

MACHINE VISION

LENS · LIGHTING · OPTICAL ACCESSORIES

2020

General Catalog

PHILOSOPHY

Pursue further improvement of our own technology and create unique products for the market development

GREETING

Nowadays demand of vision in the market has been increasing not only for TV, also for cell-phone and information technology, and requirement of vision has been developing for ultra HD. We focus on this market trend and strive to create next-generation technology for machine vision, security, and broadcast.

COMPANY PROFILE

Company Name Myutron Inc.
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 3-31-14, Nishikoiwa, Edogawa-ku, Tokyo, 133-0057, Japan
 (Ichikawa Factory)
 4-1919-1, Bokke-Cho, Ichikawa City, Chiba, 272-0811, Japan
Establishment April, 1, 2001
Representative Keiji Watanabe
Business · Design, manufacture, and supply lenses for machine vision
 · Design, manufacture, and supply optical systems for machine vision
 · Design, manufacture, and supply lenses for surveillance
 · Design, manufacture, and supply for OEM

Total Solution of Optics for Various Applications

Line-up of Myutron Lens Series

Large FOV

Lenses for photography and surveillance were used for inspection of large objects such as metal, paper, PCB, and others. Due to the improvement of systems, quality of these lenses are not enough for machine vision applications. Myutron lens is designed for very low distortion and high resolution, suitable for machine vision applications. [XLS01/02], [WF5045], [FV-W Series] are suitable for line sensor applications, [HS-V Series], [HF Series], [HS-J Series] are suitable for area sensor applications.



Line Sensor Lens

- XLS01/02
- WF5045
- FV-W Series



Fixed Focal Lens

- HS-V Series
- HF Series
- HS-J Series

Middle FOV

Suitable for inspection of electronic component and fine pitch, wire bonder, and alignment. [FT Series], [TL Series] are suitable for alignment, required for high accuracy [LSP], [UL Series], and [SP Series] are compatible with line sensor camera, high speed and accurate inspection. [XLS Series], [LS Series], and [FV-L Series] are suitable for line sensor applications, [MGTL-V Series], [MGTL-VM Series] and [MGTL Series] are suitable for area sensor applications.



Super High Resolution Lens for Line Sensor

- LSP350
- UL Series
- SP Series
- XLS Series



Telecentric Lens

- FTV Series
- MGLT-V Series
- MGLT-VM Series
- MGLT Series
- FT Series
- TL Series

Small FOV

Suitable for inspection of IC, silicon wafer, and color filter. [HMZ Series] are suitable for inspection of different size of objects. High magnification of telecentric lens with co-axial, [FTV High Magnification Series] are suitable for inspection of reflective objects, required for higher resolution.



Macro Zoom Lens

- HMZ Series

Propose to Various Systems Together with Imaging Lens



*This combination is example.

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NEW
LINEUP



NEW **SWIR** **1.1"**

SWIR Telecentric Lens for 1.1"



- ❖ Available for SWIR image sensor 1", InGaAs Sensor
- ❖ Special design to transmit SWIR 700 ~ 2000 nm
- ❖ Possible to capture differences and defects that cannot be seen in visible ray
- ❖ 1.0x/2.0x lenses are adjustable iris, possible to adjust depth of field

FTV10C-110SW

Magnification	1.0x
F No.	7.0
Object side NA	0.071
WD	110.4mm
OI	258.9mm
Depth of field	0.56mm
Resolution	10.3 μ
TV distortion	0.02%
Maximum Compatible sensor	1.1
Mount	C

FTV20C-110SW

Magnification	2.0x
F No.	11.5
Object side NA	0.087
WD	110.2mm
OI	280.1mm
Depth of field	0.23mm
Resolution	8.4 μ
TV distortion	0.03%
Maximum Compatible sensor	1.1
Mount	C

FTV30C-110SW

Magnification	3.0x
F No.	16.0
Object side NA	0.094
WD	110.3mm
OI	278.0mm
Depth of field	0.14mm
Resolution	7.8 μ
TV distortion	0.02%
Maximum Compatible sensor	1.1
Mount	C

FTV40C-110SW

Magnification	4.0x
F No.	20.0
Object side NA	0.100
WD	110.3mm
OI	290.5mm
Depth of field	0.10mm
Resolution	7.3 μ
TV distortion	0.02%
Maximum Compatible sensor	1.1
Mount	C

* Indicated Specifications are design values.

NEW **25MP** **1.1"**

25 Mega Pixel Telecentric Lens for 1.1"

FTV Series WD110mm 0.5x-1.0x

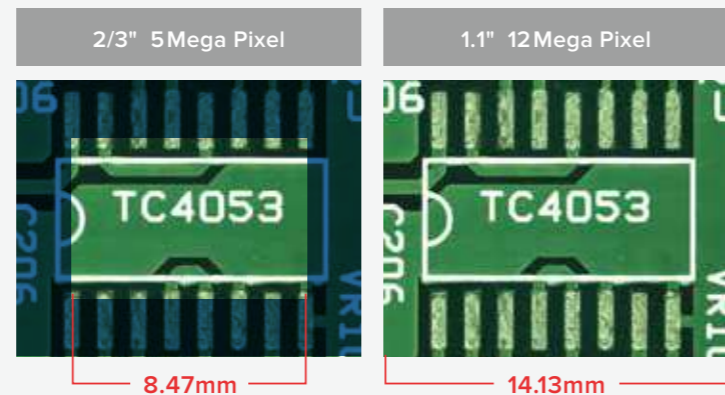


- Suitable for best quality in 25 Mega Pixel (2.5µm/Pixel)
- Adjustable iris, possible to adjust depth of field and contrast

View comparison image

Magnification : 1x

View comparison image between 1.1"12Mega Pixel camera and 2/3" 5 Mega Pixel camera
Possible to capture about 1.7x field of view



FTV05-110

Magnification	0.5x
F No.	6.3
Object side NA	0.040
WD	114.7mm
OI	257.7mm
Depth of field	2.02mm
Resolution	8.5 µ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV07-110

Magnification	0.7x
F No.	6.4
Object side NA	0.055
WD	115.0mm
OI	254.7mm
Depth of field	1.05mm
Resolution	6.1 µ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV08-110

Magnification	0.8x
F No.	6.2
Object side NA	0.064
WD	115.0mm
OI	260.1mm
Depth of field	0.78mm
Resolution	5.2 µ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV10-110

Magnification	1.0x
F No.	7.0
Object side NA	0.071
WD	110mm
OI	258.5mm
Depth of field	0.56mm
Resolution	4.7 µ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV05C-110

Magnification	0.5x
F No.	6.3
Object side NA	0.040
WD	114.7mm
OI	257.7mm
Depth of field	2.02mm
Resolution	8.5 µ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV07C-110

Magnification	0.7x
F No.	6.4
Object side NA	0.055
WD	115.0mm
OI	254.7mm
Depth of field	1.05mm
Resolution	6.1 µ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV08C-110

Magnification	0.8x
F No.	6.2
Object side NA	0.064
WD	115.0mm
OI	260.1mm
Depth of field	0.78mm
Resolution	5.2 µ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV10C-110

Magnification	1.0x
F No.	7.0
Object side NA	0.071
WD	110mm
OI	258.5mm
Depth of field	0.56mm
Resolution	4.7 µ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

* Indicated Specifications are design values.

NEW **25MP** **1.1"**

25 Mega Pixel Telecentric Lens for 1.1"

FTV Series WD150mm 0.5x-1.0x



FTV05-150

Magnification	0.5x
F No.	6.3
Object side NA	0.040
WD	152.6mm
OI	294.1mm
Depth of field	2mm
Resolution	8.4 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV07-150

Magnification	0.7x
F No.	9.0
Object side NA	0.039
WD	151.1mm
OI	292.2mm
Depth of field	1.47mm
Resolution	8.6 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV08-150

Magnification	0.8x
F No.	8.1
Object side NA	0.050
WD	151.1mm
OI	296.8mm
Depth of field	1.01mm
Resolution	6.8 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV10-150

Magnification	1.0x
F No.	9.1
Object side NA	0.055
WD	151.9mm
OI	298.8mm
Depth of field	0.73mm
Resolution	6.1 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV05C-150

Magnification	0.5x
F No.	6.3
Object side NA	0.040
WD	152.6mm
OI	294.1mm
Depth of field	2mm
Resolution	8.4 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV07C-150

Magnification	0.7x
F No.	9.0
Object side NA	0.039
WD	151.1mm
OI	292.2mm
Depth of field	1.47mm
Resolution	8.6 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV08C-150

Magnification	0.8x
F No.	8.1
Object side NA	0.050
WD	151.1mm
OI	296.8mm
Depth of field	1.01mm
Resolution	6.8 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV10C-150

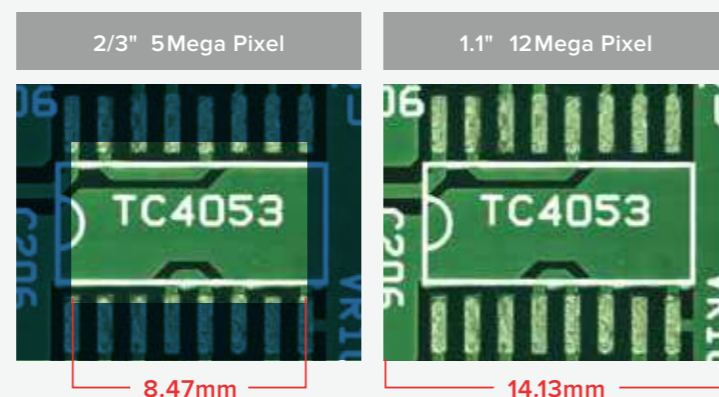
Magnification	1.0x
F No.	9.1
Object side NA	0.055
WD	151.9mm
OI	298.8mm
Depth of field	0.73mm
Resolution	6.1 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

- ❖ Suitable for best quality in 25 Mega Pixel (2.5μm/Pixel)
- ❖ Adjustable iris, possible to adjust depth of field and contrast

View comparison image

Magnification : 1x

View comparison image between 1.1"12Mega Pixel camera and 2/3" 5 Mega Pixel camera
Possible to capture about 1.7x field of view



* Indicated Specifications are design values.

NEW **SWIR** **1"-1.1"**

SWIR Fixed Focal Lens for 1"-1.1"

New line up f 35mm, f 50mm, f 75mm and f 100mm



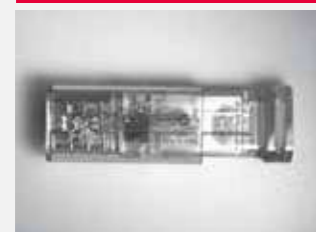
- Available for SWIR image sensor 1", InGaAs Sensor
- Special design to transmit SWIR 700 ~ 2000 nm
- Possible to capture differences and defects that cannot be seen in visible ray

USB

Transmit USB memory stick



SWIR

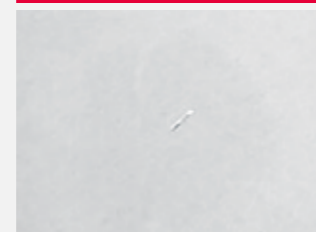


PRINTING

Possible to defect the scratch



SWIR

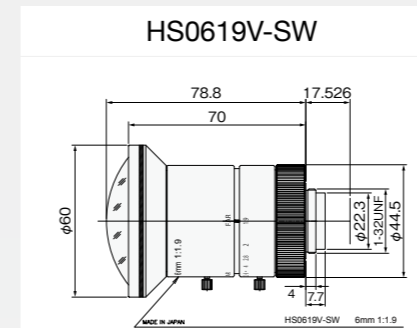


Wafer

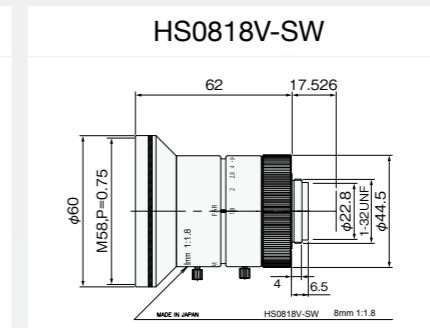
Possible to defect the back side scratch



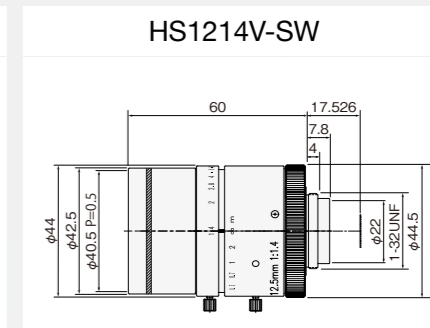
SWIR



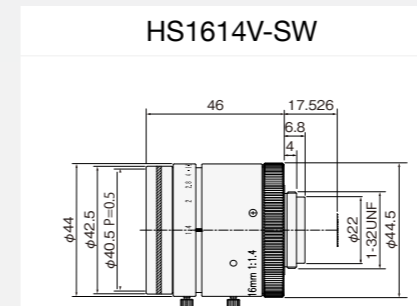
Focal length	6mm
∞F No.	1.9
Range of WD	100mm ~ ∞
TV distortion	0.14%
Angle of view (HxV)	94.1°x 77.5°
Maximum Compatible sensor	1
Mount	C



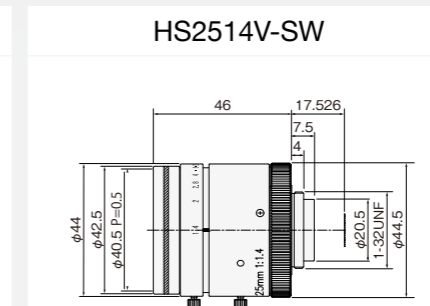
Focal length	8mm
∞F No.	1.8
Range of WD	100mm ~ ∞
TV distortion	-0.52%
Angle of view (HxV)	77°x 61°
Filter pitch	M58 P=0.75
Maximum Compatible sensor	1
Mount	C



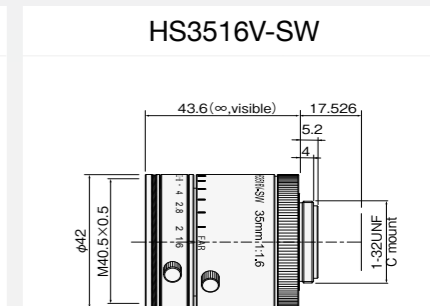
Focal length	12.5mm
∞F No.	1.4
Range of WD	300mm ~ ∞
TV distortion	-1.06%
Angle of view (HxV)	54.2°x 41.5°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1
Mount	C



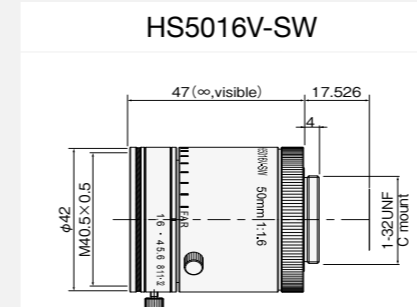
Focal length	16mm
∞F No.	1.4
Range of WD	300mm ~ ∞
TV distortion	-0.97%
Angle of view (HxV)	43.6°x 33.1°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1
Mount	C



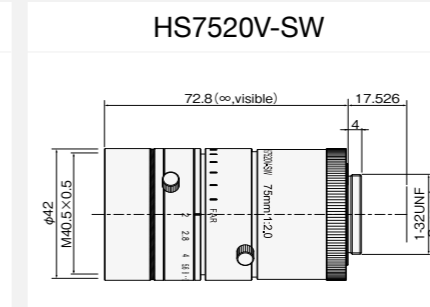
Focal length	25mm
∞F No.	1.4
Range of WD	300mm ~ ∞
TV distortion	-0.01%
Angle of view (HxV)	28.1°x 21.3°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1
Mount	C



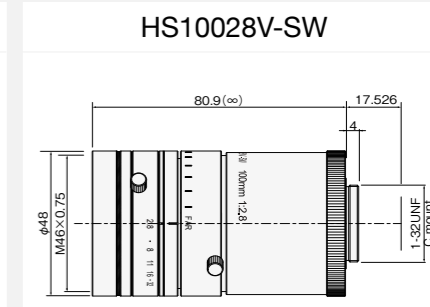
Focal length	35mm
∞F No.	1.6
Range of WD	200mm ~ ∞
TV distortion	0.09%
Angle of view (HxV)	21.5°x 16.3°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1.1
Mount	C



Focal length	50mm
∞F No.	1.6
Range of WD	300mm ~ ∞
TV distortion	0.10%
Angle of view (HxV)	15.8°x 11.9°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1.1
Mount	C



Focal length	75mm
∞F No.	2.0
Range of WD	440mm ~ ∞
TV distortion	0.05%
Angle of view (HxV)	10.8°x 8.1°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1.1
Mount	C



Focal length	100mm
∞F No.	2.8
Range of WD	620mm ~ ∞
TV distortion	0.09%
Angle of view (HxV)	8.2°x 6.1°
Filter pitch	M40.5 P=0.75
Maximum Compatible sensor	1.1
Mount	C

* Indicated Specifications are design values.

NEW **4-12MP** **1"-1.1"**

4 Mega Pixel - 12 Mega Pixel Fixed Focal Lens for 1"-1.1"

New line up f35mm, f 50mm, f 75mm and f 100mm



HS0619V

Focal length	6mm
∞F No.	1.9
Range of WD	100mm ~ ∞
TV distortion	0.83%
Angle of view (HxV)	94.7°x 78.1°
Maximum Compatible sensor	1
Mount	C

HS0818V

Focal length	8mm
∞F No.	1.8
Range of WD	100mm ~ ∞
TV distortion	-0.17%
Angle of view (HxV)	78.1°x 62.1°
Filter pitch	M58 P=0.75
Maximum Compatible sensor	1
Mount	C

HS1214V

Focal length	12.5mm
∞F No.	1.4
Range of WD	300mm ~ ∞
TV distortion	-0.69%
Angle of view (HxV)	54.9°x 42.2°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1
Mount	C

HS1614V

Focal length	16mm
∞F No.	1.4
Range of WD	300mm ~ ∞
TV distortion	-0.85%
Angle of view (HxV)	44.2°x 33.5°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1
Mount	C

HS2514V

Focal length	25mm
∞F No.	1.4
Range of WD	300mm ~ ∞
TV distortion	-0.02%
Angle of view (HxV)	28.6°x 21.6°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1
Mount	C

HS3516V

Focal length	35mm
∞F No.	1.6
Range of WD	200mm ~ ∞
TV distortion	0.12%
Angle of view (HxV)	22.1°x 16.7°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1.1
Mount	C

HS5016V

Focal length	50mm
∞F No.	1.6
Range of WD	300mm ~ ∞
TV distortion	0.14%
Angle of view (HxV)	16.1°x 12.1°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1.1
Mount	C

HS7520V

Focal length	75mm
∞F No.	2.0
Range of WD	440mm ~ ∞
TV distortion	0.05%
Angle of view (HxV)	11.1°x 8.3°
Filter pitch	M40.5 P=0.5
Maximum Compatible sensor	1.1
Mount	C

HS10028V

Focal length	100mm
∞F No.	2.8
Range of WD	620mm ~ ∞
TV distortion	0.09%
Angle of view (HxV)	8.4°x 6.3°
Filter pitch	M40.5 P=0.75
Maximum Compatible sensor	1.1
Mount	C

- ❖ New line up, f35mm, 50mm, 75mm and 100mm are suitable for 1.1"
- ❖ Suitable for 4 Mega Pixel - 12 Mega Pixel
- ❖ Stable performance at different working distance, from macro to infinity by floating design
- ❖ Robust design

* Indicated Specifications are design values.

3 Mega Pixel Fixed Focal Lens

NEW **3MP** **1/1.8" - 2/3"**

New line up f4mm, and f6mm



- ❖ New line up, f4 mm and f6 mm for 1/1.8"
- ❖ Suitable for 3 Mega Pixel (1/1.8" ,2/3")
- ❖ Compact and excellent brightness, suitable for various applications
- ❖ Stable performance from macro to infinity (∞)
- ❖ High durability

HS0420H		HS0618H	
			
			
Focal length	4mm	Focal length	6mm
∞F No.	2.0	∞F No.	1.8
Range of WD	100mm ~ ∞	Range of WD	100mm ~ ∞
TV distortion	0.26%	TV distortion	-0.13%
Angle of view (HxV)	85°×68°	Angle of view (HxV)	61°×47°
Filter pitch	Option	Filter pitch	M27 P=0.5
Maximum Compatible sensor	1/1.8	Maximum Compatible sensor	1/1.8

* Indicated specifications are design values. * TV distortion indicates a value for minimum working distance.
 * Angle of view indicates a value for maximum compatible sensor.

HS0814J		HS1214J		HS1614J	
					
					
Focal length	8mm	Focal length	12mm	Focal length	16mm
∞F No.	1.4	∞F No.	1.4	∞F No.	1.4
Range of WD	100mm - ∞	Range of WD	150mm - ∞	Range of WD	200mm - ∞
TV distortion	0.83%	TV distortion	-0.12%	TV distortion	-0.14%
Angle of view (HxV)	56°×44°	Angle of view (HxV)	39°×30°	Angle of view (HxV)	30°×23°
Filter pitch	M34 P=0.5	Filter pitch	M30.5 P=0.5	Filter pitch	M30.5 P=0.5
Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3

HS2514J		HS3514J		HS5018J	
					
					
Focal length	25mm	Focal length	35mm	Focal length	50mm
∞F No.	1.4	∞F No.	1.4	∞F No.	1.8
Range of WD	300mm - ∞	Range of WD	300mm - ∞	Range of WD	500mm - ∞
TV distortion	-0.12%	TV distortion	-0.06%	TV distortion	0.07%
Angle of view (HxV)	19°×15°	Angle of view (HxV)	14°×11°	Angle of view (HxV)	10°×7.7°
Filter pitch	M30.5 P=0.5	Filter pitch	M30.5 P=0.5	Filter pitch	M30.5 P=0.5
Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3

* Indicated specifications are design values. * TV distortion indicates a value for minimum working distance.
 * Angle of view indicates a value for maximum compatible sensor.

LENS
SERIES



LINE SENSOR LENS / LARGE AREA SENSOR LENS

LSP350



WD and Magnification Chart for Line Scan Lens /Large Area Sensor Lens

Super High Resolution of 3.5x Lens for 12K x 5μm and 8K x 7μm Line Sensor Camera

Suitable for the inspection in high accuracy such as LCD, TFT, and wafer

Display : WD (Magnification)

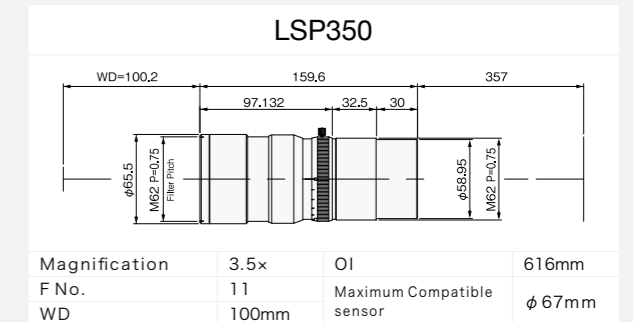
Model No.	Image Circle	∞	0.3x	0.4x	0.5x	0.6x	0.7x	0.8x	0.9x	1x	1.5x	2x	3.5x	Page
LS05	φ36				188mm (0.5x)									P28
LS07	φ36						151mm (0.7x)							P28
LS10	φ36									123mm (1.0x)				P28
LS15	φ36										102mm (1.5x)			P28
LSP350	φ67												100mm (3.5x)	P21
UL035	φ67		367mm (0.35x)											P22
UL05	φ67				270mm (0.5x)									P22
UL07	φ67						204mm (0.7x)							P22
UL10	φ67									132mm (1.0x)				P22
SP05	φ67				276mm (0.5x)									P23
SP07	φ67						211mm (0.7x)							P23
SP10	φ67									165mm (1.0x)				P23
SP14	φ86										112mm (1.4x)			P23
SP20	φ100											90mm (2.0x)		P23
XLS03	φ90	680mm (0.2x)	477mm (0.3x)	376mm (0.4x)										P25
XLS05	φ90			386mm (0.4x)	324mm (0.5x)	274mm (0.625x)								P25
XLS075	φ90					279mm (0.625x)	246mm (0.75x)	222mm (0.875x)						P25
XLS10	φ90							215mm (0.875x)		197mm (1.0x)	177mm (1.2x)			P25
XLS14	φ90									185mm (1.2x)	170mm (1.4x)	154mm (1.7x)		P25
XLS20	φ90										157mm (1.7x)	146mm (2.0x)	133mm (2.5x)	P25

Display : WD (Magnification)

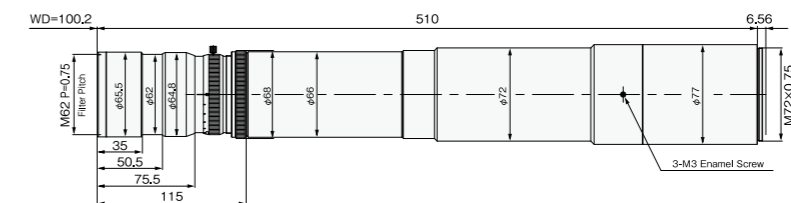
Model No.	Image Circle	∞	0.05x	0.1x	0.15x	0.2x	0.25x	0.3x	0.35x	0.4x	0.45x	0.5x	Page
MS1828	φ30.7	713mm (0.025x)			100mm (0.15x)								P35
MS2524	φ30.7	999mm (0.025x)				120mm (0.2x)							P35
MS3520	φ30.7	1,429mm (0.025x)								100mm (0.39x)			P35
LSF2528	φ44	1,000mm (0.025x)			142mm (0.15x)								P32
LSF3528	φ44	1,413mm (0.025x)			223mm (0.15x)								P32
LSF5028	φ44	2064mm (0.025x)								190mm (0.3x)			P32
LSF10528	φ48	4392mm (0.025x)								433mm (0.3x)			P33
LSF20035	φ48	7980mm (0.025x)								851mm (0.3x)			P33
FV3526L	φ36		507mm (0.07x)			178mm (0.2x)							P37
FV5026L	φ45			521mm (0.1x)		246mm (0.22x)							P37
FV5026W	φ45	2,063mm (0.025x)				297mm (0.18x)							P38
HB5014	φ45	2,058mm (0.025x)				266mm (0.2x)							P39
WF5045	φ62	2,070mm (0.025x)				276mm (0.2x)							P30
FV8528L	φ62					445mm (0.2x)					250mm (0.4x)		P37
FV8528W	φ67	3,423mm (0.025x)				463mm (0.2x)							P38
XLS01	φ82	3,345mm (0.025x)			705mm (0.125x)								P26
XLS02	φ82			705mm (0.125x)						315mm (0.3x)			P26



- ✔ Suitable for Line Sensor Camera such as 12K x 5μm and 8K x 7μm
- ✔ Maximum compatible sensor is φ67mm
- ✔ Long working distance, WD100mm
- ✔ Reduce relative illumination and excellent uniformity



Dimension of LSP350 + HS Mount (M72x0.75 FB6.56mm)



UL Series

LARGE
FORMAT

151MP

φ67

151Mega Pixel Super High Resolution Lens

Large Format φ67mm



- Suitable for Area Sensor Camera 151 Mega Pixel-3.76μm, 120 Mega Pixel-2.2μm, and Line Sensor Camera 16K x3.5μm
- Super high resolution, Low distortion, excellent uniformity of brightness and resolution
- Low color aberration, compatible 3-line camera
- F and M72 mount are available

UL035

Magnification	0.35x	OI	556.9mm
F No.	5.8	Optical Distortion	-0.01%
Object side NA	0.030	Image Circle	φ 67mm
WD	366.5mm	Mount	F, M72

UL05

Magnification	0.5 x	OI	475.2mm
F No.	6.0	Optical Distortion	0.01%
Object side NA	0.042	Image Circle	φ 67mm
WD	270.4mm	Mount	F, M72

UL07

Magnification	0.7 x	OI	418mm
F No.	3.5 / (6.0)	Optical Distortion	0.01%
Object side NA	0.058	Image Circle	φ 67mm
WD	203.6mm	Mount	F, M72

UL10

Magnification	1.0 x	OI	398.4mm
F No.	6.0	Optical Distortion	0.00%
Object side NA	0.083	Image Circle	φ 67mm
WD	132.1mm	Mount	F, M72

* Indicated Specifications are design values.

SP Series

LARGE
FORMAT

φ67-100

Super High Resolution Lens for 12K x 5μm and 8K x 7μm Line Sensor Camera

Suitable for high speed and high-end applications

- Suitable for Line Sensor Camera such as 12K x 5μm and 8K x 7μm
- Magnification can be changed by reversing a lens
- Reduce relative illumination and excellent uniformity
- Very low distortion
- Excellent brightness, ∞F No. 2.7
- F and M72 mount are available



SP05

Magnification	0.5x	OI	463mm
F No.	4.3	Maximum Compatible sensor	φ 67mm
WD	276mm		

SP07

Magnification	0.7x	OI	421mm
F No.	5	Maximum Compatible sensor	φ 67mm
WD	211mm		

SP10

Magnification	1.0x	OI	407mm
F No.	5.8	Maximum Compatible sensor	φ 67mm
WD	165mm		

SP14

Magnification	1.4x	OI	419mm
F No.	6.8	Maximum Compatible sensor	φ 86mm
WD	112mm		

SP20

Magnification	2.0x	OI	463mm
F No.	8.6	Maximum Compatible sensor	φ 100mm
WD	90mm		

Dimension of SP07 + HS Mount (M72x0.75 FB6.56mm)

* Indicated Specifications are design values.

XLS Series



Line Sensor Lens for Large Image Circle, φ90mm

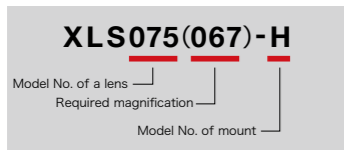
Compatible with large image circle, up to φ90mm sensor

- ✔ Suitable for Line Sensor Camera such as 16K x 5um, 16K x 3.5um, 12K x 5um
- ✔ Suitable for large Area Sensor Camera of high resolution such as 65 Mega Pixel, 50 Mega pixel, and 25 Mega Pixel
- ✔ Reduce color aberration, suitable for 3 line sensor
- ✔ Excellent uniformity of brightness and resolution
- ✔ Possible to adjust ±0.05x from the original magnification by using the optional mount
- ✔ F, M95, M90, M84.5 and M72 mount are available



How to request if magnification is other than standard.

Ex.) 0.67x for H mount



* If a lens is not used at the standard magnification, adjustable range is not ±0.05x.
 * Please select one of XLS series which magnification is the closest from required magnification.

Model No. for Different Mount

Model	Compatible Camera	Screw Pitch	Flange Back
XLS□□□-F	F Mount Camera	F Mount	46.5mm
XLS□□□-E	TELEDYNE e2V	M95 (P=1)	9.4mm
XLS□□□-DX	TELEDYNE DALSA	M90 (P=1)	12mm
XLS□□□-Q	NED	M84.5 (P=0.5)	41mm
XLS□□□-N	NED	M72 (P=0.75)	31.8mm
XLS□□□-M	TELEDYNE DALSA	M72 (P=0.75)	19.55mm
XLS□□□-D	TELEDYNE DALSA	M72 (P=0.75)	12mm
XLS□□□-VW	VIEW WORKS	M72 (P=0.75)	10.48mm
XLS□□□-H	TELEDYNE DALSA	M72 (P=0.75)	6.56mm

* ±0.05x can be adjusted from the standard magnification by using the mount mentioned above.
 * Customized mount is also available. Please contact us for further information.

XLS03		XLS05		XLS075	
Magnification	0.3x	Magnification	0.5x	Magnification	0.75x
∞F No.	4.7	∞F No.	4.7	∞F No.	4.7
F No.	6.0	F No.	7.0	F No.	8.1
WD	477mm	WD	324mm	WD	246mm
OI	666mm	OI	540mm	OI	491mm
Maximum Compatible sensor	φ 90mm	Maximum Compatible sensor	φ 90mm	Maximum Compatible sensor	φ 90mm

XLS10		XLS14		XLS20	
Magnification	1.0x	Magnification	1.4x	Magnification	2.0x
∞F No.	4.7	∞F No.	4.7	∞F No.	4.7
F No.	9.0	F No.	11.4	F No.	14.5
WD	197mm	WD	170mm	WD	146mm
OI	465mm	OI	494mm	OI	540mm
Maximum Compatible sensor	φ 90mm	Maximum Compatible sensor	φ 90mm	Maximum Compatible sensor	φ 90mm

Example of lens with mount (XLS05)

XLS05-F	XLS05-E	XLS05-Q
XLS05-N	XLS05-M	XLS05-H

How to adjust magnification

- Mount tube is composed by three mechanical parts ①, ②, and ③.
- Magnification increases by extending the mount and decreases by shortening.



* Indicated Specifications are design values.

XLS Series

LARGE
FORMAT

155MP

φ82

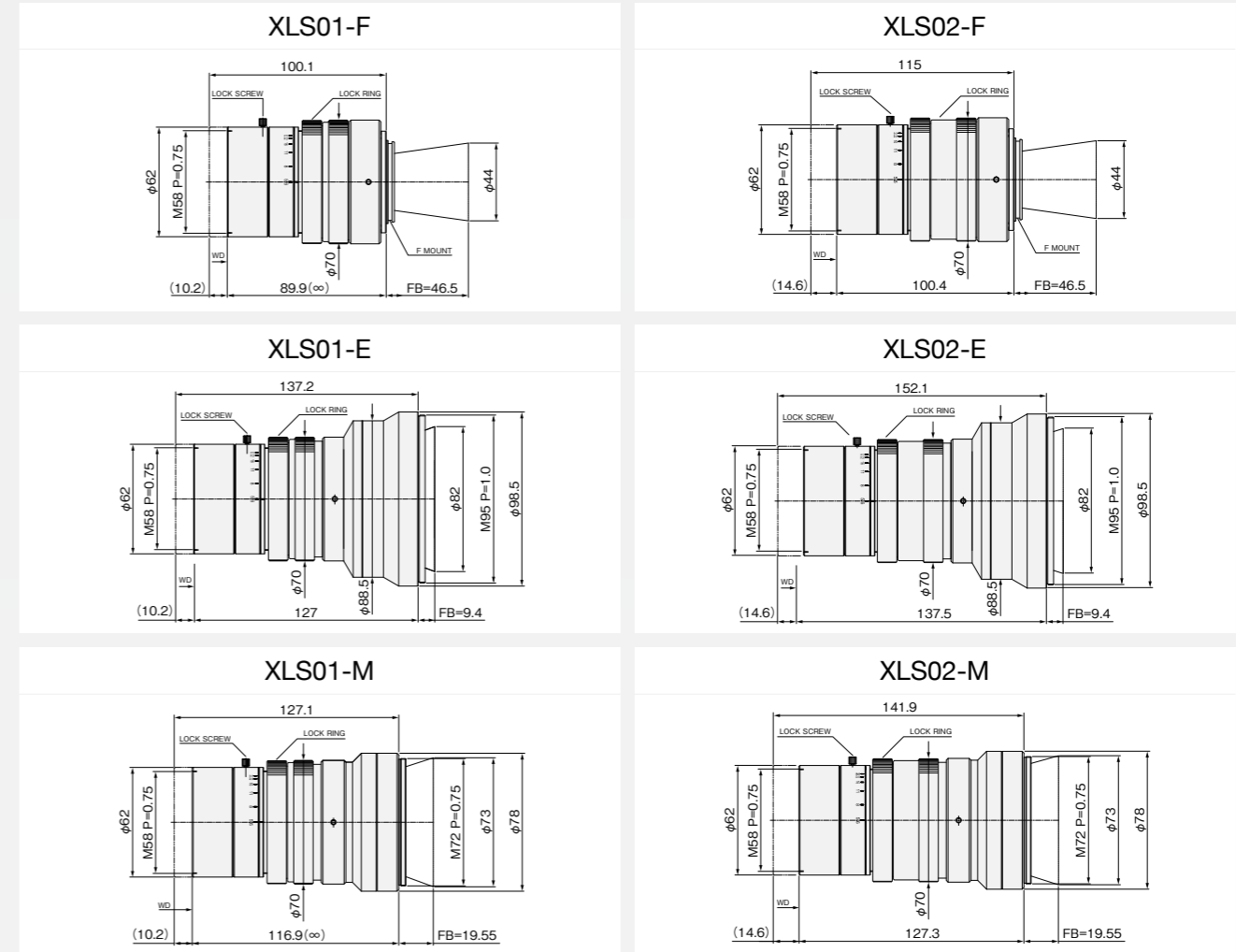
Area Sensor and Line Sensor Lens for 155 Mega Pixel and 16K x 5μm

XLS Series for Large Field of View

- Compatible with large image circle, φ82mm
- Suitable for Line Sensor Camera such as 16K x 5μm, 16K x 3.5μm, 12K x 5μm, and Area Sensor Camera such as 155 Mega Pixel, 151 Mega Pixel
- Adjustable magnification by lock ring
- Design for wide angle, suitable for large field of view in limited space
- Excellent uniformity and very low distortion
- F, M95, M90, M84.5 and M72 mount are available



Example of lens with mount (XLS01/XLS02)



Model No. for Different Mount

Model	Compatible Camera	Screw Pitch	Flange Back
XLS□□□-F	F Mount Camera	F Mount	46.5mm
XLS□□□-E	TELEDYNE e2V	M95 (P=1)	9.4mm
XLS□□□-DX	TELEDYNE DALSA	M90 (P=1)	12mm
XLS□□□-Q	NED	M84.5 (P=0.5)	41mm
XLS□□□-N	NED	M72 (P=0.75)	31.8mm
XLS□□□-M	TELEDYNE DALSA	M72 (P=0.75)	19.55mm
XLS□□□-D	TELEDYNE DALSA	M72 (P=0.75)	12mm
XLS□□□-VW	VIEW WORKS	M72 (P=0.75)	10.48mm
XLS□□□-H	TELEDYNE DALSA	M72 (P=0.75)	6.56mm

* Customized mount is also available. Please contact us for further information.

How to adjust magnification, focus

- To adjust the focus, at first loosening ②, and rolling ①.
- By loosening
- ②, to change magnification.
- ※ XLS01 = ∞ ~ 0.125x XLS02 = 0.125x ~ 0.3x



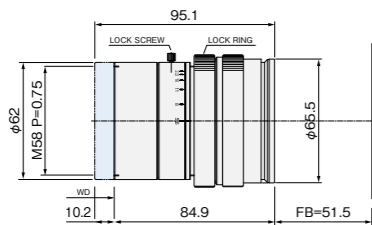
In case of low magnification



In case of high magnification

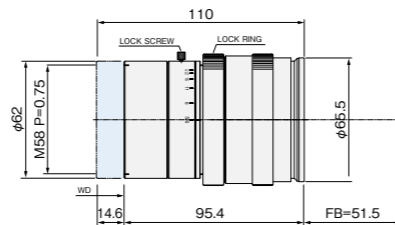
* Indicated Specifications are design values.

XLS01



Magnification	∞-0.125x	Optical distortion	-0.02%
∞FNO	5.6	Maximum Compatible sensor	φ82mm
Range of WD	∞-705mm		

XLS02



Magnification	0.125x-0.3x	Optical distortion	-0.02%
∞FNO	5.6	Maximum Compatible sensor	φ82mm
Range of WD	705mm-315mm		

* Indicated Specifications are design values.

LS Series

LARGE
FORMAT

φ22.6-36

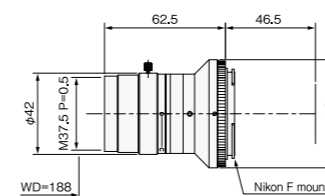
Fixed Magnification Lens for F Mount and C Mount

High Resolution and high contrast
Suitable for LCD, film, and PCB inspection

- Excellent uniformity
- High resolution from the center to the edge of image
- Compact design
- High durability
- Optical distortion less than 0.1%
- C mount type is suitable for area sensor, 4/3"

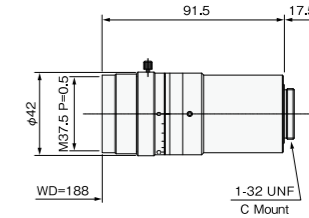


LS05F (F Mount)



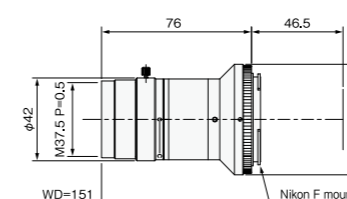
Magnification	0.5x	Resolution	11 μ
WD	188mm	Optical distortion	-0.01%
Depth of field	0.94mm	Maximum Compatible sensor	φ 36mm
F No.	5.1	Mount	F

LS05C (C Mount)



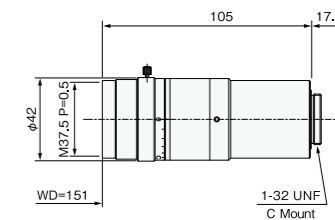
Magnification	0.5x	Resolution	11 μ
WD	188mm	Optical distortion	-0.01%
Depth of field	0.94mm	Maximum Compatible sensor	4/3 (φ 22.6mm)
F No.	5.1	Mount	C

LS07F (F Mount)



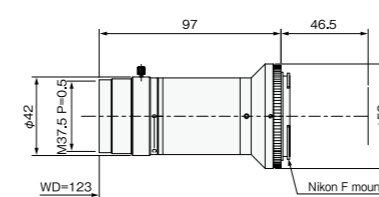
Magnification	0.7x	Resolution	10 μ
WD	151mm	Optical distortion	-0.07%
Depth of field	0.54mm	Maximum Compatible sensor	φ 36mm
F No.	6	Mount	F

LS07C (C Mount)



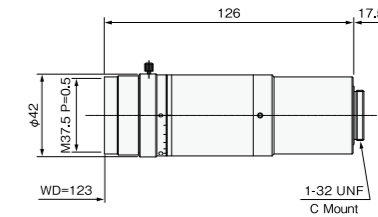
Magnification	0.7x	Resolution	10 μ
WD	151mm	Optical distortion	-0.07%
Depth of field	0.54mm	Maximum Compatible sensor	4/3 (φ 22.6mm)
F No.	6	Mount	C

LS10F (F Mount)



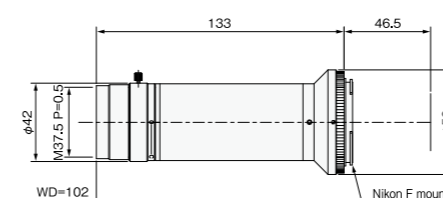
Magnification	1.0x	Resolution	8 μ
WD	123mm	Optical distortion	-0.01%
Depth of field	0.31mm	Maximum Compatible sensor	φ 36mm
F No.	7.5	Mount	F

LS10C (C Mount)



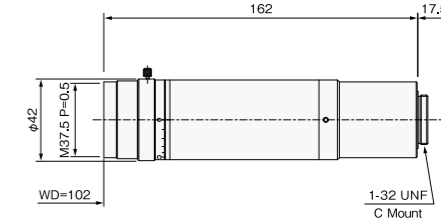
Magnification	1.0x	Resolution	8 μ
WD	123mm	Optical distortion	-0.01%
Depth of field	0.31mm	Maximum Compatible sensor	4/3 (φ 22.6mm)
F No.	7.5	Mount	C

LS15F (F Mount)



Magnification	1.5x	Resolution	7 μ
WD	102mm	Optical distortion	0.26%
Depth of field	0.17mm	Maximum Compatible sensor	φ 36mm
F No.	9.9	Mount	F

LS15C (C Mount)



Magnification	1.5x	Resolution	7 μ
WD	102mm	Optical distortion	0.26%
Depth of field	0.17mm	Maximum Compatible sensor	4/3 (φ 22.6mm)
F No.	9.9	Mount	C

* Indicated specifications are design values. * Resolution is calculated based on MTF.
* Resolution indicates a theoretical resolution at wavelength of 550nm.* Depth of field is calculated assuming F No. (∞) 5.6 and resolution of 14μ camera.

