Power Supply
MHF-V501 Series	**MLEK-A/B** (1 Channel, 2 Channel Series)
MHAA-100W Series	**MLEK-A** (Conversion Plug Essential for 3 Channel)
MHAB-150W Series	**MLED-G02512LRD**
MHAB-100W-IR	**MLED-E00811L** (Supports ON/ OFF illumination only)

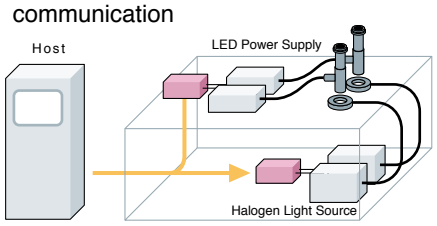
Model	Model	Product Code
MCGA-204D	RS-485 Communication Unit	A-1600
MCBB-24W-100V	ACadapters(100V)	A-1601
MC-EXC-08	Signal Cable L=500mm	A-8230
MU-EXC-01	Communication Cable L=10m	A-9004
MU-CON-01	Link Connector (2pcs)	A-1602

◆ RS-485 Communication Unit

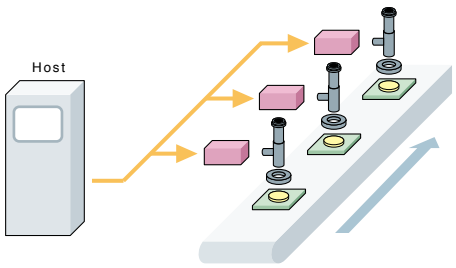


◆ Example of Application

■ Halogen light source and LED power supply control by RS-485 communication

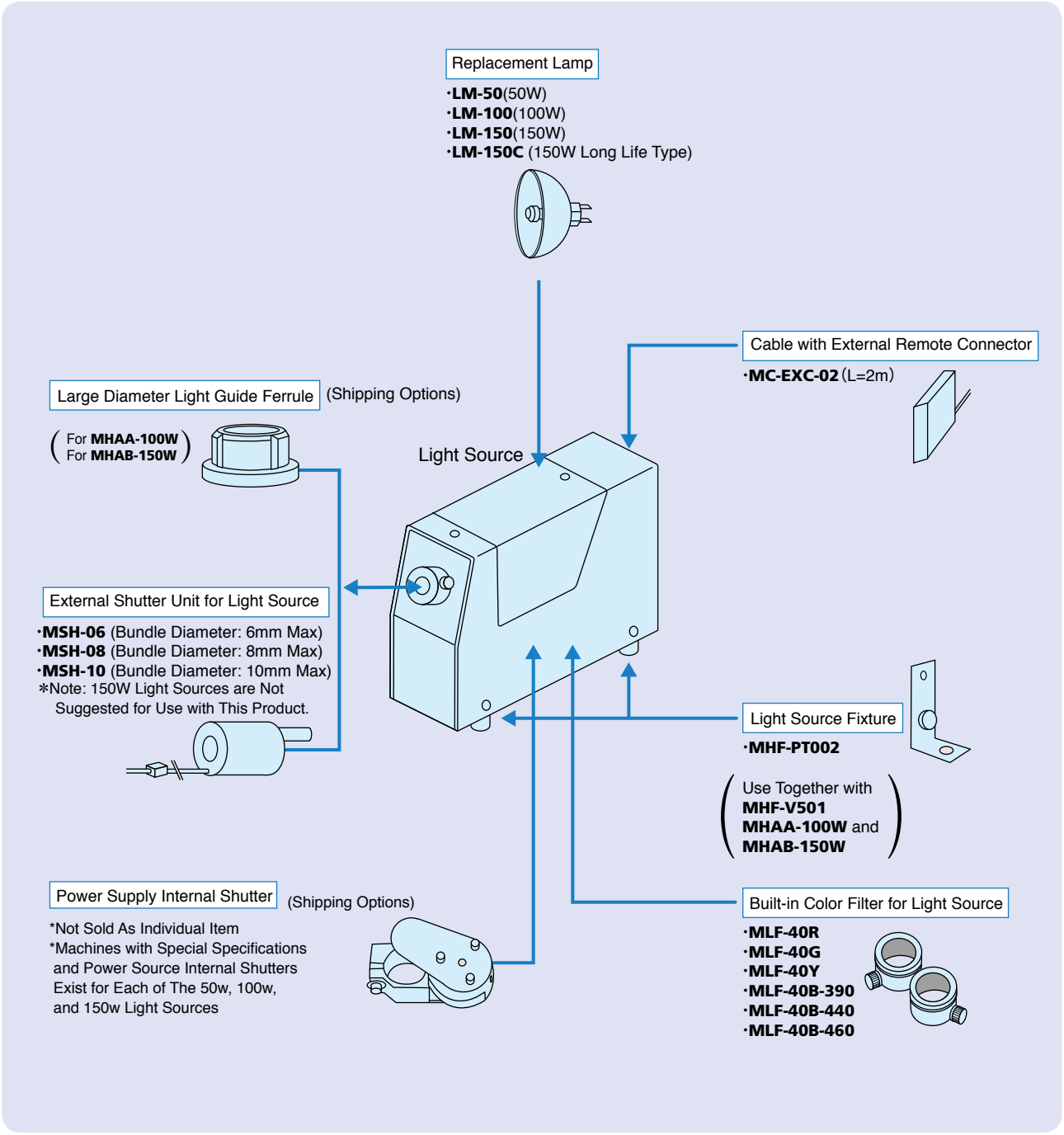


■ Batch control of production processes by RS-485 communication



Options

Option Attachment Drawing for Halogen Light Sources



◎ For light source compatibility, specifications and product codes of the options, see corresponding pages.

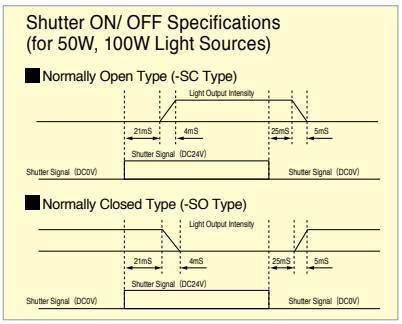
Light Source Equipment Options

Light Source Internal Shutter

Made-to-order Product (optional at time of shipping)

- Internal type means that installation space is not necessary.
- Achieves of a long life time that averages the shutter being opened and closed 50 million times.
- Independent OPEN and CLOSE is possible regardless of modulation function.
- Either opening or closing for the shutter can be chosen when voltage is superimposed.

* Not sold separately as an individual item.
* For each of the 50W, 100W, and 150W light sources there are customized specification models each with an built-in power supply.

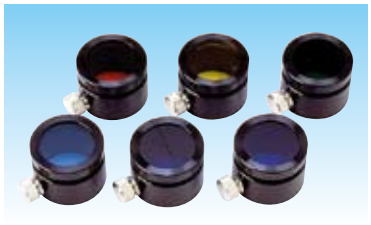


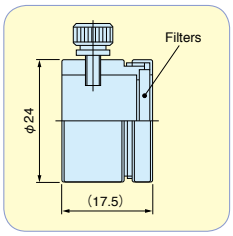
■ Specifications
● Operation input voltage: DC 24V 0.32A
● Shutter response speed

		50W, 100W	150W
Normally Open	Closed	25mS	33mS
	Open	30mS	
Normally Closed	Open	25mS	
	Closed	30mS	

* Response speed for a fiber with a diameter of 4mm when no protective diode exists.
● Average life time for opening and closing of the shutter is approximately 50 million times (average for tests performed by Moritex).
* The OPEN and CLOSE speed of the shutter may vary slightly depending on the capabilities of the power supply being used.
(Attachment of the model number for ordering)
(Example) When a normal open shutter is attached to MHAA-100W-100V: MHAA-100W-SO-100V.

Light Source Internal Color Filter Made-to-order





Model	MLF-40R	MLF-40G	MLF-40Y	MLF-40B-390	MLF-40B-440	MLF-40B-460
Color	Red	Green	Yellow	Bluish purple	Blue	Light blue
Peak Wavelength (nm)	600	533	480	390	440	460
Product Code	A-8247	A-8248	A-8249	A-8250	A-8251	A-8252

* Attach the filter to the light guide retainer inside the light source as if to cover it.
* This filter cannot be used together with a built-in shutter.

MHF-PT002

Light Source Fixture

(4 pcs./set)

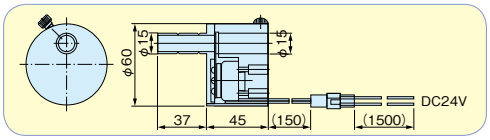
Model	MHF-PT002
Product Code	A-8200

*Contact Moritex about the mounting dimensions.

External Shutter Unit for Light Source Made-to-order

(Normally Open) Note: 150W light sources are not advised for use with this product.

Model	MSH-06	MSH-08	MSH-010
Applicable Model	Bundle Diameter: 6mm Max.	Bundle Diameter: 8mm Max.	Bundle Diameter: 10mm Max.
Product Code	A-8236	A-8237	A-8238



* The standard shutter is closed when 24V is applied.
* Contact Moritex about the specifications for the regular closed type shutter.

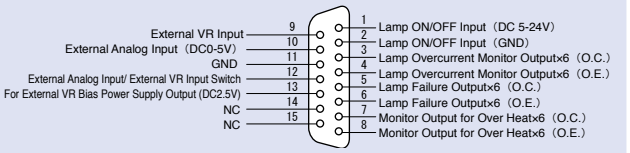
Halogen Lamp Series : Dedicated High, Highly reliable Halogen Lamp Series

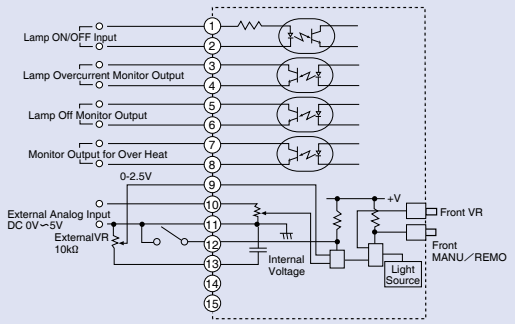
	LM-50	LM-100	LM-150	LM-150C
Power Consumption	50W	100W	150W	150W
Lamp Voltage	DC11.7V	DC11.7V	DC14.7V	DC14.7V
Lamp Current	4.2A	8.4A	10A	10A
Average Lamp Life *1	2,000hrs Nominal	1,000hrs Nominal	50hrs Nominal	500hrs Nominal
Average Illuminance *2	Approx. 19,000	Approx. 30,000	Approx. 80,000	Approx. 45,000
Color Temperature	3,000°K	3,100°K	3,400°K	3,200°K
Product Code	A-8203	A-8213	A-8220	A-8221

*1 Many lamps are powered on at rated current and the time measurements until their filaments blow are normally distributed. The average time from the peak illumination until the survival ratio of 50% is called the average life time.
*2 The average illuminance is measured at 50mm from the fiber end at maximum intensity when a Moritex standard light guide (MSG4-2200S) is attached.

For Use with MHF-V501/MHAA-100W/MHAB-150W

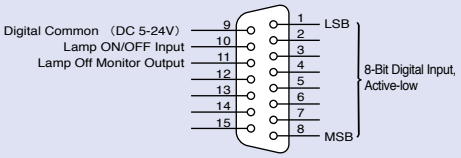
External Analog Control Connection Specifications



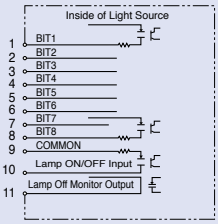


External 8-Bit Digital Control Connection Specifications

●External Analog Control Connection Specifications



● How to Use Connection Specifications and Switch Modes



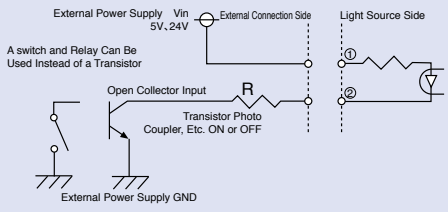
●Digital Control Truth Table

LAMP ON/OFF	LAMP Monitor	BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	LAMP Output
0	0	×	×	×	×	×	×	×	×	OFF
1	1	×	×	×	×	×	×	×	×	Lamp Burn-Out
1	0	0	0	0	0	0	0	0	0	ON (Min.)
1	0	0	0	0	0	0	0	0	1	ON
1	0	0	0	0	0	0	0	1	0	ON
1	0	0	0	0	0	0	0	1	1	ON
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
1	0	1	1	1	1	1	1	0	1	ON
1	0	1	1	1	1	1	1	1	0	ON
1	0	1	1	1	1	1	1	1	1	ON (Max.)

Note: X→ON/ OFF Can Be Selected 0→Low 1→High

Signal Output Detection Circuit Connection Example

●Signal Input Circuit Connection Example (Lamp ON/OFF Signal)



Operation

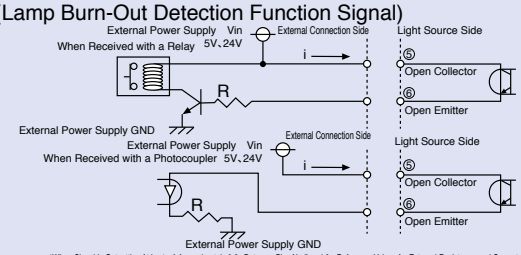
ON	OFF
OFF	Lamp on

With Transistor and Switch

*The Relationship Between Externalresistance and Current Is As Follows:Use A Resistance of 1/4W Or Greater Capacity

Vin	R(Ω)	Current
DC5V	0	Approximately 12mA
DC24V	3.3~4.7k	Approximately 7mA at 3.3k and 5mA at 4.7k

●Signal Output Detection Circuit Connection Example (Lamp Burn-Out Detection Function Signal)



*When Signal Is Outputting At i = 1mA Approximately 0.2v Between Pins No.5 and 6
At i = 5mA Approximately 1v Between Pins No.5 and 6

Signal	Between Pins No.5 and 6	Current
Lamp Normal	Not Conducted	Off
Lamp Burn-Out	Conducted	On

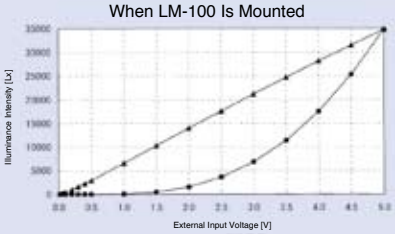
Reference Values for External Resistance and Current Are As Follows
Use Resistance of 1/4 Or Greater

Vin	R(Ω)	Current I (mA)
DC5V	1~3.3k	Approx. 1to 4
DC24V	4.7~22k	Approx. 1to 5

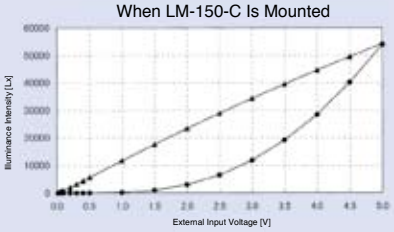
*The Resistance and Current Values Differ Depending On The Parts Used. Check The Values Well Before Use.