WF Series



High Resolution and Wide View Lens for $\phi 62\text{mm}$

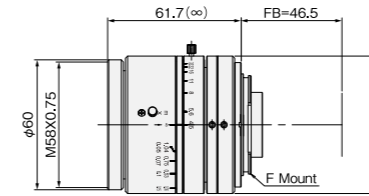
Suitable for wide field of view in limited space

- ❖ f50mm is available
- ❖ The widest angle for $\phi 62\text{mm}$ in machine vision industry
- ❖ Suitable for Line Sensor Camera such as 16K x 3.5 μm , 12K x 5 μm , 8K x 7 μm
- ❖ Possible to capture the large field of view by one camera in limited space
- ❖ F and M72 mount are available

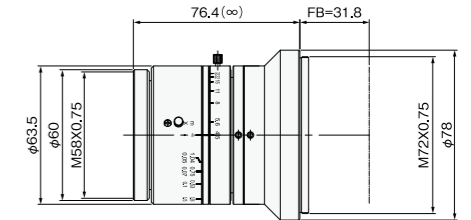
WF5045- □			
Focal length	50mm	Optical distortion	-0.01%
∞ F No.	4.5	Maximum Compatible sensor	$\phi 62.5\text{mm}$
Range of WD	276mm - ∞	Mount	M72 or F
Magnification at MOD	0.2x		



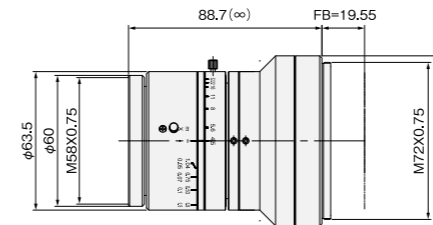
WF5045-F (FB=46.5mm)



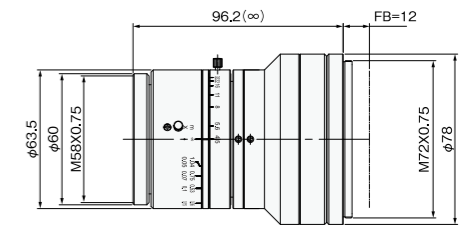
WF5045-N (FB=31.8mm)



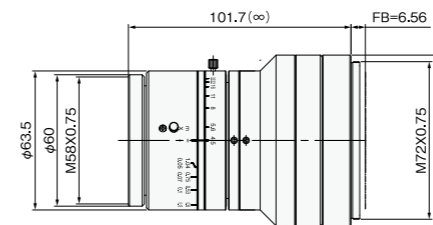
WF5045-M (FB=19.55mm)



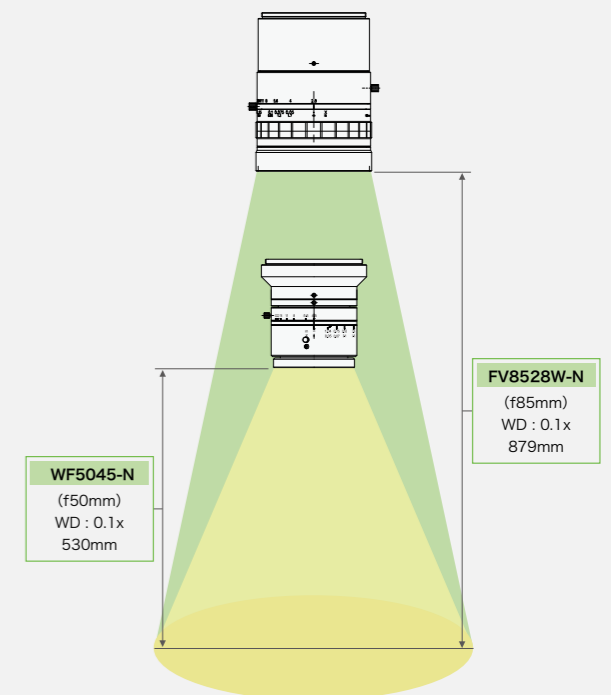
WF5045-D (FB=12mm)



WF5045-H (FB=6.56mm)



Conceptual Drawing



- ❖ Possible to capture the Large field view by short WD

LSF Series

LARGE FORMAT $\phi 44$

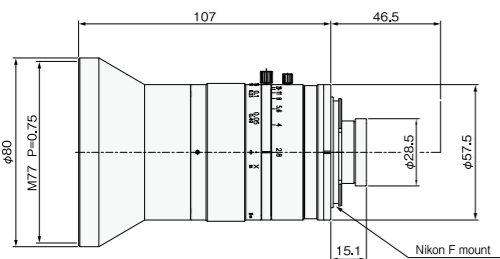
High Resolution and Wide View Lens for Area and Line Sensor Camera

Excellent relative illumination
High resolution at whole working distance



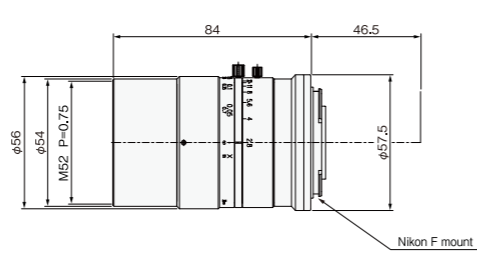
- Design for high resolution and low distortion, stable performance at whole working distance
- Suitable for Large Area Sensor Camera such as 25 Mega Pixel and 20 Mega Pixel
- Possible to use for small pixel size, 3.5 μ m
- Very low color aberration, compatible with 3-line camera
- 「LSF5028-F」 is possible to use at 0.3x without extension ring
- F, M58, M48 and M42 mount are available

LSF2528-F



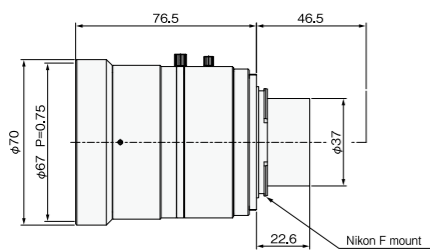
Focal length	25mm	Optical distortion	0.66%
∞ F No.	2.8	Maximum Compatible sensor	$\phi 44$ mm
Range of WD	140mm - ∞	Mount	F
Magnification at MOD	0.15x		

LSF3528-F



Focal length	35mm	Optical distortion	-0.31%
∞ F No.	2.8	Maximum Compatible sensor	$\phi 44$ mm
Range of WD	230mm - ∞	Mount	F
Magnification at MOD	0.15x		

LSF5028-F



Focal length	50mm	Optical distortion	-0.40%
∞ F No.	2.8	Maximum Compatible sensor	$\phi 44$ mm
Range of WD	190mm - ∞	Mount	F
Magnification at MOD	0.3x		

Model No. for Different Mount

Model	Compatible Camera	Screw Pitch	Flange Back
LSF□□□□-V58	SVS	M58 (P = 0.75)	11.48mm
LSF□□□□-U58	BAUMER	M58 (P = 0.75)	12mm
LSF□□□□-TFL II	TOSHIBA TELI, ADIMEC	M48 (P = 0.75)	17.5mm
LSF□□□□-B42	BASLER	M42 (P = 1)	16mm
LSF□□□□-B42/2	BASLER	M42 (P = 0.75)	16mm
LSF□□□□-V42	SVS	M42 (P = 1)	11.48mm
LSF□□□□-S42	SENTECH	M42 (P = 1)	10mm
LSF□□□□-D42	TELEDYNE DALSA	M42 (P = 1)	6.56mm

* Indicated Specifications are design values.

LSF Series

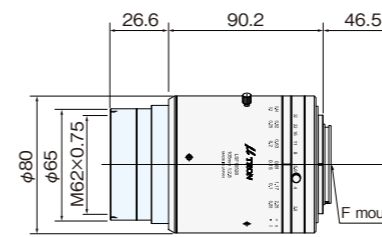
LARGE FORMAT $\phi 48$

Long Focal High Resolution Lens for $\phi 48$ mm



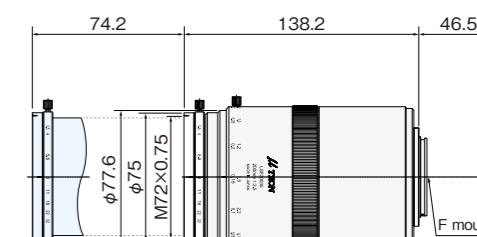
- Long focal distance, f105mm and f200mm
- Suitable for 65 Mega Pixel, 50 Mega Pixel, and 31 Mega Pixel
- Possible to use for small pixel size, 3.2 μ m
- Magnification at MOD 0.3x
- Stable performance at different WD by floating design
- F, M58, and M42 mount are available

LSF10528-F



Focal length	105mm
∞ F No.	2.8
Range of WD	433mm ~ ∞
Magnification at MOD	0.3x
TV distortion	0.10%
Maximum Compatible sensor	$\phi 48$ mm
Mount	F

LSF20035-F



Focal length	200mm
∞ F No.	3.5
Range of WD	850mm ~ ∞
Magnification at MOD	0.3x
TV distortion	0.14%
Maximum Compatible sensor	$\phi 48$ mm
Mount	F

* Indicated Specifications are design values.

MS Series



31 Mega Pixel Lens for Large format, φ30.7mm

High resolution lens for 31 Mega Pixel

- Suitable for large format, 31 Mega Pixel – 3.45μm and Line Sensor Camera , 8K x 3.5μm
- Adopt screw mount, stable mount mechanism without rattling
- Achieve low distortion and wide angle for large format, φ30.7mm
- Stable performance at different working distance by floating design
- M48, M42 and M35 mount are available



MS1828-□

Focal length	18mm	Magnification at MOD	0.15x
∞F No.	2.8	TV distortion	0.52%
Range of WD	100mm - ∞	Maximum Compatible sensor	Φ 30.7
Mount	M42,TFL- II ,TFL		

* Drawing is for B42 mount (M42 x 1, FB16mm)

MS2524-□

Focal length	25mm	Magnification at MOD	0.2x
∞F No.	2.4	TV distortion	-0.27%
Range of WD	120mm - ∞	Maximum Compatible sensor	Φ 30.7
Mount	M42,TFL- II ,TFL		

* Drawing is for B42 mount (M42 x 1, FB16mm)

MS3520-□

Focal length	35mm	Magnification at MOD	0.39x
∞F No.	2.0	TV distortion	-0.11%
Range of WD	100mm - ∞	Maximum Compatible sensor	Φ 30.7
Mount	M42,TFL- II ,TFL		

* Drawing is for B42 mount (M42 x 1, FB16mm)

Model No. for Different Mount

Model	Compatible Camera	Screw Pitch	Flange Back
MS□□□□-TFL II	TOSHIBA TELI, ADIMEC	M48 P=0.75mm	17.5mm
MS□□□□-B42	BASLER	M42 P=1mm	16mm
MS□□□□-V42	SVS	M42 P=1mm	11.48mm
MS□□□□-S42	SENTECH	M42 P=1mm	10mm
MS□□□□-D42	TELEDYNE DALSA	M42 P=1mm	6.56mm
MS□□□□-TFL	LUCID	M35 P=0.75mm	17.526mm

Example of lens with mount (MS3520)

MS3520-TFL II

MS3520-B42

MS3520-V42

MS3520-S42

MS3520-D42

FV-L Series

LARGE
FORMAT

φ21.4-62

Macro Lens for Area and Line Sensor Camera

Design for macro imaging, suitable for large area and line scan camera

- Adjustable focus and iris
- Design for macro imaging
- Suitable for inspection of wafer, PCB, electronic parts, etc..., required for high resolution at short working distance
- FV8528L is compatible with M72 mount
- Compatible with large image format of high resolution area camera



FV3526L-C

Focal length	35mm	Optical distortion	-0.05%
∞ F No.	2.6	Maximum Compatible sensor	1.2 inch (φ21.4mm)
Range of WD	0.18m - ∞	Mount	C
Magnification at MOD	0.2x		

FV3526L-F

Focal length	35mm	Optical distortion	-0.42%
∞ F No.	2.6	Maximum Compatible sensor	φ 36mm
Range of WD	0.18m - ∞	Mount	F
Magnification at MOD	0.2x		

FV5026L-C

Focal length	50mm	Optical distortion	-0.01%
∞ F No.	2.6	Maximum Compatible sensor	1.2 inch (φ21.4mm)
Range of WD	0.25m - 1m	Mount	C
Magnification at MOD	0.22x		

FV5026L-F

Focal length	50mm	Optical distortion	-0.24%
∞ F No.	2.6	Maximum Compatible sensor	φ 45mm
Range of WD	0.25 - 1m	Mount	F
Magnification at MOD	0.22x		

FV5026L II -F

Focal length	50mm	Optical distortion	-0.80%
∞ F No.	2.6	Maximum Compatible sensor	φ 45mm
Range of WD	0.17m - 0.35m	Mount	F
Magnification at MOD	0.32x		

FV8528L- □

* Drawing is for FV8528L-M (M72 P=0.75 FB19.55mm)

Focal length	85mm	Optical distortion	-0.18%
∞ F No.	2.8	Maximum Compatible sensor	φ 62mm
Range of WD	0.25m - 0.45m	Mount	F or M72
Magnification at MOD	0.4x		

* Indicated specifications are design value. * □ = Mount

FV-W Series



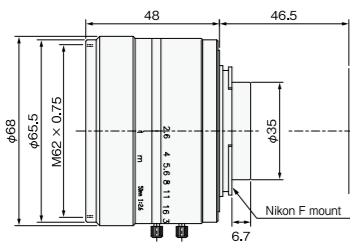
Wide Field of View Lens for Area and Line Sensor Camera

Design for Machine Vision application

- Adjustable focus and iris
- Design for infinite distance (∞), suitable for wide field of view
- f50mm and f85 mm are available
- FV8528W is compatible with M72 mount



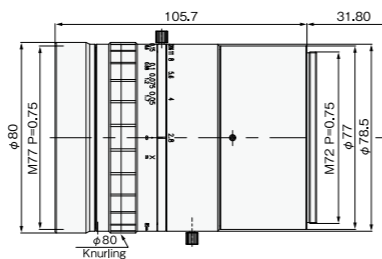
FV5026W-F



Focal length	50mm	Optical distortion	0.23%
∞ F No.	2.6	Maximum Compatible sensor	ϕ 45mm
Range of WD	0.32m - ∞	Mount	F
Magnification at MOD	0.18x		

* Indicated specifications are design value.

FV8528W-□



Focal length	85 mm	Optical distortion	0.04%
∞ F No.	2.8	Maximum Compatible sensor	ϕ 67mm
Range of WD	0.46m - ∞	Mount	F or M72
Magnification at MOD	0.2x		

HB5014-F



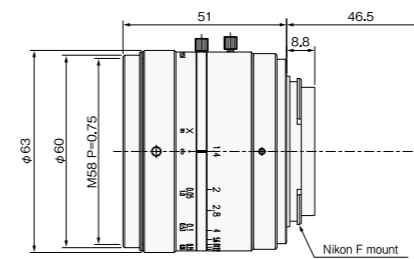
High brightness Lens for Line Sensor Camera

Excellent brightness, F No.1.4

- f50mm is available
- Suitable for high speed applications such as printing, food inspection, etc..
- Metal design, avoid aged deterioration of plastic and gum, concerned about photographic lenses
- Suitable for large image circle and high speed camera



HB5014-F



Focal length	50mm	Optical distortion	0.17%
∞ F No.	1.4	Maximum Compatible sensor	ϕ 45mm
Range of WD	0.27m - ∞	Mount	F
Magnification at MOD	0.2x		

* Indicated specifications are design values.

TELECENTRIC LENS

Magnification chart of Telecentric Lens

VGA MEGA PIXEL 5 MEGA PIXEL 4-9 MEGA PIXEL 12-25 MEGA PIXEL 12-71 MEGA PIXEL

Magnification	Compatible Sensor											
	1/2	page	1/1.8	page	2/3	page	1	page	1.1	page	Over φ28.2	page
0.12x	-		-		-		MGTL012V	P43	-		-	
0.132x	-		-		-		-		MGTL0132V	P43	-	
0.14x	MGTL014	P59	-		MGTL014VM	P55	-		-		-	
	-		-		MGTL014VM-180	P55	-		-		-	
0.15x	-		-		-		MGTL015V	P43	-		-	
0.164x	-		-		-		-		MGTL0164V	P43	-	
0.17x	-		-		MGTL017VM	P55	-		-		-	
0.19x	-		-		MGTL019	P59	-		-		-	
0.2x	-		-		-		MGTL02V	P43	-		-	
0.22x	-		-		MGTL022VM	P55	-		MGTL022V	P43	LSTL022T-F	P43
0.23x	-		-		MGTL023	P59	-		-		-	
	-		-		MGTL023H	P56	-		-		-	
0.275x	-		-		MGTL0275-2	P59	MGTL0275V	P53	-		LSTL0275T-F	P43
0.3x	-		-		MGTL03	P59	-		MGTL03V	P52	LSTL03TW-F	P45
	-		-		MGTL03VM	P56	-		MGTL03VC	P52	-	
	-		-		MGTL03VMC	P57	-		-		-	
0.345x	-		-		MGTL0345VM	P57	-		MGTL0345V	P52	-	
	-		-		MGTL0345VMC	P57	-		-		-	
0.35x	-		-		-		-		-		LSTL035H-F	P43
0.366x	-		-		-		-		-		LSTL0366T-F	P43
0.37x	-		-		-		MGTL037V	P53	-		-	
0.4x	-		-		MGTL04	P59	-		-		-	
	-		-		MGTL04VM	P57	-		-		-	
	-		-		MGTL04VMC	P57	-		-		-	
0.5x	-	TL05C-220	P70	-	FT05-65R	P60	-	MGTL05-1.1	P52	LSTL05H-F	P43	
	-	-		-	FT05C-65R	P61	-	FTV05-110	P13	-	-	
	-	-		-	FT05-110	P62	-	FTV05C-110	P13	-	-	
	-	-		-	FT05C-110	P63	-	FTV05-150	P15	-	-	
	-	-		-	MGTL05VM	P57	-	FTV05C-150	P15	-	-	
0.55x	-		-		MGTL05VMC	P57	-		-		-	
	-		-		-		-		-		LSTL055TW-F	P45
0.69x	-		-		MGTL069VM	P57	-		-		-	
	-		-		MGTL069VMC	P57	-		-		-	
0.7x	-	TL07C-220	P70	-	-		-	FTV07-110	P13	-	-	
	-	TL07C-340	P72	-	-		-	FTV07C-110	P13	-	-	
	-	-		-	-		-	FTV07-150	P15	-	-	
	-	-		-	-		-	FTV07C-150	P15	-	-	
0.78x	-		-		-		-			LSTL078TW-F	P45	
0.8x	-	TL08-65R	P66	-	-		-	FTV08-110	P13	-	-	
	-	TL08C-65R	P67	-	-		-	FTV08C-110	P13	-	-	
	-	TL08-110R	P68	-	FT08-65R	P60	-	FTV08-150	P15	-	-	
	-	TL08C-110R	P69	-	FT08C-65R	P61	-	FTV08C-150	P15	-	-	
	-	-		-	FT08-110	P62	-	-	-		-	
	-	-		-	FT08C-110	P63	-	-	-		-	

Magnification	Compatible Sensor											
	1/2	page	1/1.8	page	2/3	page	1	page	1.1	page	Over φ28.2	page
1.0x	TL10C-40	P65	TL10-65R	P66	FT10-65R	P60	-		MGTL10V	P52	LSTL10H-F	P44
	-		TL10C-65R	P67	FT10C-65R	P61	-		MGTL10VC	P52	-	
	-		TL10-110R	P68	FT10-110	P62	-		FTV10-110	P13	-	
	-		TL10C-110R	P69	FT10C-110	P63	-		FTV10C-110	P13	-	
	-		TL10C-220	P70	TL10C-310	P72	-		FTV10-150	P15	-	
	-		-		-		-		FTV10C-150	P15	-	
1.5x	-		-		-		-		FTV10C-110SW	P7	-	
	-		TL15-65R	P66	FT15-65R	P60	-		FTV15-110	P47	LSTL15H-F	P44
	-		TL15C-65R	P67	FT15C-65R	P61	-		FTV15C-110	P48	-	
	-		-		FT15-110	P62	-		FTV15-150	P48	-	
	-		-		FT15C-110	P63	-		FTV15C-150	P49	-	
	-		-		-		-		-		-	
2.0x	TL20-40	P64	TL20C-220	P70	FT20-65R	P61	-		FTV20-110	P47	LSTL20H-F	P44
	TL20C-40	P65	-		FT20C-65R	P61	-		FTV20C-110	P48	-	
	TL20-65R	P66	-		FT20-110	P63	-		FTV20-150	P48	-	
	TL20C-65R	P67	-		FT20C-110	P63	-		FTV20C-150	P49	-	
	TL20-110R	P69	-		-		-		FTV20C-110SW	P7	-	
TL20C-110R	P69	-		-		-		-		-		
3.0x	-		-		FT30-65R	P61	-		FTV30-110	P47	-	
	-		-		FT30C-65R	P61	-		FTV30C-110	P48	-	
	-		-		FT30-110R	P63	-		FTV30-150	P49	-	
	-		-		FT30C-110R	P63	-		FTV30C-150	P49	-	
	-		-		TL30-65	P67	-		FTV30C-110SW	P7	-	
	-		-		TL30C-65	P67	-		-		-	
4.0x	-		-		TL30C-110	P69	-		-		-	
	TL40-40	P64	TL40C-110R	P69	TL40-65	P67	-		FTV40-110	P48	-	
	TL40C-40	P65	-		TL40C-65	P67	-		FTV40C-110	P48	-	
	-		-		FT40-65R	P61	-		FTV40-150	P49	-	
	-		-		FT40C-65R	P61	-		FTV40C-150	P49	-	
	-		-		FT40-110R	P63	-		FTV40C-110SW	P7	-	
6.0x	-		-		FT40C-110R	P63	-		-		-	
	-		-		TL40C-240	P71	-		-		-	
	TL60-40	P65	TL60C-110R	P69	FT60-65R	P61	-		FTV60-110	P48	-	
	TL60C-40	P65	-		FT60C-65R	P61	-		FTV60C-110	P48	-	
	-		-		FT60-110R	P63	-		FTV60-150	P49	-	
	-		-		FT60C-110R	P63	-		FTV60C-150	P49	-	
8.0x	-		-		TL60-65	P67	-		-		-	
	-		-		TL60C-65	P67	-		-		-	
	-		-		TL60C-240	P71	-		-		-	
	TL80-40	P65	-		TL80-65	P67	-		-		-	
TL80C-40	P65	-		TL80C-65	P67	-		-		-		
-		TL80C-110R	P69	-	-		-	-		-		

Coaxial type is 'C' included on the model name

MGTL-V Series LSTL Series

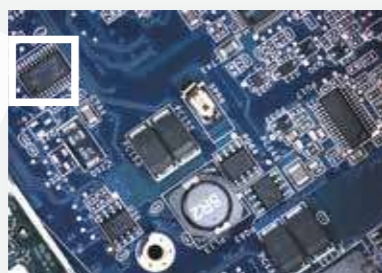
LARGE FORMAT $\phi 16-48$

Low Magnification Telecentric Lens for Large Format

Suitable for F mount and C mount high resolution camera

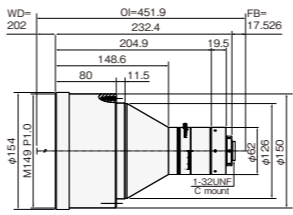
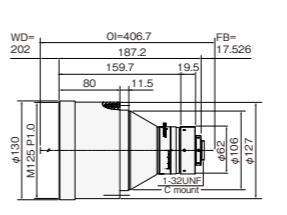
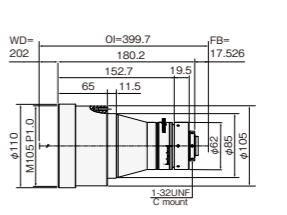
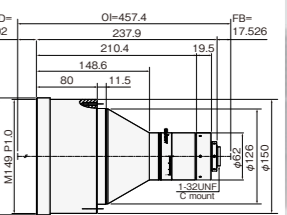
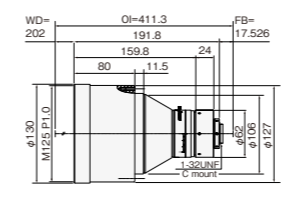
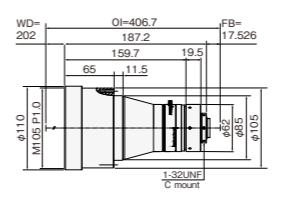
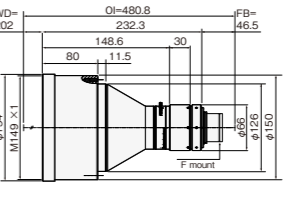
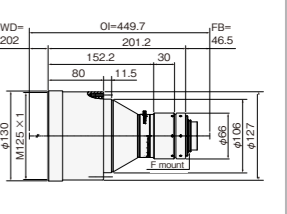
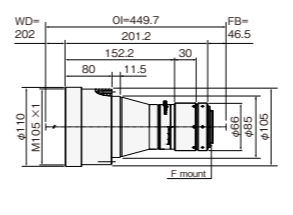
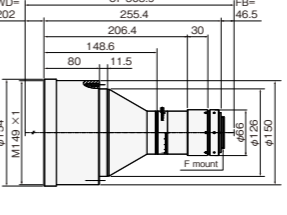
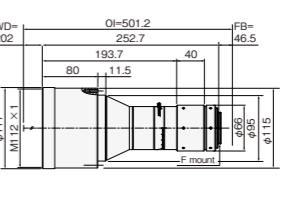


- 11 kind of wide view Telecentric Lenses are available
- F mount lenses are suitable for 71 Mega Pixel, 65 Mega Pixel and 50 Mega Pixel
- C mount lenses are suitable for 25 Mega Pixel, 12 Mega Pixel and 9 Mega Pixel
- Designed for long working distance, 200mm that can secure enough space to set up
- Adjustable iris, possible to adjust depth of field and contrast
- Possible to capture wide view with large format, high resolution camera
- Suitable for high-precision measurement of large-sized boards and electronic parts



Wide view and High resolution Image using with 71 Mega Pixel camera

Image of captured with large format, high resolution camera
Clear images can be detected up to periphery

MGTL012V	MGTL015V	MGTL02V	MGTL0132V
			
Magnification 0.12x F No. 6.0 Object side NA 0.010 WD 202mm OI 451.9mm Depth of field 33mm Resolution 34 μ TV distortion 0.03% Image Circle $\phi 16$ mm Mount C	Magnification 0.15x F No. 6.0 Object side NA 0.013 WD 202mm OI 406.7mm Depth of field 21mm Resolution 27 μ TV distortion 0.01% Image Circle $\phi 16$ mm Mount C	Magnification 0.2x F No. 6.0 Object side NA 0.017 WD 202mm OI 399.7mm Depth of field 12mm Resolution 20 μ TV distortion 0.00% Image Circle $\phi 16$ mm Mount C	Magnification 0.132x F No. 6.0 Object side NA 0.011 WD 202mm OI 457.4mm Depth of field 27.6mm Resolution 31 μ TV distortion 0.03% Image Circle $\phi 18.1$ mm Mount C
MGTL0164V	MGTL022V	LSTL022T-F	LSTL0275T-F
			
Magnification 0.164x F No. 6.0 Object side NA 0.014 WD 202mm OI 411.3mm Depth of field 18mm Resolution 25 μ TV distortion 0.00% Image Circle $\phi 18.1$ mm Mount C	Magnification 0.22x F No. 6.0 Object side NA 0.018 WD 202mm OI 406.7mm Depth of field 9.9mm Resolution 18 μ TV distortion 0.00% Image Circle $\phi 18.1$ mm Mount C	Magnification 0.22x F No. 6.0 Object side NA 0.018 WD 202mm OI 480.8mm Depth of field 9.9mm Resolution 18.3 μ TV distortion 0.02% Image Circle $\phi 29$ mm Mount F/M42	Magnification 0.275x F No. 6.0 Object side NA 0.023 WD 202mm OI 449.7mm Depth of field 6.4mm Resolution 14.7 μ TV distortion -0.01% Image Circle $\phi 29$ mm Mount F/M42
LSTL0366T-F	LSTL035H-F	LSTL05H-F	
			
Magnification 0.366x F No. 6.0 Object side NA 0.031 WD 202mm OI 449.6mm Depth of field 3.6mm Resolution 11 μ TV distortion 0.00% Image Circle $\phi 29$ mm Mount F/M42	Magnification 0.35x F No. 6.0 Object side NA 0.029 WD 202mm OI 503.9mm Depth of field 3.9mm Resolution 11.5 μ TV distortion -0.01% Image Circle $\phi 48$ mm Mount F/M42	Magnification 0.5x F No. 6.0 Object side NA 0.042 WD 202mm OI 501.2mm Depth of field 1.9mm Resolution 8.0 μ TV distortion 0.01% Image Circle $\phi 48$ mm Mount F/M42	

* Indicated Specifications are design values.

LSTL-H Series



High Resolution Telecentric Lens for φ44mm

The highest NA in the optical industry

- ❖ Telecentric lens for large format, φ44mm
- ❖ Suitable for large area sensor of high resolution, 120 Mega Pixel, 71 Mega Pixel, and 25 Mega Pixel
- ❖ Design for large aperture
- ❖ Excellent uniformity of brightness and resolution
- ❖ Suitable for high speed and precise measurement
- ❖ Adjustable iris, possible to adjust depth of field



LSTL-TW Series



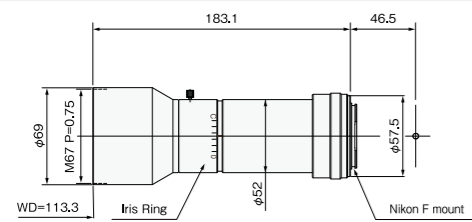
Telecentric Lens for Large Format

Suitable for middle-sized line and large area sensor

- ❖ Low magnification telecentric lens series for large format
- ❖ Suitable for 12 Mega Pixel
- ❖ LSTL078TW-F is suitable for visible – NIR
- ❖ LSTL055TW-F is designed for high NA with long working distance, 160mm
- ❖ LSTL03TW-F is designed for long working distance, 150mm that can secure enough space to set up an illumination
- ❖ Adjustable iris, possible to adjust depth of field

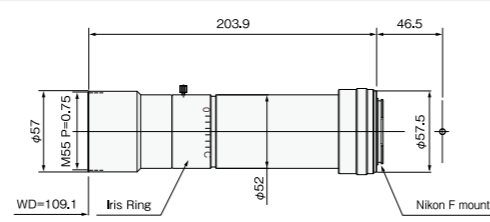


LSTL10H-F



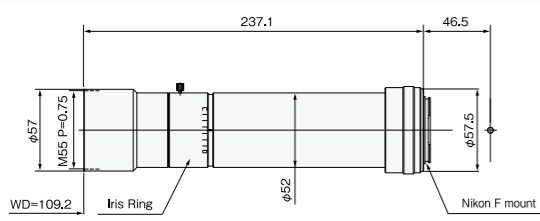
Magnification	1.0x	Resolution	4.3 μ
WD	113mm	Optical distortion	0.01%
Depth of field	0.31mm	Maximum Compatible sensor	φ 44mm
F No.	6.4	Mount	F

LSTL15H-F



Magnification	1.5x	Resolution	3.5 μ
WD	109mm	Optical distortion	0.02%
Depth of field	0.17mm	Maximum Compatible sensor	φ 44mm
F No.	7.8	Mount	F

LSTL20H-F



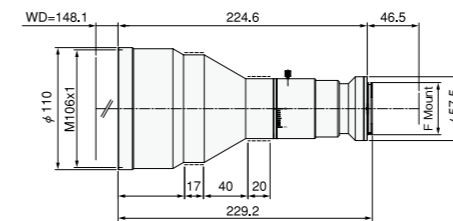
Magnification	2.0x	Resolution	2.9 μ
WD	109mm	Optical distortion	-0.02%
Depth of field	0.12mm	Maximum Compatible sensor	φ 44mm
F No.	8.7	Mount	F

Model No. for Different Mount

Model	Compatible Camera	Screw Pitch	Flange Back
LSTL□□□H-V58	SVS	M58 (P = 0.75)	11.48mm
LSTL□□□H-B42	BASLER	M42 (P = 1)	16mm
LSTL□□□H-B42/2	BASLER	M42 (P = 0.75)	16mm
LSTL□□□H-V42	SVS	M42 (P = 1)	11.48mm
LSTL□□□H-S42	SENTECH	M42 (P = 1)	10mm
LSTL□□□H-D42	TELEDYNEDALSA	M42 (P = 1)	6.56mm

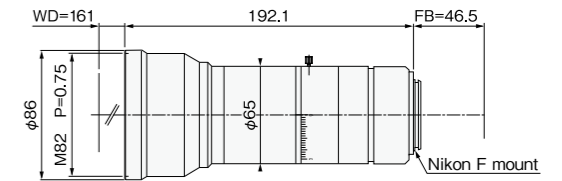
* Indicated specifications are design values. * Resolution indicates the theoretical resolution at wavelength of 550nm.

LSTL03TW-F



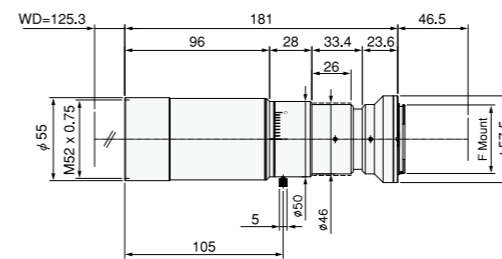
Magnification	0.3x	Depth of field	8.6mm
F No.	9.7	Resolution	22.4 μ
Object side NA	0.015	TV distortion	0.01%
WD	148.1mm	Maximum Compatible sensor	φ 28.2mm
OI	419.2mm	Mount	F

LSTL055TW-F



Magnification	0.55x	Depth of field	1.37mm
F No.	5.17	Resolution	6.33 μ
Object side NA	0.053	TV distortion	0.021%
WD	161.0mm	Maximum Compatible sensor	φ 30.8mm
OI	399.6mm	Mount	F

LSTL078TW-F



Magnification	0.78x	Depth of field	1.3mm
F No.	9.8	Resolution	8.4 μ
Object side NA	0.04	TV distortion	0.00%
WD	125.3mm	Maximum Compatible sensor	φ 28.2mm
OI	352.8mm	Mount	F

* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.

FTV Series

25MP

1.1"

25 Mega Pixel Telecentric Lens for 1.1"

FTV Series WD110mm 1.5x-6.0x



FTV Series WD150mm 1.5x-6.0x

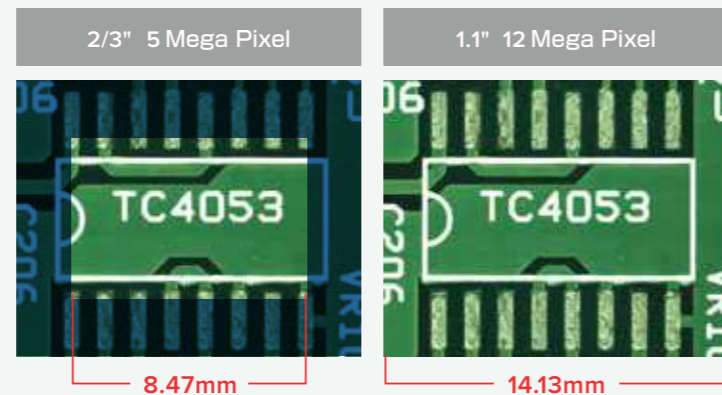


- Suitable for best quality in 25 Mega Pixel (2.5 μ m/Pixel)
- Adjustable iris, possible to adjust depth of field and contrast 1.5x and 2.0x
- Compatible with 1.1" and 1" camera, wide field of view can be captured
- Designed for long working distance, 110mm, 150mm that can secure enough space to set up

View comparison image

Magnification : 1x

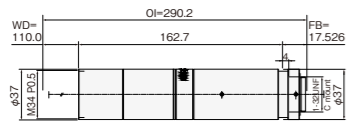
View comparison image between 1.1"12 Mega Pixel camera and 2/3" 5 Mega Pixel camera
Possible to capture about 1.7x field of view



FTV15-110		FTV20-110		FTV30-110	
Magnification	1.5x	Magnification	2.0x	Magnification	3.0x
F No.	10.1	F No.	11.5	F No.	16.0
Object side NA	0.074	Object side NA	0.087	Object side NA	0.094
WD	110mm	WD	110mm	WD	110mm
OI	269.2mm	OI	279.9mm	OI	277.7mm
Depth of field	0.36mm	Depth of field	0.23mm	Depth of field	0.14mm
Resolution	4.5 μ	Resolution	3.9 μ	Resolution	3.6 μ
TV distortion	0.00%	TV distortion	0.01%	TV distortion	0.00%
Maximum Compatible sensor	1.1	Maximum Compatible sensor	1.1	Maximum Compatible sensor	1.1
Mount	C	Mount	C	Mount	C

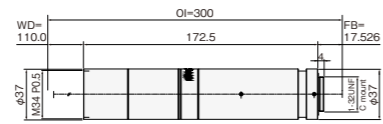
* Indicated Specifications are design values.

FTV40-110



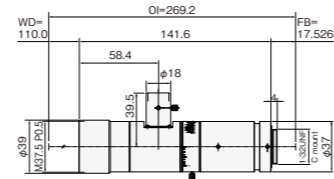
Magnification	4.0x
F No.	20.0
Object side NA	0.100
WD	110mm
OI	290.2mm
Depth of field	0.10mm
Resolution	3.4 μ
TV distortion	-0.01%
Maximum Compatible sensor	1.1
Mount	C

FTV60-110



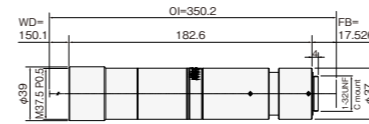
Magnification	6.0x
F No.	30.0
Object side NA	0.100
WD	110mm
OI	300.0mm
Depth of field	0.07mm
Resolution	3.4 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV15C-110



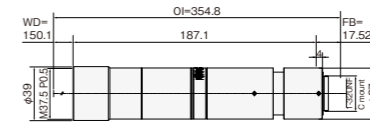
Magnification	1.5x
F No.	10.1
Object side NA	0.074
WD	110mm
OI	269.2mm
Depth of field	0.36mm
Resolution	4.5 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV30-150



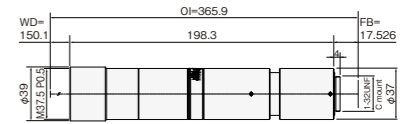
Magnification	3.0x
F No.	17.4
Object side NA	0.086
WD	150.1mm
OI	350.2mm
Depth of field	0.16mm
Resolution	3.9 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV40-150



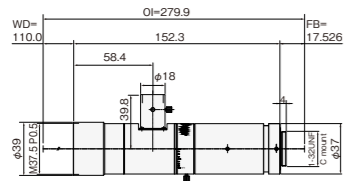
Magnification	4.0x
F No.	22.0
Object side NA	0.091
WD	150.1mm
OI	354.8mm
Depth of field	0.11mm
Resolution	3.7 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV60-150



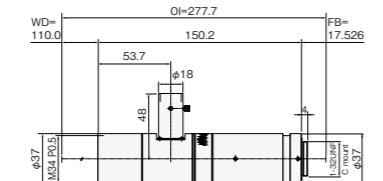
Magnification	6.0x
F No.	33.0
Object side NA	0.091
WD	150.1mm
OI	365.9mm
Depth of field	0.07mm
Resolution	3.7 μ
TV distortion	0.01%
Maximum Compatible sensor	1.1
Mount	C

FTV20C-110



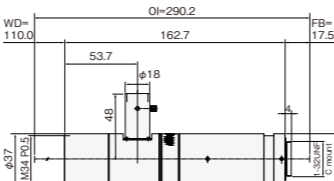
Magnification	2.0x
F No.	11.5
Object side NA	0.087
WD	110mm
OI	279.9mm
Depth of field	0.23mm
Resolution	3.9 μ
TV distortion	0.01%
Maximum Compatible sensor	1.1
Mount	C

FTV30C-110



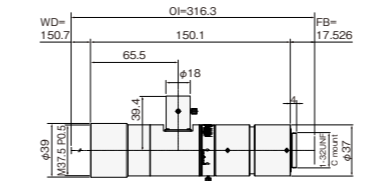
Magnification	3.0x
F No.	16.0
Object side NA	0.094
WD	110mm
OI	277.7mm
Depth of field	0.14mm
Resolution	3.6 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV40C-110



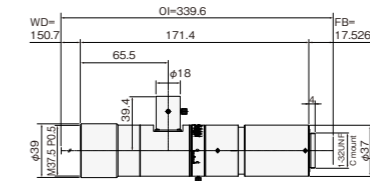
Magnification	4.0x
F No.	20.0
Object side NA	0.100
WD	110mm
OI	290.2mm
Depth of field	0.10mm
Resolution	3.4 μ
TV distortion	-0.01%
Maximum Compatible sensor	1.1
Mount	C

FTV15C-150



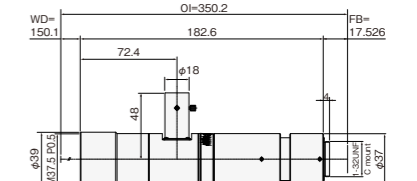
Magnification	1.5x
F No.	11.8
Object side NA	0.064
WD	150.7mm
OI	316.3mm
Depth of field	0.42mm
Resolution	5.3 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV20C-150



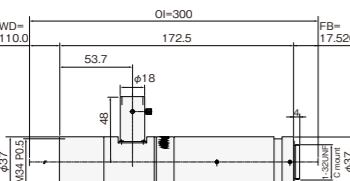
Magnification	2.0x
F No.	13.5
Object side NA	0.074
WD	150.7mm
OI	339.6mm
Depth of field	0.27mm
Resolution	4.5 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV30C-150



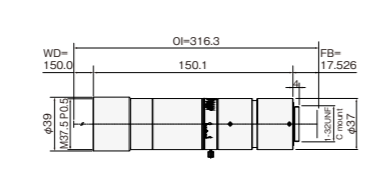
Magnification	3.0x
F No.	17.4
Object side NA	0.086
WD	150.1mm
OI	350.2mm
Depth of field	0.16mm
Resolution	3.9 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV60C-110



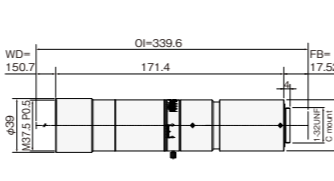
Magnification	6.0x
F No.	30.0
Object side NA	0.100
WD	110mm
OI	300.0mm
Depth of field	0.07mm
Resolution	3.4 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV15-150



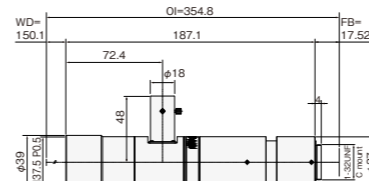
Magnification	1.5x
F No.	11.8
Object side NA	0.064
WD	150.7mm
OI	316.3mm
Depth of field	0.42mm
Resolution	5.3 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV20-150



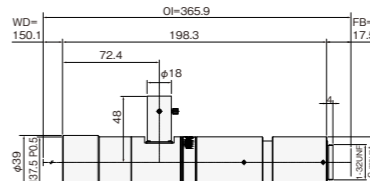
Magnification	2.0x
F No.	13.5
Object side NA	0.074
WD	150.7mm
OI	339.6mm
Depth of field	0.27mm
Resolution	4.5 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV40C-150



Magnification	4.0x
F No.	22.0
Object side NA	0.091
WD	150.1mm
OI	354.8mm
Depth of field	0.11mm
Resolution	3.7 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

FTV60C-150



Magnification	6.0x
F No.	33.0
Object side NA	0.091
WD	150.1mm
OI	365.9mm
Depth of field	0.07mm
Resolution	3.7 μ
TV distortion	0.01%
Maximum Compatible sensor	1.1
Mount	C

* Indicated Specifications are design values.

* Indicated Specifications are design values.

VTL Series

25MP

1.1"

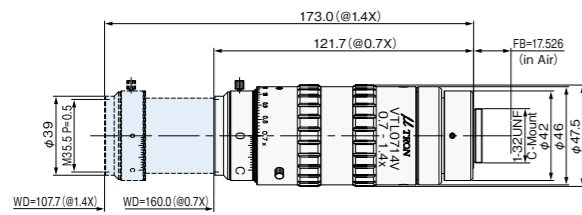
25 Mega Pixel Vari Focal Telecentric Lens for 1.1"

Vari Focal Telecentric Lens at 0.7x - 1.4x
Possible to change magnification range by using front converter

- Suitable for best quality in 25 Mega Pixel (2.5µm/Pixel)
- Super high resolution
- Adjustable the depth of field and the Contrast
- Magnification can be converted from 0.35x to 0.7x by using front converter

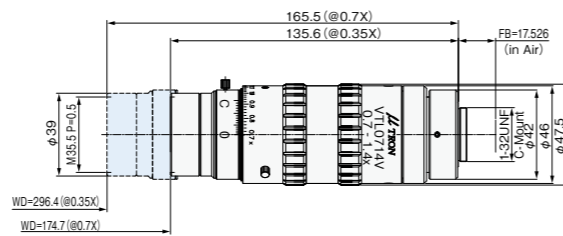


VTL0714V



Magnification	0.7x - 1.4x
WD	160mm - 108mm
Maximum Compatible sensor	1.1
Mount	C

VTL0714V + VTL05FCV



Magnification	0.35x - 0.7x
WD	296mm - 175mm
Application	For VTL0714V

* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.
* Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40µm).

VTL Series

5MP

2/3"

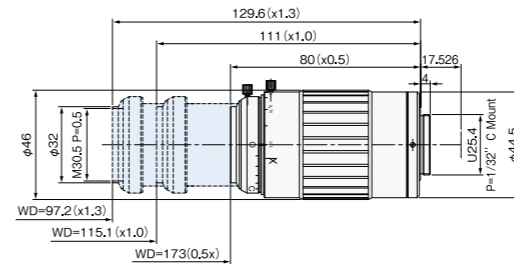
5 Mega Pixel Vari Focal Telecentric Lens

Vari Focal Telecentric Lens at 0.5x - 1.3x
Possible to change magnification range by using front converter

- Telecentric lens at the whole range of magnification
- Suitable for 5 Mega Pixel
- Magnification of VTL0513 can be converted from 0.25x - 2.6x by using front converter
- Reduce relative illumination
- TV distortion less than 0.01%
- VTL0513 is suitable for large format, up to 1.1" even though original optical design is for 2/3"

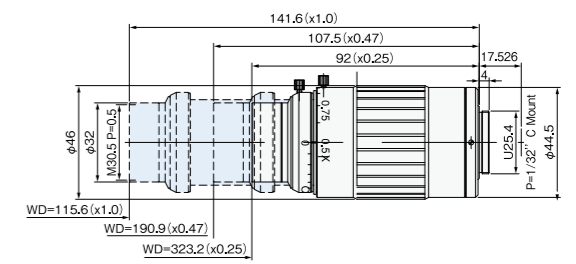


VTL0513



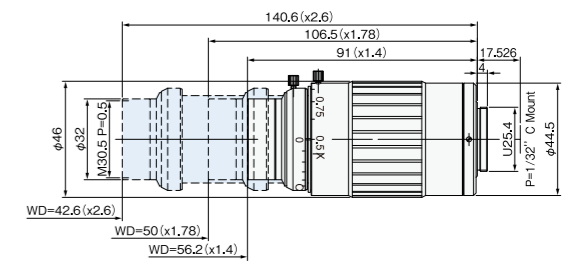
Magnification	0.5x - 1.3x
F No.	5.26 - 10
Object side NA	0.048 - 0.065
WD	173mm - 97mm
OI	271mm - 244mm
Depth of field	1.68mm - 0.47mm
Resolution	4.2 µ - 2.9 µ
TV distortion	0.01%
Maximum Compatible sensor	2/3
Mount	C

VTL0513 + VTL05FC



Magnification	0.25x - 1.0x
WD	323.2mm - 115.6mm
Application	For VTL0513

VTL0513 + VTL20FC



Magnification	1.4x - 2.6x
WD	56.2mm - 42.6mm
Application	For VTL0513

* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.
* Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40µm).

MGTL-V Series

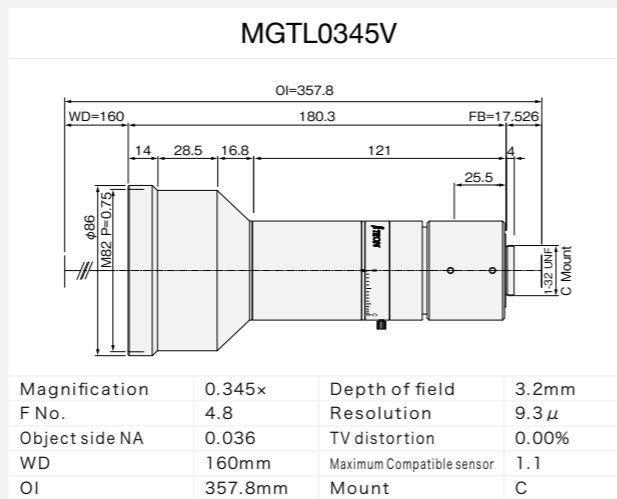
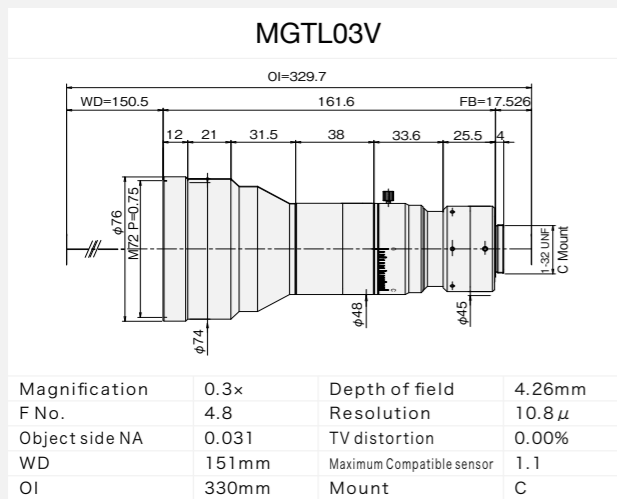
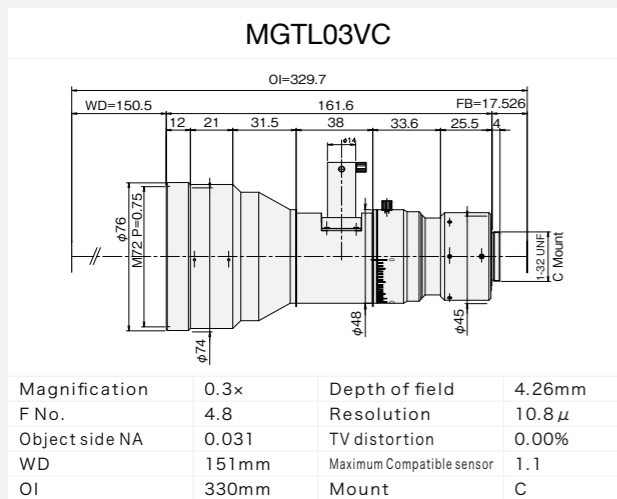
12-25MP

1.1"

12-25 Mega Pixel Telecentric Lens for 1.1"

Wide field of view 0.3x and 0.345x

- MGTL03V and MGTL03VC are suitable for 12 Mega Pixel
- MGTL0345V is suitable for 25 Mega Pixel
- Long working distance, 150mm - 160mm with excellent brightness
- Variable iris, possible to adjust DOF
- Suitable for measurement and inspection, required for high accuracy



* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.
 * Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

MGTL-V Series

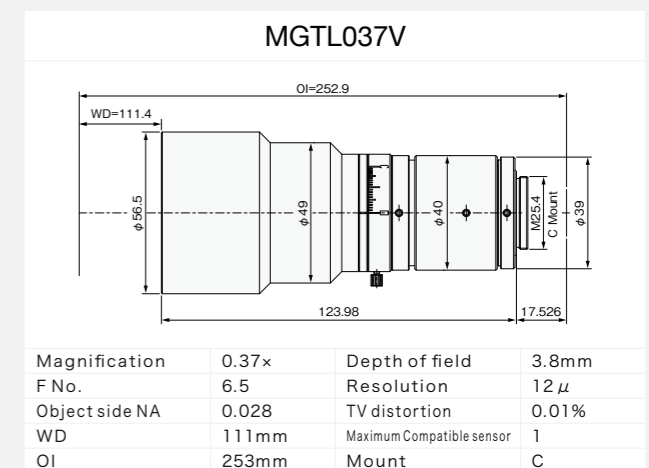
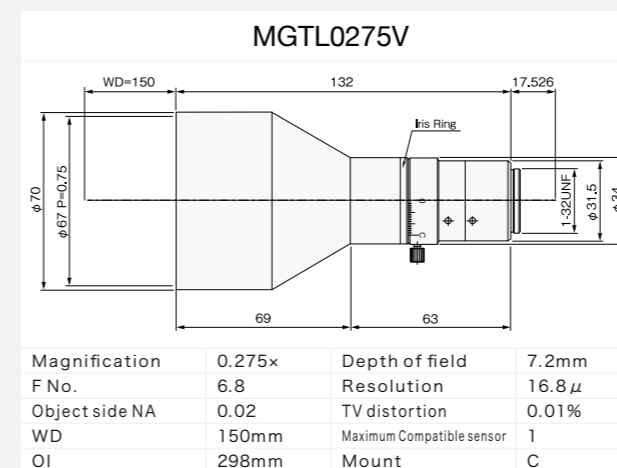
4-9MP

1"

9 Mega Pixel Telecentric lens for 1"

Design for 1" High resolution and suitable for large field of view

- 4 Mega Pixel – 9 Mega Pixel telecentric lens series for 1"
- 0.275x and 0.37x are available
- MGTL0275V is designed for long working distance, 150mm
- Excellent relative illumination
- Adjustable iris, possible to adjust depth of field



* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.
 * Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

MGTL-VM Series

5MP 2/3"

Low Magnification Telecentric Lens for 5 Mega Pixel

Possible to capture wide field of view with high resolution

- Suitable for 3.45μm
- 0.14x, 0.17x, 0.22x are available
- Long working distance, WD150mm
- WD180mm type is available for 0.14x
- Compact design with low magnification
- Adjustable iris, possible to adjust depth of field



MGTL014VM

Magnification	0.14x	Depth of field	17.5mm
F No.	4.3	Resolution	20.5 μ
Object side NA	0.016	TV distortion	0.01%
WD	150.3mm	Maximum Compatible sensor	2/3
OI	300.6mm	Mount	C

MGTL014VM-180

Magnification	0.14x	Depth of field	18mm
F No.	4.4	Resolution	21 μ
Object side NA	0.016	TV distortion	-0.01%
WD	180mm	Maximum Compatible sensor	2/3
OI	330.2mm	Mount	C

MGTL017VM

Magnification	0.17x	Depth of field	14.4mm
F No.	5.2	Resolution	20.5 μ
Object side NA	0.016	TV distortion	0.00%
WD	150.6mm	Maximum Compatible sensor	2/3
OI	294.7mm	Mount	C

MGTL022VM

Magnification	0.22x	Depth of field	8.5mm
F No.	5.2	Resolution	15.8 μ
Object side NA	0.021	TV distortion	0.00%
WD	150.7mm	Maximum Compatible sensor	2/3
OI	279.7mm	Mount	C

* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.
 * Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

MGTL-VM Series

5MP 2/3"

Telecentric Lens for 5 Mega Pixel

Suitable for the inspection in ultra high accuracy

- ▣ Suitable for 3.45μm
- ▣ Excellent brightness, compared to Mega Pixel telecentric lenses
- ▣ Adjustable iris, possible to adjust depth of field
- ▣ Compact design
- ▣ Reduce hot spots of co-axial illumination
- ▣ MGTL10V and MGTL10VC are suitable for 1.1"



MGTL023H

Magnification	0.23x
F No.	5.2
Object side NA	0.022
WD	109mm
OI	241mm
Depth of field	7.9mm
Resolution	8.7 μ
TV distortion	0.00%
Maximum Compatible sensor	2/3
Mount	C

MGTL03VM

Magnification	0.3x
F No.	5.0
Object side NA	0.03
WD	111mm
OI	263mm
Depth of field	4.4mm
Resolution	6.6 μ
TV distortion	-0.04%
Maximum Compatible sensor	2/3
Mount	C

MGTL0345VM

Magnification	0.345x
F No.	4.9
Object side NA	0.035
WD	111mm
OI	267mm
Depth of field	3.3mm
Resolution	5.5 μ
TV distortion	0.00%
Maximum Compatible sensor	2/3
Mount	C

MGTL04VM

Magnification	0.4x
F No.	5.0
Object side NA	0.04
WD	109mm
OI	275mm
Depth of field	2.5mm
Resolution	4.9 μ
TV distortion	0.00%
Maximum Compatible sensor	2/3
Mount	C

MGTL05VM

Magnification	0.5x
F No.	4.7
Object side NA	0.05
WD	109mm
OI	288mm
Depth of field	1.5mm
Resolution	3.8 μ
TV distortion	-0.03%
Maximum Compatible sensor	2/3
Mount	C

MGTL069VM

Magnification	0.69x
F No.	6.6
Object side NA	0.052
WD	109mm
OI	307mm
Depth of field	1.1mm
Resolution	3.9 μ
TV distortion	-0.04%
Maximum Compatible sensor	2/3
Mount	C

MGTL03VMC

Magnification	0.3x
F No.	5.0
Object side NA	0.03
WD	111mm
OI	267mm
Depth of field	4.4mm
Resolution	6.6 μ
TV distortion	-0.04
Maximum Compatible sensor	2/3
Mount	C

MGTL0345VMC

Magnification	0.345x
F No.	4.9
Object side NA	0.035
WD	111mm
OI	272mm
Depth of field	3.3mm
Resolution	5.5 μ
TV distortion	0.00%
Maximum Compatible sensor	2/3
Mount	C

MGTL04VMC

Magnification	0.4x
F No.	5.0
Object side NA	0.04
WD	109mm
OI	280mm
Depth of field	2.5mm
Resolution	4.9 μ
TV distortion	0.00%
Maximum Compatible sensor	2/3
Mount	C

MGTL05VMC

Magnification	0.5x
F No.	4.7
Object side NA	0.05
WD	109mm
OI	293mm
Depth of field	2.3mm
Resolution	3.8 μ
TV distortion	-0.03%
Maximum Compatible sensor	2/3
Mount	C

MGTL069VMC

Magnification	0.69x
F No.	6.6
Object side NA	0.052
WD	109mm
OI	312mm
Depth of field	1.1mm
Resolution	3.9 μ
TV distortion	-0.04%
Maximum Compatible sensor	2/3
Mount	C

MGTL10V

Magnification	1.0x
F No.	5.4
Object side NA	0.093
WD	71mm
OI	196mm
Depth of field	0.43mm
Resolution	2.5 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

MGTL10VC

Magnification	1.0x
F No.	5.4
Object side NA	0.093
WD	71mm
OI	200mm
Depth of field	0.43mm
Resolution	2.5 μ
TV distortion	0.00%
Maximum Compatible sensor	1.1
Mount	C

* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.
 * Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

MGTL Series

2MP

1/2" - 2/3"

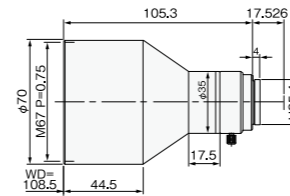
Mega Pixel Telecentric Lens

High resolution, compatible with Mega Pixel camera

- Compact design, suitable for small device
- Adjustable iris, possible to adjust depth of field
- TV distortion less than 0.05%
- MGTL05-1.1 is suitable for 1.1"

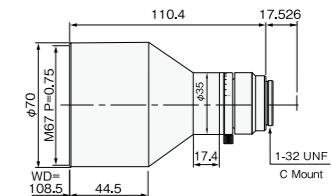


MGTL014



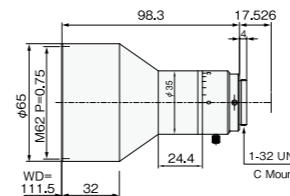
Magnification	0.14x	Depth of field	16.3mm
F No.	4.0	Resolution	19.7 μ
Object side NA	0.017	TV distortion	0.02%
WD	108mm	Maximum Compatible sensor	1/2
OI	231mm	Mount	C

MGTL019



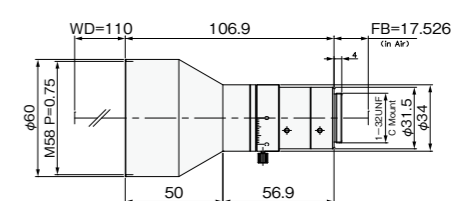
Magnification	0.19x	Depth of field	8.7mm
F No.	4.0	Resolution	14.0 μ
Object side NA	0.024	TV distortion	0.01%
WD	108mm	Maximum Compatible sensor	2/3
OI	236mm	Mount	C

MGTL023



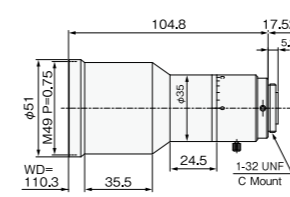
Magnification	0.23x	Depth of field	8.3mm
F No.	5.5	Resolution	16.0 μ
Object side NA	0.021	TV distortion	0.01%
WD	111mm	Maximum Compatible sensor	2/3
OI	227mm	Mount	C

MGTL0275-2



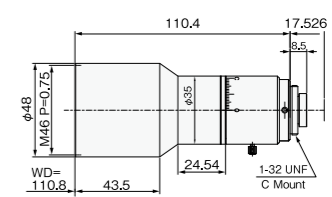
Magnification	0.275x	Depth of field	8.1mm
F No.	7.6	Resolution	18.6 μ
Object side NA	0.018	TV distortion	0.00%
WD	110mm	Maximum Compatible sensor	2/3
OI	234mm	Mount	C

MGTL03



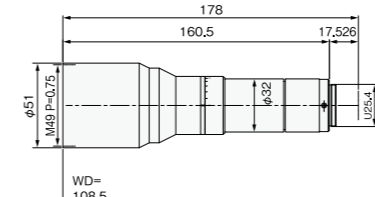
Magnification	0.3x	Depth of field	6.2mm
F No.	7.0	Resolution	16.0 μ
Object side NA	0.021	TV distortion	0.05%
WD	110mm	Maximum Compatible sensor	2/3
OI	233mm	Mount	C

MGTL04



Magnification	0.4x	Depth of field	4.6mm
F No.	9.2	Resolution	15.2 μ
Object side NA	0.022	TV distortion	0.00%
WD	110mm	Maximum Compatible sensor	2/3
OI	239mm	Mount	C

MGTL05-1.1



Magnification	0.5x	Depth of field	2mm
F No.	6.37	Resolution	8.6 μ
Object side NA	0.039	TV distortion	0.00%
WD	108mm	Maximum Compatible sensor	1.1
OI	286mm	Mount	C

* Indicated specifications are design values. *Resolution indicates a theoretical resolution at a wavelength of 550nm.
 * Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).
 * Depth of field of MGTL014, 019, and 023 indicate values at effective F No. 8

FT Series

2-5MP

2/3"

WD65 High NA Mega Pixel Telecentric Lens

Design for 2-5 Mega Pixel Compact and high durability

- Mega Pixel telecentric lens for 2/3"
- Suitable for 2 Mega Pixel - 5 Mega Pixel
- High contrast with co-axial illumination
- TV distortion less than 0.01%
- R type is improved contrast and relative illumination



FT20-65R		FT30-65R		FT40-65R		FT60-65R	
Magnification	2.0x	Magnification	3.0x	Magnification	4.0x	Magnification	6.0x
F No.	12.5	F No.	12.5	F No.	16	F No.	24
Object side NA	0.08	Object side NA	0.12	Object side NA	0.125	Object side NA	0.125
WD	65.5mm	WD	65mm	WD	65mm	WD	65mm
OI	161.8mm	OI	186.2mm	OI	192mm	OI	207.7mm
Depth of field	0.25mm	Depth of field	0.11mm	Depth of field	0.08mm	Depth of field	0.05mm
Resolution	4.2 μ	Resolution	2.8 μ	Resolution	2.7 μ	Resolution	2.7 μ
TV distortion	0.00%	TV distortion	-0.01%	TV distortion	-0.01%	TV distortion	0.00%
Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3
Mount	C	Mount	C	Mount	C	Mount	C

FT05C-65R		FT08C-65R		FT10C-65R		FT15C-65R	
Magnification	0.5x	Magnification	0.8x	Magnification	1.0x	Magnification	1.5x
F No.	9.1	F No.	9.5	F No.	9.7	F No.	10.6
Object side NA	0.028	Object side NA	0.042	Object side NA	0.052	Object side NA	0.071
WD	66mm	WD	65.8mm	WD	65.8mm	WD	65.5mm
OI	169.6mm	OI	150.3mm	OI	157.7mm	OI	156.9mm
Depth of field	2.91mm	Depth of field	1.19mm	Depth of field	0.78mm	Depth of field	0.38mm
Resolution	12.2 μ	Resolution	8.0 μ	Resolution	6.5 μ	Resolution	4.7 μ
TV distortion	0.00%	TV distortion	0.00%	TV distortion	0.00%	TV distortion	0.00%
Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3
Mount	C	Mount	C	Mount	C	Mount	C

FT05-65R		FT08-65R		FT10-65R		FT15-65R	
Magnification	0.5x	Magnification	0.8x	Magnification	1.0x	Magnification	1.5x
F No.	9.1	F No.	9.5	F No.	9.7	F No.	10.6
Object side NA	0.028	Object side NA	0.042	Object side NA	0.052	Object side NA	0.071
WD	66mm	WD	65.8mm	WD	65.8mm	WD	65.5mm
OI	169.6mm	OI	150.3mm	OI	157.7mm	OI	156.9mm
Depth of field	2.91mm	Depth of field	1.19mm	Depth of field	0.78mm	Depth of field	0.38mm
Resolution	12.2 μ	Resolution	8.0 μ	Resolution	6.5 μ	Resolution	4.7 μ
TV distortion	0.00%	TV distortion	0.00%	TV distortion	0.00%	TV distortion	0.00%
Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3
Mount	C	Mount	C	Mount	C	Mount	C

FT20C-65R		FT30C-65R		FT40C-65R		FT60C-65R	
Magnification	2.0x	Magnification	3.0x	Magnification	4.0x	Magnification	6.0x
F No.	12.5	F No.	12.5	F No.	16	F No.	24
Object side NA	0.08	Object side NA	0.12	Object side NA	0.125	Object side NA	0.125
WD	65.5mm	WD	65mm	WD	65mm	WD	65mm
OI	161.8mm	OI	186.2mm	OI	192mm	OI	207.7mm
Depth of field	0.25mm	Depth of field	0.11mm	Depth of field	0.08mm	Depth of field	0.05mm
Resolution	4.2 μ	Resolution	2.8 μ	Resolution	2.7 μ	Resolution	2.7 μ
TV distortion	0.00%	TV distortion	-0.01%	TV distortion	-0.01%	TV distortion	0.00%
Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3	Maximum Compatible sensor	2/3
Mount	C	Mount	C	Mount	C	Mount	C

* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.

* Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" inch camera (permissible circle of confusion 40μm).

WD40 Built-in type Telecentric Lens

Short WD: WD40mm

- Suitable for small device and limited space
- φ16mm telecentric lens
- Suitable for bonding, chip mounter, etc..



TL60-40

Magnification	6x	Depth of field	0.09mm
F No.	41.6	Resolution	4.7 μ
Object side NA	0.072	TV distortion	-0.10%
WD	40mm	Maximum Compatible sensor	1/2
OI	118mm	Mount	C

TL80-40

Magnification	8x	Depth of field	0.07mm
F No.	54.8	Resolution	4.6 μ
Object side NA	0.073	TV distortion	0.11%
WD	40mm	Maximum Compatible sensor	1/2
OI	130mm	Mount	C

TL10C-40

Magnification	1x	Depth of field	0.83mm
F No.	10.4	Resolution	7.0 μ
Object side NA	0.048	TV distortion	0.00%
WD	40.1mm	Maximum Compatible sensor	1/2
OI	100.8mm	Mount	C

TL20C-40

Magnification	2x	Depth of field	0.28mm
F No.	14.1	Resolution	4.7 μ
Object side NA	0.071	TV distortion	0.13%
WD	40mm	Maximum Compatible sensor	1/2
OI	98mm	Mount	C

TL40C-40

Magnification	4x	Depth of field	0.14mm
F No.	28.2	Resolution	4.7 μ
Object side NA	0.071	TV distortion	-0.19%
WD	40mm	Maximum Compatible sensor	1/2
OI	106mm	Mount	C

TL20-40

Magnification	2x	Depth of field	0.28mm
F No.	14.1	Resolution	4.7 μ
Object side NA	0.071	TV distortion	0.13%
WD	40mm	Maximum Compatible sensor	1/2
OI	98mm	Mount	C

TL40-40

Magnification	4x	Depth of field	0.14mm
F No.	28.2	Resolution	4.7 μ
Object side NA	0.071	TV distortion	-0.19%
WD	40mm	Maximum Compatible sensor	1/2
OI	106mm	Mount	C

TL60C-40

Magnification	6x	Depth of field	0.09mm
F No.	41.6	Resolution	4.7 μ
Object side NA	0.072	TV distortion	-0.10%
WD	40mm	Maximum Compatible sensor	1/2
OI	118mm	Mount	C

TL80C-40

Magnification	8x	Depth of field	0.07mm
F No.	54.8	Resolution	4.6 μ
Object side NA	0.073	TV distortion	0.11%
WD	40mm	Maximum Compatible sensor	1/2
OI	130mm	Mount	C

* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.
 * Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

TL Series

1/2" - 2/3"

WD65 Built-in type Telecentric Lens

Middle WD: WD65mm

- Short OI and High NA
- φ16mm telecentric lens
- R type is improved contrast and relative illumination



TL30-65	TL40-65	TL60-65	TL80-65
Magnification 3x F No. 19.9 Object side NA 0.075 WD 65mm OI 149mm Depth of field 0.18mm Resolution 4.47 μ TV distortion 0.15% Maximum Compatible sensor 2/3 Mount C	Magnification 4x F No. 26.0 Object side NA 0.077 WD 65mm OI 150mm Depth of field 0.13mm Resolution 4.36 μ TV distortion 0.30% Maximum Compatible sensor 2/3 Mount C	Magnification 6x F No. 39.0 Object side NA 0.077 WD 65mm OI 163mm Depth of field 0.09mm Resolution 4.36 μ TV distortion 0.33% Maximum Compatible sensor 2/3 Mount C	Magnification 8x F No. 52.0 Object side NA 0.077 WD 65mm OI 180mm Depth of field 0.07mm Resolution 4.36 μ TV distortion 0.20% Maximum Compatible sensor 2/3 Mount C

TL08C-65R	TL10C-65R	TL15C-65R	TL20C-65R
Magnification 0.8x F No. 14.8 Object side NA 0.027 WD 65mm OI 166mm Depth of field 1.85mm Resolution 12.3 μ TV distortion 0.00% Maximum Compatible sensor 1/1.8 Mount C	Magnification 1x F No. 18.5 Object side NA 0.027 WD 65mm OI 166mm Depth of field 1.48mm Resolution 12.4 μ TV distortion 0.00% Maximum Compatible sensor 1/1.8 Mount C	Magnification 1.5x F No. 16.0 Object side NA 0.047 WD 65mm OI 150mm Depth of field 0.57mm Resolution 7.22 μ TV distortion 0.00% Maximum Compatible sensor 1/1.8 Mount C	Magnification 2x F No. 16.7 Object side NA 0.06 WD 65mm OI 152mm Depth of field 0.33mm Resolution 5.6 μ TV distortion -0.01% Maximum Compatible sensor 1/2 Mount C

TL08-65R	TL10-65R	TL15-65R	TL20-65R
Magnification 0.8x F No. 14.8 Object side NA 0.027 WD 65mm OI 166mm Depth of field 1.85mm Resolution 12.3 μ TV distortion 0.00% Maximum Compatible sensor 1/1.8 Mount C	Magnification 1x F No. 18.5 Object side NA 0.027 WD 65mm OI 166mm Depth of field 1.48mm Resolution 12.4 μ TV distortion 0.00% Maximum Compatible sensor 1/1.8 Mount C	Magnification 1.5x F No. 16.0 Object side NA 0.047 WD 65mm OI 150mm Depth of field 0.57mm Resolution 7.22 μ TV distortion 0.00% Maximum Compatible sensor 1/1.8 Mount C	Magnification 2x F No. 16.7 Object side NA 0.06 WD 65mm OI 152mm Depth of field 0.33mm Resolution 5.6 μ TV distortion -0.01% Maximum Compatible sensor 1/2 Mount C

TL30C-65	TL40C-65	TL60C-65	TL80C-65
Magnification 3x F No. 19.9 Object side NA 0.075 WD 65mm OI 149mm Depth of field 0.18mm Resolution 4.47 μ TV distortion 0.15% Maximum Compatible sensor 2/3 Mount C	Magnification 4x F No. 26.0 Object side NA 0.077 WD 65mm OI 150mm Depth of field 0.13mm Resolution 4.36 μ TV distortion 0.30% Maximum Compatible sensor 2/3 Mount C	Magnification 6x F No. 39.0 Object side NA 0.077 WD 65mm OI 163mm Depth of field 0.09mm Resolution 4.36 μ TV distortion 0.33% Maximum Compatible sensor 2/3 Mount C	Magnification 8x F No. 52.0 Object side NA 0.077 WD 65mm OI 180mm Depth of field 0.07mm Resolution 4.36 μ TV distortion 0.20% Maximum Compatible sensor 2/3 Mount C

* Indicated specifications are design values. * Resolution is calculated based on MTF.
* Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

WD110 Built-in type Telecentric Lens

Long WD: 110mm

- Compact and suitable for customized optical systems
- φ16mm telecentric lens
- R type is improved contrast and relative illumination



TL20-110R

Magnification	2x	Depth of field	0.67mm
F No.	33.45	Resolution	11.2 μ
Object side NA	0.03	TV distortion	-0.03%
WD	110mm	Maximum Compatible sensor	1/2
OI	218mm	Mount	C

TL08C-110R

Magnification	0.8x	Depth of field	2.09mm
F No.	16.7	Resolution	14 μ
Object side NA	0.024	TV distortion	0.00%
WD	111mm	Maximum Compatible sensor	1/1.8
OI	240mm	Mount	C

TL10C-110R

Magnification	1x	Depth of field	1.67mm
F No.	20.9	Resolution	14 μ
Object side NA	0.024	TV distortion	0.00%
WD	110mm	Maximum Compatible sensor	1/1.8
OI	240mm	Mount	C

TL20C-110R

Magnification	2x	Depth of field	0.67mm
F No.	33.45	Resolution	11.2 μ
Object side NA	0.03	TV distortion	-0.03%
WD	110mm	Maximum Compatible sensor	1/2
OI	218mm	Mount	C

TL30C-110

Magnification	3x	Depth of field	0.27mm
F No.	30.4	Resolution	6.8 μ
Object side NA	0.049	TV distortion	0.06%
WD	110mm	Maximum Compatible sensor	2/3
OI	218mm	Mount	C

TL40C-110R

Magnification	4x	Depth of field	0.22mm
F No.	44.4	Resolution	7.5 μ
Object side NA	0.045	TV distortion	0.00%
WD	110mm	Maximum Compatible sensor	1/1.8
OI	210mm	Mount	C

TL08-110R

Magnification	0.8x	Depth of field	2.09mm
F No.	16.7	Resolution	14 μ
Object side NA	0.024	TV distortion	0.00%
WD	111mm	Maximum Compatible sensor	1/1.8
OI	240mm	Mount	C

TL10-110R

Magnification	1x	Depth of field	1.67mm
F No.	20.9	Resolution	14 μ
Object side NA	0.024	TV distortion	0.00%
WD	110mm	Maximum Compatible sensor	1/1.8
OI	240mm	Mount	C

TL60C-110R

Magnification	6x	Depth of field	0.15mm
F No.	66.7	Resolution	7.5 μ
Object side NA	0.045	TV distortion	0.00%
WD	110mm	Maximum Compatible sensor	1/1.8
OI	232mm	Mount	C

TL80C-110R

Magnification	8x	Depth of field	0.11mm
F No.	88.9	Resolution	7.5 μ
Object side NA	0.045	TV distortion	0.00%
WD	110mm	Maximum Compatible sensor	1/1.8
OI	255mm	Mount	C

* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.
 * Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

TL Series

1/1.8"

WD220 Built-in type Telecentric Lens

Long WD: 220mm

- High resolution and compact design
- Suitable for various applications, alignment, inspection, measurement, etc..
- Adjustable iris for 0.5x and 0.7x
- Compatible with 2 Mega Pixel of 1/1.8"



TL Series

2/3"

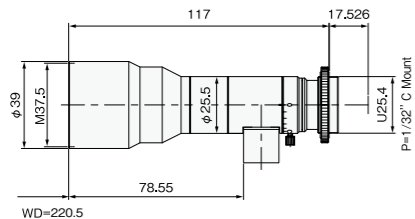
WD240 High Magnification Telecentric Lens

Long WD: 240mm

- Suitable for vacuum chamber, working environment in high temperature, etc., required for long WD
- 4x and 6x are available
- All models are designed for co-axial illumination

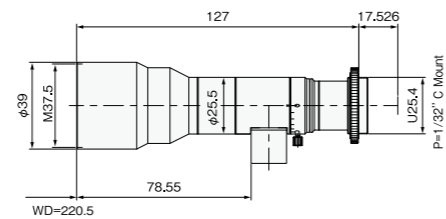


TL05C-220



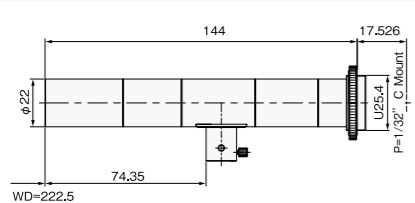
Magnification	0.5x	Depth of field	2.17mm
F No.	6.79	Resolution	9.1 μ
Object side NA	0.037	TV distortion	0.02%
WD	220.5mm	Maximum Compatible sensor	1/1.8
OI	355mm	Mount	C

TL07C-220



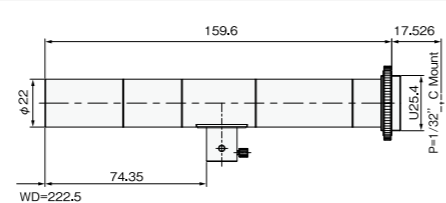
Magnification	0.7x	Depth of field	1.55mm
F No.	9.50	Resolution	9.1 μ
Object side NA	0.037	TV distortion	0.02%
WD	220.5mm	Maximum Compatible sensor	1/1.8
OI	365mm	Mount	C

TL10C-220



Magnification	1x	Depth of field	1.07mm
F No.	13.35	Resolution	9.0 μ
Object side NA	0.037	TV distortion	0.00%
WD	222mm	Maximum Compatible sensor	1/1.8
OI	384mm	Mount	C

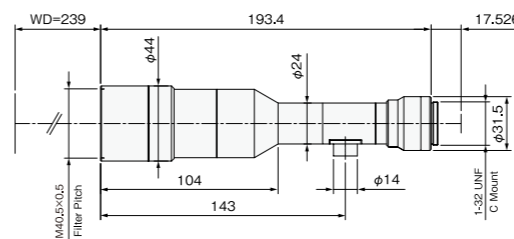
TL20C-220



Magnification	2x	Depth of field	0.53mm
F No.	26.42	Resolution	8.8 μ
Object side NA	0.038	TV distortion	0.04%
WD	222mm	Maximum Compatible sensor	1/1.8
OI	400mm	Mount	C

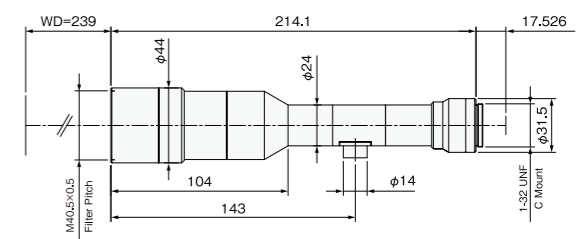
* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.
* Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

TL40C-240



Magnification	4x	Depth of field	0.14mm
F No.	28.6	Resolution	4.8 μ
Object side NA	0.07	TV distortion	0.22%
WD	239mm	Maximum Compatible sensor	2/3
OI	450.0mm	Mount	C

TL60C-240



Magnification	6x	Depth of field	0.1mm
F No.	42.9	Resolution	4.8 μ
Object side NA	0.07	TV distortion	0.0%
WD	239mm	Maximum Compatible sensor	2/3
OI	470.6mm	Mount	C

* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.
* Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

TL Series

1/1.8" - 2/3"

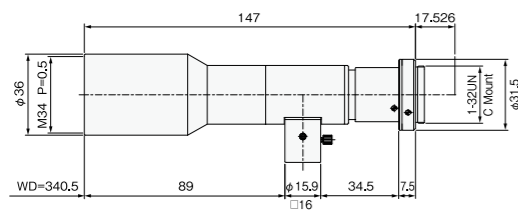
WD300 Telecentric Lens

Long WD: 310mm and 340mm

- ❖ Suitable for applications required for long WD
- ❖ Long WD, over 300mm
- ❖ TL10C-310 is compatible with 2/3"
- ❖ TV distortion is less than 0.00%

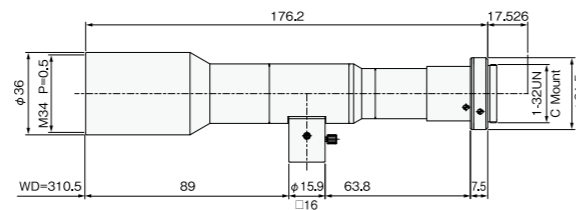


TL07C-340



Magnification	0.7x	Depth of field	1.9mm
F No.	11.6	Resolution	11.2 μ
Object side NA	0.03	TV distortion	0.00%
WD	341mm	Maximum Compatible sensor	1/1.8
OI	506mm	Mount	C

TL10C-310



Magnification	1.0x	Depth of field	1.2mm
F No.	15.5	Resolution	10.5 μ
Object side NA	0.032	TV distortion	0.00%
WD	311mm	Maximum Compatible sensor	2/3
OI	505mm	Mount	C

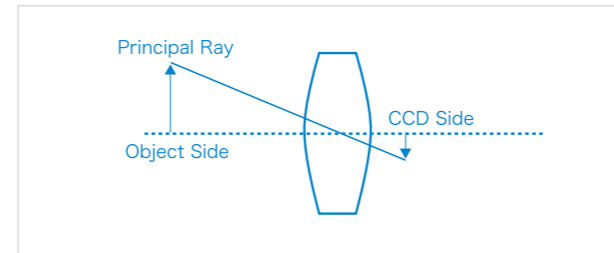
* Indicated specifications are design values. * Resolution indicates a theoretical resolution at a wavelength of 550nm.
 * Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

Telecentric Lens for Image Processing

The most suitable optical system for measurement in high accuracy

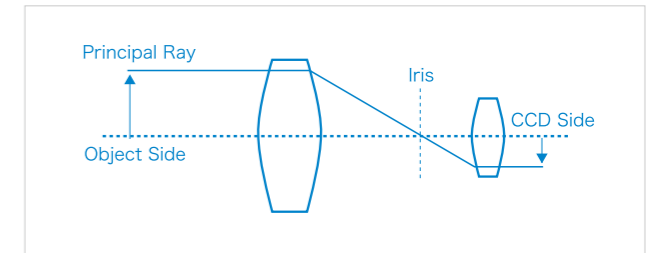
Telecentric optical system is an optical design that where the principal ray is parallel to the optical axis. It eliminates distortion problems by collimating the light entering the lens and suitable for imaging 3D objects. Co-axial illumination is suitable for recognizing object with high reflectance such as wafer, glass, and metal.

Non-telecentric lens



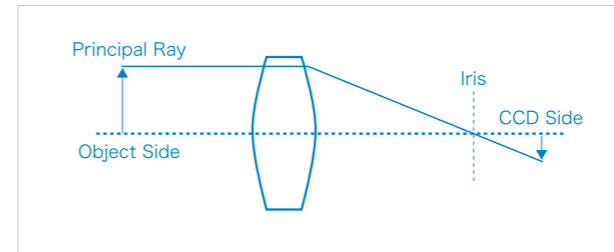
- ❖ Smaller size
- ❖ The number of lenses is fewer.
- ❖ Object size changes as the object goes up and down.

Double side telecentric lens



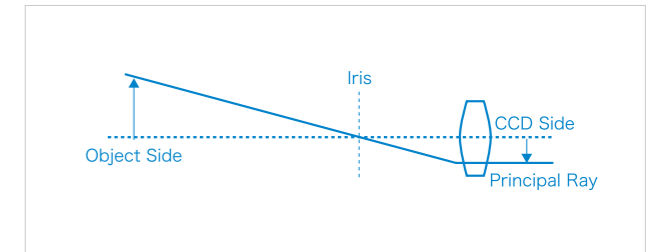
- ❖ Primary rays of object and image side are parallel to optical axis.
- ❖ Object size does not change when object goes up and down.
- ❖ Large size and high cost

Object side telecentric lens



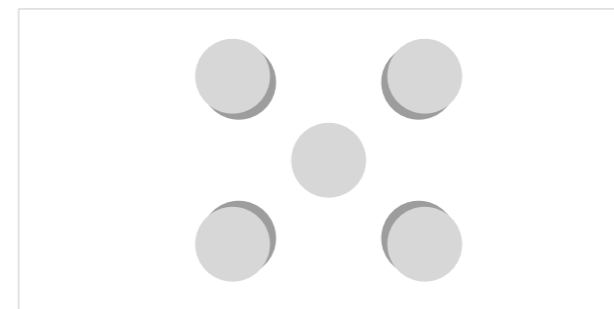
- ❖ Principal ray of object side is parallel to optical axis.
- ❖ Required for co-axial illumination
- ❖ Object size does not change when object goes up and down.
- ❖ Small size, compared to double side telecentric lens

Image side telecentric lens

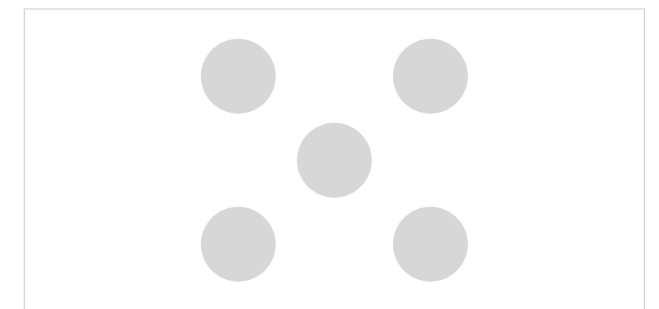


- ❖ Principal ray of image side is parallel to optical axis.
- ❖ Object size changes when object size goes up and down.
- ❖ A lens for video camera should be this optical system to correct color aberration.

Standard Lens



Telecentric lens



Size of 3D object changes when it goes up and down when non-telecentric lens is used. Telecentric lens is suitable for accurate measurement of 3D object.