Linear Intensity Control (MHAB-150W-LI Only)

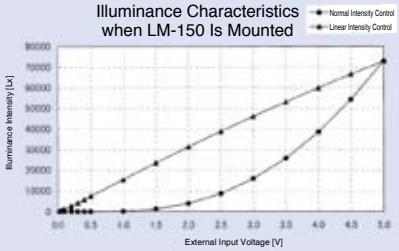
Illuminance Characteristics When LM-100 Is Mounted



Illuminance Characteristics When LM-150-C Is Mounted



Illuminance Characteristics when LM-150 Is Mounted



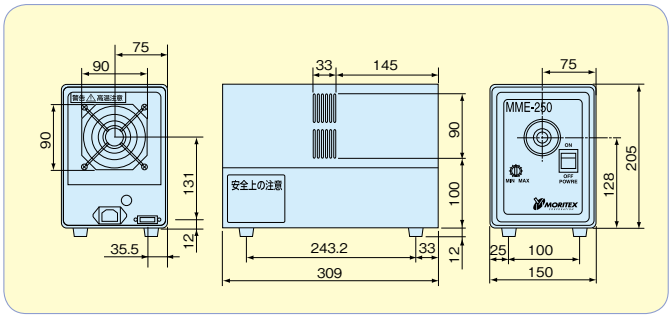
Options

Metal Halide Light Source

250W Type

MME-250

By using this high powered light source with Moritex's compound glass fiber light guides, high intensity illumination with high color temperature can be achieved. Employing a DC power supply lighting system enhances the low ripples type. Because it provides a flicker-free, powerful light, it is ideal for high speed image processing which requires high illuminance



Model	MME-250
Lamp Power Consumption	250W
Input Voltage	AC90V-110V(50/60Hz)
Power Consumption	Approximately 330W
Average Lamp Life	2,000 hours nominal (40% or Less of The Initial Luminous Energy)
Intensity*1	270,000Lx or More
Color Temperature	7,500K
Intensity Control	Manual or External 8-Bit Digital Intensity Control
Protection Function	Output off in Case of Abnormal Temperature
Installation	Rubber Legs Placed on Flat Surface
Weight	Approximately 6.0Kg
Operating Temperature and Humidity	5°C - 35°C/ 70% RH Max
Product Code	A-0489

(Optional Parts)

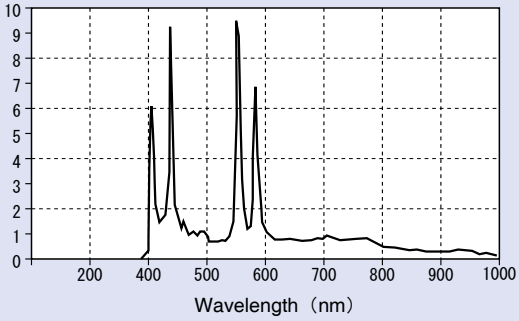
Replacement Lamp	MH-250-7500
Product Code	A-8265

*1 The value was calculated under the same conditions as the halogen lamp light source series.

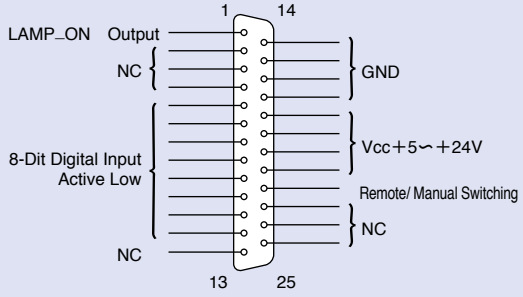
Features

- High-fidelity reproduction of white, blue, and green is possible because the light spectrum is close to that of the sun
- A cone plate creates a full light flux
- Optimum for high-speed image processing with flicker-free DC power Metal Halide lamp
- Preset lamp is easy to replace
- Capable of no-step intensity control of light quantity (0 to 100%)
- External 8-bit digital intensity control
- Twin-mirror system efficiently condenses all light fluxes in a fiber
- Reduces illuminance irregularity on the fiber incident surface by using a hexagonal rod lens

Spectral Characteristic Data



External Remote Connection Diagram



◎ The 250W Metal Halide power supply cannot be used with plastic fiber. For glass fiber also, assign a specification of a 300°C heat resistant end (The light guide code ends with -HR).

Light Guides

Moritex develops and manufactures composite glass fiber and quartz fiber from wires.
Light guides contain bundles of many fiber strands, each a mere 50μm or greater, which are assembled into a variety of emission forms. When combined with light source equipment, high brightness and illumination is possible with no noise and no heat.

Light Guide Selection Point

A smaller illumination area is needed

The individual fiber size and bundle diameter can be manufactured according to customer's unique specifications.

High light intensity is desired.

Stable illumination with little fluctuation is required.

Light that covers the entire wavelength range of visible light is desired.

Customers can select the necessary light source from our lineup that includes halogen and metal halide light sources. Additional condenser lenses can be attached for focused or spot illumination providing high power light from a remote source.

The effects of high temperatures must be avoided.

A light guide allows the light source unit to be positioned at the customer's desired location. A fiber does not conduct heat well because its wavelength transmission is low in the heat range.

To obtain direct illumination.

A light guide transmits light of different NA through the fiber material. This is optimal for illuminating a sample requiring direct light.

Ultraviolet and/or infrared irradiation using specific light guides is needed.(Special use with light guide)

When wavelengths in the ultraviolet range are necessary, use quartz fiber light guides **P.I-109**.

* Multi-component glass and plastic fibers do not conduct ultraviolet light well.
* For infrared illumination, use a heat-resistant multi-component glass fiber.
* Ordinary glass fiber light guides are not heat resistant against an infrared light that generates large amounts of heat. For details, consult the sales department.

* Please contact the sales department at Moritex before modifying light guides.
* See **P.I-73** for combination with light sources.

Light Guides

Moritex develops and manufactures multi-component glass and quartz light guides from its own drawn raw fibers. Many fibers as thin as only 50μm each are bundled and assembled in light guides of different shapes. When combined with light source devices, the light guides enable high intensity illumination free of noise and heat.

Points for The Selection of A Light Guide

- Reducing the size of the illumination area

The fiber size (element wire) and bundle diameter can be changed for manufacturing according to the customer's unique specifications

- Obtaining greater luminous energy
- Irradiate a stable light with few changes over time
- Covering the entire wavelength range of visible light

Customers can select the necessary light source from our lineup that includes halogen and metal halide light sources. Additional condenser lenses can be attached for focused or spot illumination providing power light from a remote source.

*When using a light guide for a cable pair, consult the sales department of Moritex.
*See **P.I-73** for combinations with light sources.

- Avoiding the influence of heat

A light guide allows the light source unit to be positioned at the customer's desired location. A fiber does not conduct heat well because its wavelength transmission is low in the heat range.

- Obtaining direct light

A light guide transmits light of different NA through the fiber material. This is optimal for illuminating a sample with directed light.

- Irradiating Ultraviolet and Infrared light using specific light guides for special purposes

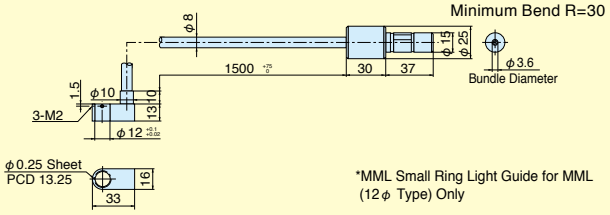
For ultraviolet light: Use a quartz fiber (**P.I-109**)

*Multi-component glass or plastic fibers do not conduct an ultraviolet ray.
*For infrared ray: Use a heat-resistant Multi-component glass fiber.
*An ordinary glass fiber does not have heat resistance to an infrared ray that generates heat. For details, consult the sales department.

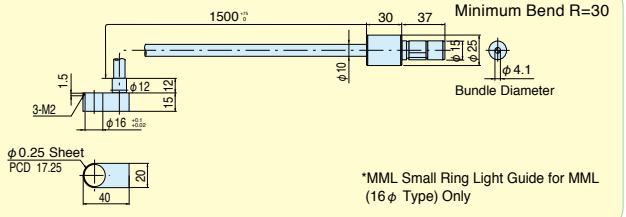
Ring Light Guides

Illumination from 360˚ produces a uniform light.
These light guides are optimum for CCD camera and microscope inspections.

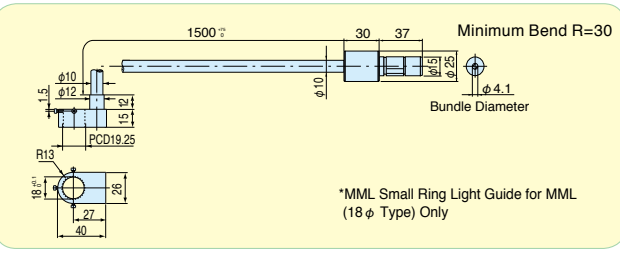
MRP12-1500V



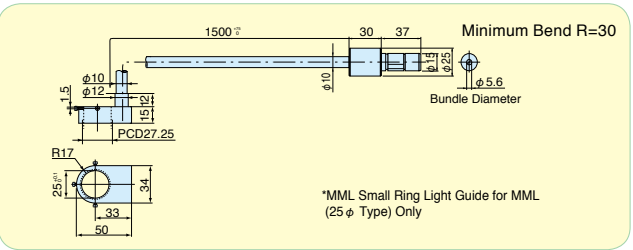
MRP16-1500V



MRP18-1500V



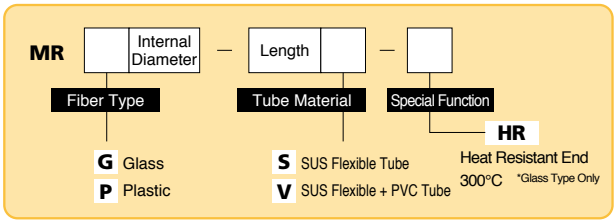
MRP25-1500V



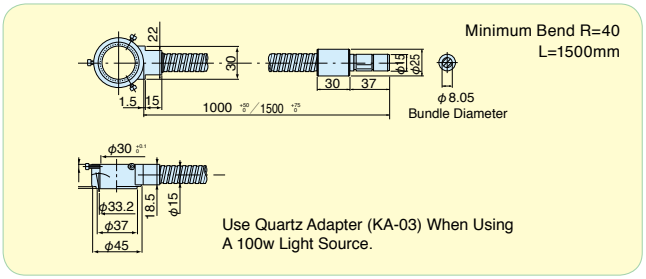
Model	Product Code
MRP12-1500V	A-0600
MRP16-1500V	A-0601
MRP18-1500V	A-0617
MRP25-1500V	A-0618
MRP30-1500V	A-0619
MRG25-1500S	A-0602
MRG31-1000S	A-0603
MRG31-1500S	A-0604
MRP31-1000S	A-0605
MRP35-1500S	A-0606

Model	Product Code
MRG40-1500S	A-0607
MRG48-1000S	A-0608
MRG48-1500S	A-0609
MRG53-1000S	A-0610
MRG53-1500S	A-0611
MRG61-1000S	A-0612
MRG61-1500S	A-0613
MRG75-1000S	A-0614
MRG75-1500S	A-0615

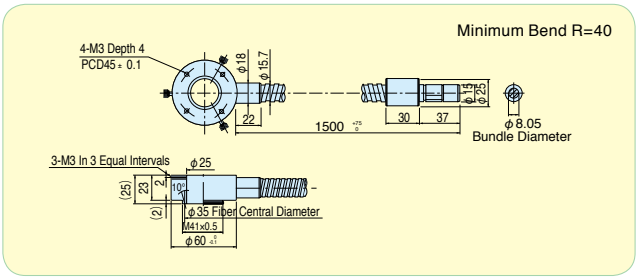
Explanation of Model Code



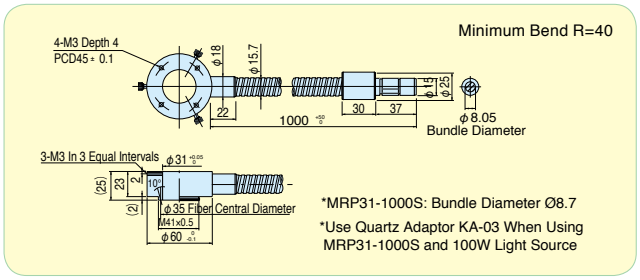
MRP30-1500V



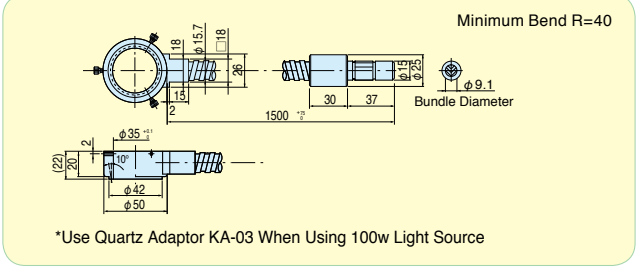
MRG25-1500S



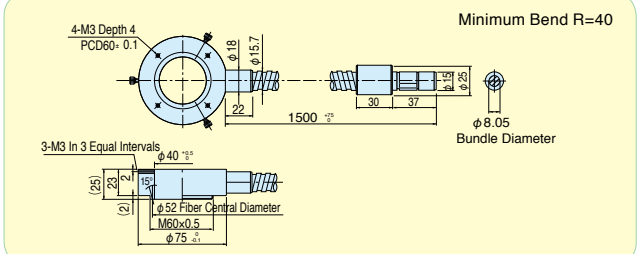
MRG31-1000S MRG31-1500S MRP31-1000S



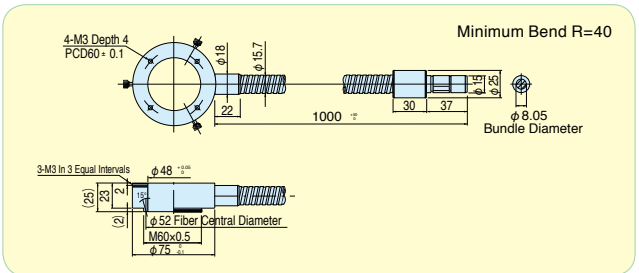
MRP35-1500S



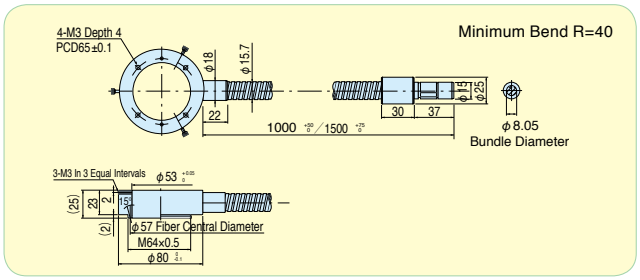
MRG40-1500S



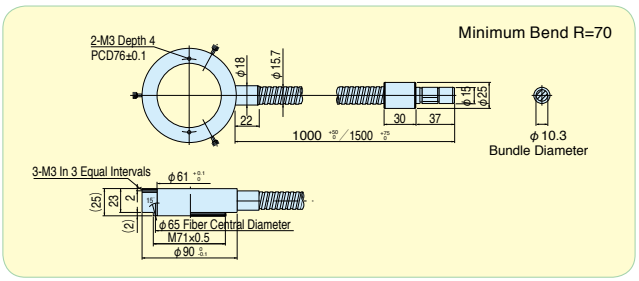
MRG48-1000S MRG48-1500S



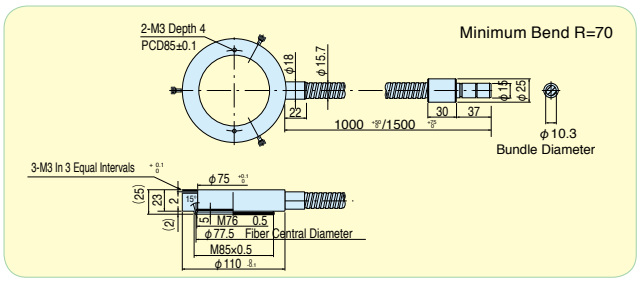
MRG53-1000S MRG53-1500S



MRG61-1000S MRG61-1500S

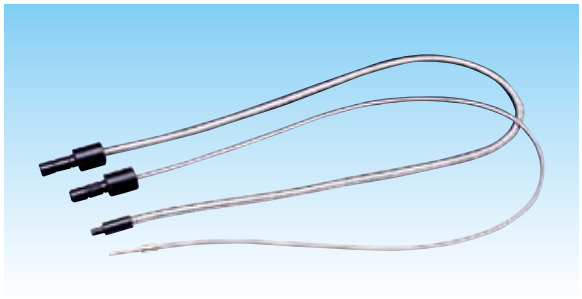


MRG75-1000S MRG75-1500S



Straight Light Guides

In addition to our standard straight type light guides, many different options are available such as random assembly, heat resistant, and small diameter types. These light guides are ideal for spot and coaxial illumination.Select a product to suit the application.