1/1.8"

HMZ Series

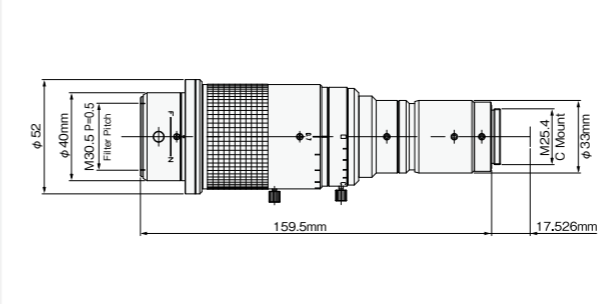
High Resolution Macro Zoom Lens

High resolution and compact design

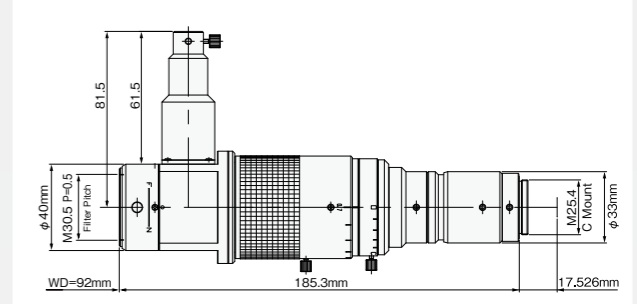
- Compatible with 1/1.8" of Mega Pixel camera
- High resolution and compact design
- High contrast and low distortion
- Improve uniformity of brightness for co-axial illumination
- Magnification and working distance can be converted to 0.21x - 18x, WD37 - 329mm by using converters



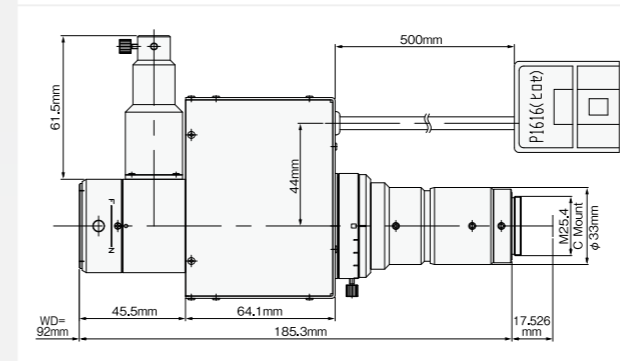
HMZ0745 (Manual Zoom)



HMZ0745C (Manual Zoom/Co-axial type)



HMZ0745C-SM (Motorized Zoom/Co-axial type)



Lens

Model	HMZ0745 / HMZ0745C / HMZ0745C-SM		
Magnification	0.7x - 4.5x	Depth of field	2mm - 0.08mm
WD	92mm	TV distortion	0.05% - 0.08%
Resolution	11.5 μ - 2.87 μ	Maximum Compatible sensor	1/1.8
Object side NA	0.03 - 0.12		

* Indicated specifications are design values.
 * Resolution indicates a theoretical resolution at a wavelength of 550nm.
 * Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

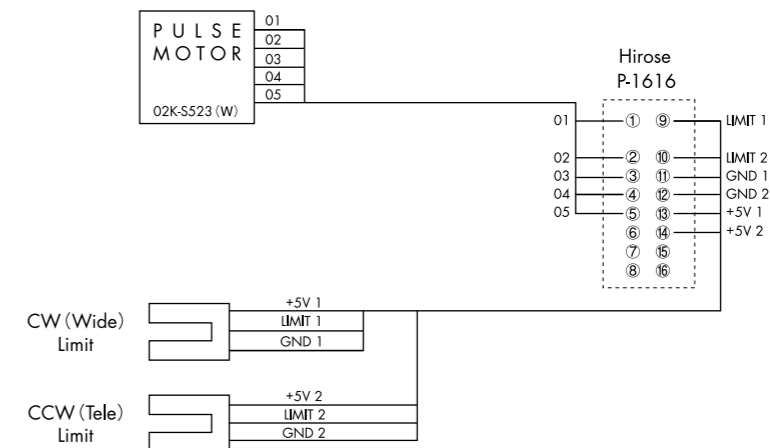
Front Converter

Model	Magnification	WD with converter
HMZ-FC03	0.3x	329mm
HMZ-FC04	0.4x	235mm
HMZ-FC05	0.5x	182mm
HMZ-FC067	0.67x	118mm
HMZ-FC20	2.0x	37mm

Rear Converter

Model	Magnification
HMZ-RC20	2.0x

(Wiring Diagram) HMZ0745C-SM



TLZ Series

1/1.8"

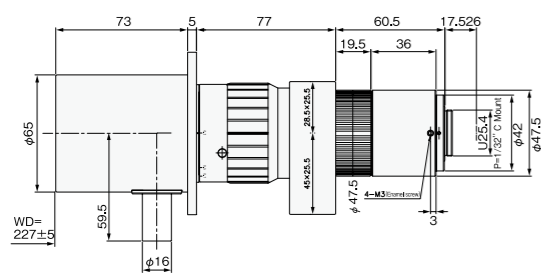
Low Magnification Zoom Lens with Co-axial Illumination

Built-in co-axial illumination
Suitable for various applications, inspection of wafer, IC chip, etc...

- 10x Zoom (0.2x - 2.0x)
- Compact design of 10x zoom ratio
- Reduce relative illumination
- High resolution at the whole magnification
- Motorized zoom type is available
- Long WD, 227mm

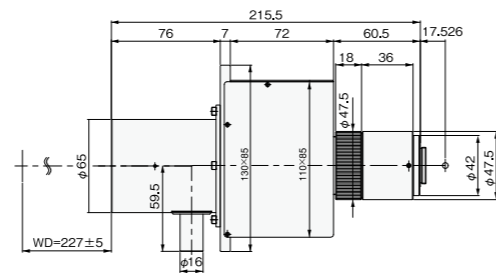


TLZ0220C (Manual Zoom)



Magnification	0.2x-2.0x	Depth of field	13.1mm - 0.45mm
WD	227mm	TV distortion	-0.16% - 0.16%
Resolution	22.4μ - 7.6μ	Maximum Compatible sensor	1/1.8
Object side NA	0.015 - 0.044		

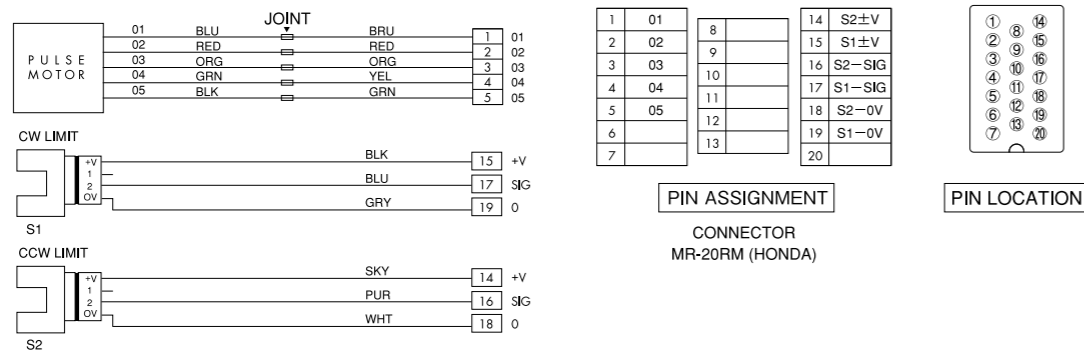
TLZ0220C-SM (Motorized Zoom)



Magnification	0.2x - 2.0x	Depth of field	13.1mm - 0.45mm
WD	227mm	TV distortion	-0.16% - 0.16%
Resolution	22.4μ - 7.6μ	Maximum Compatible sensor	1/1.8
Object side NA	0.015 - 0.044		

* Indicated specifications are design values. *Resolution indicates a theoretical resolution at a wavelength of 550nm.
* Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

(Wiring Diagram) TLZ0220C-SM



1/3"

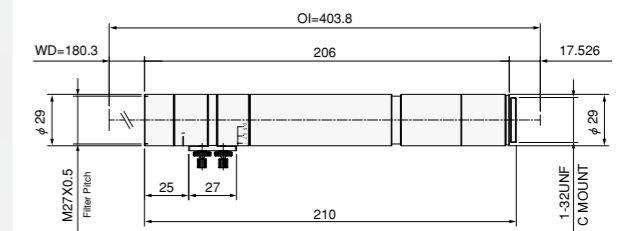
8.0x Compact Macro Zoom Lens

Compact and wide zoom ratio, suitable for inspection of various objects

- Long WD, 180mm
- Focus function is available
- φ29mm, suitable for small and limited spaces



CMZ0540-2



Magnification	0.5x~4.0x	Depth of field	3.3~0.19mm
WD	180.3mm	TV distortion	0.02%
Resolution	14 μ~6.3 μ	Maximum Compatible sensor	1/3
Object side NA	0.024~0.053		

* Indicated specifications are design values.
* Resolution indicates a theoretical resolution at a wavelength of 550nm.
* Depth of field is calculating assuming a horizontal 320 TV resolution using 1/2" camera (permissible circle of confusion 40μm).

6.0x Zoom Lens

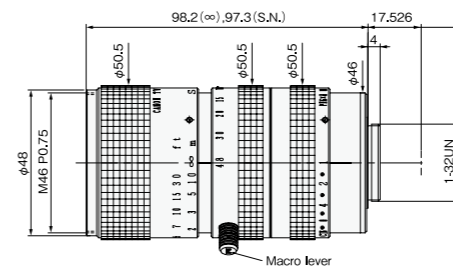
Suitable for high speed applications

- WD500mm - ∞
- *Macro photography: Possible to use at WD10mm by pulling a macro lever
- Large aperture, suitable for high speed camera

1/2" - 2/3"



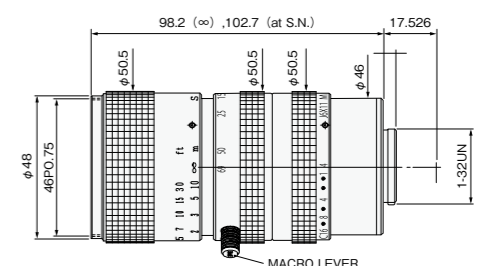
PH6 x 8Macro



Model Focal length (Zoom Ratio)	8 - 48mm (6.0x)	Magnification at WD500mm	0.017 - 0.1
∞F No.	1.0	Filter Pitch	M46 P=75
WD	500mm - ∞	Maximum Compatible sensor	1/2

* Indicated specifications are design values.

J6 x 11Macro



Model Focal length (Zoom Ratio)	11.5 - 69mm (6.0x)	Magnification at WD500mm	0.024 - 0.14
∞F No.	1.4	Filter Pitch	M46 P=75
WD	500mm - ∞	Maximum Compatible sensor	2/3

FIXED FOCAL LENS

Chart for Fixed Focal Lens

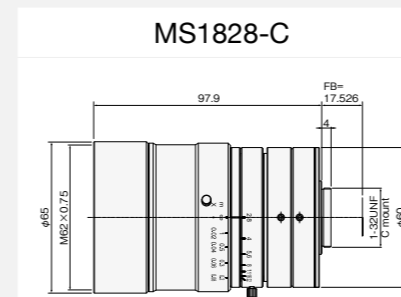
Series	Model No.	1/2	1/1.8	2/3	1	1.1	1.2	4/3	Page
4/3" 21Mega Pixel MS-C Series	MS1828-C								P79
	MS2524-C								
	MS3520-C								
5-12Mega Pixel HF Series	HF0528J-2								P80
	HF0818J-2								
	HF1214J-2								
	HF1618V-2								
	HF2514V-2								
	HF3514V-2								
	HF5018V-2								
4-12Mega Pixel HS-V Series	HS0619V								P14
	HS0818V								
	HS1214V								
	HS1614V								
	HS2514V								
	HS3516V								
	HS5016V								
	HS7520V								
	HS10028V								
	SWIR HS-V-SW Series	HS0619V-SW							
HS0818V-SW									
HS1214V-SW									
HS1614V-SW									
HS2514V-SW									
HS3516V-SW									
HS5016V-SW									
HS7520V-SW									
Resistance against vibration RV Series	RV0420								P82
	RV0622								
	RV0814								
	RV1022								
	RV1214								
	RV1520								
	RV2020								
	RV2520								
	RV3020								
	RV3519								
	RV5025								
3Mega Pixel HS Series	HS0420H								P16
	HS0618H								
	HS0814J								
	HS1214J								
	HS1614J								
	HS2514J								
	HS3514J								
Low distortion FV Series	FV0420								P84
	FV0622								
	FV1022								
	FV1520								
	FV2020								
	FV2520								
	FV3020								
	FV3519								
	FV5025								
	FV7538								
MV Series	MV0316								P86
	MV0614								
	MV0813								
	MV1214								
	MV1614								
	MV2514								
	MV3519								
	MV5018								
	MV7527								
	MV10035								

MS-C Series

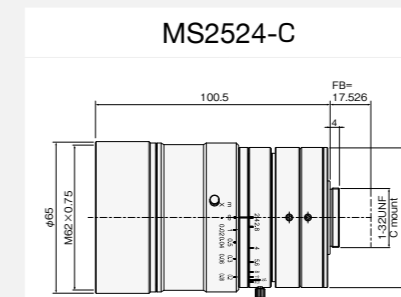
Fixed Focal Lens for 4/3"

High resolution, low distortion lens for 4/3", 21 Mega Pixel

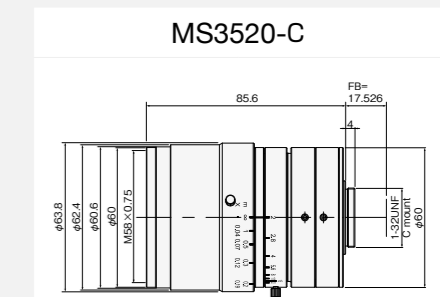
- ❖ Possible to capture wide view with c mount full size camera
- ❖ Excellent relative illumination
- ❖ Stable performance from macro to infinity by floating design



Focal length	18mm
∞F No.	2.8
Range of WD	100mm ~ ∞
Maximum Magnification	0.15x
TV distortion	0.52%
Maximum Compatible sensor	4/3
Mount	C



Focal length	25mm
∞F No.	2.4
Range of WD	120mm ~ ∞
Maximum Magnification	0.2x
TV distortion	-0.27%
Maximum Compatible sensor	4/3
Mount	C



Focal length	35mm
∞F No.	2.0
Range of WD	100mm ~ ∞
Maximum Magnification	0.39x
TV distortion	-0.11%
Maximum Compatible sensor	4/3
Mount	C

HF Series

5-12MP

2/3" - 1.2"

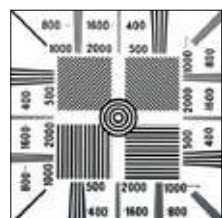
High Resolution Fixed Focal Lens for 5 Mega Pixel - 12 Mega Pixel

Suitable for inspection and alignment , required for high accuracy

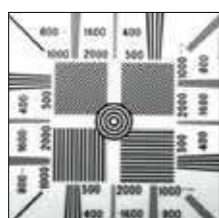
- Suitable for 5 Mega Pixel - 12 Mega Pixel
- f16mm - f75mm are compatible with 1.1" - 1.2"
- Suitable for different types of sensor
- Excellent performance at macro imaging, compared with conventional Mega Pixel Fixed Focal lens
- Stable performance at different working distance by floating design
- Large aperture
- Robust design, suitable for machine vision applications

Comparison of resolution

12 Mega Pixel Lens



Mega Pixel Lens



HF0528J-2

Focal length	5mm	TV distortion	0.29%
∞F No.	2.8	Filter pitch	M55 P=0.75
Range of WD	50mm - ∞	Maximum Compatible sensor	2/3
Maximum Magnification	0.076x		

HF0818J-2

Focal length	8mm	TV distortion	0.31%
∞F No.	1.8	Filter pitch	M40.5 P=0.5
Range of WD	100mm - ∞	Maximum Compatible sensor	2/3
Maximum Magnification	0.078x		

HF1214J-2

Focal length	12mm	TV distortion	-0.31%
∞F No.	1.4	Filter pitch	M37.5 P=0.5
Range of WD	100mm - ∞	Maximum Compatible sensor	2/3
Maximum Magnification	0.1x		

HF1618V-2

Focal length	16mm	TV distortion	-0.28%
∞F No.	1.8	Filter pitch	M49 P=0.75
Range of WD	33mm - ∞	Maximum Compatible sensor	1.1
Maximum Magnification	0.3x		

HF2514V-2

Focal length	25mm	TV distortion	-0.09%
∞F No.	1.4	Filter pitch	M52 P=0.75
Range of WD	80mm - ∞	Maximum Compatible sensor	1.1
Maximum Magnification	0.3x		

HF3514V-2

Focal length	35mm	TV distortion	-0.027%
∞F No.	1.4	Filter pitch	M46 P=0.75
Range of WD	110mm - ∞	Maximum Compatible sensor	1.1
Maximum Magnification	0.3x		

HF5018V-2

Focal length	50mm	TV distortion	-0.01%
∞F No.	1.8	Filter pitch	M49 P=0.75
Range of WD	192mm - ∞	Maximum Compatible sensor	1.2
Maximum Magnification	0.3x		

HF7518V-2

Focal length	75mm	TV distortion	0.00%
∞F No.	1.8	Filter pitch	M55 P=0.75
Range of WD	290mm - ∞	Maximum Compatible sensor	1.2
Maximum Magnification	0.3x		

* Indicated specifications are design values. * TV distortion indicates a value for 2/3" at minimum working distance.

RV Series

3MP

1/2" - 2/3"

Resistance against vibration Lens for Robot Vision

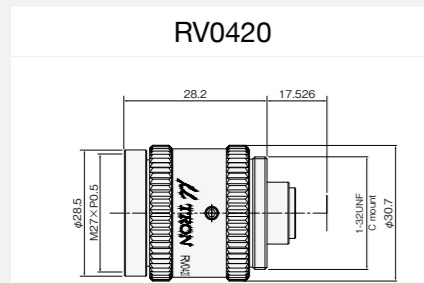
3 Mega Pixel, Low distortion



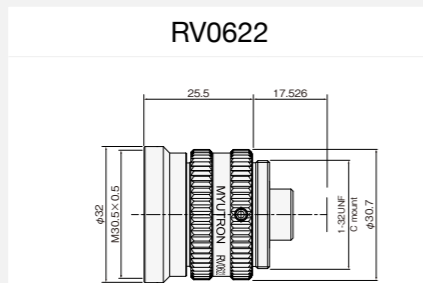
- Suitable for Resistance against vibration
- Focus : double nut and set screw
- Possible to select iris : 2 (Open) / 4/ 5.6 / 8
- Compact design
- 12 kinds of focal length are available

Possible to select iris :
Open / 4 / 5.6 / 8

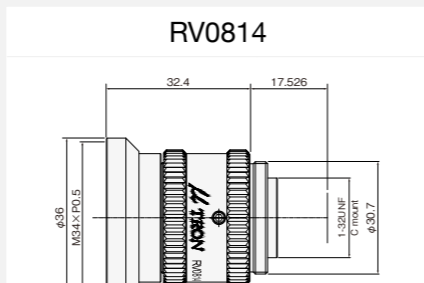
Example Model Name	F NO.
RV0420	F2 (Open)
RV0420 - F4	F 4
RV0420 - F5.6	F 5.6
RV0420 - F8	F 8



Application	Resistance against vibration Lens
Focal length	4mm
Closet magnification	0.038x
Operations distance	0.1m - ∞
Effective F No.	F2,F4,F5.6,F8
TV distortion	0.91%
Angle of view (H x V)	75.24° x 59.96°
Maximum Compatible sensor	1/2
Mount	C

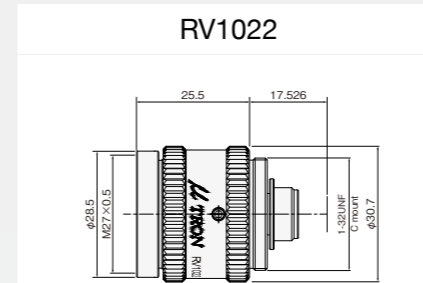


Application	Resistance against vibration Lens
Focal length	6.5mm
Closet magnification	0.055x
Operations distance	0.1m - ∞
Effective F No.	F2.2,F4,F5.6,F8
TV distortion	-0.01%
Angle of view (H x V)	52.35° x 40.47°
Maximum Compatible sensor	1/2
Mount	C

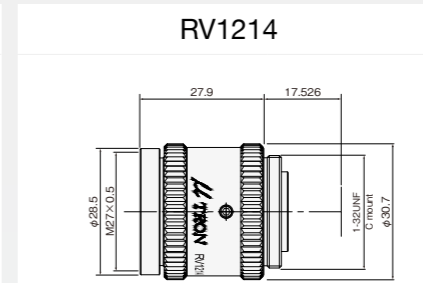


Application	Resistance against vibration Lens
Focal length	8mm
Closet magnification	0.074x
Operations distance	0.1m - ∞
Effective F No.	F1.4,F4,F5.6,F8
TV distortion	0.83%
Angle of view (H x V)	56° x 44°
Maximum Compatible sensor	2/3
Mount	C

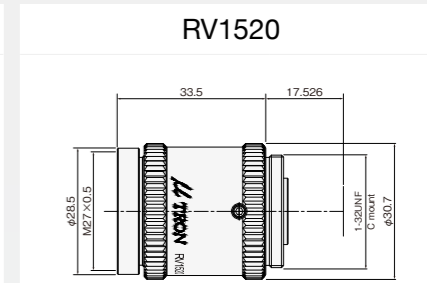
* Indicated Specifications are design values.



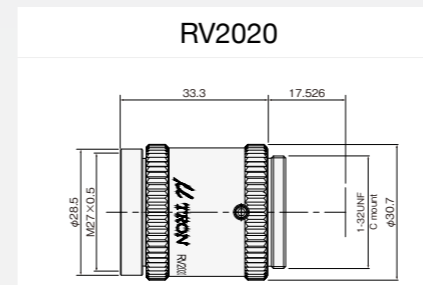
Application	Resistance against vibration Lens
Focal length	10mm
Closet magnification	0.1x
Operations distance	0.1m - ∞
Effective F No.	F2.2,F4,F5.6,F8
TV distortion	-0.08%
Angle of view (H x V)	34.61° x 26.31°
Maximum Compatible sensor	1/2
Mount	C



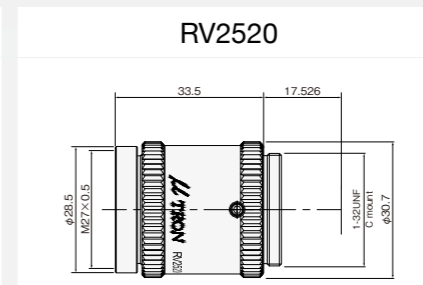
Application	Resistance against vibration Lens
Focal length	12mm
Closet magnification	0.08x
Operations distance	0.15m - ∞
Effective F No.	F1.4,F4,F5.6,F8
TV distortion	-0.12%
Angle of view (H x V)	39° x 30°
Maximum Compatible sensor	2/3
Mount	C



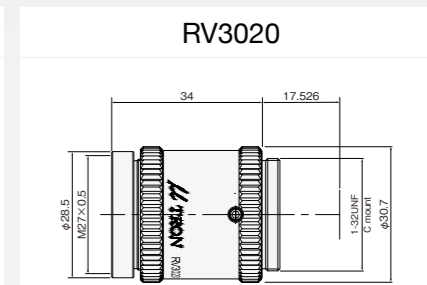
Application	Resistance against vibration Lens
Focal length	15mm
Closet magnification	0.3x
Operations distance	0.05m - ∞
Effective F No.	F2,F4,F5.6,F8
TV distortion	-0.09%
Angle of view (H x V)	31.79° x 24.11°
Maximum Compatible sensor	2/3
Mount	C



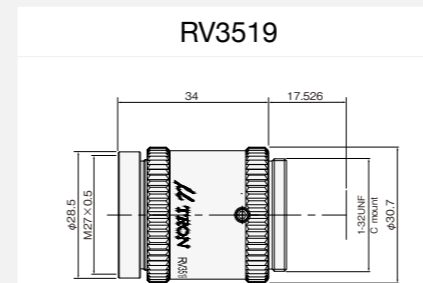
Application	Resistance against vibration Lens
Focal length	20mm
Closet magnification	0.25x
Operations distance	0.09m - 1m
Effective F No.	F2,F4,F5.6,F8
TV distortion	-0.10%
Angle of view (H x V)	24.11° x 18.2°
Maximum Compatible sensor	2/3
Mount	C



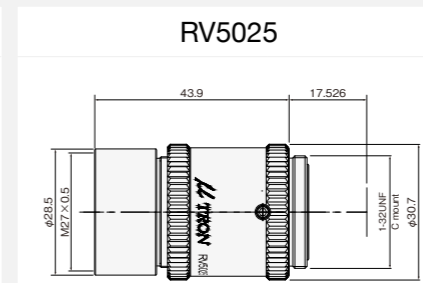
Application	Resistance against vibration Lens
Focal length	25mm
Closet magnification	0.2x
Operations distance	0.15m - 1m
Effective F No.	F2,F4,F5.6,F8
TV distortion	-0.01%
Angle of view (H x V)	19.58° x 14.75°
Maximum Compatible sensor	2/3
Mount	C



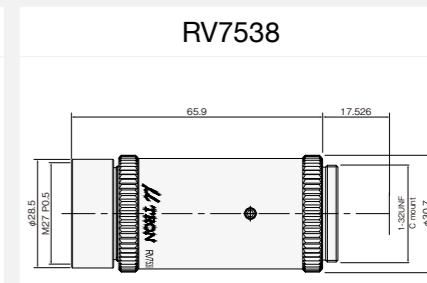
Application	Resistance against vibration Lens
Focal length	30mm
Closet magnification	0.16x
Operations distance	0.2m - 1m
Effective F No.	F2,F4,F5.6,F8
TV distortion	-0.02%
Angle of view (H x V)	16.69° x 12.55°
Maximum Compatible sensor	2/3
Mount	C



Application	Resistance against vibration Lens
Focal length	35mm
Closet magnification	0.13x
Operations distance	0.3m - 1m
Effective F No.	F1.9,F4,F5.6,F8
TV distortion	-0.03%
Angle of view (H x V)	14.32° x 10.77°
Maximum Compatible sensor	2/3
Mount	C



Application	Resistance against vibration Lens
Focal length	50mm
Closet magnification	0.13x
Operations distance	0.4m - 1m
Effective F No.	F2.5,F4,F5.6,F8
TV distortion	0.03%
Angle of view (H x V)	10.38° x 7.82°
Maximum Compatible sensor	2/3
Mount	C



Application	Resistance against vibration Lens
Focal length	75mm
Closet magnification	0.2x
Operations distance	0.4m - 1m
Effective F No.	F3.8,F5.6,F8
TV distortion	-0.01%
Angle of view (H x V)	6.81° x 5.11°
Maximum Compatible sensor	2/3
Mount	C

* Indicated Specifications are design values.

FV Series

LOW
DISTORTION

1/2" - 2/3"

Mega Pixel Low Distortion Fixed Focal Lens

Design for low distortion

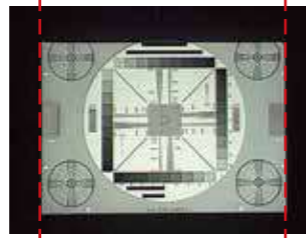
- Design for machine vision application, excellent performance at short WD, less than 500mm
- Reduce color aberration, compared with Conventional Fixed Focal Lens
- TV distortion less than 0.1% (except for f4mm)
- Possible to use for macro imaging without extension ring



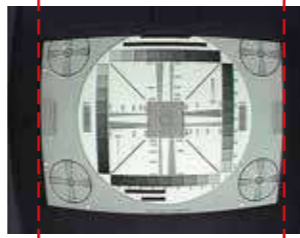
Comparison of Distortion

- FV0420 0.9%
- Conventional f4mm lens Approx. 18%

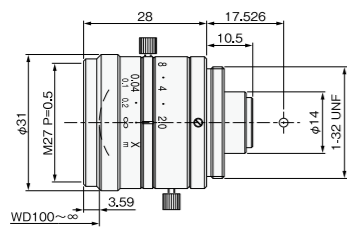
FV low distortion lens



Conventional Fixed Focal lens

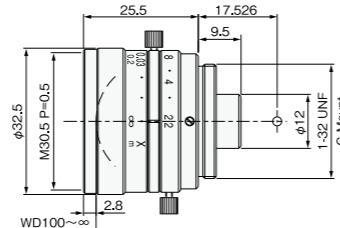


FV0420



Focal length	4mm	Angle of view(HxV)	75.14° x 59.96°
∞F No.	2.0	Filter pitch	M27 P=0.5
Range of WD	0.1m - ∞	Maximum Compatible sensor	1/2
TV distortion	0.91%		

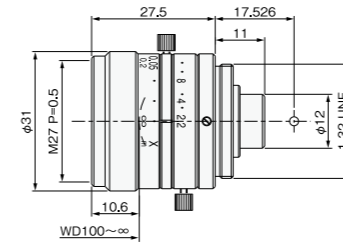
FV0622



Focal length	6.5mm	Angle of view(HxV)	52.35° x 40.47°
∞F No.	2.2	Filter pitch	M30.5 P=0.5
Range of WD	0.1m - ∞	Maximum Compatible sensor	1/2
TV distortion	-0.01%		

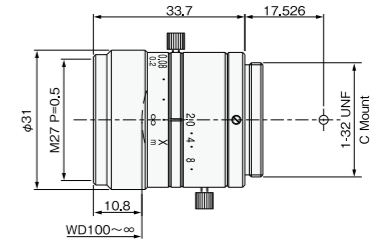
* Indicated specifications are design values. * Angle of view indicates a value for maximum compatible sensor.
* TV distortion indicates a value for minimum working distance.

FV1022



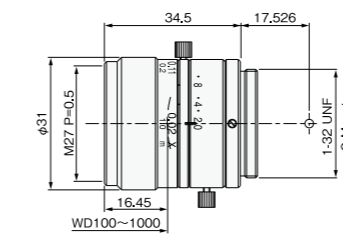
Focal length	10mm	Angle of view(HxV)	34.61° x 26.31°
∞F No.	2.2	Filter pitch	M27 P=0.5
Range of WD	0.1m - ∞	Maximum Compatible sensor	1/2
TV distortion	-0.08%		

FV1520



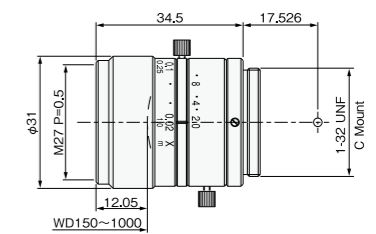
Focal length	15mm	Angle of view(HxV)	31.79° x 24.11°
∞F No.	2.0	Filter pitch	M27 P=0.5
Range of WD	0.1m - ∞	Maximum Compatible sensor	2/3
TV distortion	-0.09%		

FV2020



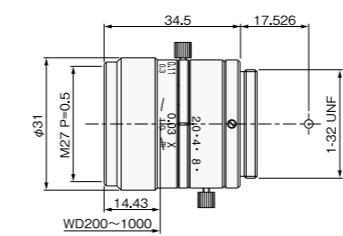
Focal length	20mm	Angle of view(HxV)	24.11° x 18.2°
∞F No.	2.0	Filter pitch	M27 P=0.5
Range of WD	0.1m - 1m	Maximum Compatible sensor	2/3
TV distortion	-0.10%		

FV2520



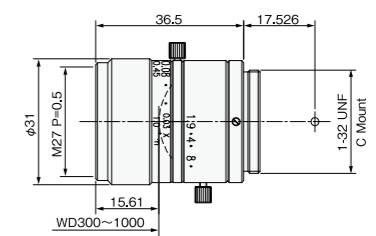
Focal length	25mm	Angle of view(HxV)	19.58° x 14.75°
∞F No.	2.0	Filter pitch	M27 P=0.5
Range of WD	0.15m - 1m	Maximum Compatible sensor	2/3
TV distortion	-0.01%		

FV3020



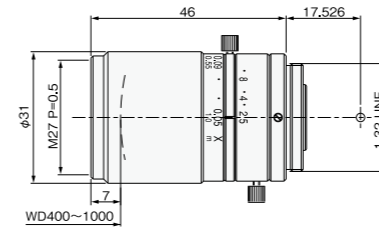
Focal length	30mm	Angle of view(HxV)	16.69° x 12.55°
∞F No.	2.0	Filter pitch	M27 P=0.5
Range of WD	0.2m - 1m	Maximum Compatible sensor	2/3
TV distortion	-0.02%		

FV3519



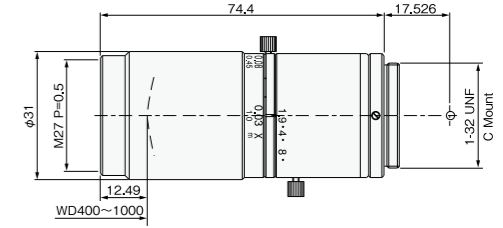
Focal length	35mm	Angle of view(HxV)	14.32° x 10.77°
∞F No.	1.9	Filter pitch	M27 P=0.5
Range of WD	0.3m - 1m	Maximum Compatible sensor	2/3
TV distortion	-0.03%		

FV5025



Focal length	50mm	Angle of view(HxV)	6.5° x 4.9°
∞F No.	2.5	Filter pitch	M27 P=0.5
Range of WD	0.4m - 1m	Maximum Compatible sensor	2/3
TV distortion	0.03%		

FV7538



Focal length	75mm	Angle of view(HxV)	6.81° x 5.11°
∞F No.	3.8	Filter pitch	M27 P=0.5
Range of WD	0.4m - 1m	Maximum Compatible sensor	2/3
TV distortion	-0.01%		

* Indicated specifications are design values. * Angle of view indicates a value for maximum compatible sensor.
* TV distortion indicates a value for the minimum working distance.

VGA Fixed Focal Lens

Wide range of focal length is available Suitable for various applications

- ❖ Focal length f3.5mm - f100mm, 10 models are available
- ❖ Available for focus and iris lock screws
- ❖ Suitable for various applications



MV0813

Focal length	8.0mm	Angle of view(HxV)	57.8° x 45°
∞F No.	1.3	Filter pitch	M25.5 P=0.5
Range of WD	0.2m - ∞	Maximum Compatible sensor	2/3

MV1214

Focal length	12mm	Angle of view(HxV)	29° x 21.9°
∞F No.	1.4	Filter pitch	M27 P=0.5
Range of WD	0.3m - ∞	Maximum Compatible sensor	1/2

MV1614

Focal length	16mm	Angle of view(HxV)	30.4° x 23°
∞F No.	1.4	Filter pitch	M27 P=0.5
Range of WD	0.4m - ∞	Maximum Compatible sensor	2/3

MV2514

Focal length	25mm	Angle of view(HxV)	28.5° x 21.6°
∞F No.	1.4	Filter pitch	M27 P=0.5
Range of WD	0.5m - ∞	Maximum Compatible sensor	2/3

MV3519

Focal length	35mm	Angle of view(HxV)	14.4° x 10.8°
∞F No.	1.9	Filter pitch	M27 P=0.5
Range of WD	0.5m - ∞	Maximum Compatible sensor	2/3

MV5018

Focal length	50mm	Angle of view(HxV)	10.5° x 7.9°
∞F No.	1.8	Filter pitch	M30.5 P=0.5
Range of WD	1m - ∞	Maximum Compatible sensor	2/3

MV0316

Focal length	3.5mm	Angle of view(HxV)	84.9° x 68.9°
∞F No.	1.6	Filter pitch	M43 P=0.75
Range of WD	0.1m - ∞	Maximum Compatible sensor	1/2

MV0614

Focal length	6.0mm	Angle of view(HxV)	54.6° x 42.3°
∞F No.	1.4	Filter pitch	M27 P=0.5
Range of WD	0.2m - ∞	Maximum Compatible sensor	1/2

MV7527

Focal length	75mm	Angle of view(HxV)	6.5° x 4.9°
∞F No.	2.7	Filter pitch	M30.5 P=0.5
Range of WD	1m - ∞	Maximum Compatible sensor	2/3

MV10035

Focal length	100mm	Angle of view(HxV)	5.1° x 3.8°
∞F No.	3.5	Filter pitch	M30.5 P=0.5
Range of WD	1m - ∞	Maximum Compatible sensor	2/3

* Indicated specifications are design values. * Angle of view indicates a value for maximum compatible sensor.

* Indicated specifications are design values. * Angle of view indicates a value for maximum compatible sensor.

ACCESSORIES



WD and FOV Chart for Extension Ring 3 Mega Pixel Fixed Focal Lens (HS Series)

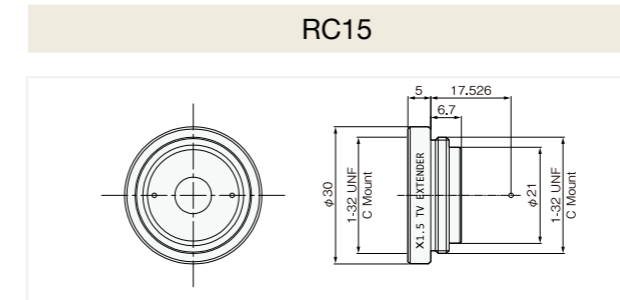
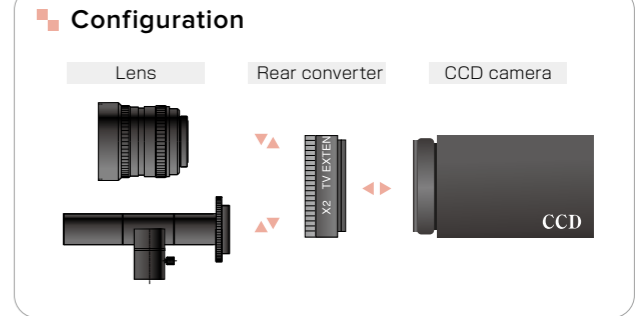
Extension Ring (mm)	HS0814J				HS1214J				HS1614J			
	FOV (V x H)		WD (mm)	Magnification	FOV (V x H)		WD (mm)	Magnification	FOV (V x H)		WD (mm)	Magnification
	1/2 CCD	1/3 CCD			1/2 CCD	1/3 CCD			1/2 CCD	1/3 CCD		
0	65x86	49x65	90	0.074	61x81	46x61	145	0.079	60x80	45x60	197	0.08
	600x800	450x600	989	0.008	400x533	300x400	994	0.012	300x400	225x300	996	0.016
0.5	36x47	27x36	40	0.135	40x54	30x40	92	0.119	44x58	33x44	141	0.11
	70x93	52x70	98	0.069	91x121	68x91	223	0.053	102x136	77x102	343	0.047
1	24x33	18x24	21	0.196	30x40	23x30	65	0.16	34x45	26x34	108	0.141
	37x49	28x37	42	0.13	52x69	39x52	120	0.093	62x83	47x62	204	0.077
1.5	19x25	14x19	11	0.256	24x32	18x24	50	0.2	28x37	21x28	87	0.171
	25x34	19x25	21	0.19	36x48	27x36	80	0.133	45x60	34x45	144	0.107
2	15x20	11x15	5	0.317	20x27	15x20	39	0.24	24x32	18x24	73	0.201
	19x25	14x19	11	0.251	28x37	21x28	58	0.173	35x46	26x35	110	0.138
5					10x13	7.5x10	13	0.482	13x17	9.4x13	34	0.383
					12x15	8.7x12	17	0.415	15x20	11x15	42	0.32
10					5.4x7.2	4.1x5.4	2	0.885	7x9.3	5.2x7	15	0.686
					5.9x7.8	4.4x5.9	2	0.818	7.7x10	5.8x7.7	16	0.623

Extension Ring (mm)	HS2514J				HS3514J				HS5018J			
	FOV (V x H)		WD (mm)	Magnification	FOV (V x H)		WD (mm)	Magnification	FOV (V x H)		WD (mm)	Magnification
	1/2 CCD	1/3 CCD			1/2 CCD	1/3 CCD			1/2 CCD	1/3 CCD		
0	55x74	41x55	291	0.087	47x63	35x47	337	0.102	43x58	32x43	438	0.111
	185x246	138x185	988	0.026	98x131	73x98	701	0.049	80x107	60x80	813	0.06
0.5	45x60	34x45	236	0.107	41x55	31x41	295	0.116	40x53	30x40	402	0.121
	107x142	80x107	560	0.045	75x100	56x75	542	0.064	69x91	51x69	693	0.07
1	38x51	29x38	200	0.126	37x49	28x37	263	0.13	37x49	27x37	371	0.131
	74x98	55x74	390	0.065	62x82	46x62	441	0.078	60x80	45x60	604	0.08
1.5	33x44	25x33	172	0.146	33x44	25x33	235	0.145	34x45	26x34	345	0.141
	57x76	43x57	298	0.084	52x70	39x52	371	0.092	53x70	40x53	536	0.091
2	29x39	22x29	151	0.166	21x28	16x21	145	0.231	24x32	18x24	239	0.203
	46x62	35x46	241	0.104	27x36	20x27	188	0.178	32x42	24x32	317	0.152
5	17x23	13x17	87	0.283	13x17	10x13	87	0.374	16x21	12x16	159	0.305
	22x29	16x22	111	0.221	15x20	11x15	101	0.321	19x25	14x19	188	0.254
10	10x13	7.5x10	50	0.479	9.3x12	7x9.3	62	0.517	12x16	9x12	118	0.408
	12x15	8.6x12	57	0.417	10x14	7.8x10	67	0.464	13x18	10x13	133	0.357
15	7.1x9.5	5.3x7.1	35	0.674	7.3x10	5.5x7.3	47	0.66	9x13	7.1x9.4	95	0.51
	7.8x10	5.9x7.8	37	0.613	7.9x11	5.9x7.9	50	0.607	10x14	7.8x10	103	0.459
20	5.5x7.4	4.1x5.5	26	0.87	6x8	4.5x6	37	0.803	7.8x10.4	5.9x7.8	78	0.613
	5.9x7.9	4.5x5.9	27	0.808	6.4x8.5	4.8x6.4	39	0.75	8.5x11.4	6.4x8.5	83	0.562
30									6.7x9	5x6.7	67	0.715
									7.2x9.6	5.4x7.2	70	0.664
35									5.9x7.8	4.4x5.9	59	0.818
									6.3x8.3	4.7x6.3	60	0.767

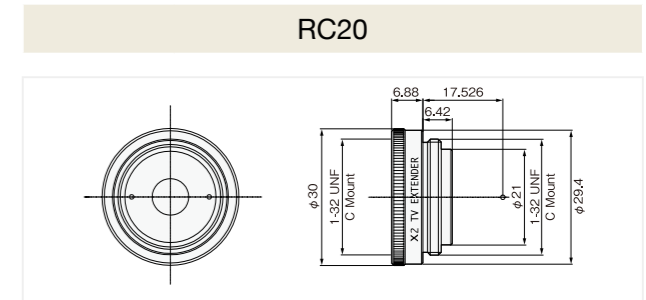
Rear Converter

Rear converter for C mount

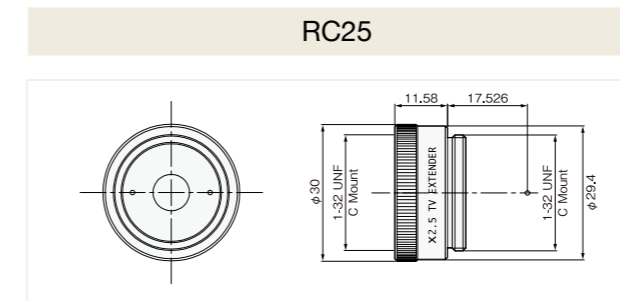
- Easy to convert magnification without changing the working distance
- * Using rear converter is deteriorated resolution and F No.