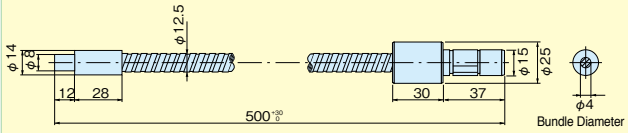
Explanation of Model Code

MS □□ – Length □□ – □

Fiber Type	Bundle Diameter	Tube Material	Special Function
G Glass	3 ϕ3	R Interlocking Tube	HR Heat Resistant End 300°C
P Plastic	4 ϕ4	S SUS Flexible Tube	*Glass Type Only
	6 ϕ6	V SUS Flexible + PVC Tube	SD Small Diameter Type
	8 ϕ8		RM Random Assembly
	10 ϕ10		

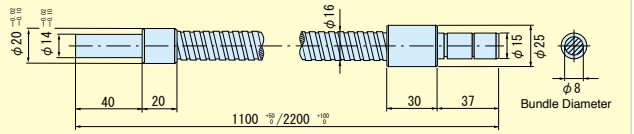
MSG4-500R (Interlocking Type)

Minimum Bend R=60



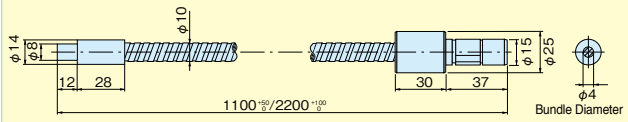
MSG8-1100S MSG8-2200S

Minimum Bend R=50



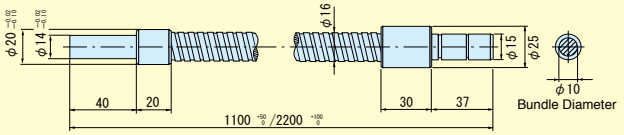
MSG4-1100S MSG4-2200S MSP4-1100S MSG4-1100S-RM MSG4-2200S-RM

Minimum Bend R=30



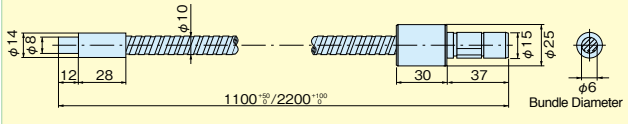
MSG10-1100S MSG10-2200S

Minimum Bend R=60



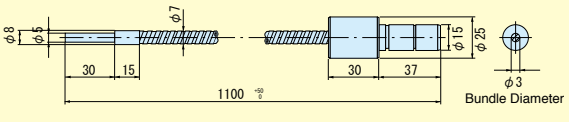
MSG6-1100S MSG6-2200S MSG6-1100S-RM MSG6-2200S-RM

Minimum Bend R=30



MSG3-1100S-SD

Minimum Bend R=25



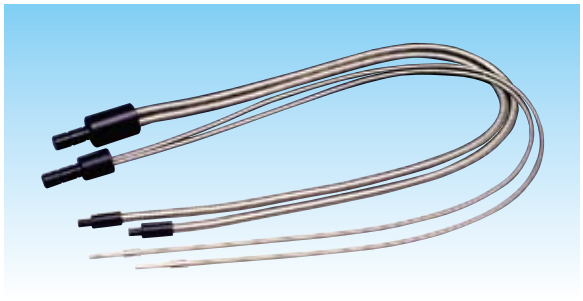
Model	Product Code
MSG3-1100S-SD	A-0622
MSG4-500R	A-0623
MSG4-1100S	A-0624
MSP4-1100S	A-0625
MSG4-2200S	A-0626

Model	Product Code
MSG4-1100S-RM	A-0627
MSG4-2200S-RM	A-0628
MSG6-1100S	A-0629
MSG6-2200S	A-0630
MSG6-1100S-RM	A-0631

Model	Product Code
MSG6-2200S-RM	A-0632
MSG8-1100S	A-0633
MSG8-2200S	A-0634
MSG10-1100S	A-0635
MSG10-2200S	A-0636

Bifurcated Light Guides

Use these light guides for applications where lighting from two directions is needed, for example when using a microscope or CCD camera, or for pattern recognition. Coatings and tube materials can be selected to suit the purpose. Interlock type tube material allows for any necessary bending and for fixing in position SUS flexible ("goose neck") type tube material allows you to move the light guide around freely in a small space.



Explanation of Model Code

MW – [ ] Length [ ] – [ ]

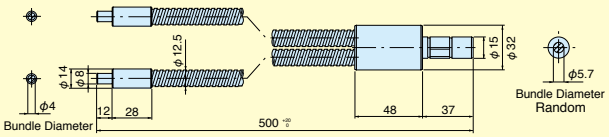
Fiber Type
- G Glass
- P Plastic

Tube Material
- R Interlocking Tube
- S SUS Flexible Tube
- V SUS Flexible + PVC Tube
- SR SUS Flexible + Interlock

Special Function
- HR Heat Resistant End 300°C *Glass Type Only
- SD Small Diameter Type
- L L-shape Type

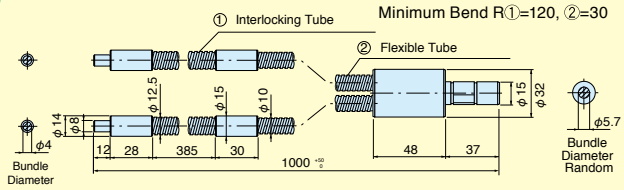
MWG-500R (Interlocking Type)

Minimum Bend R=120



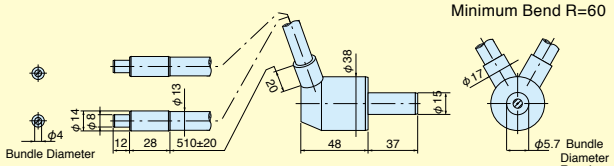
MWG-1000SR

Minimum Bend R①=120, ②=30



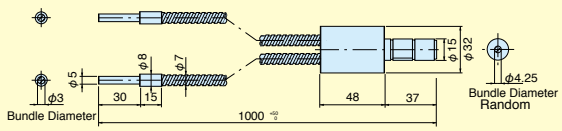
MWG-L-650R (Interlocking Type)

Minimum Bend R=60



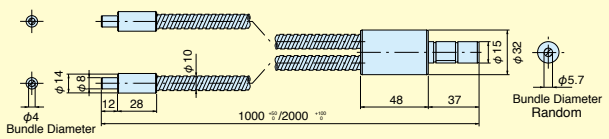
MWG-1000S-SD

Minimum Bend R=25



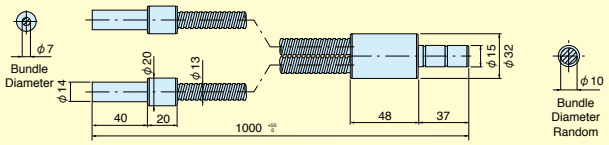
MWG-1000S
MWG-2000S

Minimum Bend R=30



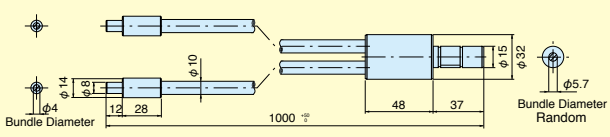
MWG7-1000S

Minimum Bend R=50



MWG-1000V
MWP-1000V

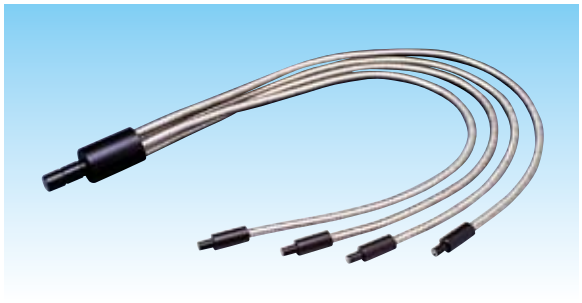
Minimum Bend R=30



Model	Product Code
MWG-500R	A-0647
MWG-L-650R	A-0648
MWG-1000S	A-0649
MWG-2000S	A-0650
MWG-1000V	A-0651
MWP-1000V	A-0652
MWG-1000SR	A-0653
MWG7-1000S	A-0654
MWG-1000S-SD	A-0655

Multifurcated Light Guides

A 3 to 4 multifurcated light guide can be used when it is necessary to illuminate an object from many different angles, for example in the case of IC pin inspection.

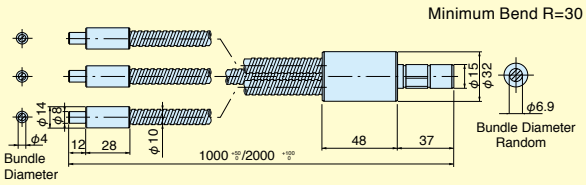


Explanation of Model Code

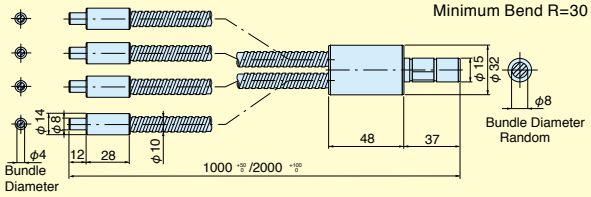
M □ G □ – Length S – □

- Number of Branches: 3 = 3-Branch; 4 = 4-Branch
- Bundle Diameter: 3 = ϕ3; 4 = ϕ4
- Special Function: SD = Small Diameter Type

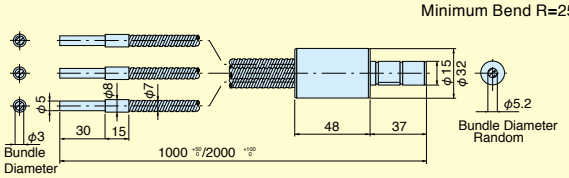
M3G4-1000S
M3G4-2000S



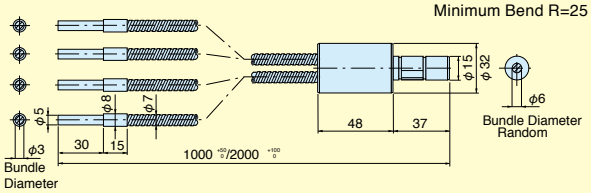
M4G4-1000S
M4G4-2000S



M3G3-1000S-SD
M3G3-2000S-SD

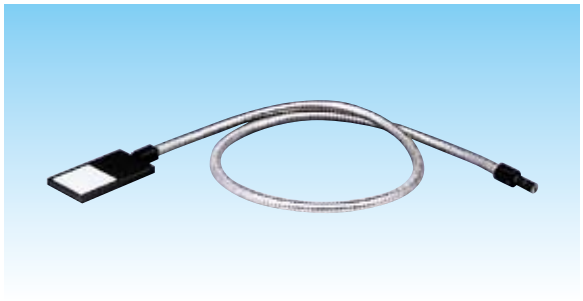


M4G3-1000S-SD
M4G3-2000S-SD



Model	Product Code
M3G4-1000S	A-0663
M3G4-2000S	A-0664
M4G4-1000S	A-0665
M4G4-2000S	A-0666
M3G3-1000S-SD	A-0667
M3G3-2000S-SD	A-0668
M4G3-1000S-SD	A-0669
M4G3-2000S-SD	A-0670

Plate Type Light Guides



These plate type light guides do not require much space due to their slim, compact design. Moritex's unique reflected light inducer allows for even and bright illumination. They can be used for multi-observation inspections that require transmitted and uniform illumination such as backlighting electronic components or semi-transparent surfaces.

Explanation of Model Code

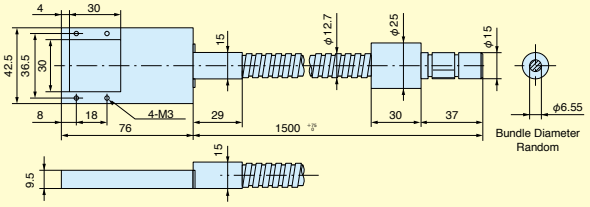
MPP □ — **1500S-2**

Illuminating Area

30	30×30mm
60	60×60mm
90	90×90mm

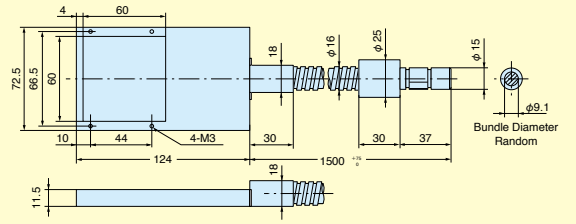
MPP30-1500S-2

Minimum Bend R=40



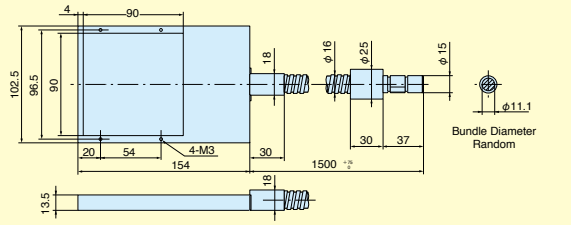
MPP60-1500S-2

Minimum Bend R=50



MPP90-1500S-2

Minimum Bend R=60



*Plastic light guides that cannot be used with 150W light sources: MPP30-1500S, MPP60-1500S, and MPP90-1500S.Use quartz adapter (KA-03) when using a 100W light source. See **P.I-73.**

Model	Product Code
MPP30-1500S-2	A-0679
MPP60-1500S-2	A-0680
MPP90-1500S-2	A-0681

Line Light Guides

These light guides can be used when line illumination or line scan CCD lighting is necessary.

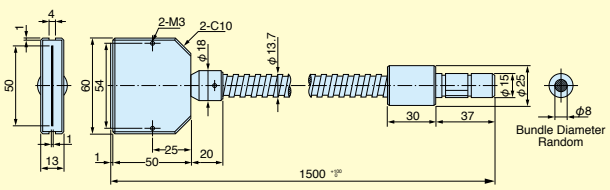
Explanation of Model Code

MK □ □ □ — Length S

Fiber Type		Line Length			
G	Glass	50	50mm	×0.5W	2-Branch
P	Plastic	180	180mm		

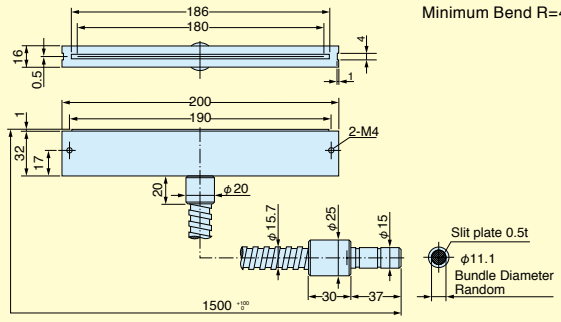
MKG50-1500S

Minimum Bend R=40



MKP180-1500S

Minimum Bend R=40

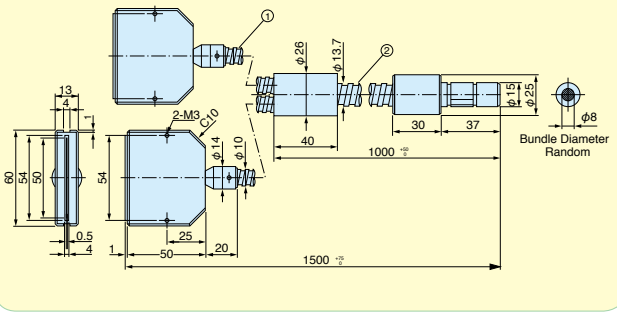


* 150W light sources cannot be used with MKP180-1500S. Use quartz adapter (KA-03) when using a 100W light source. See **P.I-73**.

MKG50×0.5W-1500S

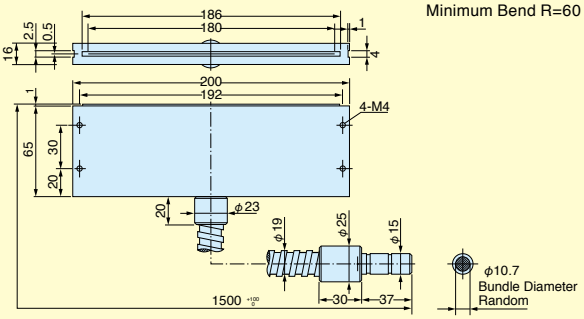
Made-to-order

Minimum Bend R ①=30, ②=40



MKG180-1500S

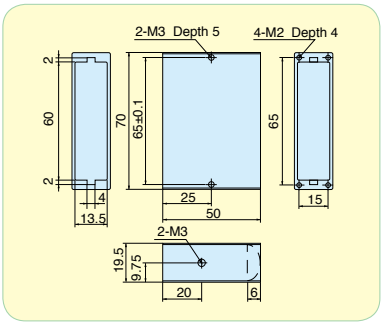
Minimum Bend R=60



Model	Product Code
MKG50-1500S	A-0684
MKG50×0.5W-1500S	A-0685
MKG180-1500S	A-0686
MKP180-1500S	A-0687

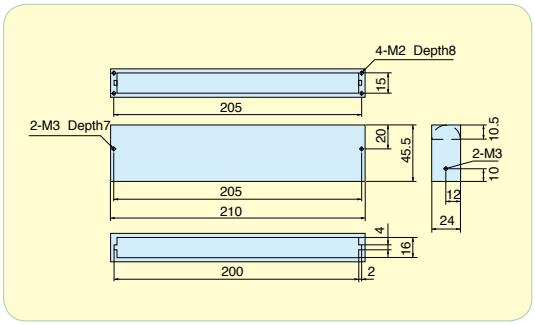
Condenser Lenses for Line Light Guides

MLK-50



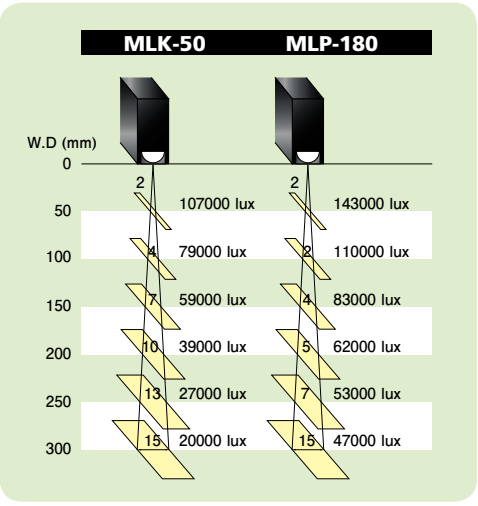
● Cylindrical focusing lens with the MKG50 light guide achieves a highly uniform beam with greater illuminance.

MLP-180



● Cylindrical focusing lens with the MKP180/MKG180 light guides achieves a highly uniform beam with greater illuminance.

Condenser Lenses	Product Code
MLK-50	A-8307
MLP-180	A-8308



■ Light source: 100W halogen light source (Volume: max)
■ Fiber: MKG50-1500S for MLK-50
MKP180-1500S for MLP-180

Long Width Line Light Guides

Made-to-order

Line light guides with a uniform line width of 180mm can be connected to produce seamless, uniform illumination of high intensity over long widths.
These light guides are available in multiples of 180mm from 360mm to 1440mm long. Use these long width light guides for illumination when inspecting LCD, PDP, and other glass boards and substrates or sheet products with line CCD cameras. Please note that a variable number of light sources are needed for each individual unit depending on the length.

Line Light Guides (glass fiber)
MFKG Series

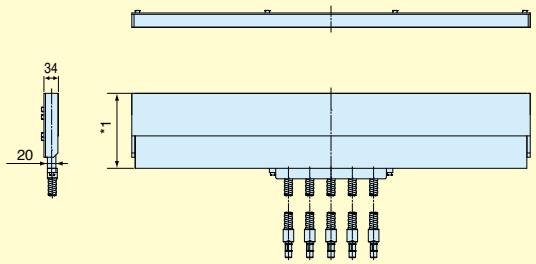
Line Light Guides (plastic fiber)
MFKP Series

Explanation of Model Code

MFK □ □ – **2000S-SRM-L**

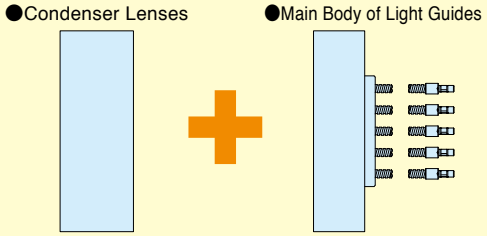
Fiber Type / Line Length

G Glass
P Plastic



*1 Operable in Range from 159.5 to 194.5mm

Structure of Long Width Line Light Guides



◎Long Width Line Light Guides are Composed of a Combination of Condenser Lenses and Line Light Guides

Model	Fiber Type	Line Length(mm)	Required Quantity of Light Source	Product Code
MFKG360-2000S-SRM-L	Glass	360	2	A-0735
MFKG540-2000S-SRM-L	Glass	540	3	A-0736
MFKG720-2000S-SRM-L	Glass	720	4	A-0737
MFKG900-2000S-SRM-L	Glass	900	5	A-0738
MFKG1080-2000S-SRM-L	Glass	1080	6	A-0739
MFKG1260-2000S-SRM-L	Glass	1260	7	A-0740
MFKG1440-2000S-SRM-L	Glass	1440	8	A-0741
MFKP360-2000S-SRM-L	Plastic	360	2	A-0742
MFKP540-2000S-SRM-L	Plastic	540	3	A-0743
MFKP720-2000S-SRM-L	Plastic	720	4	A-0744
MFKP900-2000S-SRM-L	Plastic	900	5	A-0745
MFKP1080-2000S-SRM-L	Plastic	1080	6	A-0746
MFKP1260-2000S-SRM-L	Plastic	1260	7	A-0747
MFKP1440-2000S-SRM-L	Plastic	1440	8	A-0748

Ultra-Uniform Fiber Illumination

Made-to-order

MFKG-F1 Model

An ultra-uniform model for length line light guides. This model has made ultra-even possible through improvement of the falling of light intensity at the connection area, as well as through unique technology in which the light guide incidence sides give uniformity to irregularities in the light source equipment.

Usage

Inspection of LCD glass panel inspection
Inspection of color filters
Inspection of sheet surface conditions

Explanation of Model Code

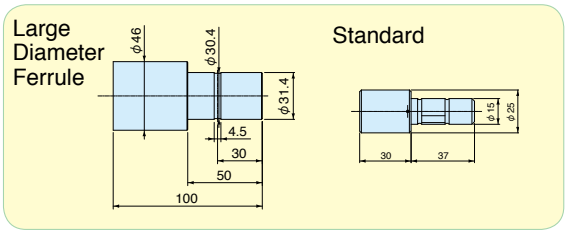
MFKG □ – □ □ □ – □ □ □ □

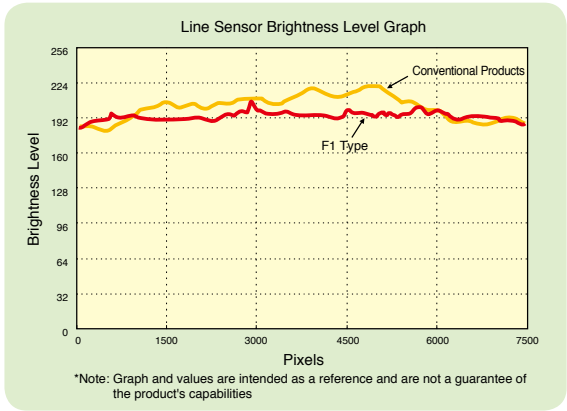
Line Length	Fiber Length	Tube	F1	Number of Light Sources	Ferrule	Special Element	Special Function
		S SUS Flexible V SUS Flexible + PVC Tube (Black) G SUS Flexible + PVC Tube (Antistatic Grey)		Standard L Large Diameter Ferrule		None D Special Element	HR Heat Resistant End 300°C REF Reference

Features

- Improved uniformity through unique optical fiber manufacturing technology.
- Support for a line length of up to 3,600mm is possible.
- Ultra-uniform lighting is made possible for the condenser lens unit by using a uniquely designed optical system.
- Special optical elements that reduce light source irregularity can be installed in the light input bundle area. (Optional)
- The number of input dispersions and light source cap is specified by the customer.

(Approximate Measurements)
Standard : Maximum Band Diameter 11
Line Length possible up to 180mm x 0.5
Large Diameter Cap : Maximum Band Diameter 20
Line Length possible up to 500 mm x 0.5



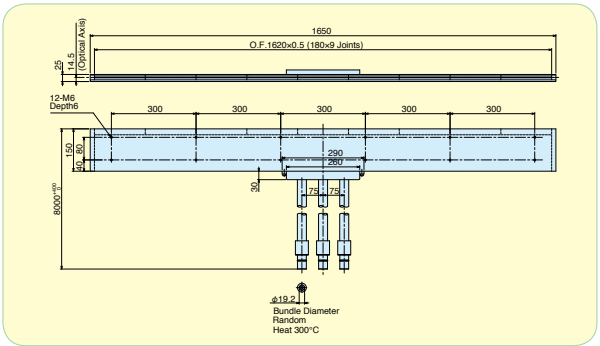


*Note: Graph and values are intended as a reference and are not a guarantee of the product's capabilities

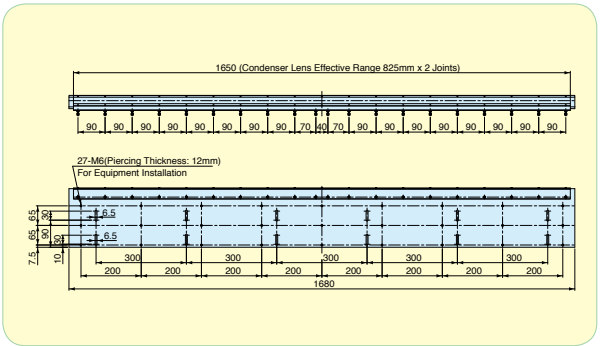
Example of Production Record

MFKG1620-8000G-F1-3LD-HR
Line Length : 1,620mm
Fiber Length : 8,000mm
Model : F1
Light Source : 3 light type large diameter cap / Special element attached / Heat resistant specification

Light Guide



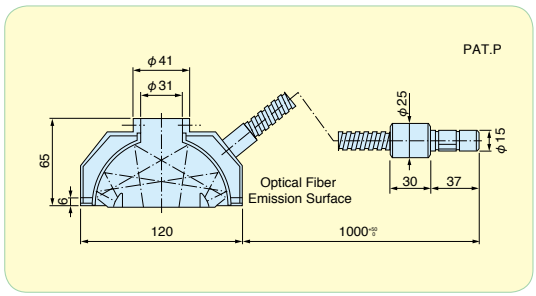
Condenser Lenses



Dome-Type Light Guide

The fiber emission light from the 360˚ internal facing of the lower area inside the dome is reflected on the dome surface. This results in indirect illumination that provides uniform illumination of a work surface.
Useful in instances when problems arise due to halo effect caused by illumination.

MDP120-1000S

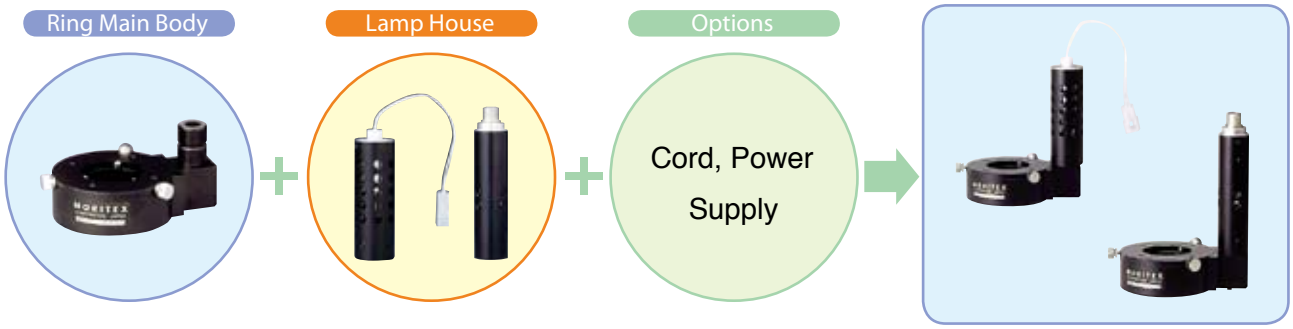


* A compact type (2 types: external diameter of Ø54 or Ø80) can also be manufactured)

Model	Fiber Type	Product Code
MDP120-1000S	Plastic	A-0719

Built-in Lamp Light Guides

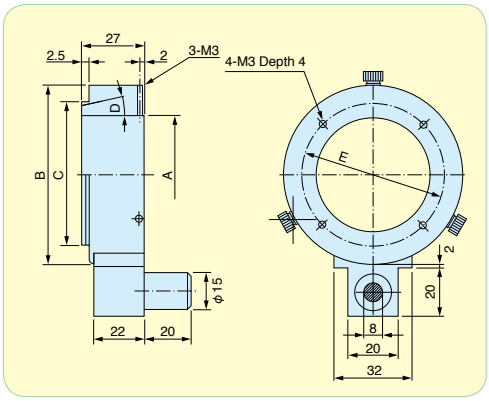
Because a ring light is integrated with a light source (Tungsten or halogen lamp) no-fiber routing is required, therefore making this unit ideal for illuminating robots, X-Y drive units, and other movable parts.



Ring Main Body

Made-to-order

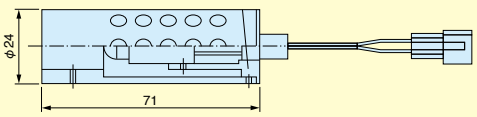
MRG-L31
MRG-L48
MRG-L61



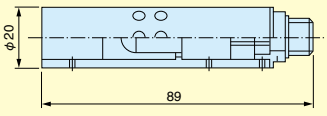
Model	Fiber Type	Ring Internal Diameter A (mm)	Ring External Diameter B (mm)	Adapter Mounting Pitch C (mm)	Fiber Illumination Angle D (°)	Mounting 4-M3 E (mm)	Product Code
MRG-L31	Compound Glass	φ31	φ60	M41 P0.5	10°	φ45	A-0725
MRG-L48		φ48	φ75	M60 P0.5	15°	φ60	A-0726
MRG-L61		φ61	φ90	M70 P0.5	15°	φ76	A-0727

Lamp House

MZ-01 Built-in Halogen Lamp Type



MZ-02 Built-in Tungsten Lamp Type



Model	Lamp	Product Code
MZ-01	Halogen	A-0728
MZ-02	Tungsten	A-0729

Options

Light Guide Connection Barrel

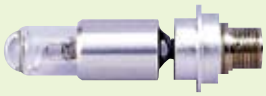
Light Guide Connection Barrel	Product Code
MT-01	A-8415

*This guide is available for all of the series.
*The tolerance is +0.1.
*This attachment also can be used with the halogen lamp light sources of the conventional series.