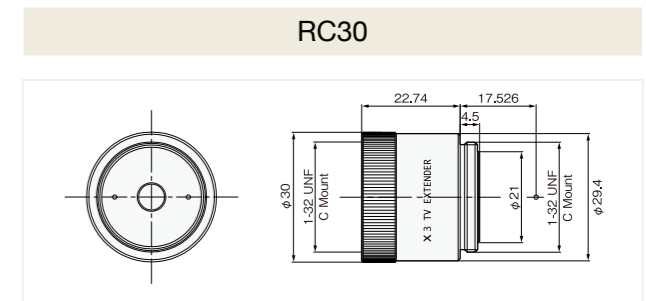
Magnification 1.5x



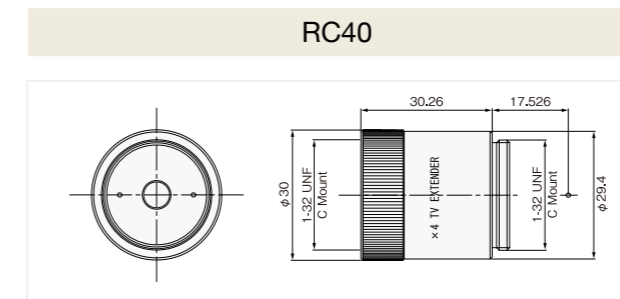
Magnification 2.0x



Magnification 2.5x



Magnification 3.0x



Magnification 4.0x

Filter

Customization is available

Attach to the tip of lenses and use for adjustment of wavelength and brightness

*Please contact us for different filters, not listed on the catalog.



UV Cut Filter (Protection cover filter)

Model	Filter	Screw Pitch
UV225	UV-CUT	M22.5 P=0.5
UV255	UV-CUT	M25.5 P=0.5
UV270	UV-CUT	M27.0 P=0.5
UV305	UV-CUT	M30.5 P=0.5



IR Cut Filter

Model	Filter	Screw Pitch
IR225	IR-CUT	M22.5 P=0.5
IR255	IR-CUT	M25.5 P=0.5
IR270	IR-CUT	M27.0 P=0.5
IR305	IR-CUT	M30.5 P=0.5



ND Filter

Model	Filter	Screw Pitch
ND2225	ND 2 (50%)	M22.5 P=0.5
ND2255	ND 2 (50%)	M25.5 P=0.5
ND2270	ND 2 (50%)	M27.0 P=0.5
ND2305	ND 2 (50%)	M30.5 P=0.5
ND2405	ND 2 (50%)	M40.5 P=0.5
ND4225	ND 4 (25%)	M22.5 P=0.5
ND4255	ND4(25%)	M25.5 P=0.5
ND4270	ND4(25%)	M27.0 P=0.5
ND4305	ND4(25%)	M30.5 P=0.5
ND4405	ND4(25%)	M40.5 P=0.5
ND8270	ND8(12.5%)	M27.0 P=0.5
ND8305	ND8(12.5%)	M30.5 P=0.5



Polarized Filter

Model	Filter	Screw Pitch
PL255R	PL255 Rotation type	M25.5 P=0.5
PL270R	PL270 Rotation type	M27.0 P=0.5
PL305R	PL305 Rotation type	M30.5 P=0.5
PL340R	PL340R Rotation type	M34.0 P=0.5
PL355R	PL355R Rotation type	M35.5 P=0.5
PL375R	PL375R Rotation type	M37.5 P=0.5
PL405R	PL405R Rotation type	M40.5 P=0.5
PL430R	PL430R Rotation type	M43.0 P=0.75
PL460R	PL460R Rotation type	M46.0 P=0.75
PL490R	PL490R Rotation type	M49.0 P=0.75
PL520R	PL520R Rotation type	M52.0 P=0.75
PL550R	PL550R Rotation type	M55.0 P=0.75
PL580R	PL580R Rotation type	M58.0 P=0.75
PL620R	PL620R Rotation type	M62.0 P=0.75
PL670R	PL670R Rotation type	M67.0 P=0.75
PL720R	PL720R Rotation type	M72.0 P=0.75
PL770R	PL770R Rotation type	M77.0 P=0.75
PL820R	PL820R Rotation type	M82.0 P=0.75
PL950R	PL950R Rotation type	M95.0 P=0.75
PL106R	PL106R Rotation type	M106.0 P=1.0



Color Filter

Model	Filter	Screw Pitch
B225	Blue	M22.5 P=0.5
B255	Blue	M25.5 P=0.5
B270	Blue	M27.0 P=0.5
B305	Blue	M30.5 P=0.5
G225	Green	M22.5 P=0.5
G255	Green	M25.5 P=0.5
G270	Green	M27.0 P=0.5
G305	Green	M30.5 P=0.5
Y225	Yellow	M22.5 P=0.5
Y255	Yellow	M25.5 P=0.5
Y270	Yellow	M27.0 P=0.5
Y305	Yellow	M30.5 P=0.5
R225	Red	M22.5 P=0.5
R255	Red	M25.5 P=0.5
R270	Red	M27.0 P=0.5
R305	Red	M30.5 P=0.5

CHART

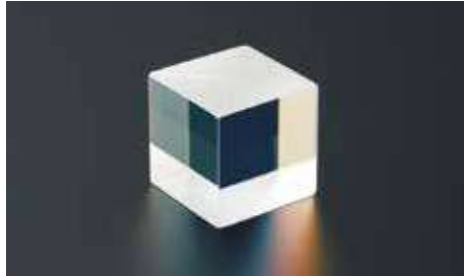
Screw Pitch	Model Name			
	LINE/LARGE AREA SENSOR LENS	TELECENTRIC LENS	MACRO ZOOM LENS	FIXED FOCAL LENS
M25.5 P=0.5			CMZ0540-2	MV0813
M27.0 P=0.5				FV0420, FV1022, FV1520, FV2020, FV2520, FV5025, FV7538, MV0614, MV1214, MV1614, MV2514, MV3519
M30.5 P=0.5		VTL0513	HMZ0745, HMZ0745C	HS1214J, HS1614J, HS2514J, HS3514J, HS5018J, FV0622, MV5018, MV7527, MV10035
M34 P=0.75		MGTL10V, MGTL10VC		HS0814J
M35.5 P=0.5		VTL0714, MGTL05VM, MGTL05VMC, MGTL069VM, MGTL069VMC		
M37.5 P=0.5	LS05, LS07, LS10, LS15			HF1214J-2
M40.5 P=0.5		MGTL03, MGTL03VM, MGTL03VMC, MGTL0345VM, MGTL0345VMC		HF0818J-2, HS1214V, HS1614V, HS2514V
M43 P=0.75		MGTL04VM, MGTL04VMC		
M46 P=0.75	XLS03, XLS05, XLS075, XLS10, XLS14, XLS20	MGTL04		HF3514V-2
M49 P=0.75	FV3526L	MGTL03, MGTL03VM, MGTL03VMC, MGTL0345VM, MGTL0345VMC		HF1618V-2, HF5018V-2
M52 P=0.75	LSTL078TW, LSF3528			HF2514V-2
M55 P=0.75	LSTL15H, LSTL20H			HF0528J-2, HF7518V-2
M58 P=0.75	SP10, SP20, XLS01, XLS02, WF5045, MS1828, MS3520, HB5014	MGTL0275-2		HS0818V
M62 P=0.75	MS2524, LSP350, SP05, SP07, SP14, FV5026L, FV5026W	MGTL023, MGTL022VM		
M67 P=0.75	LSTL10H, LSF5028	MGTL014, MGTL019, MGTL023H, MGTL0275V		
M72 P=0.75		MGTL03V, MGTL03VC		
M77 P=0.75	LSF2528, FV8528W	MGTL017VM		
M82 P=0.75	LSTL055TW, FV8528L			
M95 P=1.0		MGTL014VM, MGTL014VM-180		
M106 P=1.0	LSTL03TW			

Optical Lens Parts

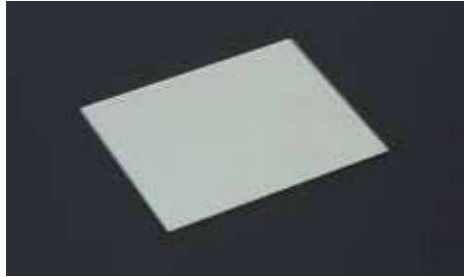
Customization is available



Beam splitter			
Wavelength	400nm-700nm	Model	Dimension(mm)
Coating	Slope: Dielectric multilayer coating Side: AR multi-coated	BS-10	10×10×10
Spectral ratio	T : R = 50 : 50	BS-15	15×15×15
Surface tolerance	$\lambda / 4$	BS-20	20×20×20
Angle	$\pm 3^\circ$	BS-25	25×25×25
Size tolerance	+0.1 / -0.3mm		
Material	BK-7		



Polarized beam splitter			
Wavelength	450nm-650nm	Model	Dimension(mm)
Coating	Slope: Dielectric multilayer coating Side: AR multi-coated	BSP-03	3×3×3
Spectral ratio	Tp > 95 Rs > 95	BSP-05	5×5×5
Surface tolerance	$\lambda / 4$	BSP-08	8×8×8
Angle	$\pm 3^\circ$	BSP-10	10×10×10
Size tolerance	+0.1 / -0.3mm		
Material	BK-7		



Half mirror				
Coating	Surface: Dielectric multilayer coating Rear surface : AR multi-coated	Model	Dimension(mm)	Thickness(mm)
Spectral ratio	T : R = 50 : 50	HM-30-1	30×30	1
Surface tolerance	$\lambda - 3\lambda$	HM-50-1	50×50	1
Parallelism	Within 1°	HM-100-1	100×100	1
Angle of incidence	45°	HM-30-2	30×30	2
Material	Crown	HM-50-2	50×50	2
		HM-100-2	100×100	2



Aluminized surface mirror				
Coating	Aluminum + Sio	Model	Dimension(mm)	Thickness(mm)
Surface tolerance	λ	AM-5	5×5	1
Size tolerance	+0 / -0.2mm	AM-10	10×10	1
Material	Crown	AM-30	30×30	2
		AM-50	50×50	3
		AM-100	100×100	3



Right angle prism			
Coating	Slope: Aluminum coated Vertical plane: AR multi-coated	Model	Dimension(mm)
Surface tolerance	$\lambda / 2$	TP-5	5×5×5
Angle	$\pm 3^\circ$	TP-10	10×10×10
Size tolerance	+0 / -0.2mm	TP-15	15×15×15
Material	BK-7	TP-20	20×20×20
		TP-25	25×25×25
		TP-30	30×30×30
		TP-40	40×40×40
		TP-50	50×50×50



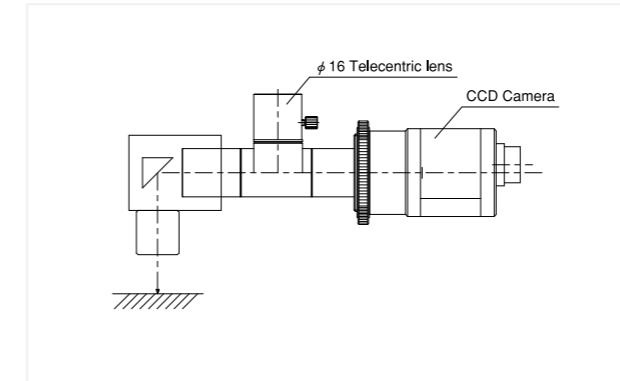
Penta prism			
Coating	Two sided: AR multi-coated Two sided: black coated aluminum	Model	Dimension(mm)
Surface tolerance	$\lambda / 2$	PP-5	5×5×5
Angle	$\pm 3^\circ$	PP-10	10×10×10
Size tolerance	$\pm 0.2\text{mm}$	PP-15	15×15×15
Material	BK-7	PP-20	20×20×20
		PP-25	25×25×25
		PP-30	30×30×30

Prism Adapter

Prism adapters for telecentric lenses

➤ Bend the optical axis at 90° and suitable for mark recognition

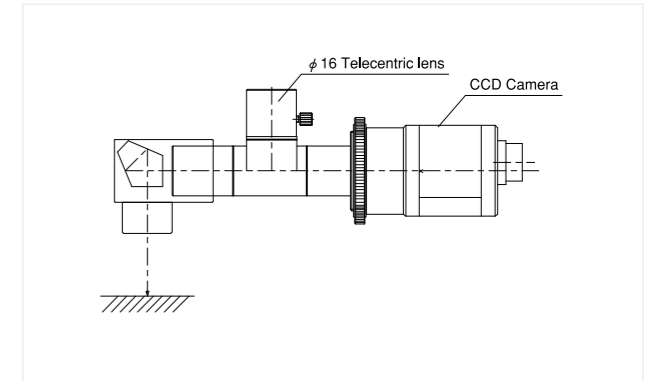
90° slide-looking rectangular mirror type



Optical axis can be bent 90° degrees. Effective when there is no space above the object. Monitored image is a mirror image.

Model	Compatible model
TL-PM16-1	φ 16 Telecentric Series
TL-PM22-1	WD220 Telecentric φ 22
TL-PM39-1	WD220 Telecentric φ 39

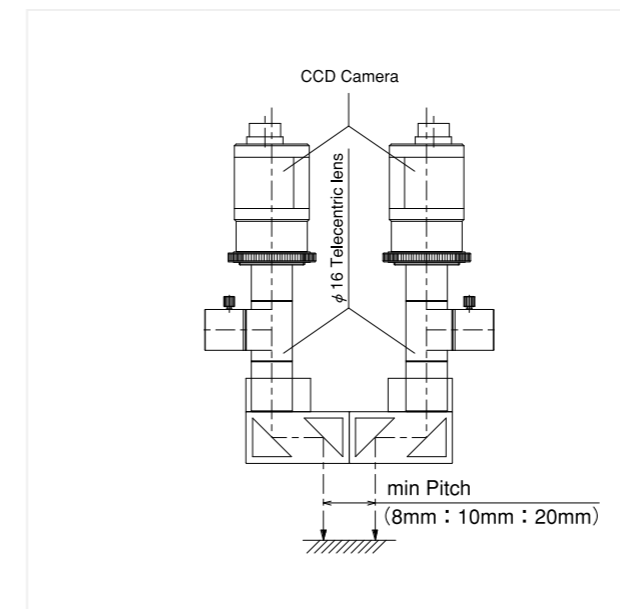
90° slide-looking pentaprism type



Optical axis can be bent 90° degrees. Effective when there is no space above the object. Monitored image is an erecting image.

Model	Compatible model
TL-PP16-1	φ 16 Telecentric Series
TL-PP22-1	WD220 Telecentric φ 22
TL-PP39-1	WD220 Telecentric φ 39

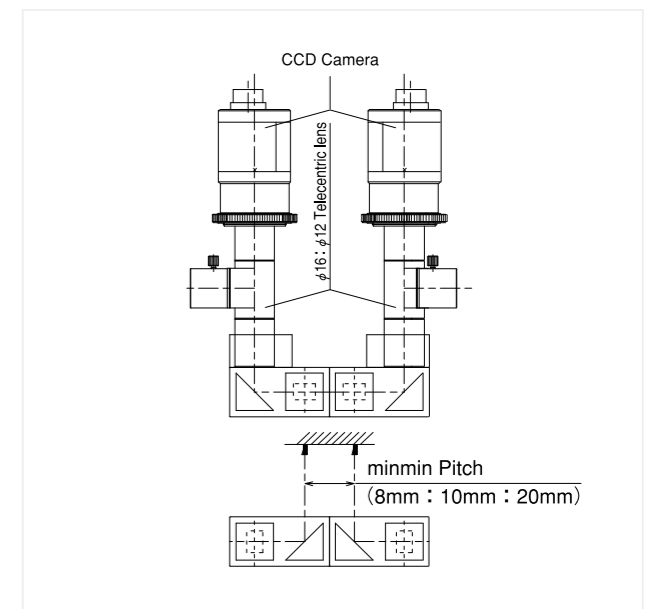
Optical axis pitch conversion type



Narrow pitch marks between two points can be recognized.

Model	Compatible model
TL-PT16-1	φ 16 Telecentric (Pitch 8mm/One side 4mm)
TL-PT16-2	φ 16 Telecentric (Pitch 10mm/One side 5mm)
TL-PT16-3	φ 16 Telecentric (Pitch 20mm/One side 10mm)

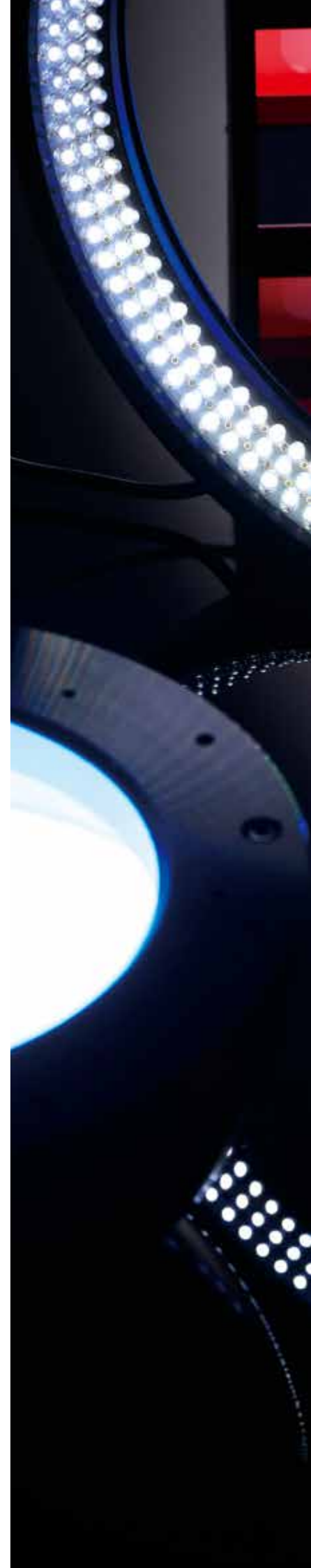
Optical axis pitch 90° conversion type



Narrow pitch marks between two points can be recognized. Effective when there is no space above the object.

Model	Compatible model
TL-PTV16-1	φ 16 Telecentric (Pitch 8mm/One side 4mm)
TL-PTV16-2	φ 16 Telecentric (Pitch 10mm/One side 5mm)
TL-PTV16-3	φ 16 Telecentric (Pitch 20mm/One side 10mm)

LIGHTING SERIES



MDBB-LSRH Series LED LIGHTING

1 million lx very bright lighting product line

Natural air-cooled, industrys' highest class

Use PC to adjust light strength each 100mm.

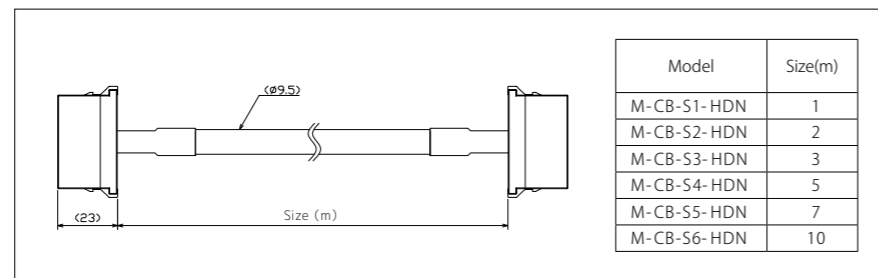
- Special Optical Design
- Natural air cooled
- Power LED



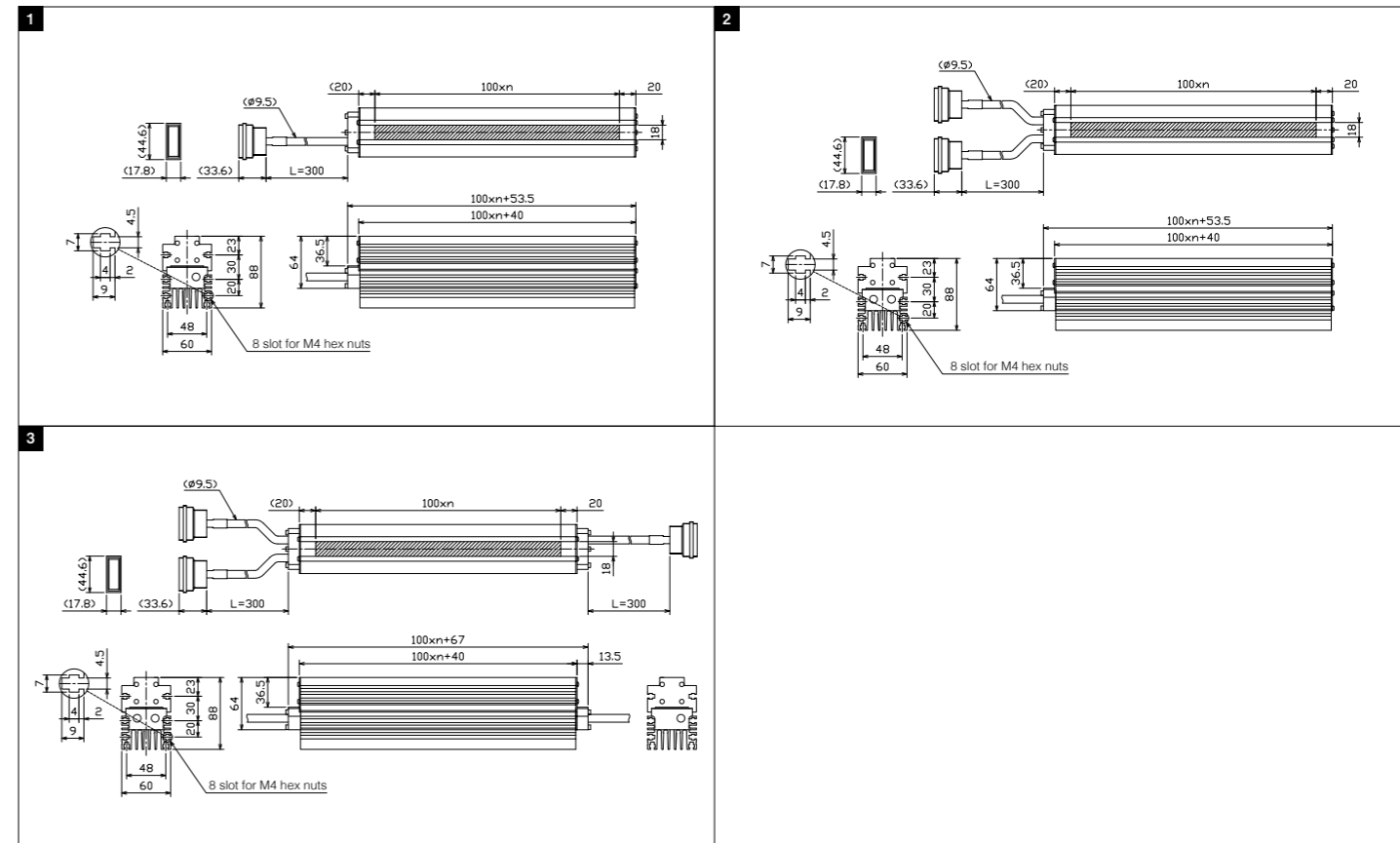
- Achieves natural air-cooled 1 million lx (WD 50mm).
- Can use special power app to control by PC individually each 100mm.
- Our product line emits light from 100 to 3000 mm, in 100mm units.
- Models ending in -S can be used very uniformly.

Model	Color	Power Consumption (W)	Channels	Dimension
MDBB-LSRH100W	W	30	1CH	1
MDBB-LSRH200W	W	60	2CH	
MDBB-LSRH300W	W	90	3CH	
MDBB-LSRH400W	W	120	4CH	
MDBB-LSRH500W	W	150	5CH	
MDBB-LSRH600W	W	180	6CH	
MDBB-LSRH700W	W	210	7CH	
MDBB-LSRH800W	W	240	8CH	
MDBB-LSRH900W	W	270	9CH	
MDBB-LSRH1000W	W	300	10CH	
MDBB-LSRH1100W	W	330	11CH	
MDBB-LSRH1200W	W	360	12CH	2
MDBB-LSRH1300W	W	390	13CH	
MDBB-LSRH1400W	W	420	14CH	
MDBB-LSRH1500W	W	450	15CH	
MDBB-LSRH1600W	W	480	16CH	
MDBB-LSRH1700W	W	510	17CH	
MDBB-LSRH1800W	W	540	18CH	
MDBB-LSRH1900W	W	570	19CH	
MDBB-LSRH2000W	W	600	20CH	
MDBB-LSRH2100W	W	630	21CH	
MDBB-LSRH2200W	W	660	22CH	3
MDBB-LSRH2300W	W	690	23CH	
MDBB-LSRH2400W	W	720	24CH	
MDBB-LSRH2500W	W	750	25CH	
MDBB-LSRH2600W	W	780	26CH	
MDBB-LSRH2700W	W	810	27CH	
MDBB-LSRH2800W	W	840	28CH	
MDBB-LSRH2900W	W	870	29CH	
MDBB-LSRH3000W	W	900	30CH	

MDBB-LSRH Dedicated extension cable



• Condenser lens MLBBH-□, diffusion plate MKBB-LSRH□. Replace the □ with its size, in 100mm units. Product line from 100 to 1000 mm. Please tell us whether you want a condenser lens or diffusion plate attached. Diffusion plates are 30%, 60%, 80% or 90%.



Power Supply application

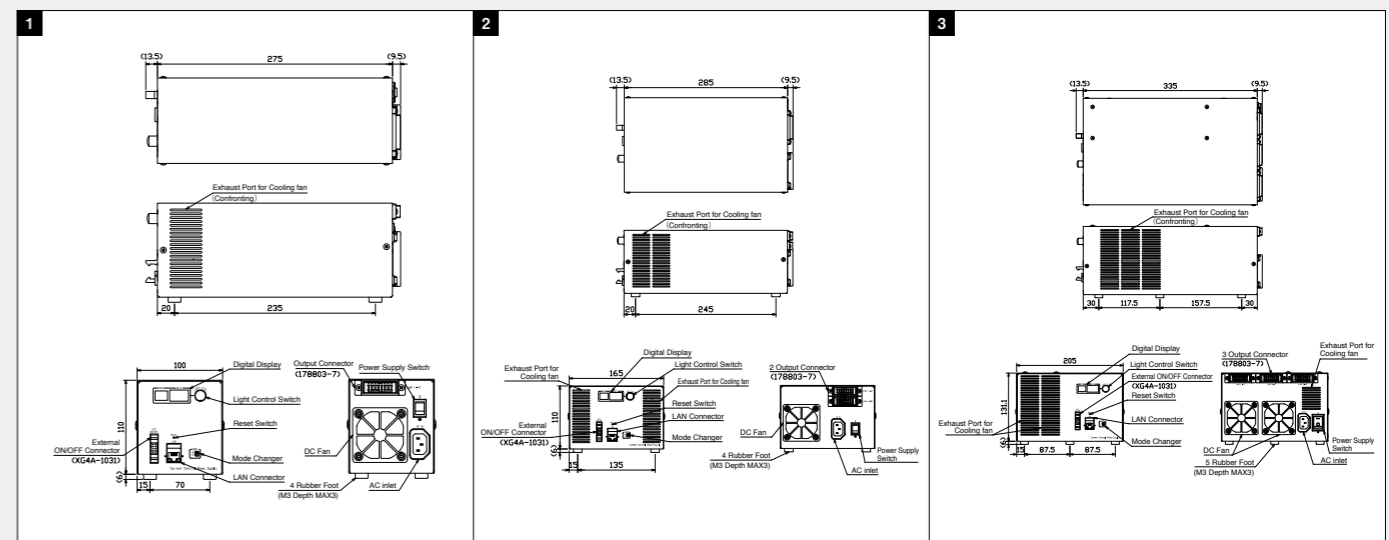
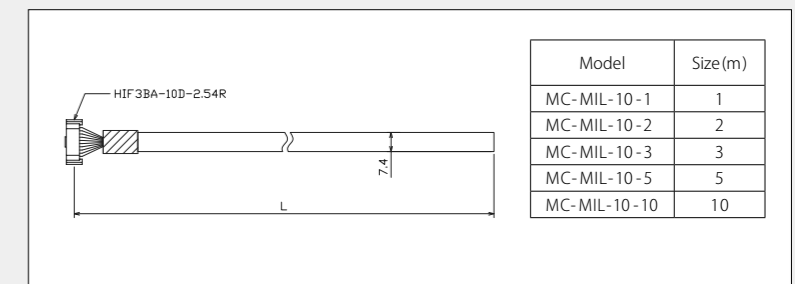
Power Supply for MDBB-LSRH

Available in size from 100 to 1,000 mm



Model	MMC-300M10-TP	MMC-600M20-TP	MMC-1000M30-TP
Input Voltage	AC100~240V		
Operating frequency	50/60Hz		
Capacity	30W/CH		
Channels	10CH	20CH	30CH
Dimming method	Method to vary output current		
External control	LAN外部ON/OFF		
対応サイズ	100~1000	1100~2000	2100~3000
Dimension	1	2	3

External control cable



MDBB-LSRA Series LED LIGHTING

600,000 lx very bright lighting product line

Great variety of sizes

Extendable from 100mm to max 3000mm

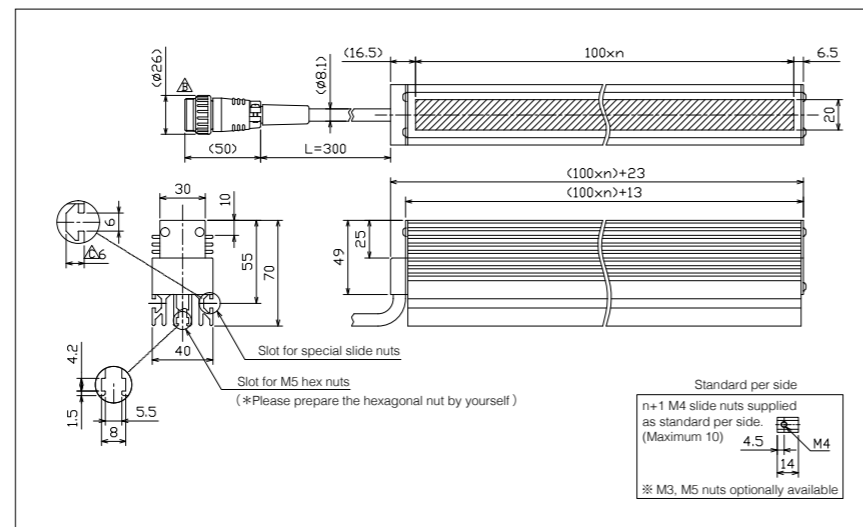
- Special Optical Design
- Natural air cooled
- DC24V
- Power LED



• Models ending in -S can be used very uniformly.

Model	Color	Power Consumption (W)	Dimension
MDBB-LSRA100□	W	20	n=1
	B		
MDBB-LSRA200□	W	40	n=2
	B		
MDBB-LSRA300□	W	60	n=3
	B		
MDBB-LSRA400□	W	80	n=4
	B		
MDBB-LSRA600□	W	120	n=6
	B		
MDBB-LSRA1000□	W	200	n=10
	B		

- W = White, B = Blue, in □.
- Input voltage is DC24V.
- Condenser lens MLBBH-□ and diffusion plate MKBB-LSR□ (optional) can be attached. Replace the □ with its size, in 100mm units. Product line from 100 to 1000 mm. Please tell us whether you want a condenser lens or diffusion plate attached. Diffusion plates are 30%, 60%, 80% or 90%.

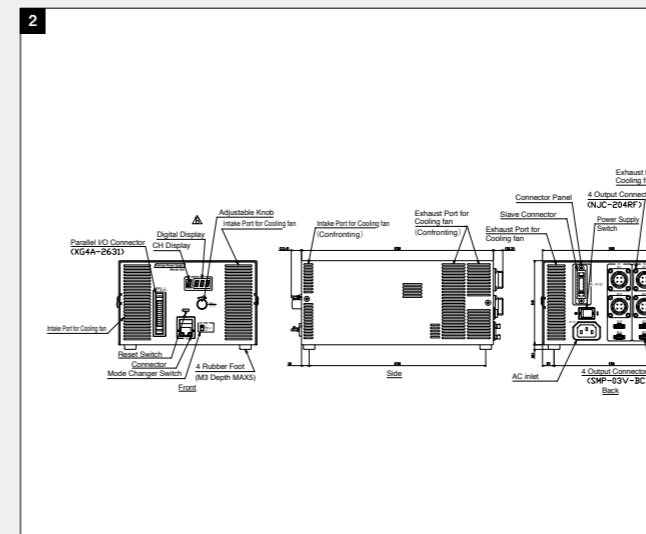


Power Supply application High function Voltage Light Control Power Supply

Voltage light control power supply capable of 1,000 - level light control

- As it is capable of varying output voltage, this series is suitable for Line Scan Camera and High Speed Camera
- This series is capable of supporting large 24 V DC lights with power consumption of 300 W and makes it possible to select an optimal light control range by setting a low-voltage output limit.
- It is possible to switch between LAN and parallel communication for external light control.

Model	MWDV-300S-24	MWDV-600M2-24	MWDV-300M1-24
Input Voltage	AC100~240V		
Operating frequency	50/60Hz		
Rated output	DC24V		
Capacity	300W	Total 600W (300W/CH)	300W
Channels	Single split - channel output connectors (metal connectors ×2 +SM connectors ×4)	2CH 4 connectors ×2 +SM connectors ×4)	1CH 4 connectors / CH (metal connectors ×2 +SM connectors ×2)
Dimming method	Method to vary output current		
External control	External ON/OFF External light control (10 bit parallel communication / LAN communication)		External ON/OFF External light control (10 bit parallel communication / LAN communication)
Dimension	1	2	3

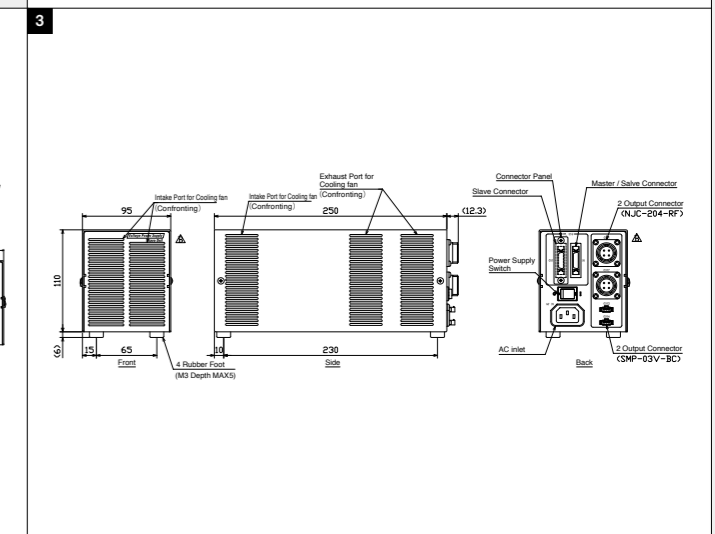
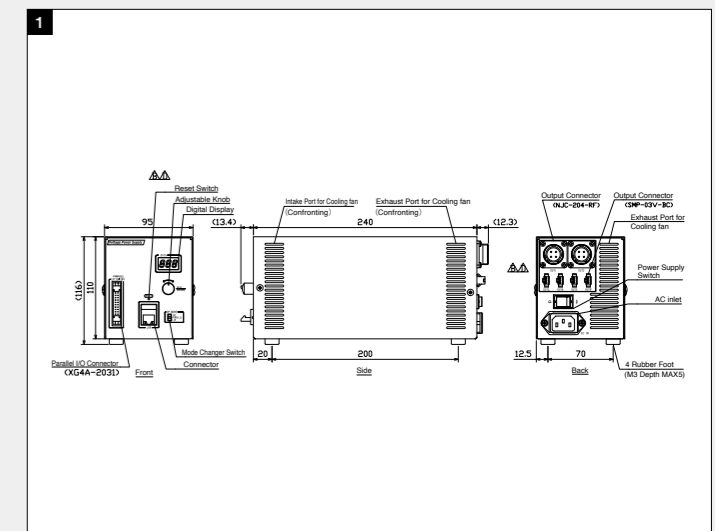


10bit

LAN

Dedicated extension cable

Model	Size(m)
M-CB-S1R-MCB	1
M-CB-S2R-MCB	2
M-CB-S3R-MCB	3
M-CB-S5R-MCB	5
M-CB-S10R-MCB	10



* For details on the external control cable, refer to MC-MIL-series on page 113.

MV & MHV Series Coaxial Light

Ultra-high brightness coaxial spot lighting

Telecentric light source

Ideal for mirror work such as a wafers

We also have UV & IR types

MHVE-21A is the industry's highest class of brightness

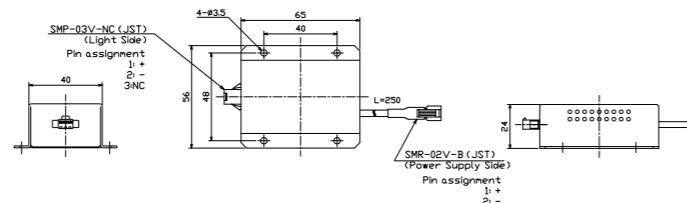


Power LED

Model	Color	Power Consumption (W)	Applicable Current	Dimension
MV-14A□	R	1.0	DC12V	1
	W			
	G			
	B			
MV-30A□	R	1.5	DC12V	2
	W			
	G			
	B			
MHV-20□	R	-	MLC-350M2-VI	3
	W			
	G			
	B			
MHVE-21A□	R	-	MLC-350M2-VI	4
	W			
	G			
	B			
MHV-20UV-400	UV	-	MLC-350M2-VI	5
MHVB-22UV-365	UV	-	MLC-700M2-VI	6
MHVB-24IR-850	IR	-	MLC-700M2-VI	7
MHVB-24IR-940	IR	-	MLC-700M2-VI	7

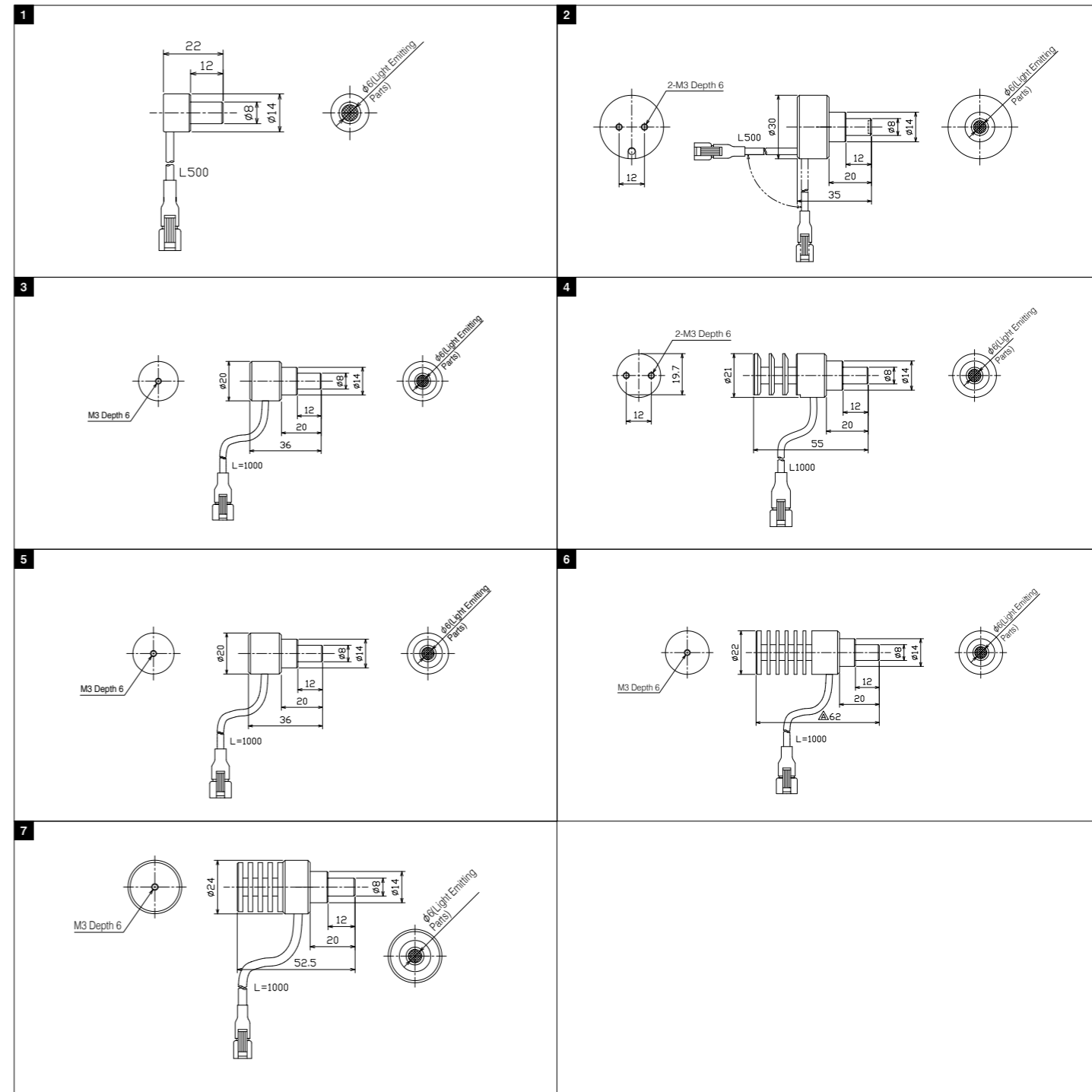
Resistance Box / MRBOX (Required when using 12V DC output power supply)

MRBOX-24R / MRBOX3W-15R / MRBOX3W-12R

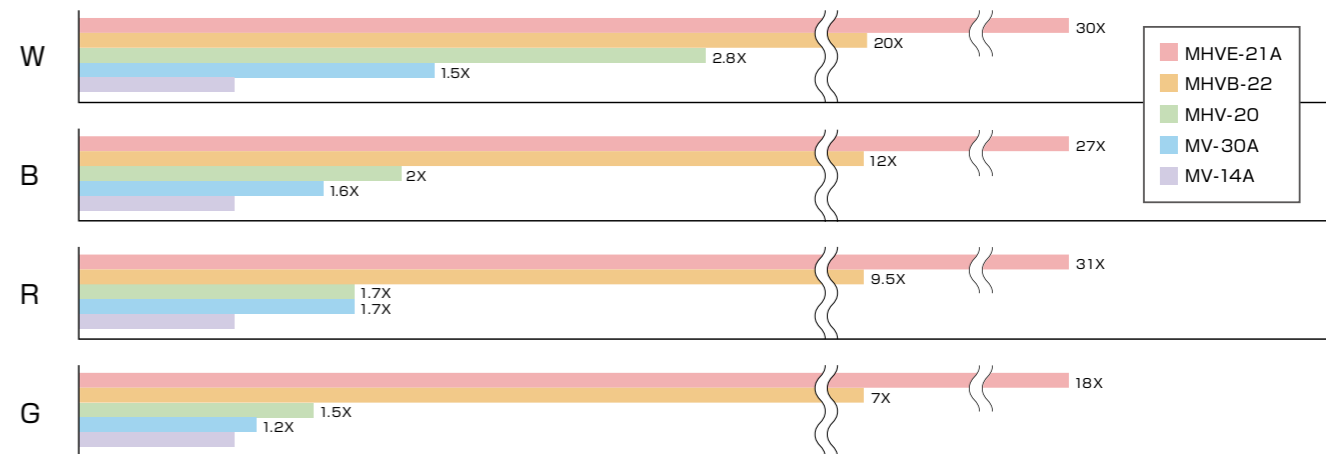


Model	Applicable lighting	Power Consumption (W)
MRBOX-24R	MHV-20	4.5
MRBOX3W-15R	MHVE21A (R only)	9.0
MRBOX3W-12R	MHVB-22	9.0
	MFVE21A (Except R)	

- R= Red, W = White, B = Blue, G = Green, in □.
- Use a resistance box to enable connection to power supplies other than MLC.
- LEDs have individual differences in peak wavelengths, so their hues can vary, even if the same model product.