Cord Made-to-order

Model	Length (mm)	Notes	Product Code
MC-01	2000	Tungsten Lamp with Double-Ended Connector	A-8416
MC-02	5000		A-8417
MC-03	2000	Tungsten Lamp with Single-Ended Connector	A-8418
MC-04	5000		A-8419
MC-05	2000	Halogen Lamp with Single-Ended Connector	A-8420
MC-06	5000		A-8421

Holder With A Lamp & Spare Lamp



Model	Lamp	Standard	Color Temperature	Life Time Average	Product Code
MH-01	Halogen	10V-1.8A	2950°K	3000 hours	A-8427
MH-02	Tungsten	5V-1A	2600°K	5000 hours	A-8428

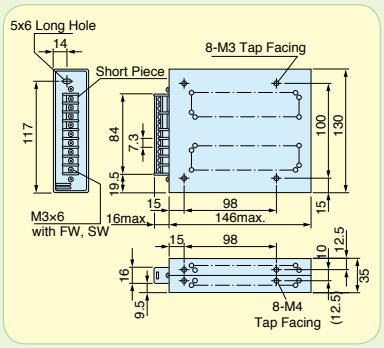
〈Optional Parts for Holder With A Lamp〉

Spare Lamp	Lamp	Product Code
MR-01	Halogen	A-8434
MR-02	Tungsten	A-8435

Power Supply Unit

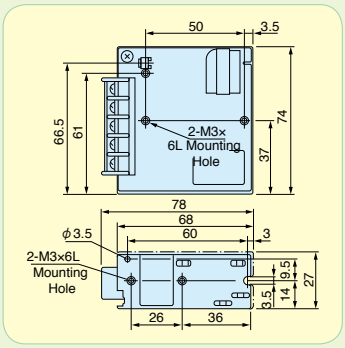
■ Halogen Lamp Power Supply

K-10-1



■ Tungsten Lamp Power Supply

K-5



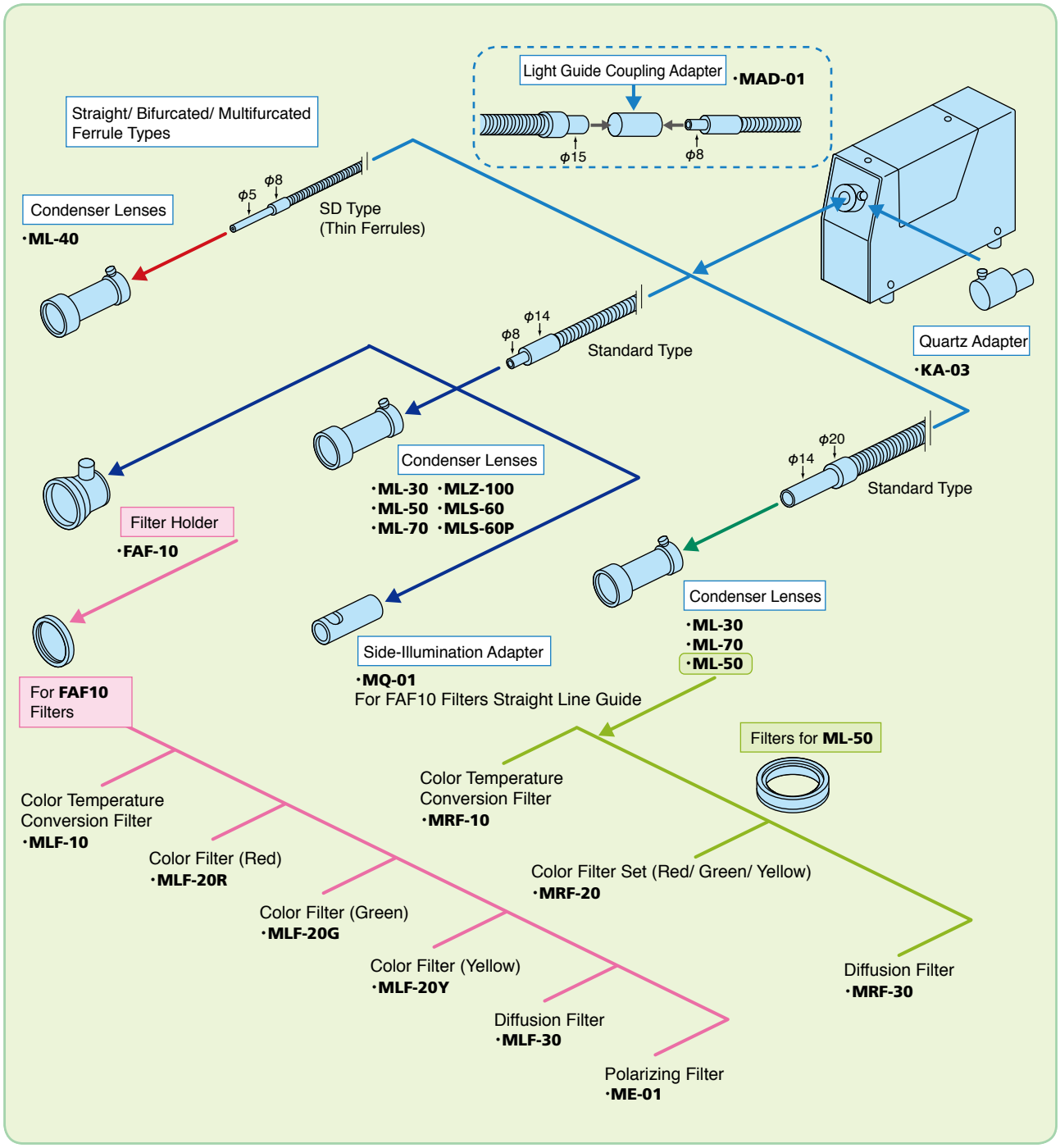
*Lamp wires may break when used with a severely vibrating machine

Model	Input Voltage (V)	Rated Output Voltage (V)	Rated Output Current (A)	Input Voltage Fluctuation (mV)	Load Voltage Fluctuation (mV)	Ripple (mcp-p)	Output Voltage Variation Range	Product Code
K-10-1	AC85~132V	9.7	3.4	72Max	100Max	50Max	–	A-8441
K-5	AC85~132V	5	2	20Max	40Max	80Max	±10%	A-8442

*Purchase the ring, lamp house, and options separately. (The customer must assemble these.)

Light Guide Options

Option Attachment Drawing for Straight/ Bifurcated/ Multifurcated Light Guides



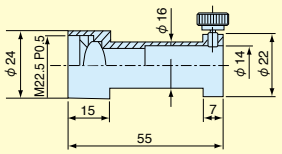
◎ See corresponding pages for light guide compatibility, specifications, and option commodity codes

For Straight/ Bifurcated/ Multifurcated Light Guides

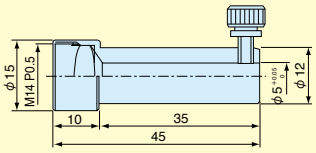
Condenser Lenses

These high performance condenser lenses were uniquely developed by Moritex for optical fiber light guides.
Through careful design and production, Moritex ensures high quality performance at reasonable cost.

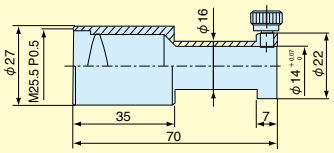
ML-30



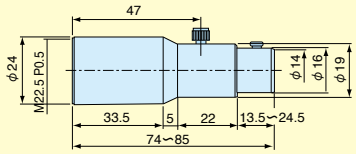
ML-40



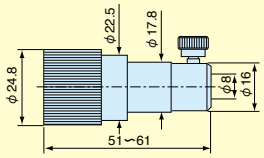
ML-50



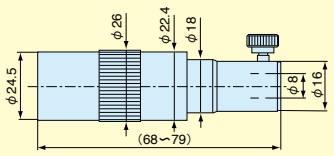
ML-70



MLZ-100

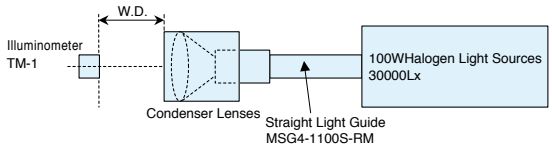


MLS-60P/MLS-60



Illuminance Characteristic and Illumination Range of Condenser Lenses

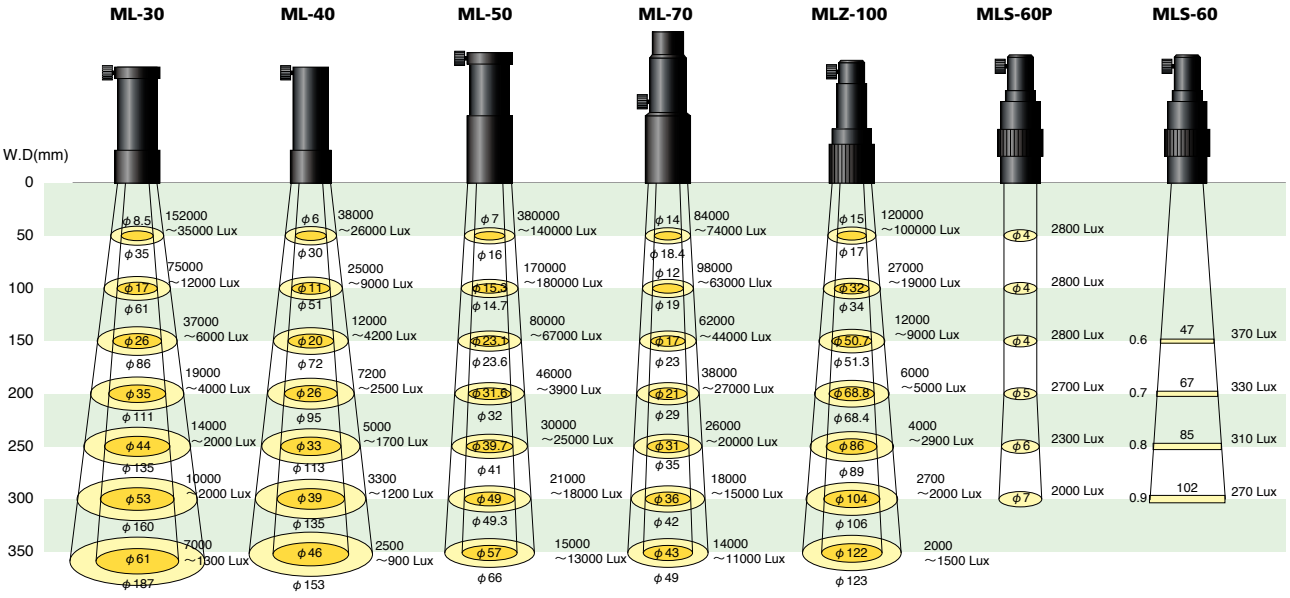
Central Illuminance



Model	Key Features	Product Code
ML-30	For straight or 2-branch light guides	A-8300
ML-40	For small diameter type (-SD)	A-8301
ML-50	Provides almost double the illuminance of the ML-30	A-8302
ML-70	For two lenses of two groups. Condenses into A uniform, comparatively small spot beam.	A-8303
MLZ-100	Uniform spot beam with each working distance. Adjustable focus function by helicoid.	A-8304
MLS-60P	Fine spot beam, focused by helicoid. Adjustable focus function by helicoid.	A-8306
MLS-60	Uniform and sharp slit beam, focused by helicoid. Adjustable focus function by helicoid.	A-8305

Measuring Method:

Position the illuminometer visually at the center of the illumination range (narrow or wide) and measure the illuminance. Set the illuminance of the light source to 30,000Lx for standard measurement (measurement using the standard light guide and measuring instrument).
If the illuminance of the light source set to 30,000Lx exceeds 99,900Lx (upper limit of the measuring instrument) in standard measurement, reduce the luminous energy to the measurable range and convert the value into the range of 30,000Lx later.



■Light source: 100W halogen light source (volume: max)
■Fiber: MSG4-1100S-RM for ML-30, ML-50, ML-70, MLZ-100, and MLS-60/60P
MSG3-1100S-SD for ML-40

Filters and Adapters

A filter or adapter can be attached to the illumination port of Moritex straight, bifurcated, or multifurcated light guide to change the color temperature of the fiber illumination, or to change the color to red, green, or yellow. Various filters are also made for the ML-50 condenser lenses to obtain high illuminance.

Made-to-order

Filter Holder

FAF-10

This filter holder fits a straight, bifurcated, or multifurcated light guide with irradiation port of 8.0 in the outside diameter. A color temperature conversion filter (MLF-10), color filter (MLF-20 Series of R, G, and Y colors) and diffusion filter (MLF-30) can be installed.

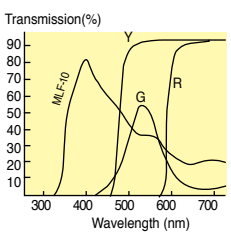
Model	Product Code
FAF-10	A-8321

Made-to-order

Filters

MLF-10
MLF-20
MLF-30

*Screw pitch M22.5x0.5



By using a filter holder (FAF-10), the following filters can be attached:

Model	Product Name	Product Code
MLF-10	Color Temperature Conversion Filter	A-8322
MLF-20	Color Filter Set (R/G/Y)	A-8323
MLF-30	Diffusion Filter	A-8324
MLF Filter Frame	MLF Filter frame	A-8325

*Each individual color filter (MLF-20) is 3,000JPY

Made-to-order

Condenser Lenses

Filters for ML-50

MRF-10
MRF-20
MRF-30

*Screw Pitch M22.5x0.5

These filters are made for ML-50 condenser lenses.

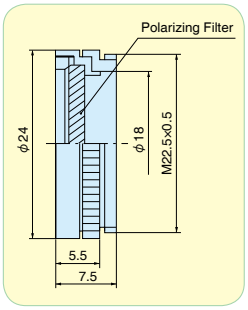
Model	Product Name	Product Code
MRF-10	Color Temperature Conversion Filter	A-8331
MRF-20	Color Filter Set (R/G/Y)	A-8332
MRF-30	Diffusion Filter	A-8333
MRF Filter frame	MRF Filter Frame	A-8334

Made-to-order

Polarizing Filter for Straight Light Guides

ME-01

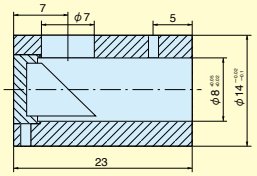
Can be attached to either the filter holder (FAF-10) or various lenses.



Model	Product Code
ME-01	A-8340

Side-Illumination Adapter

MQ-01

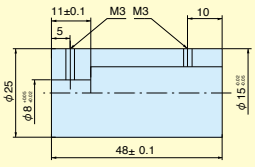


*Used to bend illumination 90° from the light guide output axis.

Model	Product Code
MQ-01	A-8346

Light Guide Coupling Adapter

MAD-01

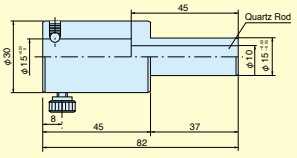


*This adapter joins the ferrules on the output side of one light guide to the input side of another.

Model	Product Code
MAD-01	A-8347

Quartz Adapter

KA-03

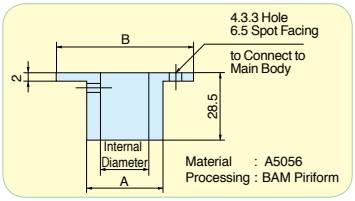


*Use this adapter when combining a 100W light source and a plastic light guide.

Model	Product Code
KA-03	A-8348

Inner Diameter Adapter

Made-to-order



Model	Compatible model	Dimension A (mm)	Dimension B (mm)
MS-02-□	MRG-31	ϕ31	ϕ60
MS-03-□	MRG-48	ϕ48	ϕ75
MS-04-□	MRG-53	ϕ53	ϕ80
MS-05-□	MRG-61	ϕ61	ϕ90

*Specify the bore or internal diameter as required. The tolerance for the internal diameter is +0.1/+0.

*Coating processing not performed for the internal diameter.

Ring Light Guide Options

Diffusion Filter

Model	Compatible Model	External Diameter	Thickness (mm)	Product Code
MK-02	MRG-31	φ46	5.5	A-8364
MK-03	MRG-48	φ65		A-8365
MK-04	MRG-53	φ69		A-8366
MK-05	MRG-61	φ76		A-8367
MK-06	MRG-75	φ90		A-8368

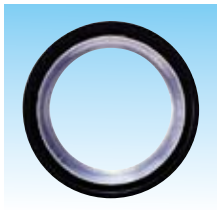
Setting this filter at the light irradiation end of a ring light guide suppresses illuminance irregularity, achieving a soft illumination effect.

Color Temperature Conversion Filter

Model	Compatible Model	External Diameter	Thickness (mm)	Product Code
MF-02	MRG-31	φ46	5.5	A-8374
MF-03	MRG-48	φ65		A-8375
MF-04	MRG-53	φ69		A-8376
MF-05	MRG-61	φ76		A-8377
MF-06	MRG-75	φ90		A-8378

Use for color imaging

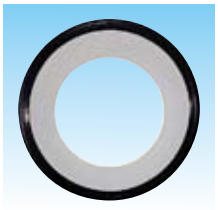
Short WD Adapter



Model	Compatible Model	External Diameter	Thickness (mm)	Product Code
MA-02	MRG-31	φ44	7	A-8384
MA-03	MRG-48	φ66		A-8385
MA-04	MRG-53	φ70		A-8386
MA-05	MRG-61	φ77		A-8387
MA-06	MRG-75	φ90		A-8388

Optimum if working distance is short and gentle-angle illumination is necessary.

Polarizing Filter



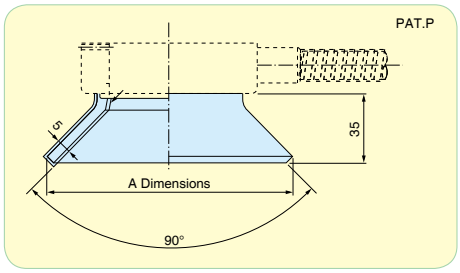
Model	Compatible Model	External Diameter	Thickness (mm)	Product Code
MI-02	MRG-31	φ44	8.5	A-8394
MI-03	MRG-48	φ63		A-8395
MI-04	MRG-53	φ67		A-8396
MI-05	MRG-61	φ74		A-8397
MI-06	MRG-75	φ88		A-8398

Use to prevent halation by illumination or irregular reflection.

Indirect Diffuse Lighting Adapter Series
MD02~06

By attaching an indirect diffuse lighting adapter (MD Series) to the standard ring light guide, the cone shaped adapter emits the light, which illuminates the interior of the cone and produces uniform diffused illumination.

*Ring light guide MRG series is sold separately.

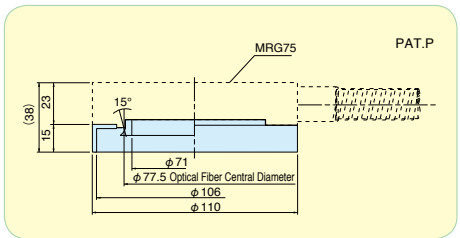


Model	Compatible Ring Light Guide	Dimension A (mm)	Product Code
MD-02	MRG31-	101	A-8404
MD-03	MRG48-	121	A-8405
MD-04	MRG53-	115	A-8406
MD-05	MRG61-	126	A-8407
MD-06	MRG75-	140	A-8408

Reflection Type Indirect Diffuse Lighting Adapter
MDC-06

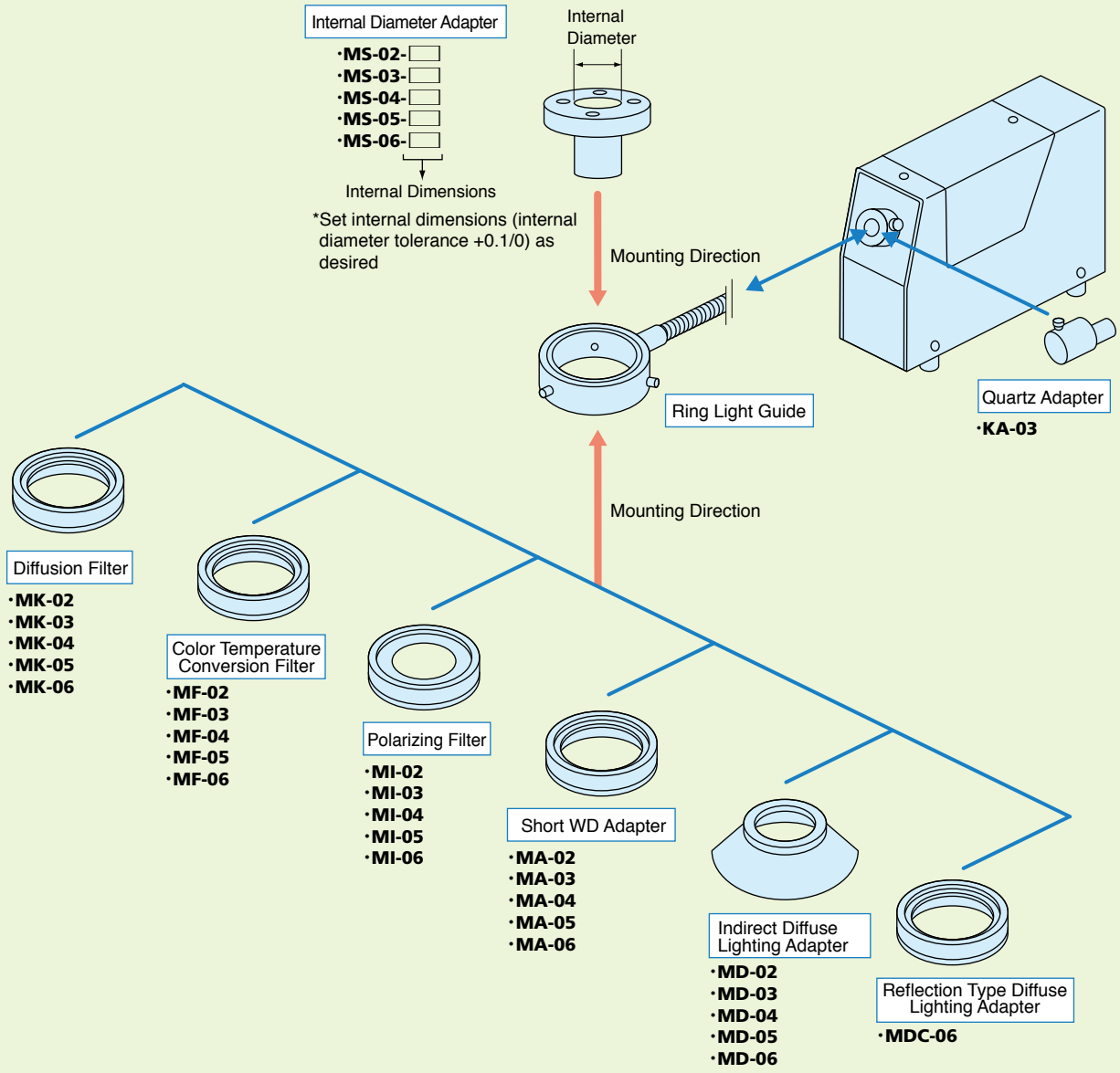
When this reflection type diffuse lighting adapter is used, light from the ring light guide is directed outwards by reflection, which results in diffused and uniform illumination, ideal for laser mark recognition applications.

*The ring light guide MRG-75-1000S/1500S is sold separately.



Model	Product Code
MDC-06	A-8409

System Chart of Ring Light Guide



◎ See corresponding pages for light guide compatibility, specifications, and option commodity codes

Ring Light Guide Options

Diffusion Filter

Model	Compatible Model	External Diameter	Thickness (mm)	Product Code
MK-02	MRG-31	φ46	5.5	A-8364
MK-03	MRG-48	φ65		A-8365
MK-04	MRG-53	φ69		A-8366
MK-05	MRG-61	φ76		A-8367
MK-06	MRG-75	φ90		A-8368

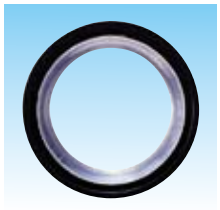
Setting this filter at the light irradiation end of a ring light guide suppresses illuminance irregularity, achieving a soft illumination effect.

Color Temperature Conversion Filter

Model	Compatible Model	External Diameter	Thickness (mm)	Product Code
MF-02	MRG-31	φ46	5.5	A-8374
MF-03	MRG-48	φ65		A-8375
MF-04	MRG-53	φ69		A-8376
MF-05	MRG-61	φ76		A-8377
MF-06	MRG-75	φ90		A-8378

Use for color imaging

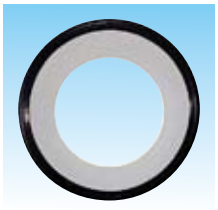
Short WD Adapter



Model	Compatible Model	External Diameter	Thickness (mm)	Product Code
MA-02	MRG-31	φ44	7	A-8384
MA-03	MRG-48	φ66		A-8385
MA-04	MRG-53	φ70		A-8386
MA-05	MRG-61	φ77		A-8387
MA-06	MRG-75	φ90		A-8388

Optimum if working distance is short and gentle-angle illumination is necessary.

Polarizing Filter



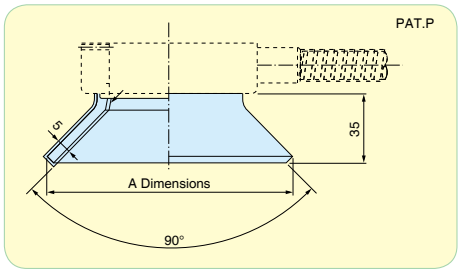
Model	Compatible Model	External Diameter	Thickness (mm)	Product Code
MI-02	MRG-31	φ44	8.5	A-8394
MI-03	MRG-48	φ63		A-8395
MI-04	MRG-53	φ67		A-8396
MI-05	MRG-61	φ74		A-8397
MI-06	MRG-75	φ88		A-8398

Use to prevent halation by illumination or irregular reflection.

Indirect Diffuse Lighting Adapter Series
MD02~06

By attaching an indirect diffuse lighting adapter (MD Series) to the standard ring light guide, the cone shaped adapter emits the light, which illuminates the interior of the cone and produces uniform diffused illumination.

*Ring light guide MRG series is sold separately.

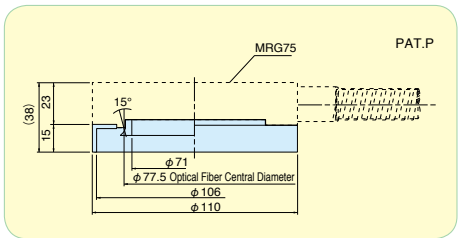


Model	Compatible Ring Light Guide	Dimension A (mm)	Product Code
MD-02	MRG31-	101	A-8404
MD-03	MRG48-	121	A-8405
MD-04	MRG53-	115	A-8406
MD-05	MRG61-	126	A-8407
MD-06	MRG75-	140	A-8408

Reflection Type Indirect Diffuse Lighting Adapter
MDC-06

When this reflection type diffuse lighting adapter is used, light from the ring light guide is directed outwards by reflection, which results in diffused and uniform illumination, ideal for laser mark recognition applications.

*The ring light guide MRG-75-1000S/1500S is sold separately.



Model	Product Code
MDC-06	A-8409

Light Guide Data

Mechanical Characteristics and Environment Resistance

Mechanical Characteristics

●Minimum Bend Radius

The minimum bend radius of fiber optic light guides is determined mainly by the tube's bend radius. It is also influenced by the diameter and length of the fiber optic bundle. If you bend a light guide over its limit, it cannot perform properly because transmitted light quantity decreases due to bending or disconnection of optical fiber. Note that bend radius is larger for optical fiber with a random sequence.

●Durability for Repeated Bending

Although durability of optical fiber for repeated bending varies depending on types, it is not very good overall. Optical fiber breaks or deteriorates because of twisting, friction with other optical fiber, and friction within tubing (coating for a fiber optic bundle). When this happens, transmitted light quantity reduces and a light guide cannot perform sufficiently. Durability for repeated bending is even lower for optical fiber with a random sequence. If more durability is required, use a flexible light guide (special order) with a different internal structure and special coating agent.

Environment Resistance

●Heat Resistance

The normal heat resistance ranges for raw plastic fiber, multi-component glass fiber, and quartz fiber are 70, 430˚C (except oiling), and 1,000˚C (except coating) respectively. Upper limit temperature for light guides ends differs according to the heat resistance of adhesives and coating materials used to protect optical fiber. Upper limit temperature for raw plastic fiber, multi-component glass fiber, and quartz fiber are 70˚C, 200˚C, and 200˚C respectively. If higher heat resistance is required, please use heat-resistant line guides (special order, 300˚C for multi-component glass fiber and quartz fiber). If even higher heat resistance is required, quartz fiber light guides that are resistant to 500˚C can be manufactured.

Life of raw optical fiber varies according to temperature that it is used at, and the amount and time of change in temperature. Please contact us before using light guides in special conditions.

Heat Resistance

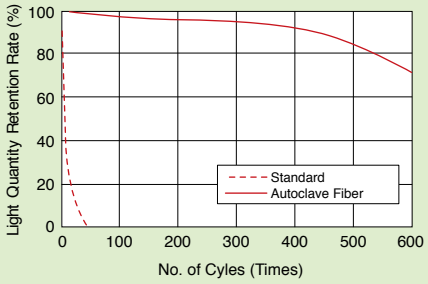
Optical Fiber	Heat Resistance of Raw Fiber (˚C)	End Heat Resistances of Standard Products (˚C)	End Heat Resistance of Heat-Resistant Products (˚C)
Plastic	70	70	—
Multi-Component Glass	430 (Except Oiling)	200	300
Quartz	1,000 or More (Except Coating)	200	300、500

●Moisture Resistance and Water Resistance

Moisture resistance and water resistance of optical fiber is not very high. If moisture/ water-resistance is required, please use light guides with appropriate specifications (special order). (Only multi-component glass fiber is available.) Graph 1 is the result of autoclave test.