Luminance Comparison (Reference Values) Relative brightness (MV-14A standard)



MMAR Series Ring Light

Multi-angle ring lighting

From low angles to high angles
Applicable to wide range of uses



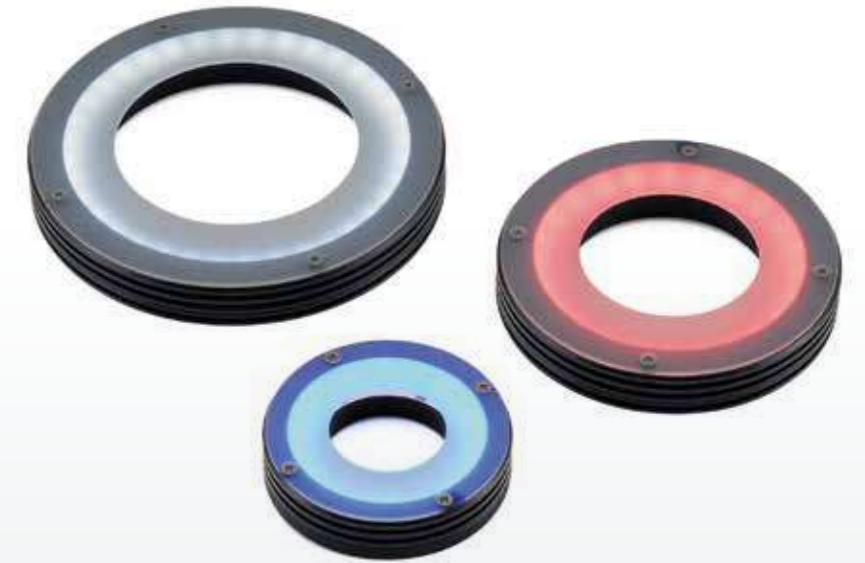
24 V DC Models Available

Power LED

MHRA Series Ring Light

High Power Flat Ring Light

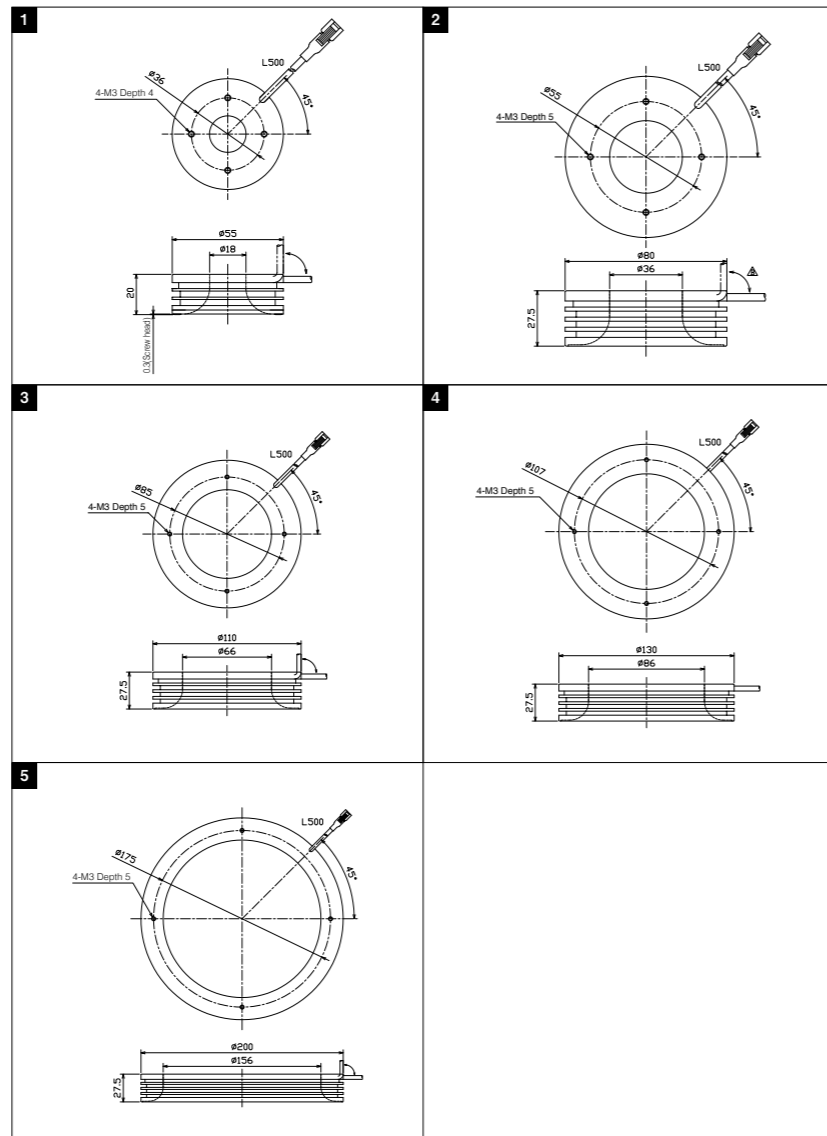
φ66 to φ353
7 types in product line



Power LED

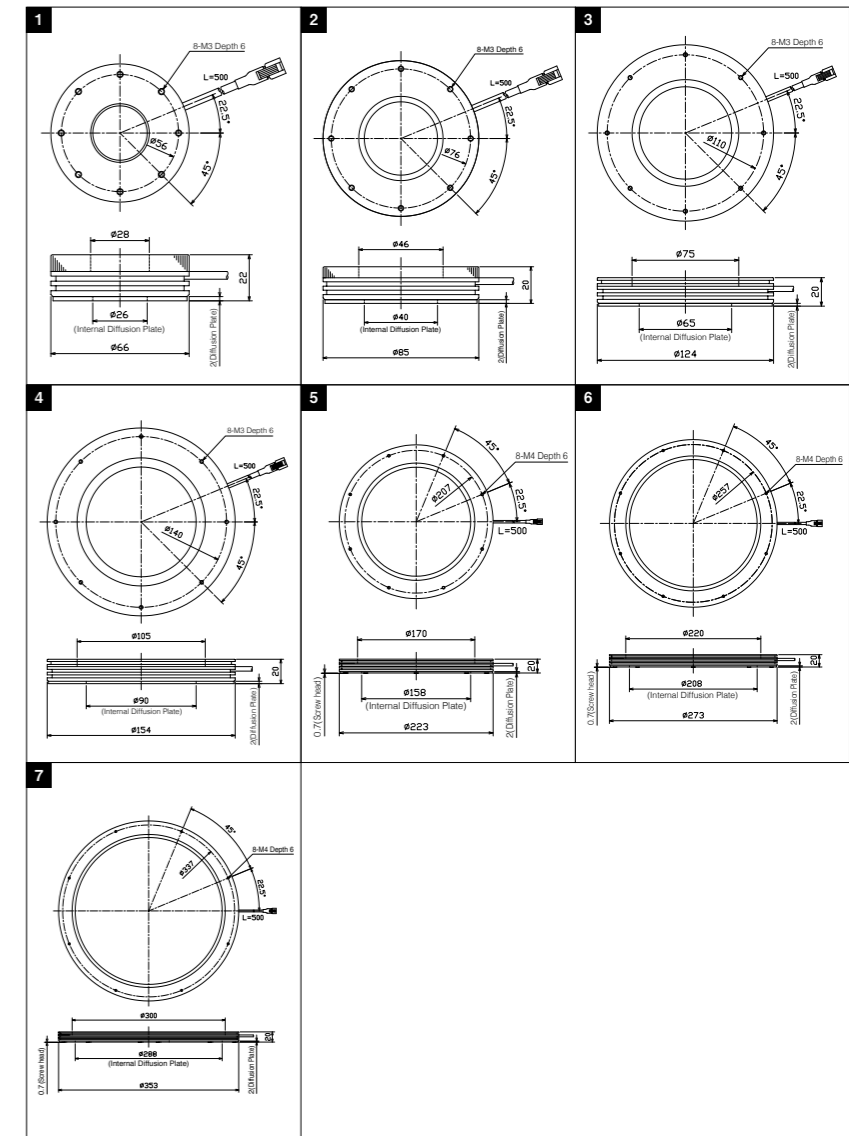
Model	Color	Power Consumption (W)	SAG*	Dimension
MMAR-55□	AR	4.5	D6	1
	W		C2	
	B		C5	
MMAR-80□	AR	8.5	CA	2
	W		AC	
	B		AE	
MMAR-110□	AR	12	CA	3
	W		AC	
	B		AE	
MMAR-130□	AR	14.5	B8	4
	W		A6	
	B		A9	
MMAR-200□	AR	24	AF	5
	W		AA	
	B		B2	

- AR= Red, W = White, B = Blue, in □ .
- Input voltage is DC12V, but we can also make DC24V products.
- * SAG is the maximum voltage setting for a SAG power supply. See details P.108.



Model	Color	Power Consumption (W)	Input Voltage (V)	SAG*	Dimension
MHRA-60□S	R	6.5	12	FF	1
	AW				
	B				
MHRA-80□S	R	9	12	FF	2
	AW				
	B				
MHRA-120□S	R	13.5	12	FF	3
	AW				
	B				
MHRA-150□S	R	18	12	FF	4
	AW				
	B				
MHRA-220□S	R	28.5	24	FF	5
	AW				
	B				
MHRA-270□HVS	R	34	24	-	6
	AW				
	B				
MHRA-350□HVS	R	44	24	-	7
	AW				
	B				

- R= Red, AW = White, B = Blue, in □ .
- Diffusion plate is removable. Can add a polarization plate (optional).
- MHRA-270 □ HVS and higher models are DC24V spec.
- * SAG is the maximum voltage setting for a SAG power supply. See details P.108.



MDR Series Ring Light

Direct Ring Light

General purpose ring LED applicable in a wide angle of uses



24 V DC Models Available

MDR-LA Series Ring Light

Low Angle Direct Light

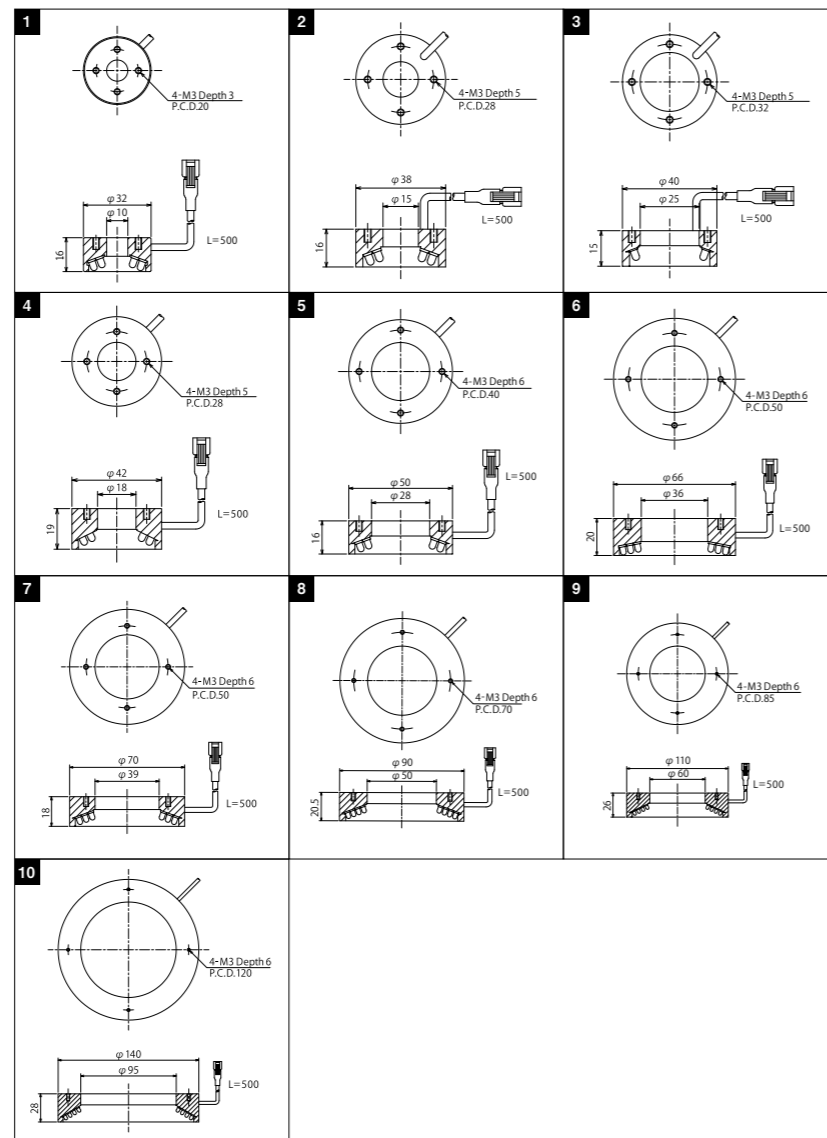
Great for detecting minute scratches and edges



24 V DC Models Available

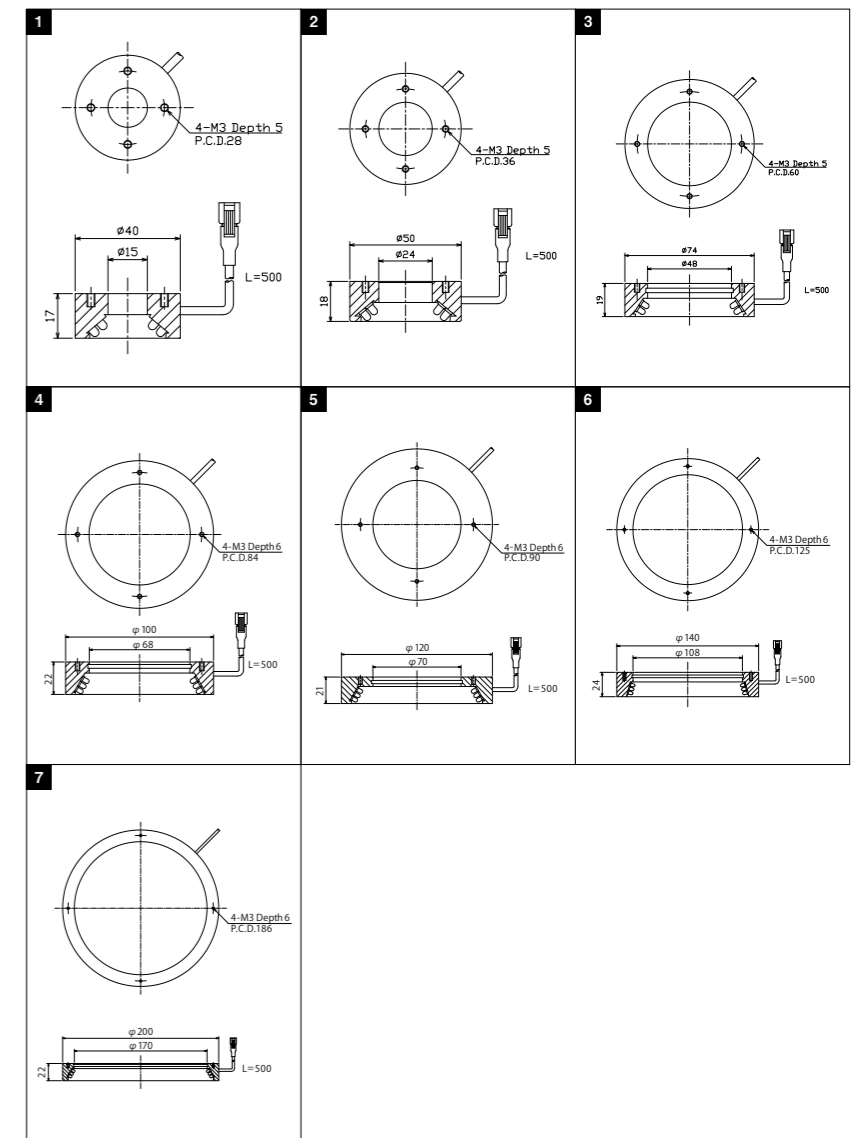
Model	Color	Power Consumption (W)	WD	SAG*	Dimension
MDR-32/10DR	DR	0.8	20-35	6E	1
MDR-32/10□	DW B G	1.1	20-35	FF	
MDR-38/15DR	R	1.8	20-35	6E	2
MDR-38/15□	DW B G	2.2	20-35	FF	
MDR-40/25DR	DR	1	25-45	6E	3
MDR-40/25□	DW B G	1.5	25-45	FF	
MDR-42/18DR	DR	1.7	25-45	6E	4
MDR-42/18□	DW B G	2.6	25-45	FF	
MDR-50/28DR	DR	3.3	30-50	6E	5
MDR-50/28□	DW B G	3.3	30-50	FF	
MDR-66/36DR	DR	4.6	40-70	70	6
MDR-66/36□	DW B G	5.4	40-70	FF	
MDR-70/39DR	DR	4.8	20-60	71	7
MDR-70/39□	DW B G	5.8	20-60	FF	
MDR-90/50DR	DR	7.3	40-90	73	8
MDR-90/50□	DW B G	6.2	40-90	FF	
MDR-110/60DR	DR	10.1	35-90	75	9
MDR-110/60□	DW B G	9.6	35-90	FF	
MDR-140/95DR	DR	14.4	50-110	78	10
MDR-140/95□	DW B G	10.8	50-110	FF	

- DR = Red, DW = White, B = Blue, G = Green, in □.
 - Can attach a diffusion plate and polarization plate (optional).
 - Input voltage is DC12V, but we can also make DC24V products.
 - We can also make other sizes.
 - DC24V models have HV at end of the model number.
- * SAG is the maximum voltage setting for a SAG power supply. See details P.108.



Model	Color	Power Consumption(W)	WD	SAG*	Dimension
MDR-LA40/15DR-2	DR	2.1	5-10	6E	1
MDR-LA40/15□-2	DW B G	2.2	5-10	FF	
MDR-LA50/24DR-2-C01	DR	2.7	10-20	6E	2
MDR-LA50/24□-2-C01	DW B G	2.9	10-20	FF	
MDR-LA74/48DR	DR	5.4	15-30	70	3
MDR-LA74/48□	DW B G	5.4	15-30	FF	
MDR-LA100/68DR-3	DR	7	20-40	72	4
MDR-LA100/68□-3	DW B G	5.4	20-40	FF	
MDR-LA120/70DR-3	DR	10.5	20-40	74	5
MDR-LA120/70□-3	DW B G	6.9	20-40	FF	
MDR-LA140/108DR-3	DR	11.9	15-40	75	6
MDR-LA140/108□-3	DW B G	8	15-40	FF	
MDR-LA200/170DR-3	DR	18.4	40-45	79	7
MDR-LA200/170□-3	DW B G	18.9	40-45	FF	

- DR = Red, DW = White, B = Blue, G = Green, in □.
 - Can attach a diffusion plate and polarization plate (optional). * Excludes LA40/15.
 - Input voltage is DC12V, but we can also make DC24V products.
 - We can also make other sizes.
 - DC24V models have HV at end of the model number.
- * SAG is the maximum voltage setting for a SAG power supply. See details P.108.



MDHM Series Transparent lighting

Very bright chip LED surface-emitting lighting

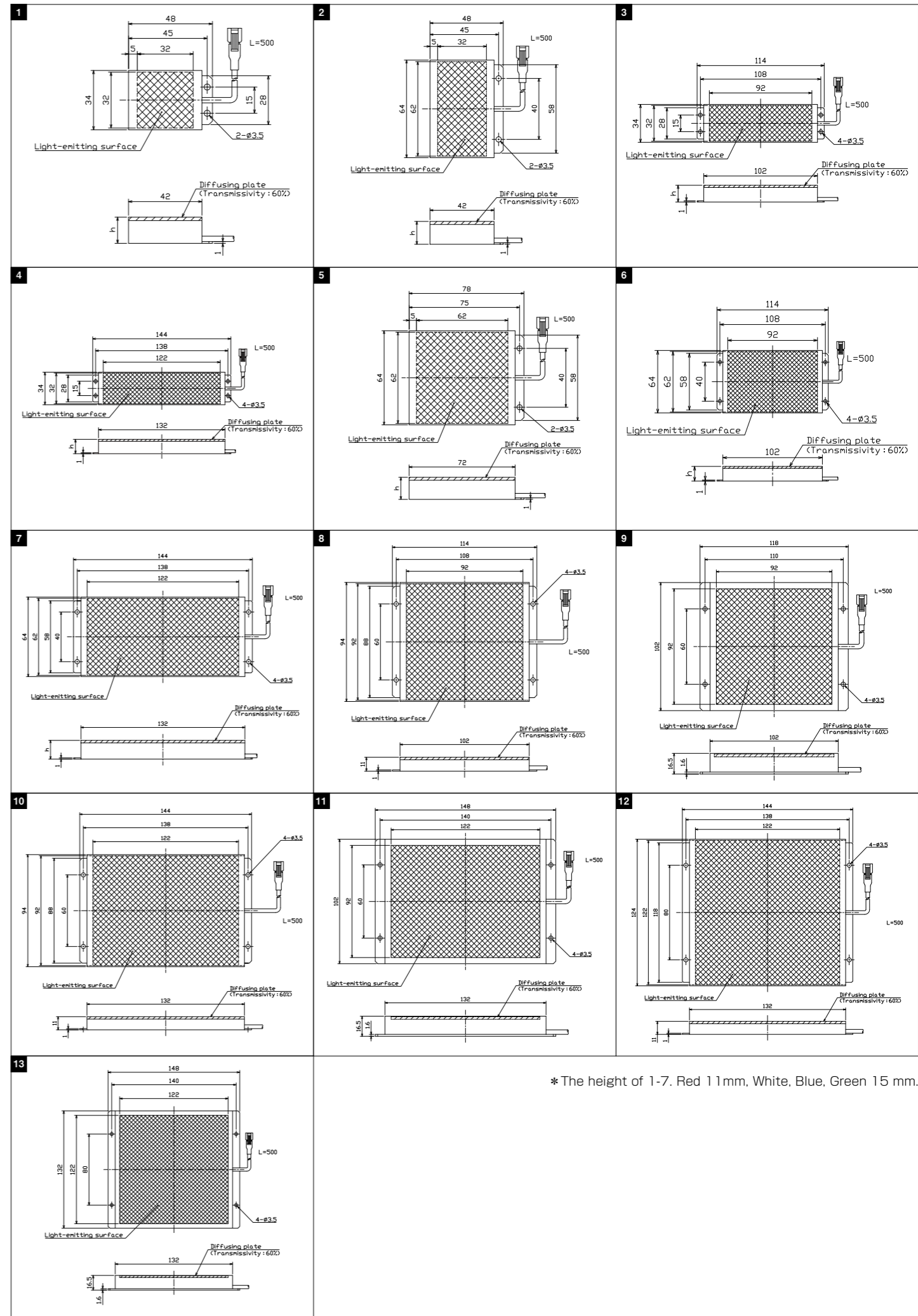
Very bright & uniform thin flat surface-emitting lighting.
We can make these in sizes that are multiples of 30mm square.



24 V DC Models Available

Model	Color	Power Consumption (W)	SAG*	Dimension	Model	Color	Power Consumption (W)	SAG*	Dimension
MDHM-32/32HRT	R	1.5	74	1	MDHM-62/92HRT	R	8.7	76	6
MDHM-32/32DWT	DW	1.8	FF		MDHM-62/92DWT	DW	10.8	FF	
MDHM-32/32□T	B G	1.8	DC		MDHM-62/92□T	B G	10.8	E8	
MDHM-32/62HRT	R	2.9	75	2	MDHM-62/122HRT	R	11.6	77	7
MDHM-32/62DWT	DW	3.6	FF		MDHM-62/122DWT	DW	14.4	FF	
MDHM-32/62□T	B G	3.6	DD		MDHM-62/122□T	B G	14.4	E0	
MDHM-32/92HRT	R	4.4	75	3	MDHM-92/92HRT	R	13	78	8
MDHM-32/92DWT	DW	5.4	FF		MDHM-92/92DWT	DW	16.2	FF	
MDHM-32/92□T	B G	5.4	E0		MDHM-92/92□T	B G	16.2	E6	
MDHM-32/122HRT	R	5.8	76	4	MDHM-92/122HRT	R	17.3	79	10
MDHM-32/122DWT	DW	7.2	FF		MDHM-92/122DWT	DW	21.6	FF	
MDHM-32/122□T	B G	7.2	DF		MDHM-92/122□T	B G	21.6	ED	
MDHM-62/62HRT	R	5.8	76	5	MDHM-122/122HRT	R	23.1	7B	12
MDHM-62/62DWT	DW	7.2	FF		MDHM-122/122DWT	DW	28.8	FF	
MDHM-62/62□T	B G	7.2	E3		MDHM-122/122□T	B G	28.8	F3	

- B = Blue, G= Green, in □.
- Input voltage is DC12V, but we can also make DC24V products.
- DC24V models have HV at end of the model number.
- * SAG is the maximum voltage setting for a SAG power supply. See details P.10B.

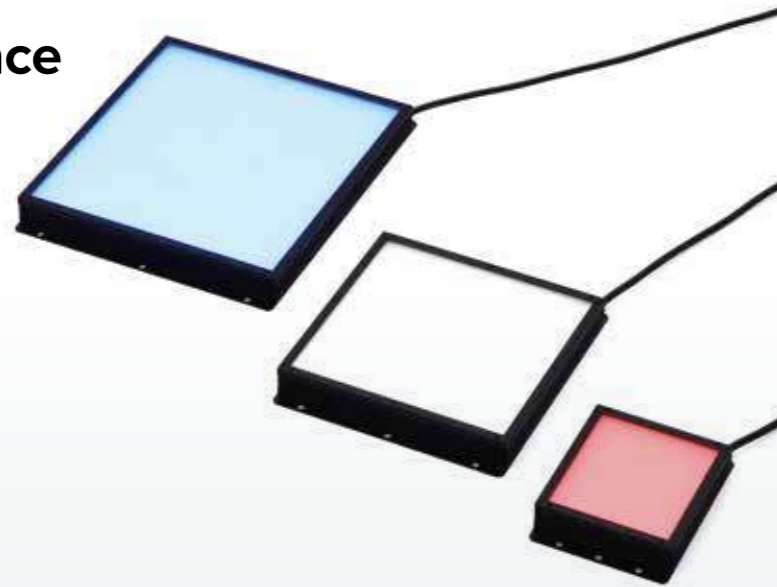


* The height of 1-7. Red 11 mm, White, Blue, Green 15 mm.

MHM Series Transparent lighting

Very bright chip LED surface illumination lighting

High output, light weight chip type transparent lighting
 IR:850nm is also in our product line.



24 V DC Models Available

MFV-C Series Coaxial Light

Pseudo coaxial epi-illumination

Achieves coaxial incident on a lens that is not telecentric.
 Uniformly gets a positive reflection in a wide field of view.

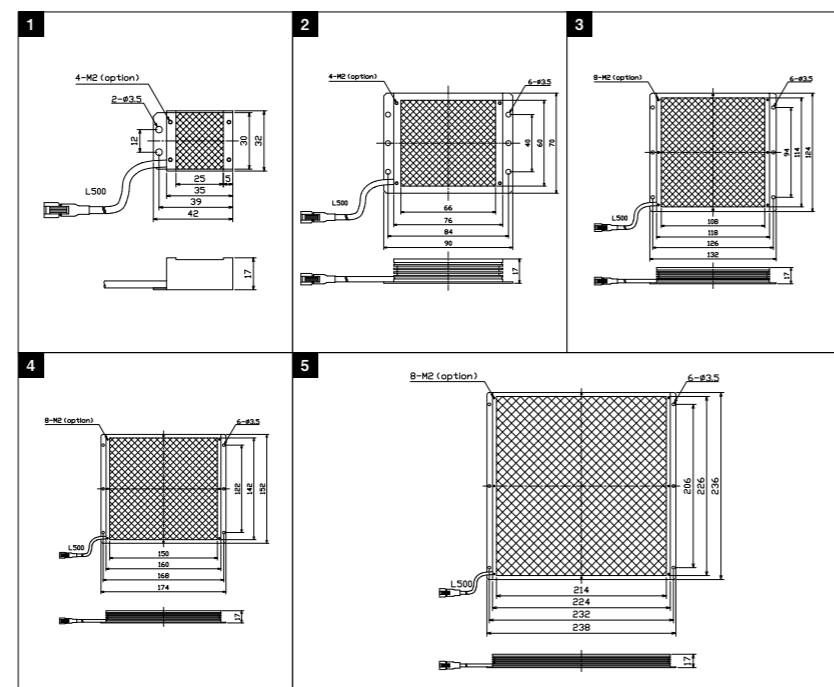
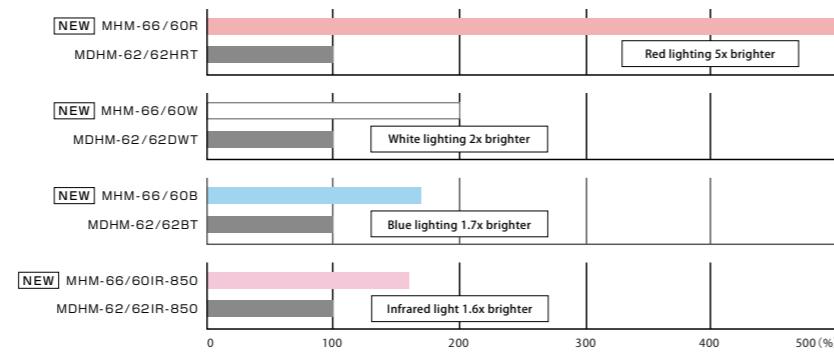


24 V DC Models Available

Model	Color	Power Consumption(W)	Input Voltage (V)	SAG*	Dimension
MHM-25/30□	R	2	12	9A	1
	AW			F9	
	B			98	
	IR (850)			E3	
MHM-66/60□	R	7.5	12	F5	2
	AW			FF	
	B			B3	
	IR (850)			FF	
MHM-108/114□	R	14.7	12	FF	3
	AW			FF	
	B				
	IR (850)				
MHM-150/142□	R	24	12	FF	4
	AW			CF	
	B			D0	
	IR (850)			E5	
MHM-214/226□HV	R	47	24	-	5
	AW				
	B				
	IR (850)				

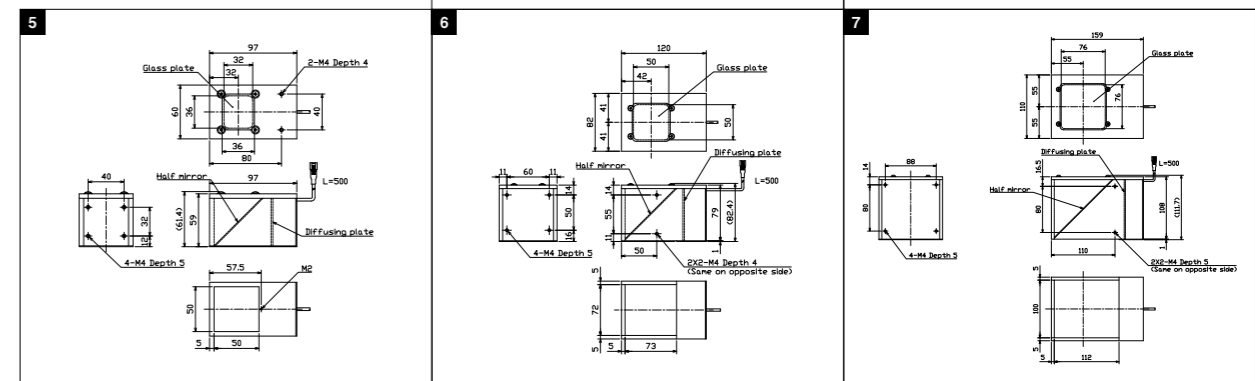
- R = Red, AW = White, B = Blue, IR (850) = Infrared, in □.
- Can attach a polarization plate and light control (optional).
- The AW series has a color temperature about 500K lower than conventional W. But this can vary by type and size.
- MHM-214/226 □ HV is DC24V.
- SAG is the maximum voltage setting for a SAG power supply. See details P.108.

Drastically Increased Brightness



Model	Color	Power Consumption (W)	SAG*	Dimension	
MFV-C13DR-HM	DR	0.3	6D	1	
MFV-C13□-HM	DW B G	0.6	FF		
MFV-C20DR	DR	1.2	6D		2
MFV-C20□	DW B G	1.7	FF		
MFV-C32DR	DR	2.4	6F		3
MFV-C32□	DW B G	2.6	FF		
MFV-C40DR	DR	3.6	6F		4
MFV-C40□	DW B G	3.1	FF		
MFV-C50DR	DR	6.0	71	5	
MFV-C50□	DW B G	4.9	FF		
MFV-C70DR	DR	10.2	72	6	
MFV-C70□	DW B G	10.1	FF		
MFV-C100DR	DR	19.2	77	7	
MFV-C100□	DW B G	19.5	FF		

- DW = White, B = Blue, G = Green, in □.
- Input voltage is DC12V, but we can also make DC24V products.
- We can also make other sizes.
- SAG is the maximum voltage setting for a SAG power supply. See details P.108.



MDBA-LE Series Bar Light

High Power Bar Light

Achieves illumination in wide field of vision at long distances.

7 colors: white, red, blue, green, yellow, infrared, ultraviolet, in product line



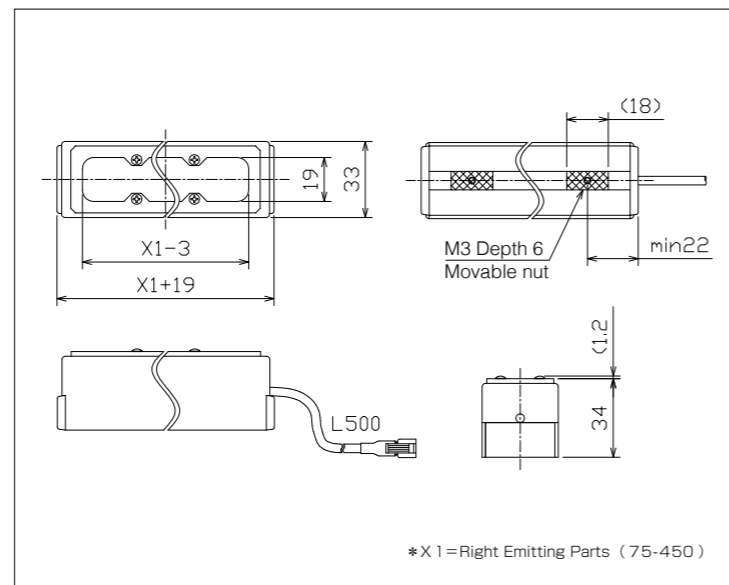
- Power LED
- reasonable price

Model	Color					Power Consumption (W)	Input Voltage(V)
MDBA-LE75□-■	R	W	B	IR	UV	4.5	12
MDBA-LE150□-■	R	W	B	IR	UV	9.0	
MDBA-LE225□-■	R	W	B	IR	UV	13.5	
MDBA-LE300□-■	R	W	B	IR	UV	18.0	
MDBA-LE375□-■	R	W	B	IR	UV	22.5	
MDBA-LE450□-■	R	W	B	IR	UV	27.0	24
MDBA-LE600□-■HV	R	W	B	IR	UV	36.0	
MDBA-LE750□-■HV	R	W	B	IR	UV	45.0	
MDBA-LE900□-■HV	R	W	B	IR	UV	54.0	
MDBA-LE1050□-■HV	R	W	B	IR	UV	63.0	
MDBA-LE1200□-■HV	R	W	B	IR	UV	72.0	

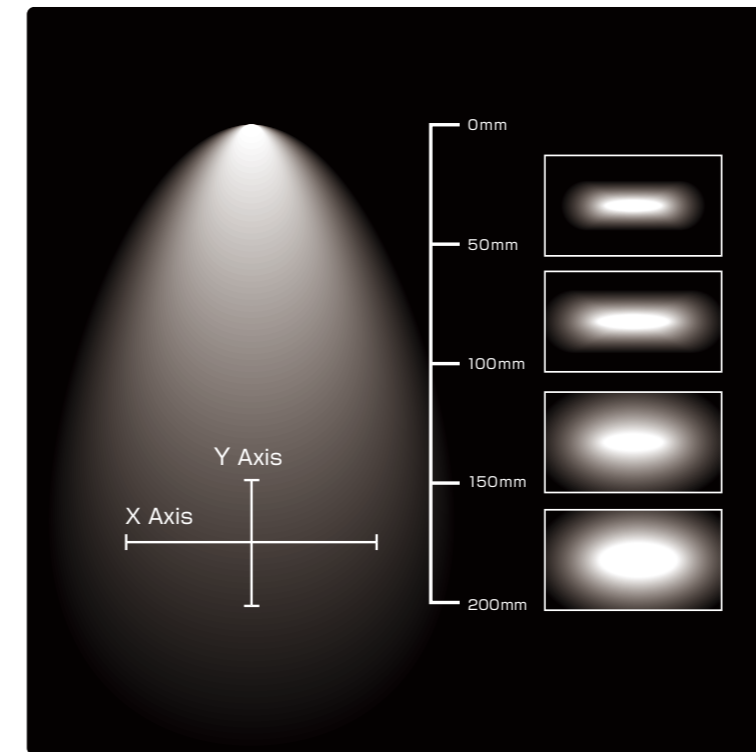
- S = wide angle light distribution type, L = narrow-angle light distribution type, in □ of the model number.
- Color is in ■ of model number (R = Red, W = White, B = Blue, G = Green, Y = Yellow, IR-850 = Infrared, UV-400 = Ultraviolet).
- The standard diffusion plate included is 90%. 80% or 60% can be attached as options.
- Can also attach a polarization plate.
- * SAG is the maximum voltage setting for a SAG power supply. See details P.10B.

SAG Settings Values

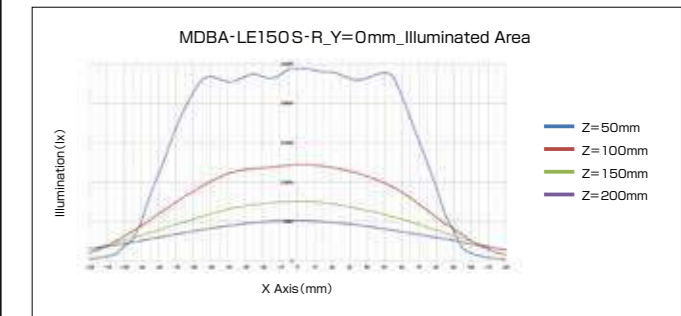
Model	R	W	B	IR	UV
MDBA-LE75□-■	C7	8B	90	CB	7F
MDBA-LE150□-■	C9	8D	92	CD	80
MDBA-LE225□-■	CA	8E	94	CE	82
MDBA-LE300□-■	CC	90	95	D0	83
MDBA-LE375□-■	CD	91	97	D1	85
MDBA-LE450□-■	CF	93	98	D3	87



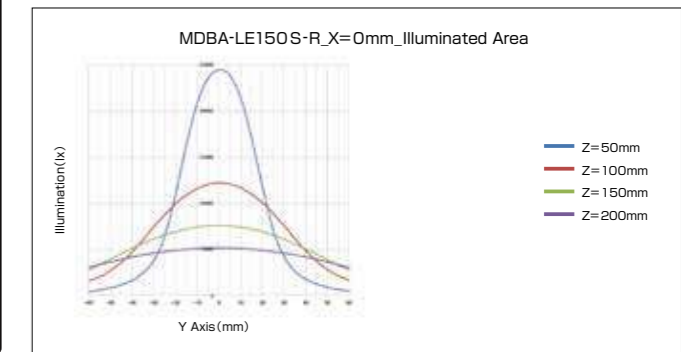
S type wide distribution model - illuminates a wide area at close distances (Reference Values)



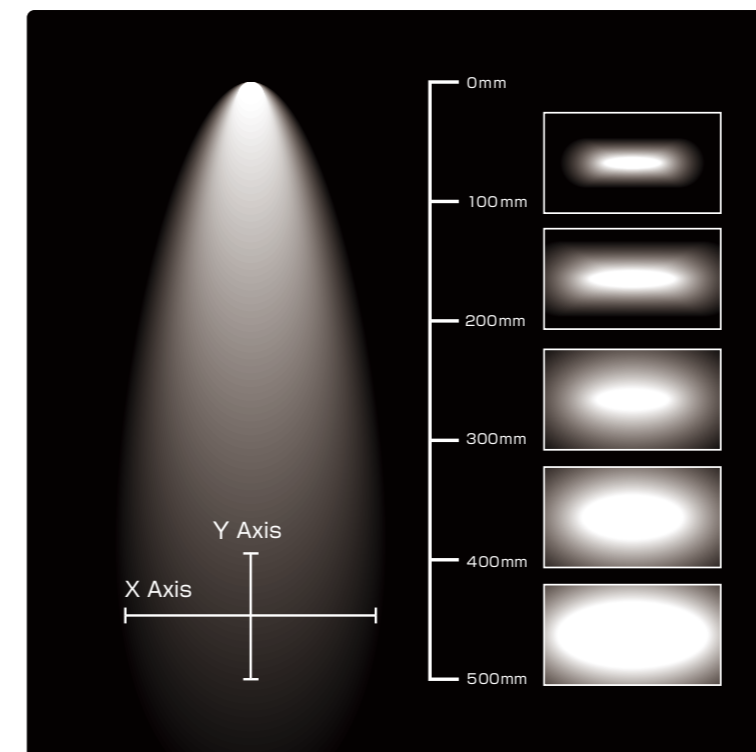
X Axis Graph



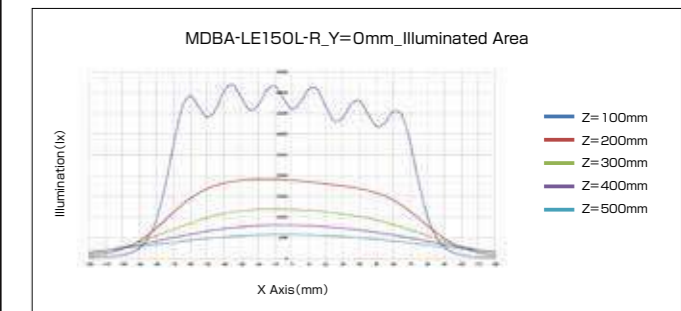
Y Axis Graph



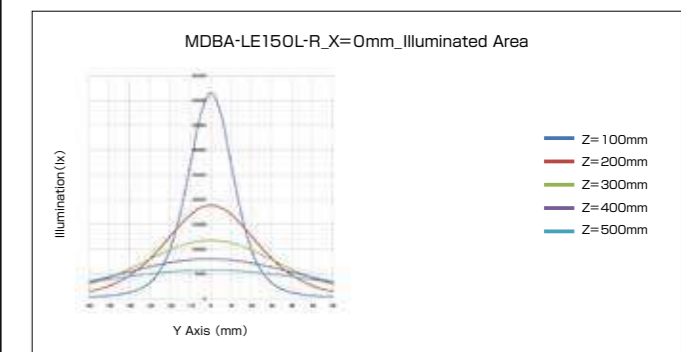
L type narrow distribution model - provides bright illumination at long distances (Reference Values)



X Axis Graph



Y Axis Graph



MDBA-C Series Bar Light

Bar Light

Wide range of uses, as oblique lighting and backlight for various work



24 V DC Models Available

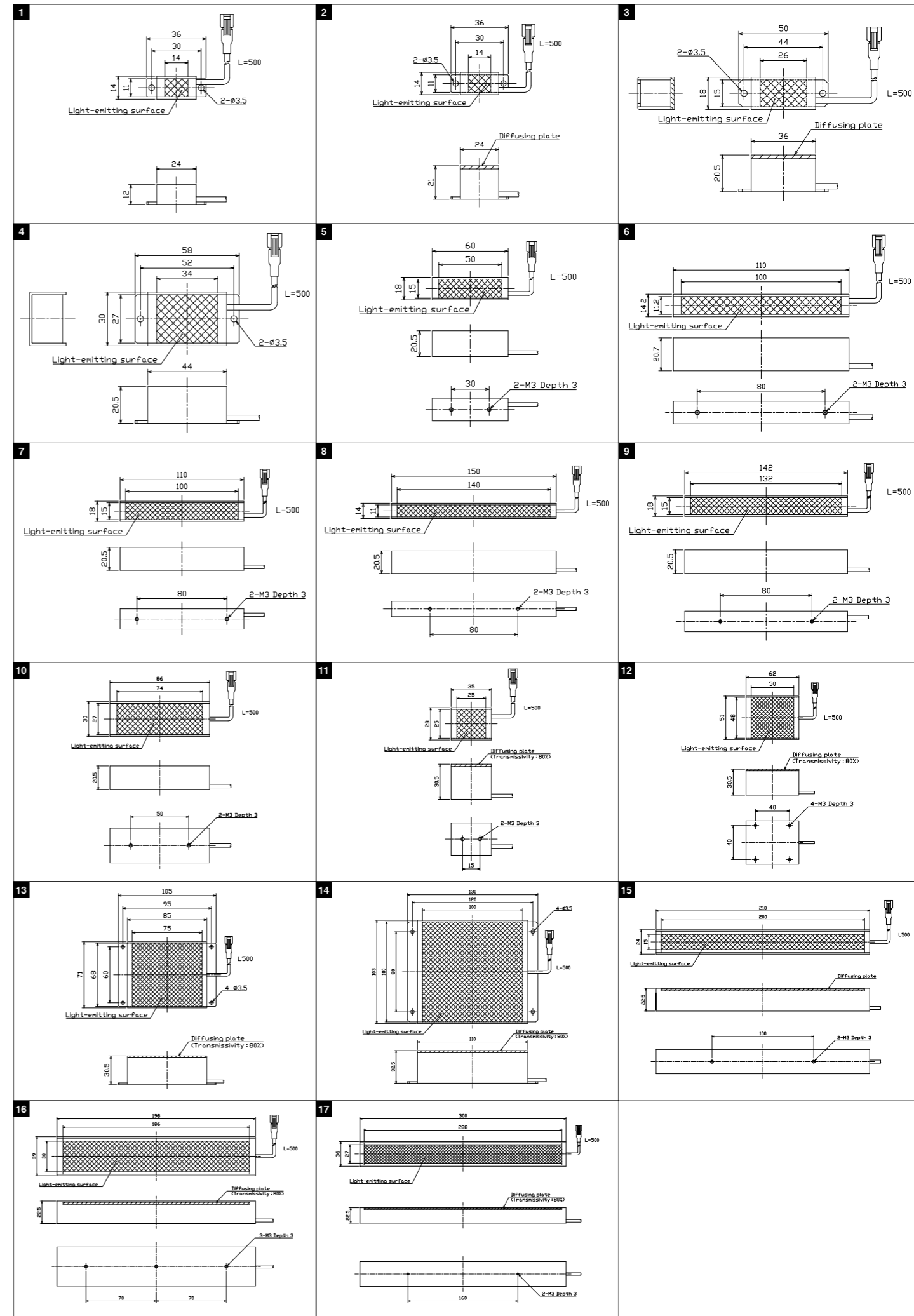
Model	Color	Power Consumption (W)	SAG*	Dimension	Model	Color	Power Consumption (W)	SAG*	Dimension
MDBA-C11/14DR	DR	0.3	6D	1	MDBA-C72/24DR	DR	4.4	73	10
MDBA-C11/14□	DW B G	0.4	FF		MDBA-C72/24□	DW B G	4.4	FF	
MDBA-C11/14DRS-H21	DR	0.3	6D	2	MDBA-C25/25DRS	DR	1.5	6E	11
MDBA-C11/14□S-H21	DW B G	0.4	FF		MDBA-C25/25□S	DW B G	2.2	FF	
MDBA-C15/26DRS	DR	0.6	6D	3	MDBA-C50/50DRS	DR	5.8	71	12
MDBA-C15/26□S	DW B G	1.1	FF		MDBA-C50/50□S	DW B G	5.4	FF	
MDBA-C27/34DR	DR	2.4	6E	4	MDBA-C70/75DRS	DR	6.8	72	13
MDBA-C27/34□	DW B G	2.9	FF		MDBA-C70/75□S	DW B G	10.1	FF	
MDBA-C50/15DR	DR	1.8	6E	5	MDBA-C100/100DRS	DR	13.7	77	14
MDBA-C50/15□	DW B G	2.2	FF		MDBA-C100/100□S	DW B G	20.6	FF	
MDBA-C100/11DR	DR	2.4	6E	6	MDBA-C15/200DRS	DR	6.0	71	15
MDBA-C100/11□	DW B G	2.9	FF		MDBA-C15/200□S	DW B G	8.9	FF	
MDBA-C100/15DR	DR	4.2	6F	7	MDBA-C185/30DRS	DR	8.7	73	16
MDBA-C100/15□	DW B G	4.4	FF		MDBA-C185/30□S	DW B G	13.0	FF	
MDBA-C140/11DR	DR	2.9	6F	8	MDBA-C300/24DRS	DR	20.2	7A	17
MDBA-C140/11□	DW B G	4.4	FF		MDBA-C300/24□S	DW B G	25.6	DC	
MDBA-C132/15DR	DR	3.9	70	9					
MDBA-C132/15□	DW B G	5.8	FF						

• DW = White, B = Blue, G = Green in □.