(One cycle = 20 min. at 132˚C, 100% humidity, 2kg/cm² pressure --> regular temperature, humidity, air pressure)

Moisture Resistance of Optical Fiber (Reference Values)



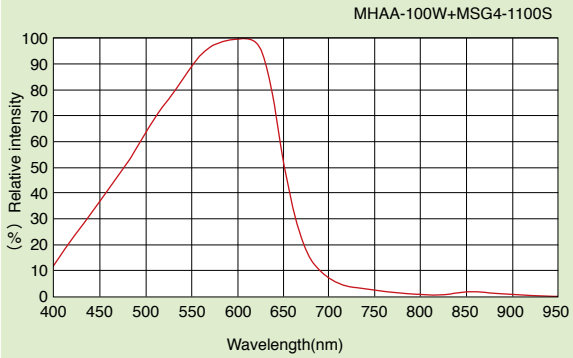
Transmittance Rate and Luminosity Distribution Characteristics

Optical Fiber Data

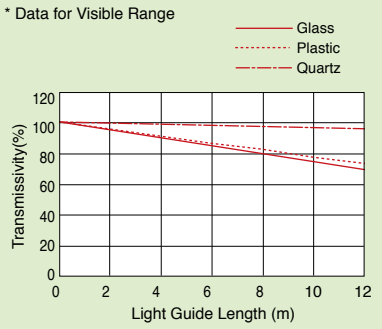
Item / Materials	Compound Glass		Plastic		Quartz	
Fiber Diameter	50μm		250μm 500μm 750μm 1000μm 2000μm		208μm(Many Others)	
Core Diameter	45μm		(3~5 μm Less Than Fiber Diameter)		200μm	
Entrance Angle	Approx. 70°		Approx. 60°		Approx. 25°	
Upper Temperature Limit for Light Gudie Ends*1	Standard Type	200°C	Standard Type	70°C	Standard Type	200°C
	Special Order	300°C			Special Order	500°C
Durability	△		○		×	
Heat Resistance	○		×		○	
Transmittance*2 (Visible Light for Short Distance)	△		△		○	
Values	○		○		×	

○Excellent △Problems in certain conditions ×Not recommended
For reference only. Consult Moritex for details
*1 Data of a bundle (not element wire data)
*2 Transmission at 10m or less

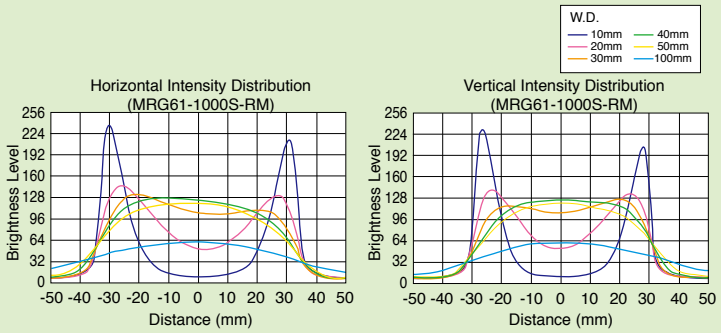
Distribution Characteristics of Light Guide and Halogen Light Source



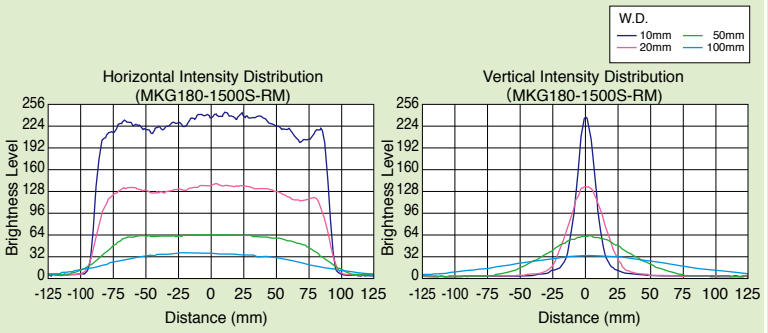
Length and Transmission of Light Guide



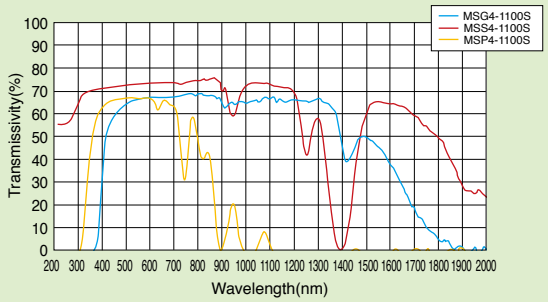
Luminance Distribution of Ring Light Guide



Luminance Distribution of Line Light Guide



Spectral Transmission of Different Light Guides



UV Visible Range Quartz Fiber Characteristics

Raw Fiber Specifications

NA and Stucture Dimensions	NA		0.22±0.02
	Diameter	Core(μm)	200±3
		Clad(μm)	208±3
		Primary Coating (μm)	240±10
	Permissable Bend Radius (mm)		20
Materials	Core		Pure SiO^2
	Clad		With F SiO^2

Note: Fiber diameter (core/ clad) may be changed without any notice.

Features

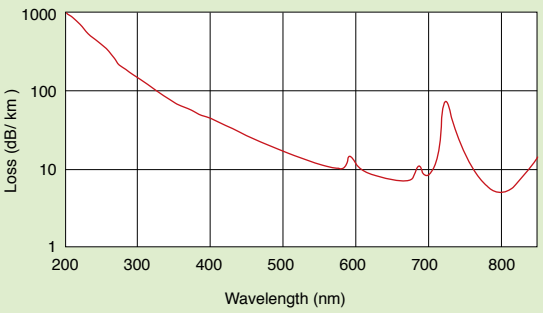
- Suitable for UV-ray transmission because of high OH contents.
- Prices are low because of rational production system.
- Transmittance rate is stable for a long time when used for UV light guides.
- Can be used for i, g, and h rays.
- The thorough quality control of transmission performance and dimensional precision realizes easy processing with less dispersion and produces good-quality products.
- The technology, experience, and know-how of Moritex, accumulated over a long period enables various fiber processing.

* Light guides for KrF. and excimer laser can be custom-made

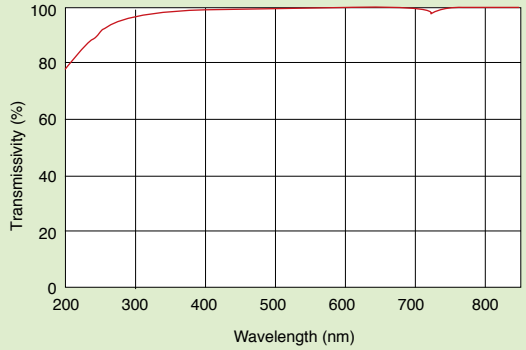
Applications

- Light guides for UV spot light sources
- Advanced light guides for semiconductors and liquid crystal exposure devices
- Light guides for analyzers
- Fiber probes for sensors
- Light guides for fluorometric analysis
- Light guides for medical use

Wavelength Loss Characteristics



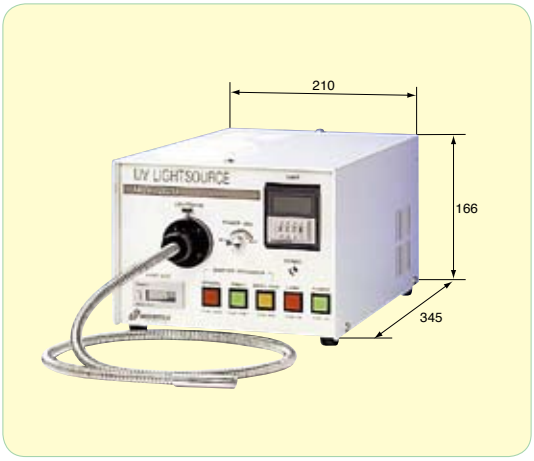
Wavelength Transmittance Rate Characteristics (Per Meter Excluding Fresnel Reflection)

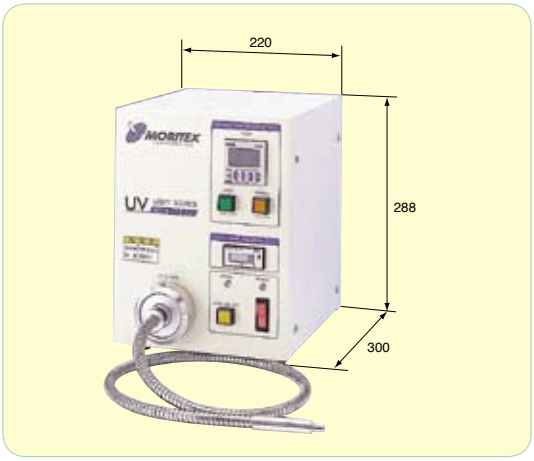


UV Illumination Systems for Spot Area Irradiation

MUV-202U
MUV-250U-L

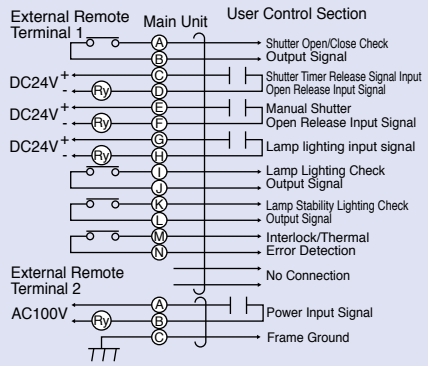
Areas that were not easily illuminated by conventional light sources can be illuminated effectively and efficiently by combining lamps, fibers and light sources of different types and outputs.



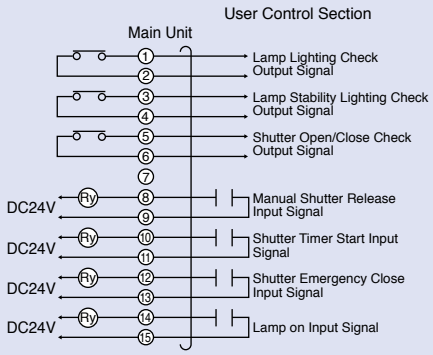


Remote Function

MUV-202U/MUV-202K



MUV-250U-L



Ry Relay | Relay Contact | Relay External Contact

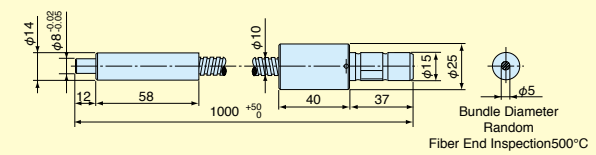
Series	Mercury Xenon 200W	Ultrahigh Pressure Mercury 250W
Model	**MUV-202U**	**MUV-250U-L**
External Dimensions (Inc. Projection) WxHxD (mm)	210×166×345	220×288×300
Key Features	Low Cost and Long Life	High Power
Lamp Model	**LUM-202**	**LUM-250**
Average Lamp Life (Hr)	3000 Hours	3000 Hours
Ultraviolet Intensity (365 Nm)	2000mW/cm^2	4000mW/cm^2
Optical Axis Adjustment	None	
Intensity Control	Mechanical Dimmer	
Shutter Drive System (Front Operation)	Manual/ Digital Timer	
Power Consumption	320W	500W
Weight	7kg	9kg
Fiber		
(External Input Functions)		
Shutter Timer Start	○	○
ON/OFF Manual Shutter	○	○
Power ON/OFF	○	○
Lamp ON/OFF	○	○
(Output Functions)		
Lamp On	○	○
Lamp Stability	○	○
Shutter Open/Close	○	○
Interlock/Thermal Error Detection	○	○
Product Code	A-1201	A-1203
(Options)		
Replacement Lamp	**LUM-202**	**LUM-250**
Product Code	A-8531	A-8532
Uv Intensity Monitor (Main Unit)	**MUVM-MP**	
Product Code	A-8563	
Amplifier for UV Light Intensity Monitor	**MUVM-254**	**MUVM-365**
Product Code	A-8569	A-8570
Fiber Sensor for UV Light Intensity Monitor	**MUVM-FS**	
Product Code	A-8576	
Condensed Direct Radiation Unit	**MTC-1**	
Product Code	A-8582	
High-Condensing Direct Irradiation Unit	**MTC-2**	–
Product Code	A-8583	–
High Uniformity Direct Radiation Unit	**MTU-1**	–
Product Code	A-8584	–

*1 Attached to the tip of a fiber *2 Attached to the route of a fiber

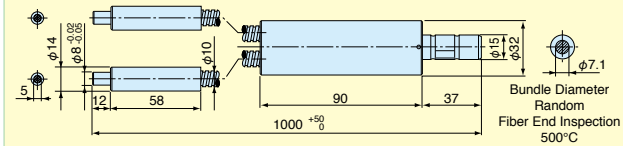
Quartz UV Light Guide

Moritex handle the processing to installation of raw quartz fibers and produce UV bundle fibers according to the use. Straight type light guides, multi-branch light guides, and other various kinds of configurations can be manufactured, including light guides made to customer specifications.

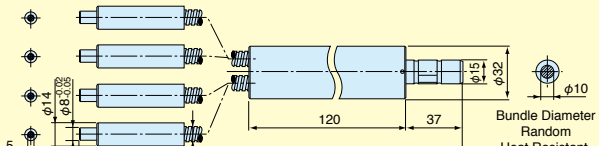
MSS5-1000S-UVⅢ



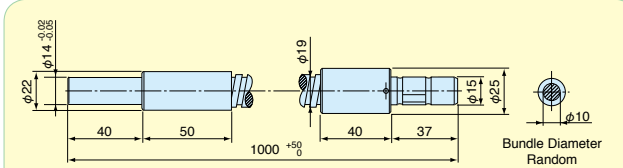
MWS5-1000S-UVⅢ



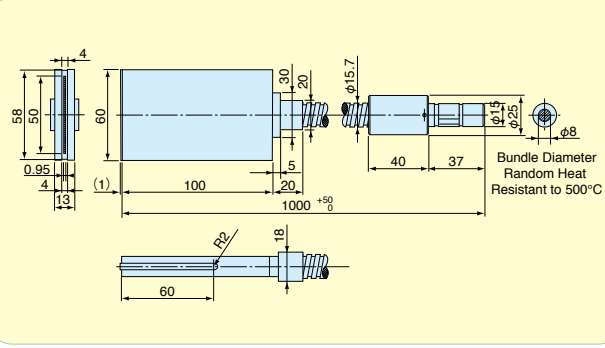
M4S5-1000S-UVⅢ



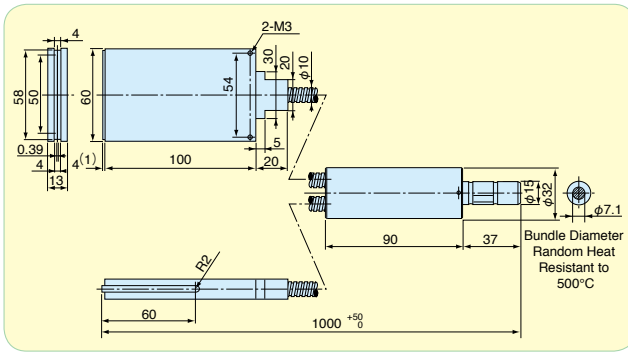
MSS10-1000S-UVⅢ



MKS50-1000S-UVⅢ

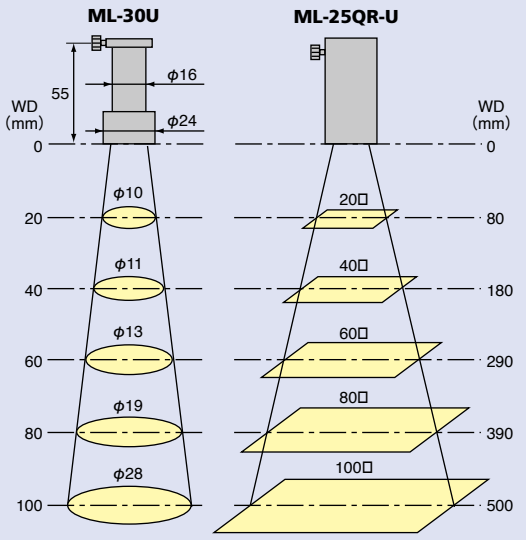


MKS50×0.4W-1000S-UVⅢ



	Model	Notes	Product Code
Standard Model	**MSS5- 1000S-UVⅢ**	φ5×1000L	A-1260
	MWS5- 1000S-UVⅢ	φ5 x 2-Branch x 1000L	A-1261
	M4S5- 1000S-UVⅢ	φ5 x 4-Branch x 1000L	A-1262
Made-to-order	**MSS3.5- 1000S-UVⅢ**	φ3.5×1000L	A-1263
	MWS3.5- 1000S-UVⅢ	φ3.5 x 2-Branch x 1000L	A-1264
	M3S3.5- 1000S-UVⅢ	φ3.5 x 3-Branch x 1000L	A-1265
	M4S3.5- 1000S-UVⅢ	φ3.5 x 4-Branch x 1000L	A-1266
	MSS10- 1000S-UVⅢ	φ10×1000L	A-1267
	MKS50- 1000S-UVⅢ	Line Width: 50mm	A-1268
	MKS50×0.4W- 1000S-UVⅢ	Line Width: 50mm x 0.4mm (2-Branch Type)	A-1269

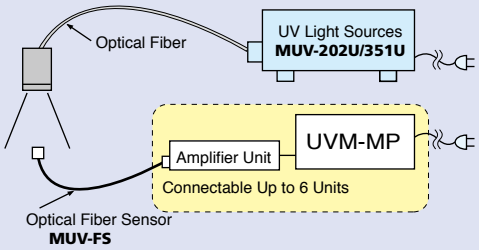
■Unit for Condenser Lenses



Model	Notes	Product Code
ML-30U	Condenser Lenses	A-8590
ML-25QR-L	Uniform Light Irradiate Quartz Lens	A-8591

■UV irradiate Intensity Monitor

A light guide unit with dedicated sensor is combined to continuously monitor UV intensity and display it on a panel. If the UV intensity becomes lower than the setting, the UV intensity lower limit alarm function is activated.