• Input voltage is DC12V, but we can also make DC24V products.

• We can also make other sizes.

* SAG is the maximum voltage setting for a SAG power supply. See details P. 10B.



MDDA-KH Series Dome Light

High Power Dome Light

Illuminates objects with glossy surfaces or curved shapes, without irregularities

6 types in product line, from φ85 to φ353



Power LED

UV Series UV LED

Ultraviolet lighting

Long type and short type radiation distances in product line.

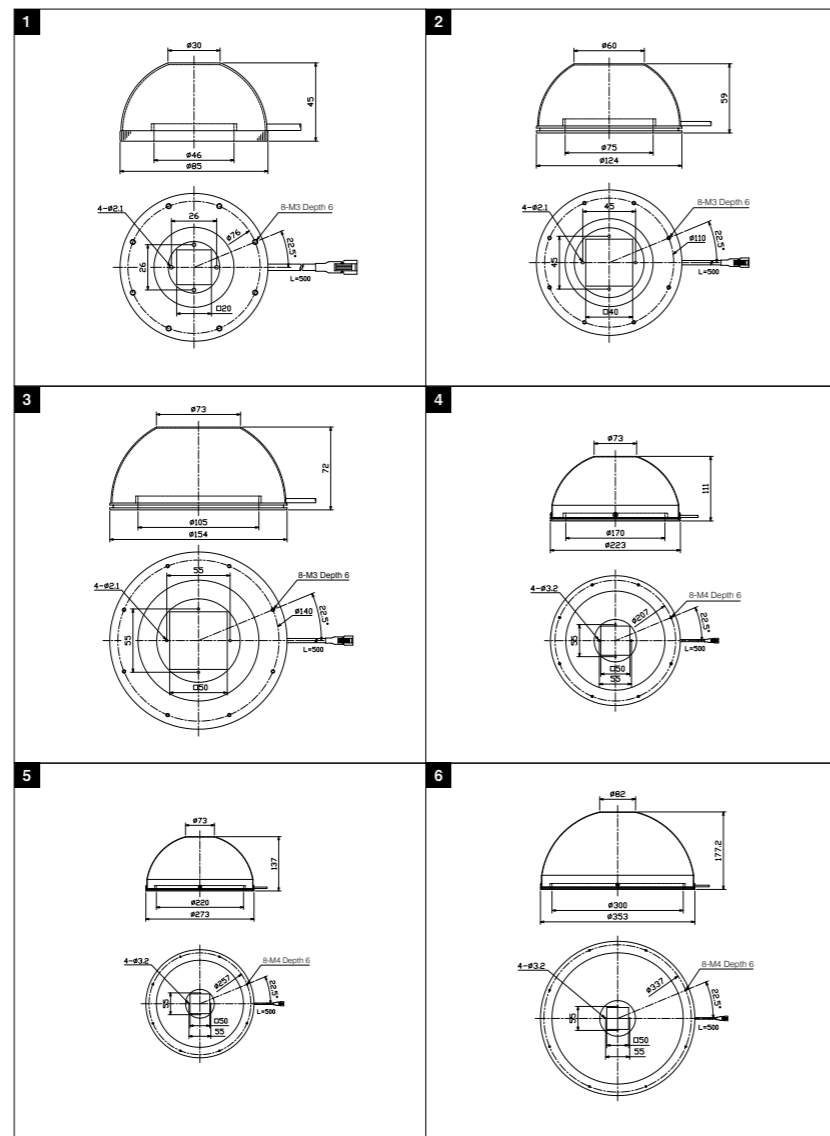
High output UV LED included



24 V DC Models Available

Model	Color	Power Consumption (W)	Input Voltage (V)	SAG*	Dimension
MDDA-KH80□	R	9	12	FF	1
	AW				
	W				
MDDA-KH120□	R	13.5	12	FF	2
	AW				
	W				
MDDA-KH150□	R	18	12	FF	3
	AW				
	W				
MDDA-KH220□	R	28.5	24	FF	4
	AW				
	B			BC	
MDDA-KH270□HV	R	34	24	-	5
	AW				
	W				
MDDA-KH350□HV	R	44	24	-	6
	AW				
	W				

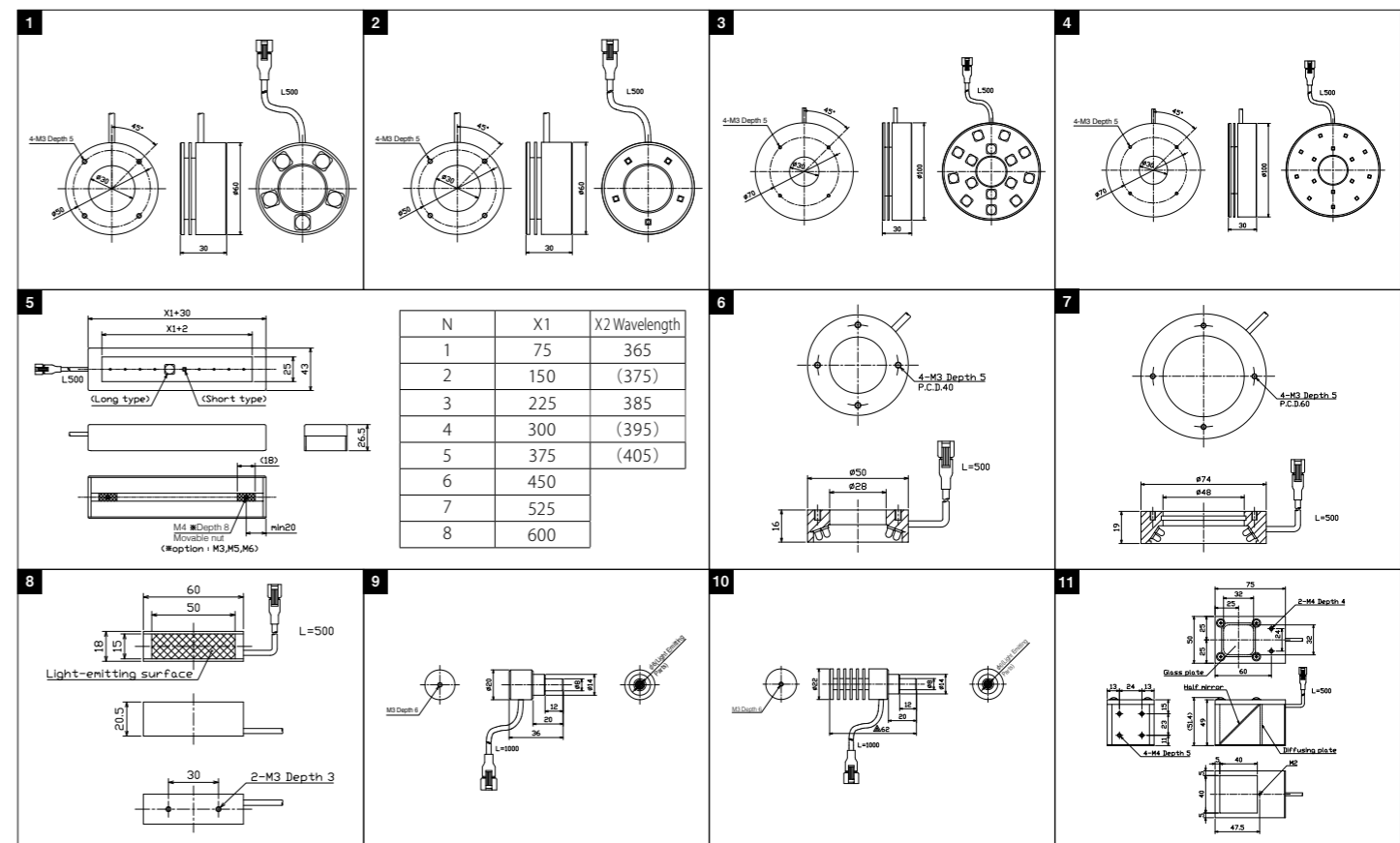
- R = Red, AW = White, W = White, B = Blue in □.
- MDDA-KH270 □ HV and higher models are DC24V.
- The AW series has a color temperature about 500K lower than conventional W. But this can vary by type and size.
- SAG is the maximum voltage setting for a SAG power supply. See details P.108.



Model	Color	Power Consumption (W)	Input Voltage (V)	Wavelength (mm)	Dimension
MDHR-60L-UV-(X2)	UV	8	24	365	1
MDHR-60S-UV-(X2)	UV			(375)	2
MDHR-100L-UV-(X2)	UV	15.4	24	385	3
MDHR-100S-UV-(X2)	UV			(395)	4
MDBA-CH(X1)L-UV-(X2)	UV	8 x N	24	(405)	5
MDBA-CH(X1)S-UV-(X2)	UV				

Model	Color	Power Consumption (W)	Input Voltage (V)	SAG*	Wavelength (mm)	Dimension
MDR-50/28UV-405	UV	3.6	12	A7	405	6
MDR-LA74/48UV-405	UV	7.2		A9	7	
MDBA-C50/15UV-405	UV	2.9	12	A7	405	8
MHV-20UV-400	UV	-		-	400	9
MHV-22UV-365	UV	-	12	-	365	10
MFV-C40UV-405	UV	4.1		A7	405	11

- Ask us about other shapes.
- Input voltage is DC12V, but we can also make DC24V products.
- SAG is the maximum voltage setting for a SAG power supply. See details P.108.



MDGB Series Digital power supply

Digital path dimmer power supply

Multi-function power supply with freely selectable interface



Total Diverse Line up of 63 Models

Model	Input Voltage (V)	Output voltage	Capacity (W)	Channels	Mass (g)	Dimension	
MDGB-30M2-*****	AC100-240V	DC12V	30	2CH	700	1	
MDGB-30M4-*****				4CH	1000	2	
MDGB-30M8-*****				8CH	1000	2	
MDGB-50M2-*****			50	2CH	1200	3	
MDGB-50M4-*****				4CH	1200	3	
MDGB-50M8-*****				8CH	1200	3	
MDGB-100M2-*****		100	DC24V	2CH	1300	4	
MDGB-100M4-*****				4CH			
MDGB-100M8-*****				8CH			
MDGB-30M2-24-*****		DC24V	30	2CH	700	1	
MDGB-30M4-24-*****					4CH	1000	2
MDGB-30M8-24-*****					8CH	1000	2
MDGB-50M2-24-*****				50	2CH	1200	3
MDGB-50M4-24-*****					4CH	1200	3
MDGB-50M8-24-*****					8CH	1200	3
MDGB-100M2-24-*****			100	2CH	1300	4	
MDGB-100M4-24-*****	4CH						
MDGB-100M8-24-*****	8CH						
MDGB-50M2-24-*****-T	DC24V		46	2CH	700	5	
MDGB-150M4-24-*****-T		144			4CH	1000	6
MDGB-150M8-24-*****-T					8CH		

Common Specifications

Dimmer method	Approx. 125kHz PWM control
External control	External ON/OFF, external dimmer
Protective function	Overcurrent protection, fan abnormal

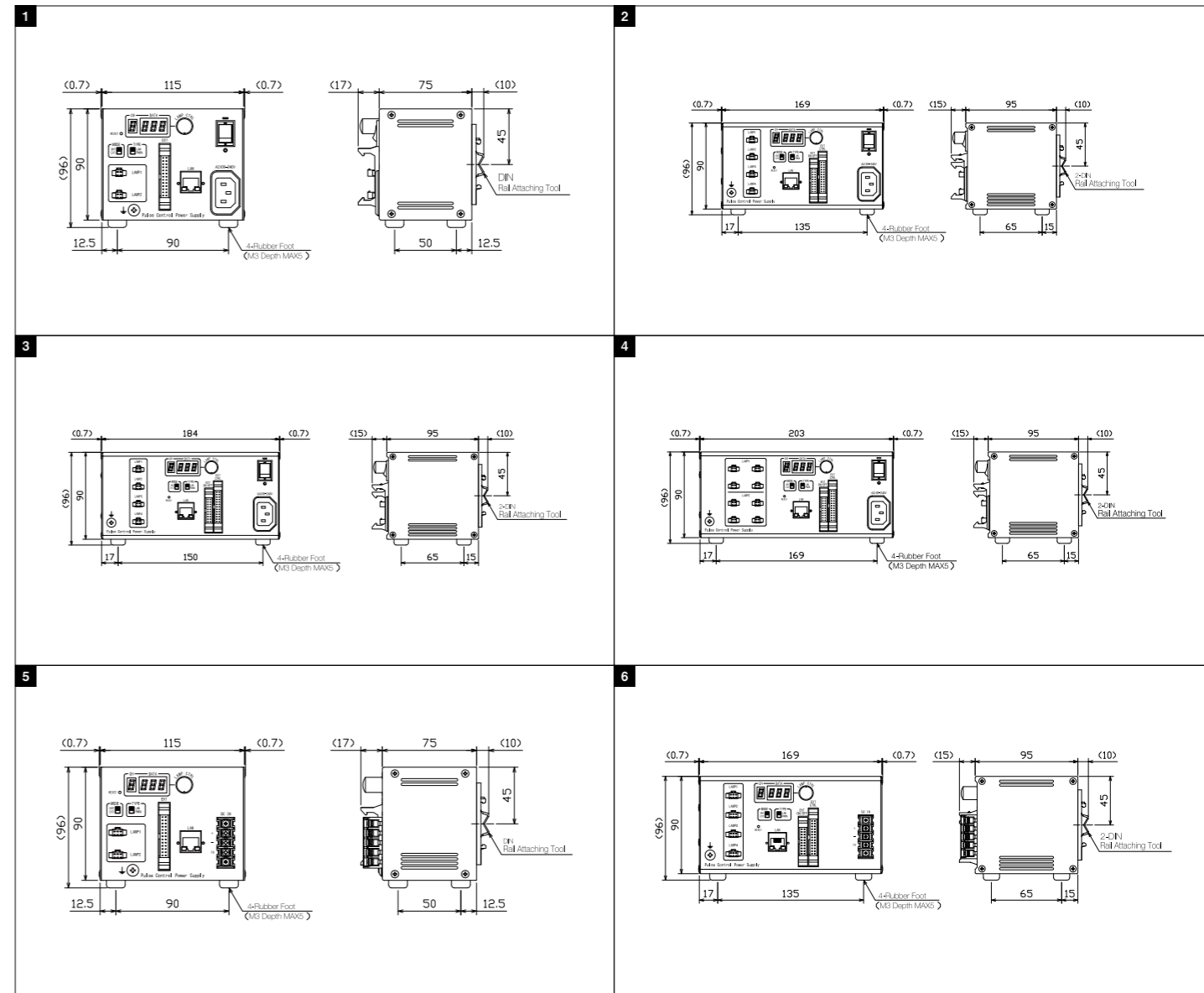
Communication Specifications (LAN)

Communication protocol	TCP/IP
Compliance	IEEE802.3(10BASE-T)、IEEE802.3u(100BASE-TX)
Transmission speed	10Mbps(10BASE-T)、100Mbps(100BASE-TX)
Connection ports	4 ports
Functions	Auto MDI/MDIX、Auto Negotiation

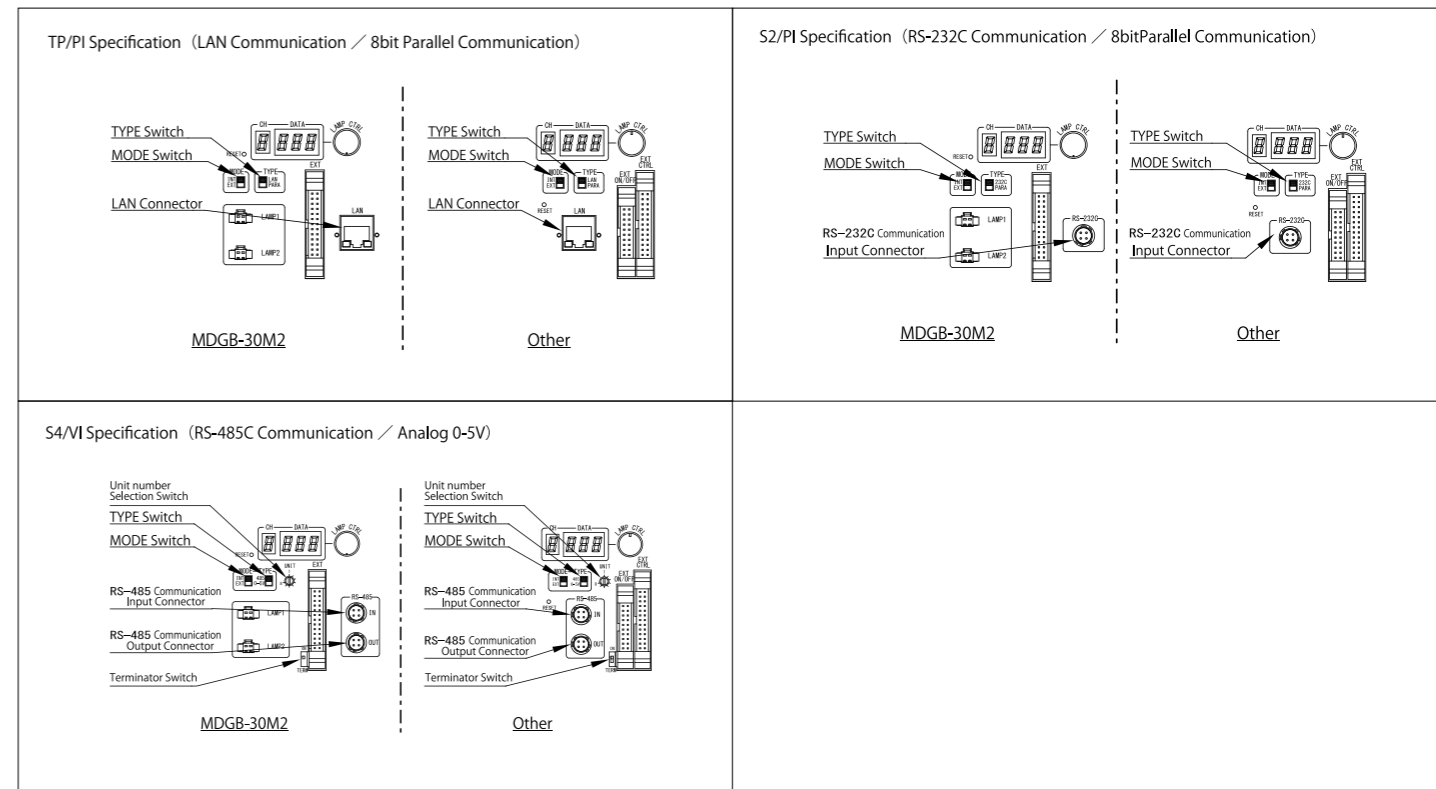
Communication Specifications (RS-232C/RS-485)

Communication protocols	RS-232C/RS-485
Baud rate	19200bps
Data	8bit
Parity bit	Even parity
Stop bit	1bit

- ***** in model number is for the external control type code.
- TP/PI: LAN communication / 8 bit parallel communication switch type
- S2/PI: RS-232C communication / 8 bit parallel communication switch type
- S4/VI: RS-485 communication / Analog 0-5V switch type
- Depending on number of channels, dimensions and number of lighting connectors will vary.
- DC24V output specification has different dimensions and connector shape.
- For the external control cable, refer to P.113.

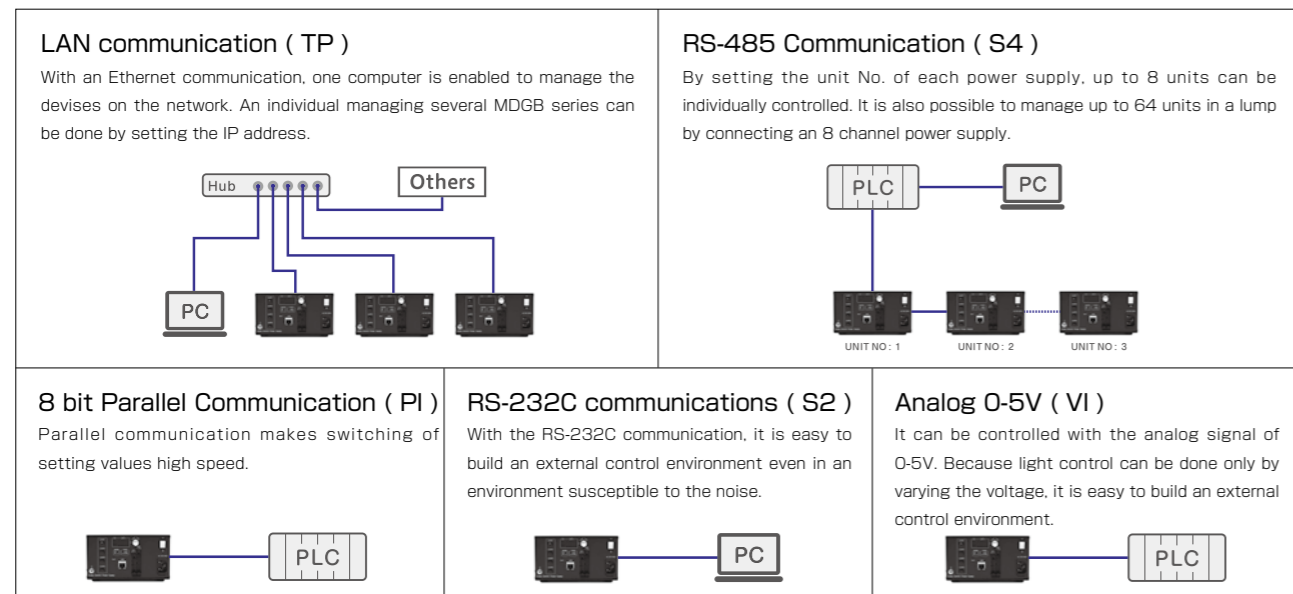


The layout of control part on the front panel



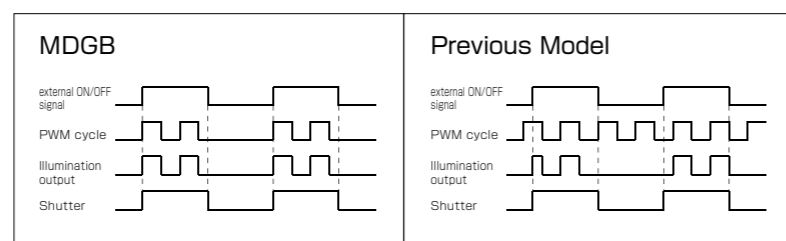
Fully External control Facility

Some type of external controls are available for your network environment the lineup of LAN communication / 8 bit parallel communication * switch, * RS-232C communication / 8 bit parallel communication * switch, and * RS-485 communication / Analog 0-5 V * switch.



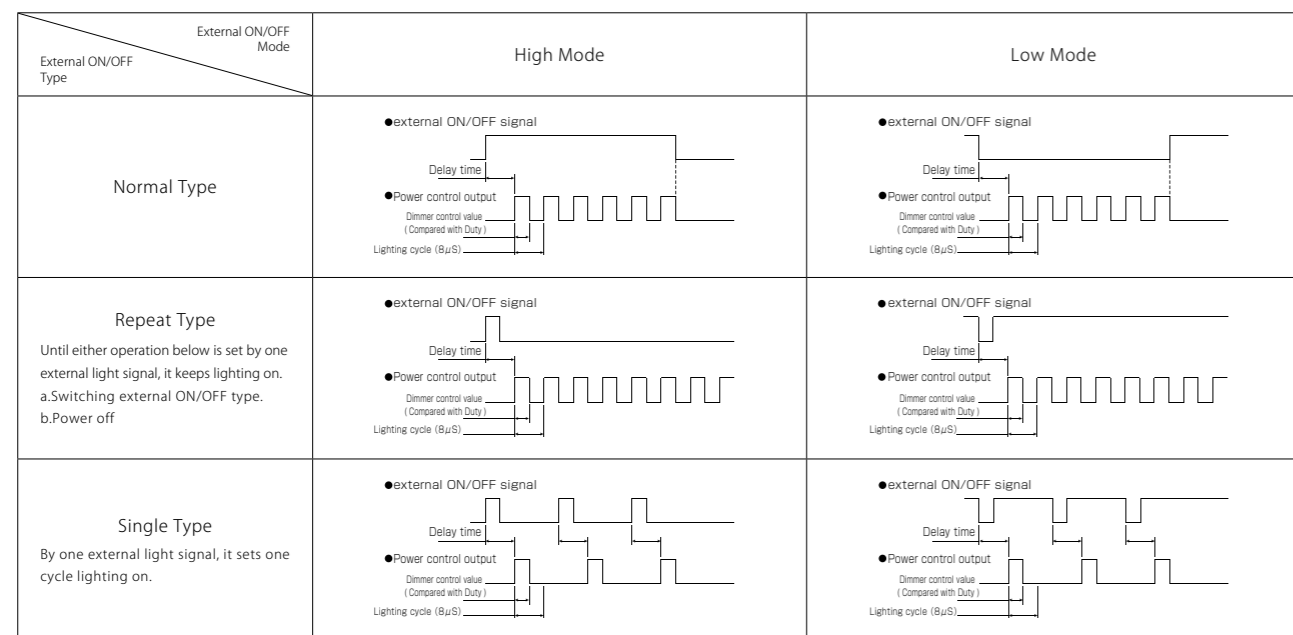
Fully synchronizes the lighting output and external ON/OFF signal

The conventional products had a lighting function due to an asynchronism in the external ON/OFF signal and inner PWM cycle. However, the PWM cycle of these products synchronizes with the external ON/OFF signal so it has no lighting fluctuation.



Various External ON/OFF Functions

Regarding the external ON/OFF mode, the "High Mode" which the lighting turns off with the signal and the "Low Mode" which the lighting turns on with one trigger, and "Single type" which turns the light on for one cycle with one trigger.



MLC Series Constant-current power supply

Small constant current controller

Constant-current power supply with external 0 to 5V control function. Can be connected to MHV, MHVB, MHVC and MBF series.

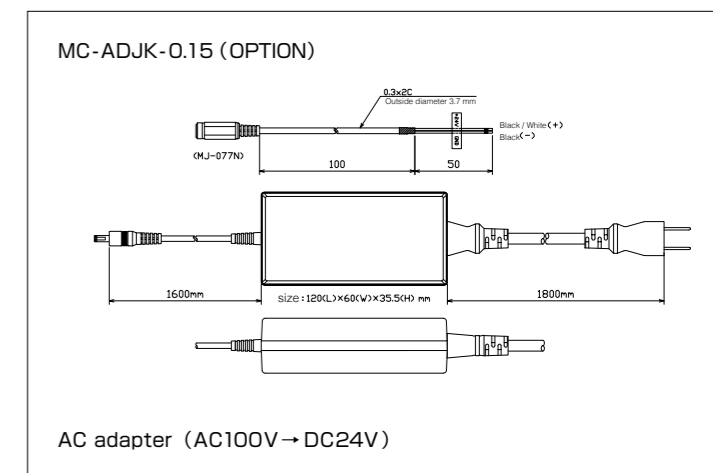
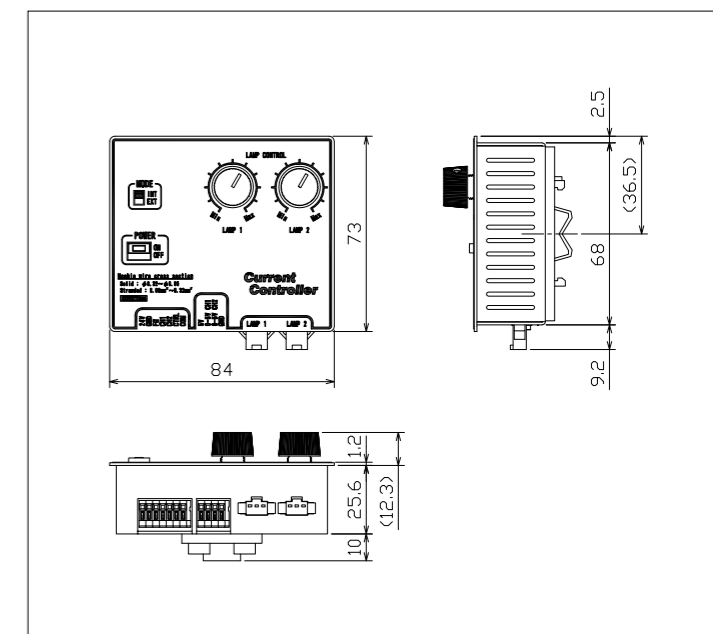
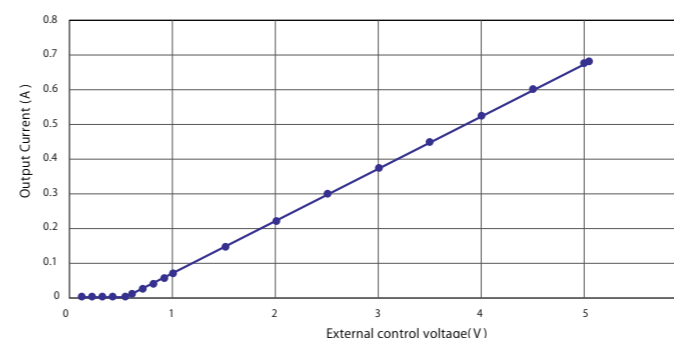


Model	MLC-700M2-VI	MLC-350M2-VI
Input Voltage (V)	DC24V±10%	
Input current	0.3A	0.15A
Operating frequency	-	
Rated output	700mA/CH	350mA/CH
Channels	2CH	
Dimming method	Method to vary output current	
External control	0-5V input, external On/Off	
Can be connected to lighting	MHVB · MHVC · MBF · LX (except for UV)	MHV · MBF (UV-400)

* Available for MHA-IL (option).refer to P.106.



External 0 to 5 V light control output linearity



MLP Series

Digital power supply

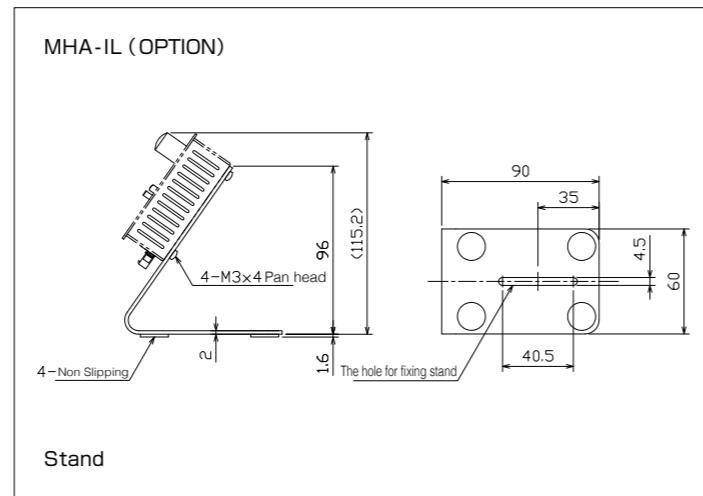
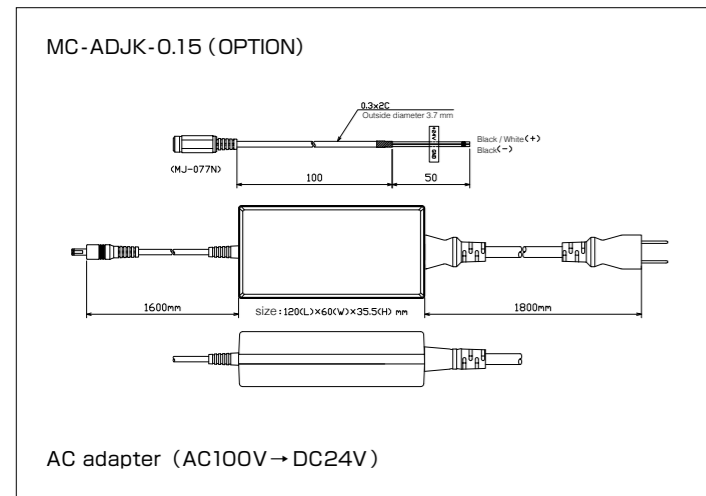
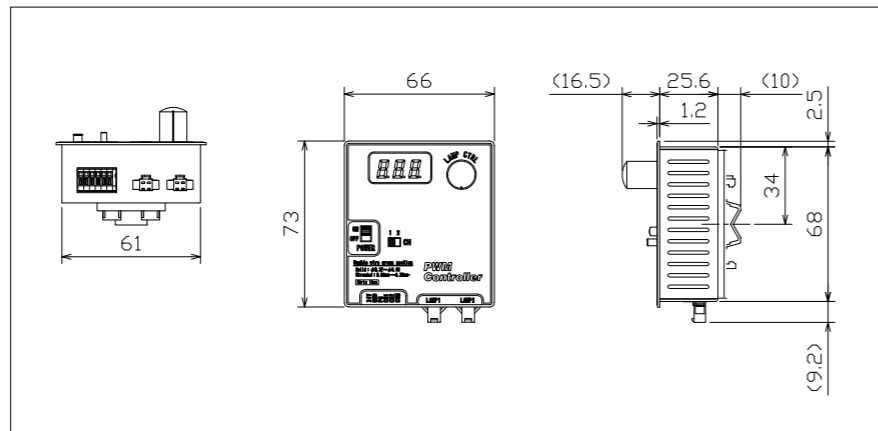
1000 gradations digital controller

Small, low price digital power supply

reasonable price

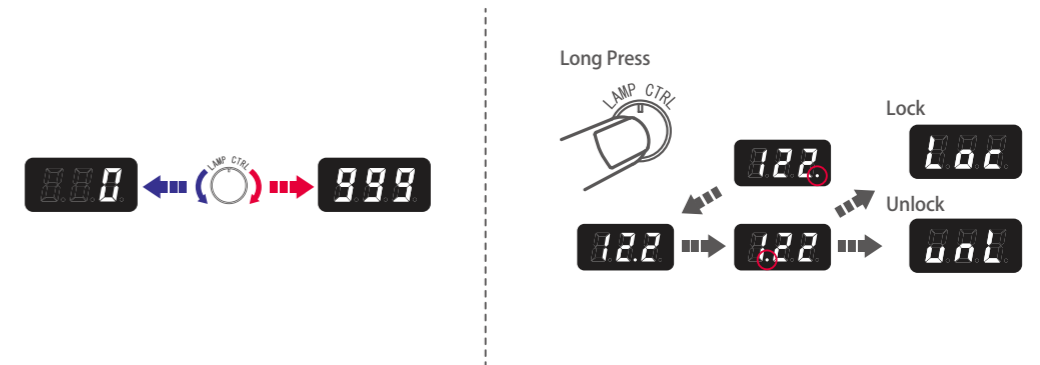


Model	MLP-30M2	MLP-60M2-24
Input Voltage (V)	DC24V±10%	
Input current	1.5A (Max)	3.0A (Max)
Output voltage	DC12V	DC24V
Channels	2CH	
Capacity	30W (2 channels total)	60W (2 channels total)
Dimming method	Approximate 80kHz PWM control (1000 gradations)	
Response speed	OFF→ON: Within 70 μS, ON→OFF: Within 20 μS	

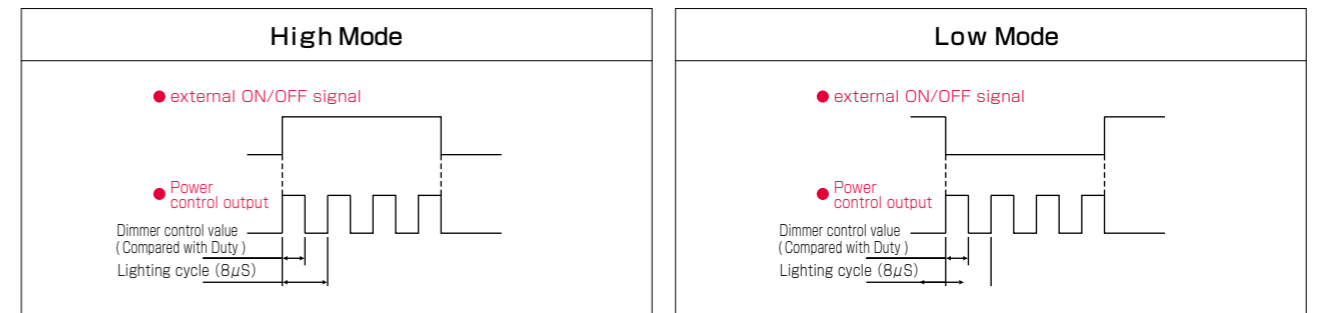
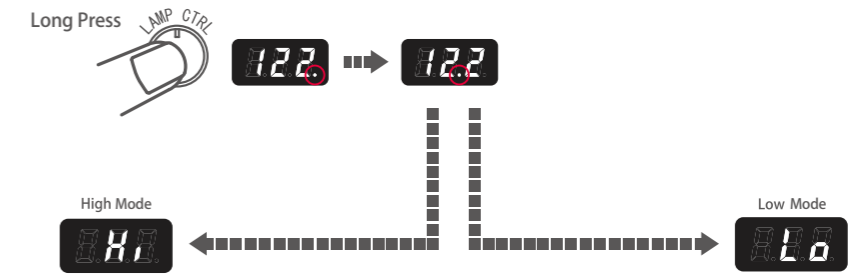


Easy to check the set value with the good visibility display.

1000 level digital controller with good visibility display. Since the variable speed of the light control is changed according to the speed of rotating the dimmer switch, the dimming value will be quickly set. Further, by pressing and holding the dimmer switch, you can lock each channel.

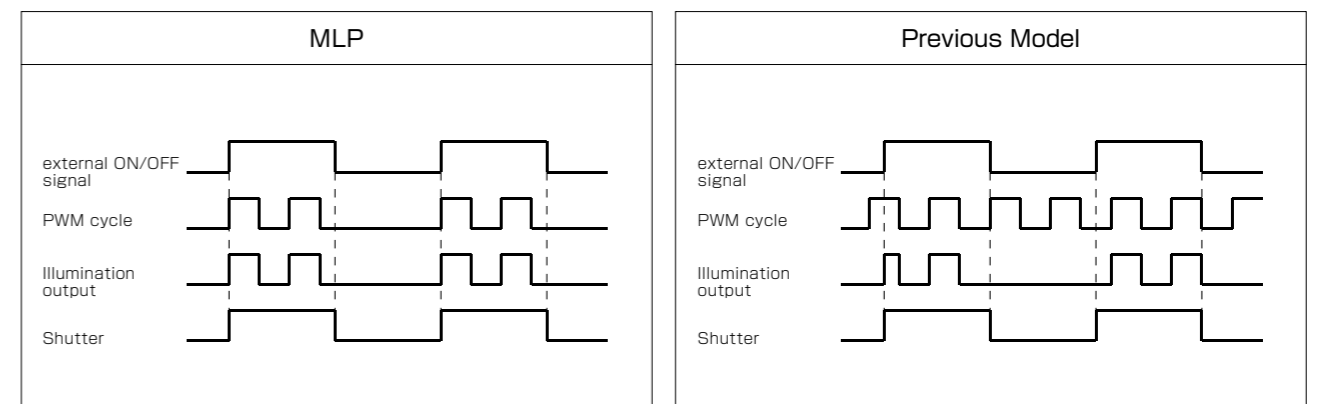


The external ON/OFF signal and inverting function of lighting output



Fully synchronizes the lighting output and external ON/OFF signal

The conventional products had a lighting function due to an asynchronism in the external ON/OFF signal and inner PWM cycle. However, the PWM cycle of these products synchronizes with the external ON/OFF signal so it has no lighting fluctuation.