Model	Notes	Product Code
MUVM-MP	UV Intensity Monitor (Main Unit)	A-8563
MUVM-365	Sensor Box for UV Intensity Monitor (365nm)	A-8570
MUVM-254	Sensor Box for UV Intensity Monitor (254nm)	A-8569
MUVM-FS	Fiber Sensor Head for UV Intensity Monitoring	A-8576

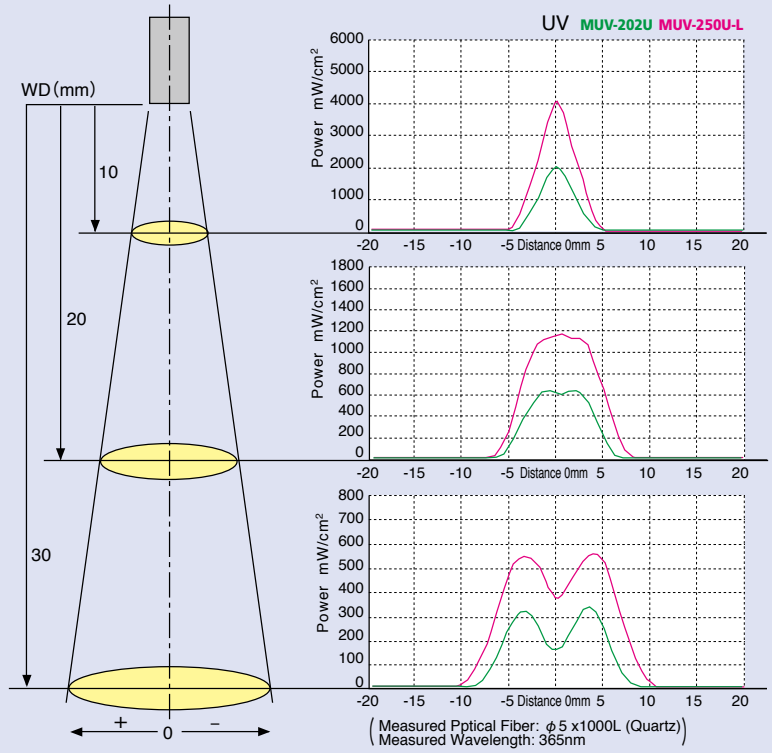
■ Other

Model	Notes	Product Code
MTC-1	MUV-202U/ 351U Condensed Direct Radiation Unit	A-8582
MTC-2	MUV-202U/ 351U Condensed Direct Radiation Unit	A-8583
MTU-1	MUV-202U/ 351U High Uniformity Direct Radiation Unit	A-8584

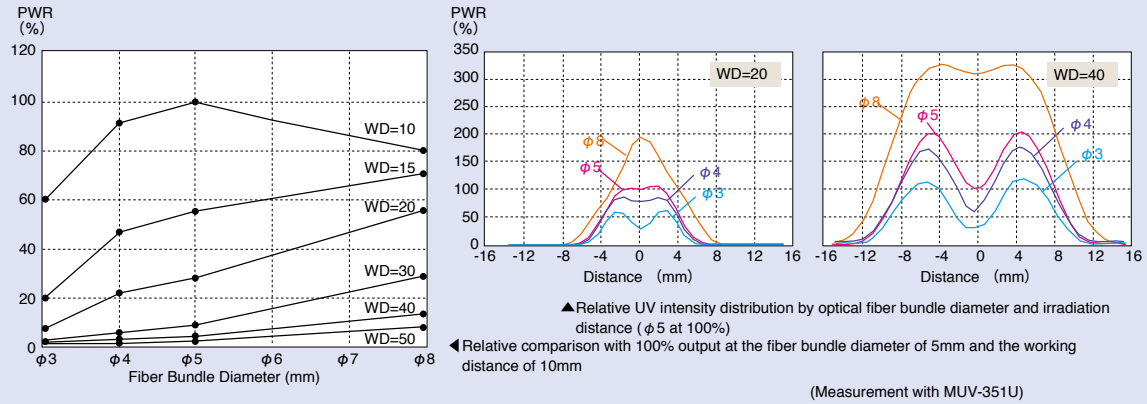
UV Illumination Systems Data

Illumination Working Distance - Intensity Distribution

Expansion of Light Emitted From Optical Fiber and Power Distribution Characteristics



Quartz Fiber Bundle Diameter - UV Intensity ◎Extending the optical fiber bundle diameter increases the UV intensity.



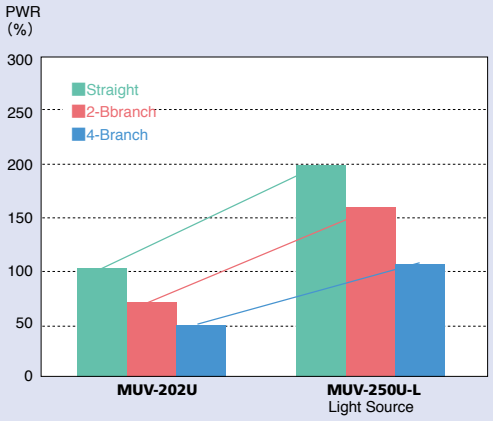
▲Relative UV intensity distribution by optical fiber bundle diameter and irradiation distance (φ5 at 100%)

◀Relative comparison with 100% output at the fiber bundle diameter of 5mm and the working distance of 10mm

(Measurement with MUV-351U)

Reduction of Light Intensity Due to Increase of Branches

◎Light intensity is reduced if the number of branches of the optical fiber increases (when bundle diameter is the same).



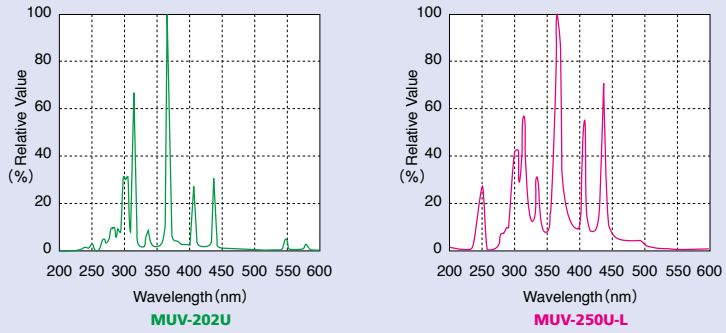
Quartz

	Straight	2-Branch	4-Branch
MUV-202U	100%	70%	50%
MUV-250U-L	100%	80%	53%

UV Intensity Data According to Number of Branches
(When Emission Data is Set at φ5)

■Spot Area Radiant Transmission

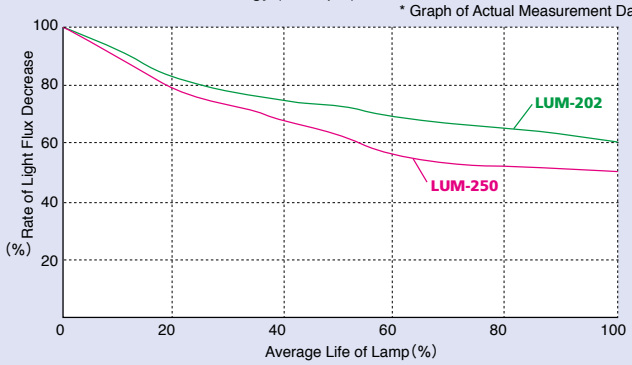
Spectral Distribution After Emission From Optical Fiber



■Lamp Life Characteristics

Deterioration of Luminous Energy (Example)

* Graph of Actual Measurement Data (at 365nm)



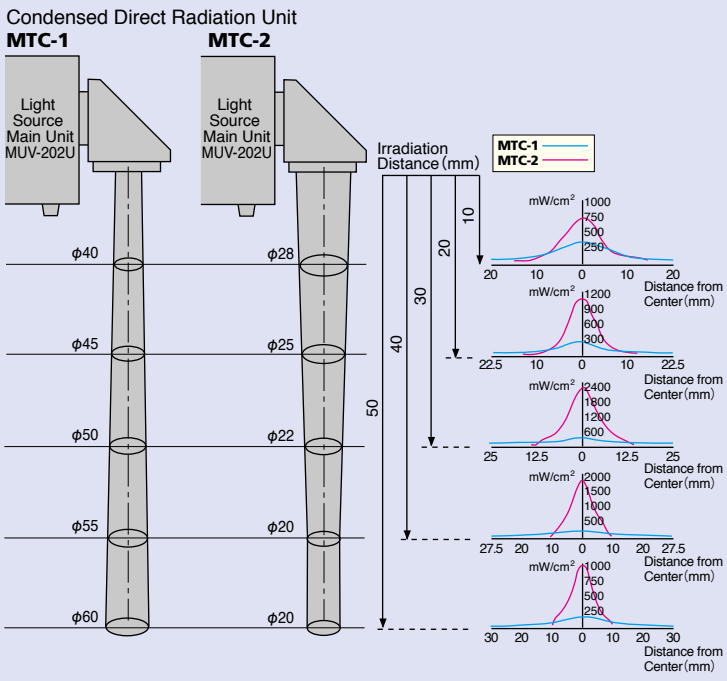
Compatible Light Source	Compatible lamp	Average Life (Hours)	Average Life (Light Flux Maintenance Rate)
MUV-202U	**LUM-202**	3000hr	〃 50%
MUV-250U-L	**LUM-250**	3000hr	〃 50%

Definition of average life: Average duration of continuous lighting at the rated power in hours.
The life ends in either the case of (1) or (2):
(1) The total light flux becomes the specified percentage of less than the initial value.
(2) The lamp fails to light

■Direct Radiation Unit - Intensity Distribution ◎Three Types of Condensed Direct Radiation Units are Made for MUV-202V

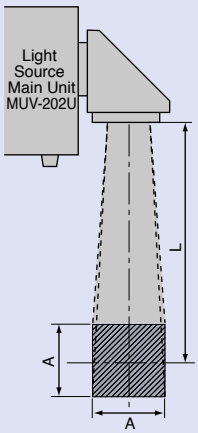
The Following Characteristics are Achieved by Attaching to Main Unit

Condensed Direct Radiation Unit



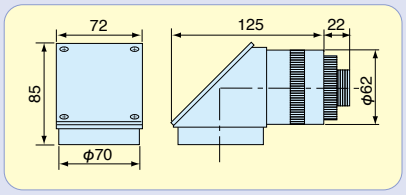
High Uniformity Direct Radiation Unit

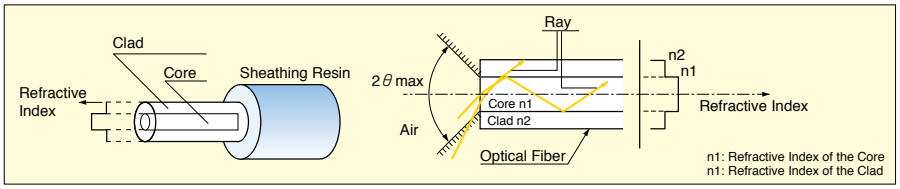
MTU-1



L (mm)	A (mm)	UV Intensity (mW/cm²)
10	30	35±2 (Front of Irradiation Face)
25	35	30±2 (Front of Irradiation Face)
50	50	22±1 (Front of Irradiation Face)
100	65	18±1 (Front of Irradiation Face)
150	80	10±1 (Front of Irradiation Face)
200	100	6±1 (Front of Irradiation Face)

* Dimension A (mm) of the irradiation face represents the effective irradiation face



Measured Light Quantity	Light Flux（lm）	The quality of light emitted from a light source. The unit is lumen (lm)
	luminous Intensity (cd＝lm/sr)	Light source quantity representing the quantity of light emitted from a light source per unit solid angle. The unit is candela (cd) = lm/ sr (solid angle)
	Intensity（lx＝lm/m²）	Brightness on an object surface irradiated by light emitted from a light source. The unit is lux (lx) = lm/ m² where m² is the area of the object surface
	Illuminance（nt＝cd/m²）	Light source quantity representing the luminous intensity of light emitted from a light source per unit area. The unit is nit (nit) = cd/m² or stilb = cd/ cm²
Filter	Color Temperature °K	Color temperature representing the spectral energy distribution of light emitted from a light source. The unit is kelvin (k). A light source of a low value is reddish and one of a high value is bluish. To change the color temperature of a light source, use a color temperature conversion filter.
	Polarizing Filter	A filter to block light being reflected from glass, metal, or liquid surfaces that is too strong and detrimental .
	ND Filter	A filter to reduce the light quantity only, without affecting color reproduction. Also known as a gray filter.
	Color Temperature Conversion Filter	A filter to change the color temperature. The wavelength can be selected.
	Diffusion Filter	A filter to diffuse light from a light source and suppress illumination irregularity.
	IR Cut Filter	This filter can be classified into two types: heat-ray absorbing filters (or, catathermic filters), which absorb infrared rays, and cold filters, which reflects infrared rays by a multilayer film.
	Light Control Film	By laminating a micro-louver film with PET or other types of film, diffused light becomes more parallel.
Lamp	Halogen Lamp	An incandescent lamp with a trace of halogen gas added to the sealed gas. The halogen cycle prevents the blackening of the bulb wall. The optical output and color temperature are stable with less attenuation compared with that of an ordinary incandescent.
	Metal Halide Lamp	A lamp of great color rendering and high intensity using illumination by various metal halogen compounds and mercury.
	LED	A Light Emitting Diode (LED) is a semi-conductor element that applys a fixed-direction current to a crystalline substance with a semi-conductor PN junction, generating energy in the substance and emitting the energy as light. The basic theory was found early in the 20th century and silicon carbide was confirmed, experimentally, to emit light if a current was applied. Following this research, the current technology was established in the 1960's. Red and green were developed first, yellow in the 1970's, blue in 1993 and white in 1996.
	Constant-Current Power Supply	A power supply that can supply a fixed current even if infinite impedance and load voltage change.
	Constant-Voltage Power Supply	A power supply that can supply a fixed voltage even if 0 impedance and load voltage change.
	Resistance	Resistance (R) represents the difficulty of a current to pass: R = V/I. The unit is ohm (Ω). If the potential of a current drops by 1 volt (V) per ampere (A), the resistance is 1Ω.
Fiber	Optical Fiber	
	Numerical Aperture NA	The characteristic of receiving rays transmitted through the end face of an optical fiber. This is determined by the refractive indexes of the core and clad of the optical fiber. $NA=\sqrt{n_1^2-n_2^2}$
	Light-Reception Angle θ	An angle where the optical fiber can receive light. $\theta=2\sin^{-1}(NA)$

MV General Catalog
[Lenses & Peripherals]

Guide

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