MJS Series

Strobe power supply

Small multi-channel strobe power supply for LAN

30W capacity, 2 to 6 channels, enables strobe light.

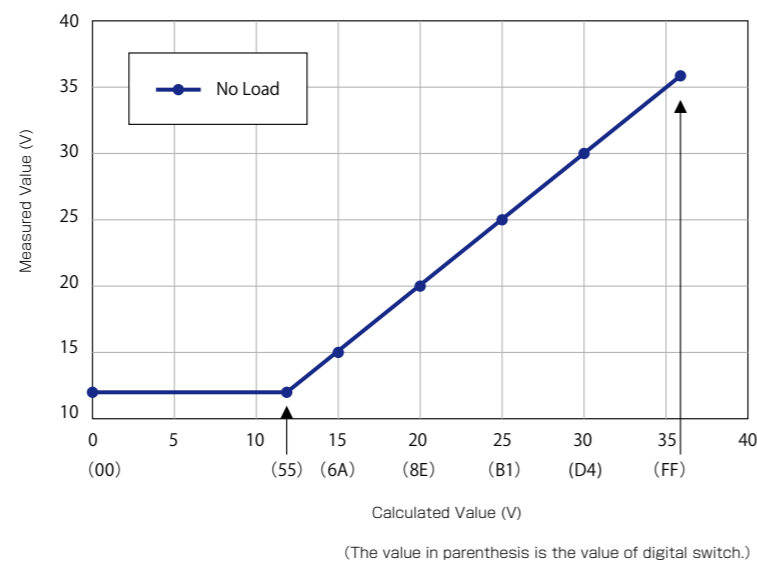


- Momentarily sends current that is larger than normal. Can be used for up four times normal current or higher.
- More compact than conventional SAG power supplies.
- Adjustable in 256 gradients, from 12V to the SAG value set.
- 4 connection ports. Can control from 4 PCs.
- Multi-channel has same chassis size.

Model	Channels	Connection lighting capacity (power consumption)	Dimension
MJS-30M2-TP	2CH	15W x 2: Total 30W	1
MJS-30M3-TP	3CH	15W x 3: Total 30W	2
MJS-30M4-TP	4CH	10W x 2, 5W x 2: Total 30W	3
MJS-30M6-TP	6CH	5W x 6: Total 30W	4

Input Voltage (V)	AC 100 to 240V
Operating frequency	50/60Hz
Output voltage	DC12 to 36V (256 gradient variable output voltage)
Pulse width setting	10 μ sec to 990 μ sec
Trigger signal	Synchronous lighting function (internal/external switching)
Trigger response speed	Approximately 1 μ S
Internal lighting	50Hz fixed
External dimming function	LAN communication
Variable delay	0 to 5,000 μ S range in 1 μ S intervals (external control mode only)
Other	Interlock function, Overcurrent protection function

Voltage Characteristic



Light Control

Light control method

Strobe luminescence by external trigger signal
The duty ratio of luminescence frequency should be 1/20 or less.

* Please use our LED lightings within the maximum SAG setting value specified in the catalogue.

Light Control Method

DC12-36V (For the relationship between the digital switch hexadecimal values and voltage, see Page 108)

* Digital switch controls DC12V - 36V at 256 steps.

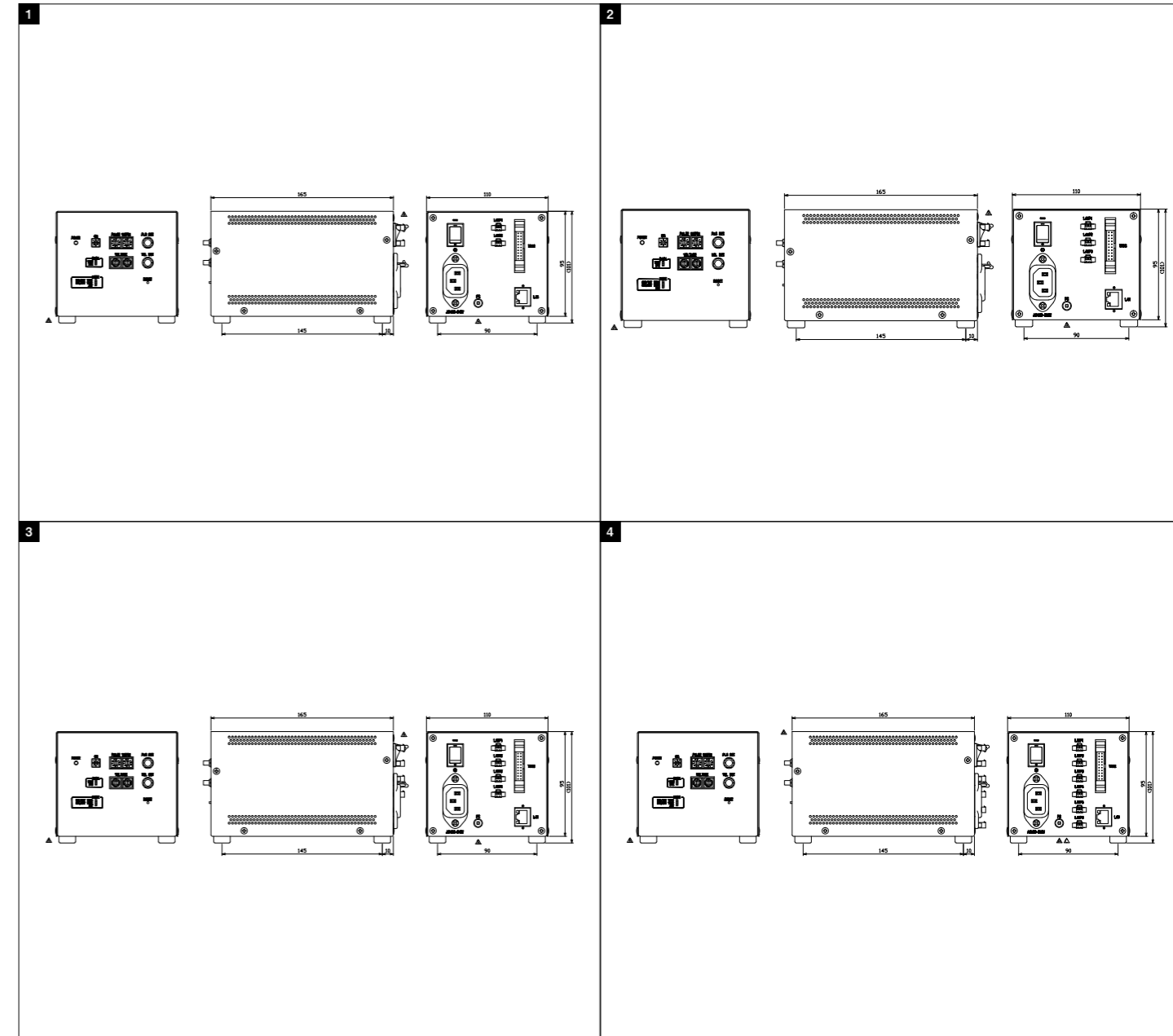
Range of 00 → 55 outputs DC12V constantly.
Please refer to the catalogue of SAG setting value and be sure not to apply excess current to LED.

Range of Voltage

① Luminescence time is adjusted by pulth width.
(Approx. 10 μ SEC - 1mSEC)
(Switch INTI/EXT by PLS Select)

EXT:Adjust by pulth width of external trigger
INT:Control light by volume setting of pulth width
(Variable range: 10 μ s - 990 μ s)

②Luminescence intensity is adjusted by variable voltage of VOLTAGE SELECT.



Options

Diffusion plate for ring lighting / MKR & MKR-F

- Diffusion plate for ring lighting. Attach to diffuse light and reduce reflection from work.
- Can control transmittance (diffusion index). Standard 80% transmittance. We also have 90%, 60% or 30% transmittance in same thickness and price. Special order sizes also possible.
- Easy to attach and detach later with screws.

Model	Applicable lighting	Model	Applicable lighting
MKR-32/10-80	MDR-32/10	MKR-66/32-80	MDR-66/36
MKR-38/15-80	MDR-38/15	MKR-70/39-80	MDR-70/39
MKR-38/12-80	MDR-38/15	MKR-70/35-80	MDR-70/39
MKR-40/25-80	MDR-40/25	MKR-90/50-80	MDR-90/50
MKR-40/21-80	MDR-40/25	MKR-90/46-80	MDR-90/50
MKR-42/18-80	MDR-42/18	MKR-110/60-80	MDR-110/60
MKR-50/28-80	MDR-50/28	MKR-110/56-80	MDR-110/60
MKR-50/24-80	MDR-50/28	MKR-140/95-80	MDR-140/95
MKR-66/36-80	MDR-66/36	MKR-140/91-80	MDR-140/95

* The above models have 80% transmittance. 90% transmittance has -90 at the end of the model number. -60 for 60%, -30 for 30%.

Diffusion plate for bar lighting / MKBA

- Diffusion plate for bar lighting. Attach to diffuse light and reduce reflection from work.
- Can control transmittance (diffusion index). Standard 80% transmittance. We also have 90%, 60% or 30% transmittance in same thickness and price. Special order sizes also possible.
- Bar light manufacturing methods vary depending on whether there is a diffusion plate, so please tell us whether you want a diffusion plate when you order a light.

Model	Applicable lighting	Model	Applicable lighting	Model	Applicable lighting
MKBA-11/14-80	MDBA-C11/14	MKBA-100/15-80	MDBA-C100/15	MKBA-100/100-80	MDBA-C100/100
MKBA-15/26-80	MDBA-C15/26	MKBA-140/11-80	MDBA-C140/11	MKBA-15/200-80	MDBA-C15/200
MKBA-25/25-80	MDBA-C25/25	MKBA-132/15-80	MDBA-C132/15	MKBA-185/30-80	MDBA-C185/30
MKBA-50/15-80	MDBA-C50/15	MKBA-72/24-80	MDBA-C72/24	MKBA-300/24-80	MDBA-C300/24
MKBA-27/34-80	MDBA-C27/34	MKBA-50/50-80	MDBA-C50/50		
MKBA-100/11-80	MDBA-C100/11	MKBA-70/75-80	MDBA-C70/75		

* The above models have 80% transmittance. 90% transmittance has -90 at the end of the model number. -60 for 60%, -30 for 30%.

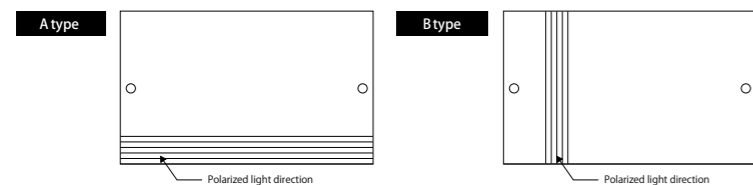
Polarization plate (PL plate) / MKBA-PL & MKR-PL & MKR-F PL

- You can eliminate glare and surface reflection from work by installing a PL plate or PL filter on light or camera lens.
- Can screw on, like the diffusion plate.
- For the bar lighting polarization plate, the polarizer's direction determines whether it is A type or B type.
- There is risk of deformation and discoloration due to heat, depending on your environment. Do heat dissipation countermeasures, and use within a range that does not exceed the heat resistance temperature (74°C). The original effect will no longer be obtained, so check by periodic inspections.

For ring lighting / MKR-PL, MKR-PL, MKR-F PL

Model	Applicable lighting	Model	Applicable lighting	Model	Applicable lighting
MKR-32/10-PL	MDR-32/10	MKR-140/91-PL	MDR-140/95	MKR-66/32-PL	MDR-66/36
MKR-38/15-PL	MDR-38/15	MKHR-60-PL	MDR-66/36	MKR-70/39-PL	MDR-70/39
MKR-38/12-PL	MDR-38/15	MKHR-80-PL	MDR-70/39	MKR-70/35-PL	MDR-70/39
MKR-40/25-PL	MDR-40/25	MKHR-120-PL	MDR-70/39	MKR-90/50-PL	MDR-90/50
MKR-40/21-PL	MDR-40/25	MKHR-150-PL	MDR-90/50	MKR-90/46-PL	MDR-90/50
MKR-50/28-PL	MDR-50/28	MKHR-220-PL	MDR-90/50	MKR-110/60-PL	MDR-110/60
MKR-50/24-PL	MDR-50/28	MKHR-270-PL	MDR-110/60	MKR-110/56-PL	MDR-110/60
MKR-66/36-PL	MDR-66/36	MKHR-350-PL	MDR-110/60	MKR-140/95-PL	MDR-140/95

Polarized light direction



For bar lighting / MKBA-PL

Model	Applicable lighting	
MKBA-11/14-A-PL	MKBA-11/14-B-PL	MDBA-C11/14
MKBA-15/26-A-PL	MKBA-15/26-B-PL	MDBA-C15/26
MKBA-25/25-A-PL	MKBA-25/25-B-PL	MDBA-C25/25
MKBA-50/15-A-PL	MKBA-50/15-B-PL	MDBA-C50/15
MKBA-27/34-A-PL	MKBA-27/34-B-PL	MDBA-C27/34
MKBA-100/11-A-PL	MKBA-100/11-B-PL	MDBA-C100/11
MKBA-100/15-A-PL	MKBA-100/15-B-PL	MDBA-C100/15
MKBA-132/15-A-PL	MKBA-132/15-B-PL	MDBA-C132/15
MKBA-72/24-A-PL	MKBA-72/24-B-PL	MDBA-C72/24
MKBA-50/50-A-PL	MKBA-50/50-B-PL	MDBA-C50/50
MKBA-70/75-A-PL	MKBA-70/75-B-PL	MDBA-C70/75
MKBA-100/100-A-PL	MKBA-100/100-B-PL	MDBA-C100/100
MKBA-15/200-A-PL	MKBA-15/200-B-PL	MDBA-C15/200
MKBA-185/30-A-PL	MKBA-185/30-B-PL	MDBA-C185/30
MKBA-300/24-A-PL	MKBA-300/24-B-PL	MDBA-C300/24
MKBA-LE75-A-PL	MKBA-LE75-B-PL	MKBA-LE75□-■
MKBA-LE150-A-PL	MKBA-LE150-B-PL	MKBA-LE150□-■
MKBA-LE225-A-PL	MKBA-LE225-B-PL	MKBA-LE225□-■
MKBA-LE300-A-PL	MKBA-LE300-B-PL	MKBA-LE300□-■
MKBA-LE375-A-PL	MKBA-LE375-B-PL	MKBA-LE375□-■
-	MKBA-LE450-B-PL	MKBA-LE450□-■

Extension cable for LED lighting

1ch Cable

Model	Size (m)
M-CB-S1	1
M-CB-S2	2
M-CB-S3	3
M-CB-S4	4
M-CB-S5	5
M-CB-S10	10

2ch Cable

Model	Size (m)
M-CB-D1	1
M-CB-D2	2
M-CB-D3	3
M-CB-D4	4
M-CB-D5	5
M-CB-D10	10

3ch Cable

Model	Size (m)
M-CB-T1	1
M-CB-T2	2
M-CB-T3	3
M-CB-T4	4
M-CB-T5	5
M-CB-T10	10

Extension robot cable for LED lighting

1ch Robot Cable

Model	Size (m)
M-CB-S1R-C02	1
M-CB-S2R-C02	2
M-CB-S3R-C02	3
M-CB-S4R-C02	4
M-CB-S5R-C02	5
M-CB-S10R-C02	10

2ch Robot Cable

Model	Size (m)
M-CB-D1R-C02	1
M-CB-D2R-C02	2
M-CB-D3R-C02	3
M-CB-D4R-C02	4
M-CB-D5R-C02	5
M-CB-D10R-C02	10

3ch Robot Cable

Model	Size (m)
M-CB-T1R-C02	1
M-CB-T2R-C02	2
M-CB-T3R-C02	3
M-CB-T4R-C02	4
M-CB-T5R-C02	5
M-CB-T10R-C02	10

Extension cable for very bright coaxial & spot lighting MHV, MHVB & MHVC

For MHV

Model	Size (m)
M-CB-S1-HV	1
M-CB-S2-HV	2
M-CB-S3-HV	3
M-CB-S4-HV	4
M-CB-S5-HV	5

For MHVB & MHVC

Model	Size (m)
M-CB-S1-HV3W	1
M-CB-S2-HV3W	2
M-CB-S3-HV3W	3
M-CB-S4-HV3W	4
M-CB-S5-HV3W	5

Extension branch cable for LED lighting

Two branches Cable

Model	Size (m)
M-2M-1-100	1
M-2M-2-100	2
M-2M-3-100	3
M-2M-4-100	4
M-2M-5-100	5
M-2M-10-100	10

Three branches Cable

Model	Size (m)
M-3M-1-100	1
M-3M-2-100	2
M-3M-3-100	3
M-3M-4-100	4
M-3M-5-100	5
M-3M-10-100	10

Four branches Cable

Model	Size (m)
M-4M-1-100	1
M-4M-2-100	2
M-4M-3-100	3
M-4M-4-100	4
M-4M-5-100	5
M-4M-10-100	10

External control cable

ON/OFF cable, Dimmer cable / MC-MIL-20 series

Compatible power supplies (external ON/OFF): MWDV-300S-24 / MDGB series (except MDGB-30M2) / MJS series
(external dimmer): MWDV-300S-24

Pin No.	MDGB (4CH)	MDGB (8CH)	MWDV-300S-24
1	EXT 0~24V IN	EXT 0~24V IN	EXTCOM
2	EXT 0~24V IN	EXT 0~24V IN	NC
3	EXT ON/OFF CH1	EXT ON/OFF CH1	B0 (LSB)
4	EXT ON/OFF CH2	EXT ON/OFF CH2	B1
5	EXT ON/OFF CH3	EXT ON/OFF CH3	B2
6	EXT ON/OFF CH4	EXT ON/OFF CH4	B3
7	RESERVED	EXT ON/OFF CH5	B4
8	RESERVED	EXT ON/OFF CH6	B5
9	RESERVED	EXT ON/OFF CH7	B6
10	RESERVED	EXT ON/OFF CH8	B7
11	Error Reset	Error Reset	B8
12	STATUS CH1	STATUS CH1	B9 (MSB)
13	STATUS CH2	STATUS CH2	ON/OFF信号入力
14	STATUS CH3	STATUS CH3	NC
15	STATUS CH4	STATUS CH4	Status
16	RESERVED	STATUS CH5	COM
17	RESERVED	STATUS CH6	NC
18	RESERVED	STATUS CH7	NC
19	RESERVED	STATUS CH8	NC
20	STATUS COM	STATUS COM	NC

Model	Size (m)
MC-MIL-20-1	1
MC-MIL-20-2	2
MC-MIL-20-3	3
MC-MIL-20-5	5
MC-MIL-20-10	10

Pin No.	Cable Color	Dot Mark	Dot Color	Pin No.	Cable Color	Dot Mark	Dot Color
1	Orange	■	Black	1	Orange	■■	Black
2	Orange	■	Red	2	Orange	■■	Red
3	Yellow	■	Black	3	Yellow	■■	Black
4	Yellow	■	Red	4	Yellow	■■	Red
5	Light green	■	Black	5	Light green	■■	Black
6	Light green	■	Red	6	Light green	■■	Red
7	Gray	■	Black	7	Gray	■■	Black
8	Gray	■	Red	8	Gray	■■	Red
9	White	■	Black	9	White	■■	Black
10	White	■	Red	10	White	■■	Red

Core Wire image

Dimmer cable (for VI/PI) / MC-MIL-26 series

Compatible power supplies (external ON/OFF): MWDV-600M2-24 / MDGB-30M2
(external dimmer): MWDV-600M2-24 / MDGB series

Model	Size (m)
MC-MIL-26-1	1
MC-MIL-26-2	2
MC-MIL-26-3	3
MC-MIL-26-5	5
MC-MIL-26-10	10

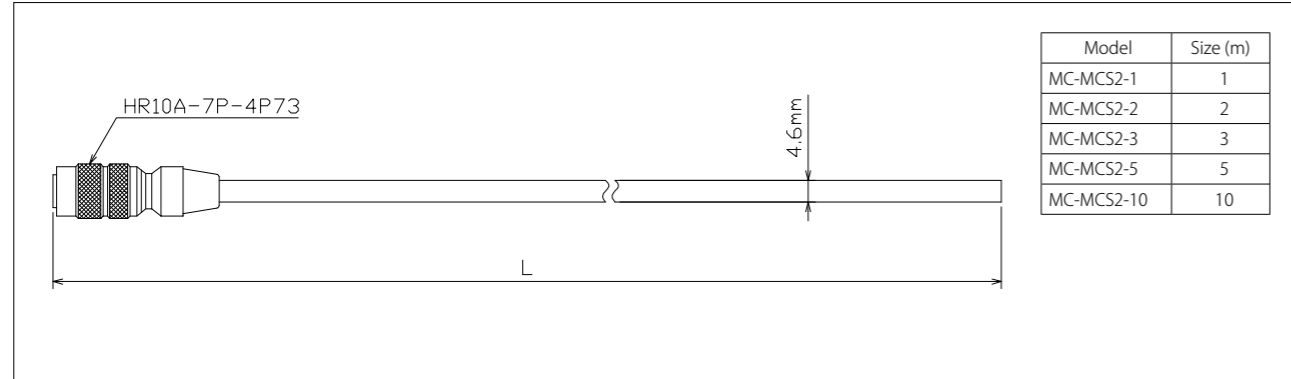
Pin No.	Cable Color	Dot Mark	Dot Color	Pin No.	Cable Color	Dot Mark	Dot Color	Pin No.	Cable Color	Dot Mark	Dot Color
1	Orange	■	Black	11	Orange	■■	Black	21	Orange	■■■	Black
2	Orange	■	Red	12	Orange	■■	Red	22	Orange	■■■	Red
3	Yellow	■	Black	13	Yellow	■■	Black	23	Yellow	■■■	Black
4	Yellow	■	Red	14	Yellow	■■	Red	24	Yellow	■■■	Red
5	Light green	■	Black	15	Light green	■■	Black	25	Light green	■■■	Black
6	Light green	■	Red	16	Light green	■■	Red	26	Light green	■■■	Red
7	Gray	■	Black	17	Gray	■■	Black	Core Wire image 			
8	Gray	■	Red	18	Gray	■■	Red				
9	White	■	Black	19	White	■■	Black				
10	White	■	Red	20	White	■■	Red				

Core Wire image

External control cable

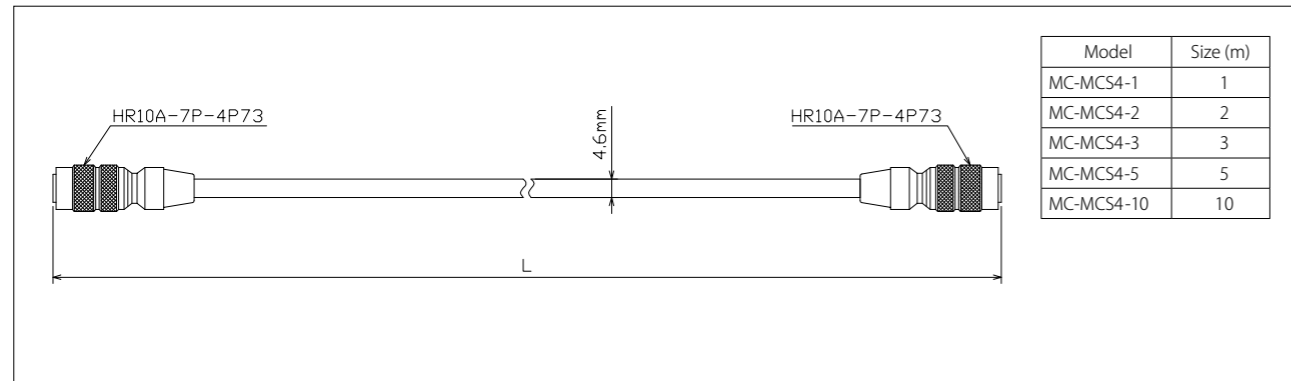
Dimmer cable (for S2/S4) / MC-MCS2 series

Compatible power supplies: MDGB series (-S2/PI, -S4/VI)



Communication transition cable (for S4) / MC-MCS4 series

Compatible power supplies: MDGB series (-S2/PI, -S4/VI)



LED lighting for image processing

Long life and low power consumption

Features

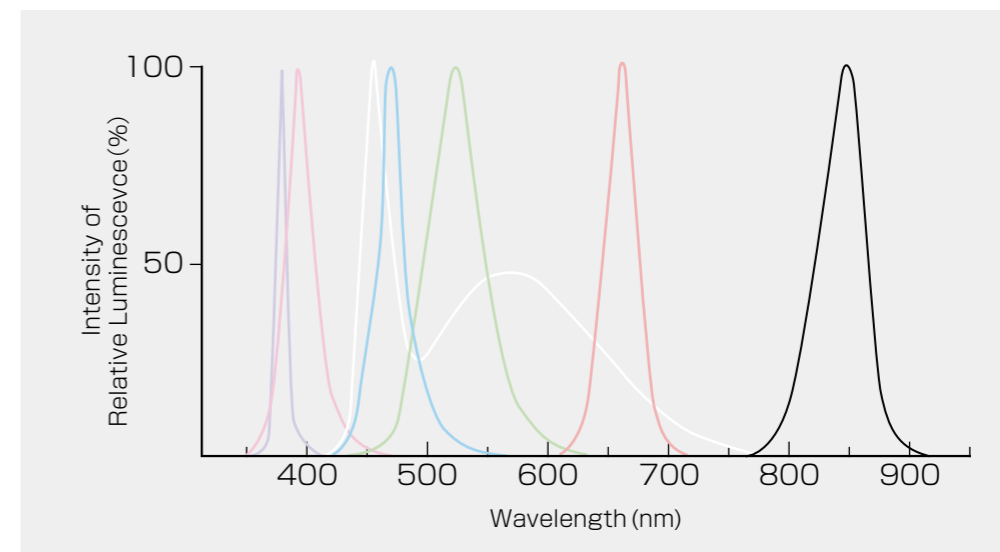
- ✓ Low power consumption
- ✓ Ten times longer life compare to halogen lamp and fluorescent light
- ✓ Greater flexibility in dimensions
- ✓ Suitable for narrow space or small device
- ✓ Excellent switch characteristics
- ✓ UV and IR lighting are also available

Comparison of characteristic of wave length

	Max. Wavelength	Main Uses of Inspection	Dispersion Rate
White	-	Color treating, etc	-
Ultraviolet	375nm	Inspection for fine scratches, etc.	Approx. 9times
	405nm		Approx. 8times
Blue	470nm	Inspection for scratches, etc.	Approx. 4times
Green	525nm	Visual Inspection, etc	Approx. 2.5times
Red	660nm	Use for backlight, etc	1
Infrared	850nm	Penetrating illumination	Approx. 0.4times

- As the wavelength is shorter, dispersion rate is increased, and it is suitable for surface inspection of fine scratch.
- If the object and LED are same color, it lowers the contrast.

Wavelength graph



CUSTOMIZATION



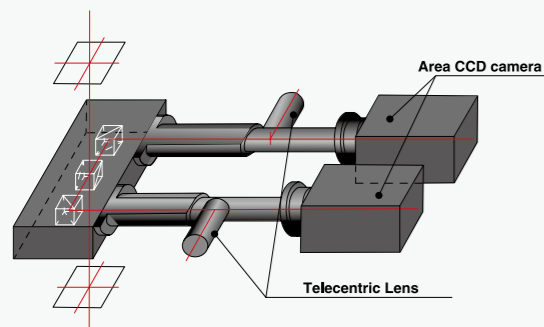
Customization

Customization Optical System

We can customize for your request. Semi-customized, fully customized, and OEM.

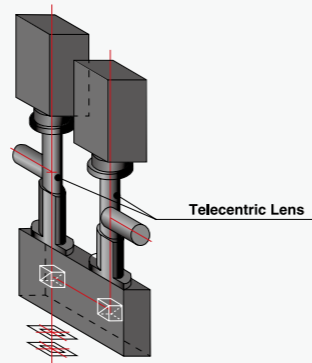
Production example

Top and bottom double field / Two magnification



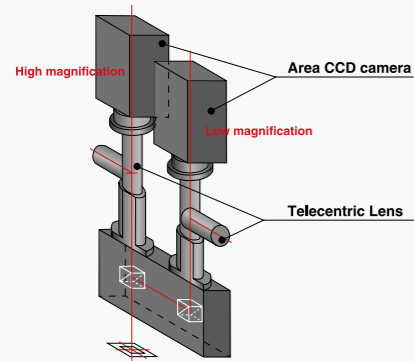
● Optical system to stick together two objects that are matching each other

Twin lens two focuses system



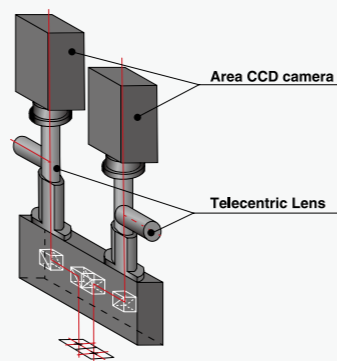
● Optical system to check at two focuses and two different magnification

Twin lens, two magnification system



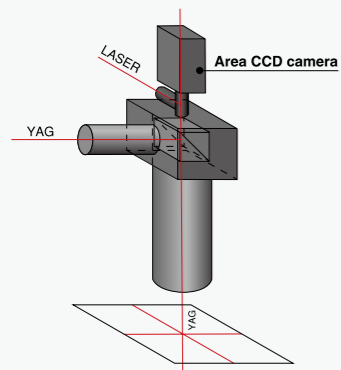
● Optical system to check an object at two different magnification

Optical system for inspection between two points

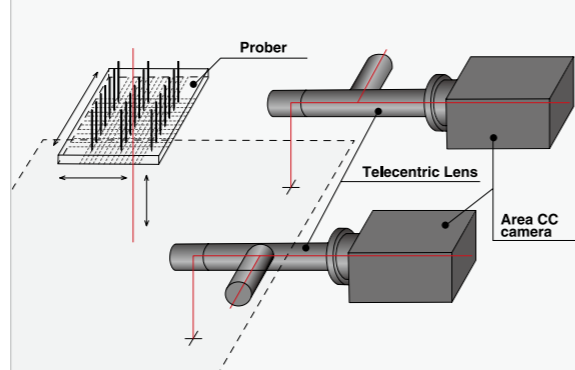


● Optical system to check narrow pitch marks between two points

YAG laser optical system

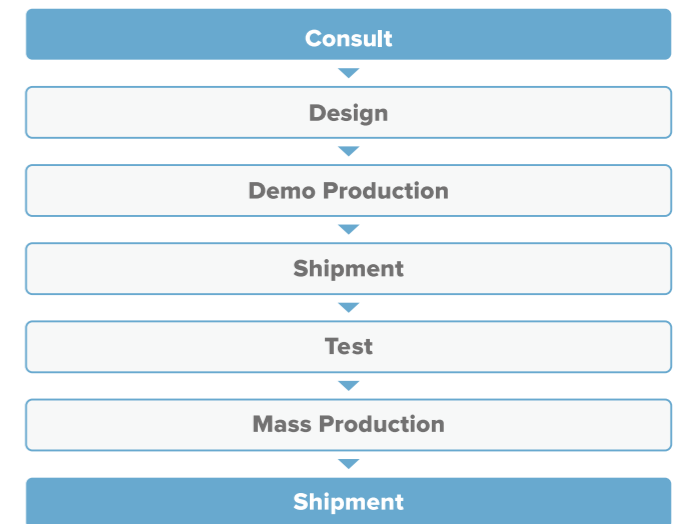


Prober alignment



Work Flow

When you request the Customization products, please consult with the sales staff. We will discuss the specification each other, and then start to design by our engineer. After confirming the designed drawing, specification, Demo, and mass production will be started.



Design / Development

Customization

Propose optical design for a special request
Customize lens mount and mechanical design

Optical unit

Propose optical system, including a lens, camera and illumination as a unit

SUPPORT

CUSTOMER SUPPORT

We will support both before and after sales service to each customers. We deal with any products except the catalogue products. Also, the custom and the semicustom production are available.

This Home page is written in not only, Japanese, but also English, Chinese and Korean.

We have the staff who can speak each foreign language. Kindly contact with us for each inquiry.

Before sales service

Demo products is available at free of charge.

- Download of the specifications and the drawings
You can download it from sign-in form page.
If you have more inquiries, please don't hesitate to contact us.

Consultation

The sales staff in charge will consult with you to choose the most suitable products.

After sales service

- Download of the specifications and the drawings

You can download it from sign-in form page.

If you have more inquiries, please don't hesitate to contact us.

MATERIAL



Glossary

Resolution(μ m)

Resolution indicates the ability to recognize two points that are close together.
Resolution values in this catalogue are theoretical resolution at 550nm.
Resolution = $0.61 \times \lambda / NA$

Resolving power(line/mm)

Resolving power indicates the number of black and white lines distinguished within 1mm in an image through a black and white grid-like chart lens. It is expressed by line/mm.
For example, 100 line/mm means that black and white pitch 1/100mm(10 μ) can be distinguished. The width of both the black and white lines is 1/200mm(5 μ).

Horizontal TV resolution

The total number of black and white horizontal stripes on a TV monitor screen.
It is expressed in TV lines. For resolving power, a pair of black and white lines is counted as one line.
However, for TV lines, one pair is counted as 2 TV lines. For example, if 470 horizontal TV lines of 1/2 CCD (H = 6.4mm) is used, required resolving power is $1\text{mm}/(6.4\text{mm}/(470/2)) = 36.72/\text{mm}$.

Aperture efficiency/Relative illumination (%)

Aperture efficiency indicates the brightness difference between the optical axis of the image formation plane and its surrounding area when an evenly bright object is captured with a lens. It is expressed by percent(%) assuming that the center brightness is 100. It is one of a lens's optical characteristics.

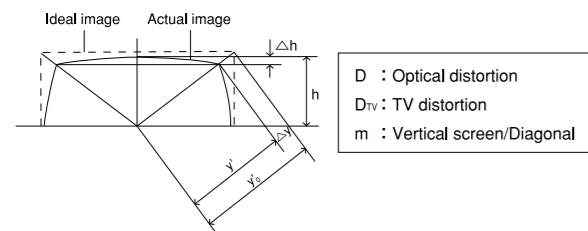
Shading

Shading is the brightness difference between TV monitor's center and its edges when an evenly bright object is captured with a lens. Shading indicates comprehensive performance of a lens and TV camera.

Chromatic aberration

In lenses' optional systems, positions where images are formed and image magnification differ according to light's wavelength. Rays with different wavelengths have different colors. This is called chromatic aberration. Aberration on the optical axis is called chromatic aberration on the axis and magnification difference is called magnification chromatic aberration.

Distortion



Optical distortion
Lens's aberration where a straight object outside of the optical axis appears curved.

$$D = \frac{y' - y'_0}{y'_0} \times 100\%$$

Positive distortion of a straight line is called pincushion distortion. Negative distortion is called barrel distortion.

TV distortion
Image distortion on a TV monitor. The closer to zero, the better the performance.

$$D_{TV} = \frac{\Delta h}{2h} \times 100\%$$

Object	Pincushion distortion	Barrel distortion

F Number (F No)

The brightness of a lens at infinity. It is calculated by dividing the focal length by the diameter of entrance pupil (D) (effective aperture)).
F No. = f/D

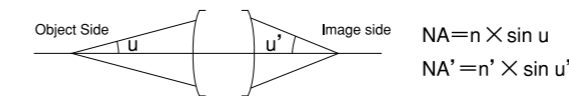
Effective F No

The brightness of a lens at a certain magnification.
Effective F No. = $(1 + M) \times F \text{ No.}$

NA

The higher the NA, the greater the resolution and brightness are. When the half angle that an image makes on exit pupil is u' and refractive index is n', n' x sin u' is called image side numerical aperture, NA'.

NA in this catalogue indicates object side numerical aperture.



$NA = M/2xF$, $NA' = 1/2xF$.
Relation of NA and NA' is $NA = NA' \times \text{Optical magnification}$ or $NA' = NA / \text{optical magnification}$.

MTF

It provides a graph analyzing a lens' ability to resolve sharp details in very fine sets of parallel lines, and a lens' contrast or ability to provide a sharp transfer between light and dark areas in sets of thicker parallel lines.

Depth of field

Images through lenses theoretically form as points. Acceptable blur on an acceptably clear image is called the permissible circle of confusion. Depth is the distance between the nearest and farthest points that appear in acceptably sharp focus when an object is shifted back and forth from the best focal point. Depth range of the object side is called depth of field.
Depth of field = $2(\text{Permissible circle of confusion} \times \text{Effective F No.} / \text{Magnification}^2)$

Depth of focus

Depth is the distance between the nearest and farthest points that appear in acceptably sharp focus when a CCD is shifted back and forth from the best focal point. Depth range of the image side is called depth of focus.

Angle of view

The angle formed by imaginary lines connecting the lens second principal point with both ends of the image diagonal. Angle of view is directly associated with lens focal length. As the focal length is longer, the angle of view is narrower.
Angle of view = $2 \times \tan^{-1}(\text{Image size} / 2f)$ (Focal length)

WD

Distance from the object to the front lens.

OI

Distance from the object to the image sensor.

Focal length

Focal length is the distance from the optical system's principle point to the focal point. Distance from the vertex of the last lens to the back focal point is called back length. Distance from the vertex of the first lens to the front focal point is called front focal length.

Image size

The diameter of the sharp image circle formed by a lens. Area sensor is expressed by inch, and diameter of image circle is equal to diagonal of sensor. Image circle of diameter for line sensor is equal to the maximum sensor size. It is expressed by pixel size x resolution.

Optical Data

How to calculate optical magnification

Most of lenses in this catalogue are designed for finite distance. Image format (sensor size) divided by object size equal to optical magnification. It is the most important to select a lens.

Image Format

Area Sensor / Large Area Sensor

Examples of area sensor and large area sensor. Different size of sensor will be expected to be available for various applications.

Area Sensor

Image Size (inch)	1/3	1/2.5	1/2	1/1.8	2/3(5MP)	1(5MP)	1(20MP)	1.1(12MP)	1.1(25MP)	4/3
Vertical (mm)	3.6	4.27	4.8	5.35	7.1	10.2	8.81	10.35	12.8	13
Horizontal (mm)	4.8	5.7	6.4	7.14	8.47	12.8	13.19	14.13	12.8	17.3
Diagonal (mm)	6	7.12	8	8.93	11	16.4	15.86	17.5	18.1	23.5

Large Area Sensor

Resolution (Mega Pixel)	19.6MP	20MP	25MP	31MP	51MP	61MP	65MP	71MP	101MP	120MP	151MP
Resolution (H x V)	4416 x 4428	5120 x 3840	5120 x 5120	6464 x 4852	8424 x 6032	9588 x 6380	9344 x 7000	10000 x 7096	11648 x 8742	13264 x 9176	14192 x 10640
Pixel size (μm)	3.45	6.4	4.5	3.45	4.6	3.76	3.2	3.1	3.76	2.2	3.76
Vertical (mm)	15.24	24.6	23.04	22.3	38.75	35.98	29.9	31	43.8	29.18	53.36
Horizontal (mm)	15.28	32.8	23.04	16.74	27.75	23.99	22.4	22	32.87	20.19	40.01
Diagonal (mm)	21.6	41	32.6	27.9	47.7	43.2	37.4	38	54.8	35.5	66.7

Line Sensor

Length of line sensor is formed, depended on pixel size and resolution. As the sensor size is larger, design and manufacture of a lens for line sensor are more difficult and complicated.

Sensor Size (mm)	10.24	14.34	20.48	28.67	28.67	35	36	57.34	57.34	61.44	81.92
Pixel size (μm)	10	14	10	14	7	4.7	7	7	3.5	5	5
Resolution (pixel)	1024	1024	2048	2048	4096	7450	5150	8192	16384	12288	16384

Formula of optical magnification

Field of View (FOV)

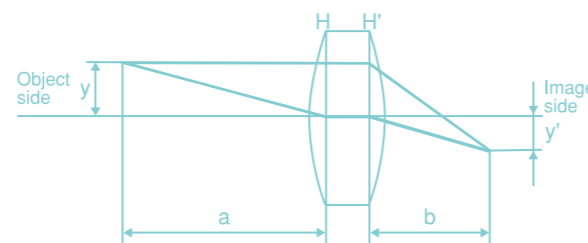
The actual size of a viewed object that can be taken when a lens is mounted to a camera.
Ex). Magnification: 0.5x Image format: 1/2

Vertical FOV = 4.8 ÷ 0.5 = 9.6mm Horizontal FOV = 6.4 ÷ 0.5 = 12.8mm

Magnification

Magnification (M) = Image format/FOV

$M = y'/y = b/a$



How to calculate focal length and photographic range

Formula of photographic range

$X = \frac{(\text{Distance from lens to object}) \times (\text{Image size})}{\text{Focal length}}$

Ex. Object distance: 100m Focal length: 50mm CCD: 2/3



$X = \frac{100,000 \times 6.6}{50} = 13,200 \text{ (mm)}$ Height: 13.2m

Formula of Focal length

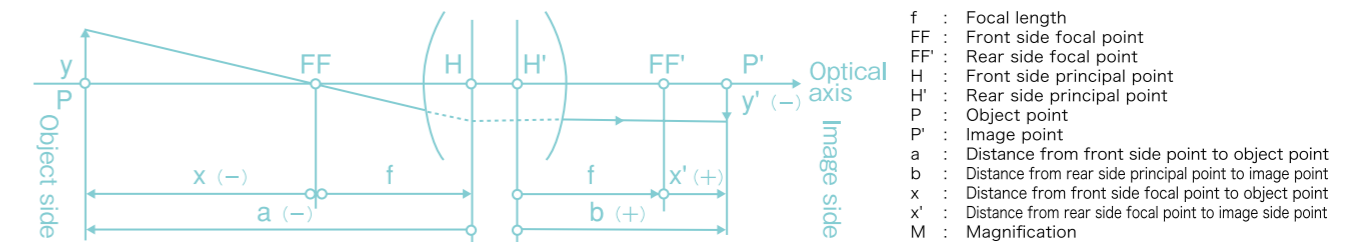
$f = \frac{(\text{Distance from lens to object}) \times (\text{Image size})}{\text{Height}}$

Ex. Object distance: 20m Height: 6.6m CCD: 2/3



$f = \frac{20,000 \times 6.6}{2,000} = 66 \text{ (mm)}$ Focal length: 66mm

Formula of conjugation relationship



Basics formula	Horizontal magnification	Object point distance	Image point distance
$-\frac{1}{a} + \frac{1}{b} = \frac{1}{f}$	$M = \frac{y'}{y} = \frac{b}{a}$	$-a = (1 - \frac{1}{M}) \times f$	$b = (1 - M) \times f$

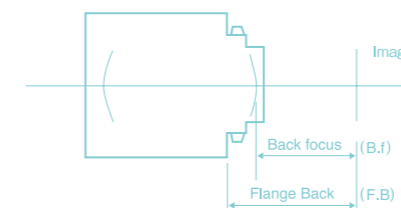
F No./NA Formula

Relationship of object side NA and image side NA (NA')	Relationship of F No. and Effective F no.(Fe)	Relationship of NA and Effective F No.
$NA' = \frac{NA}{M}$	$Fe = (1+M) F$	$NA' = \frac{1}{2Fe}$ $NA' = \frac{1}{2(1+M)F}$ $NA = \frac{M}{2Fe}$ $NA = \frac{M}{2(1+M)F}$

Camera mount and Flange Back

Back focus : Distance from the vertex of the last lens to the image plane

Flange Back : Distance from the surface of lens mount to the image plane



Name	Flange Back	Screw size
C Mount	17.526mm	25.4mm 32tpi thread
CS Mount	12.5mm	25.4mm 32tpi thread
F Mount	46.5mm	Bayonet

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