

CATALOG

LENSATION 
smart lenses. smart solutions.

Sマウントレンズ
2025



太平貿易株式会社

TABLE OF CONTENT

S-MOUNT LENSES (M12X0.5)

8/10/14 Megapixel Board Lenses	3
5 Megapixel Board Lenses	4
4 Megapixel Board Lenses	5
3 Megapixel Board Lenses	5
1-2 Megapixel Board Lenses	6
Board Lenses up to 1 Megapixel	7
VGA and below Megapixel High Resolution Lenses	7
Pinhole Board Lenses	8
Time-of-Flight Board Lenses	8
M16 CCTV Lenses	8
Waterproof Automotive Board Lenses	9
Fisheye Board Lenses	9

ACCESSORIES

S-Mount to C-Mount Scheimpflug Adapter	3
Adapters, Holders, Extension-/Lockrings	10
Optical Glossary	12
Optical Formulas	13-14

ABOUT LENSATION



Our mission is to keep
our customers excited.

With this goal in mind, we provide:

- Free consultancy
- Exceptionally good value for money
- Best performance
- OEM design and development
- Unique solutions
- Products tailored especially according to your demands

8/10/14 MEGAPIXEL BOARD LENSES

For 4k cinema resolution cameras.

Supports sensors like

- ON MT9J00x/MT9F00x/AR133x/AR1820
- Perfect for Sony IMX213/286/374/377/486/663/708
- Also suits for the Omnivision OV128xx/OV138xx series

Crystal clear images with pixel sizes down to the 1.25µm class.

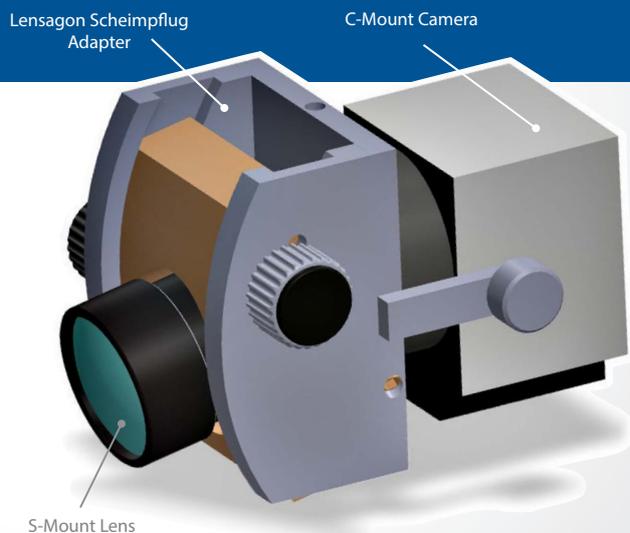


	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Distortion (%)	Weight (g)	Mega Pixel	IR corr.	IR cut filter / option
B8M2624S125ND	2.6	2.4	1/2.5"	0.2	2.52	106°	-0.12	-	8	•	B8M2624S125NDC
B14M28620S123	2.86	2.0	1/2.3"	0.1	5.71	170°	-25	15.0	14		B14M28620S123C
B8M3025S125ND	3.0	2.5	1/2.5"	0.2	3.74	97°	2	-	8	•	B8M3025S125NDC
B8M4028S118ND	4.0	2.8	1/1.8"	0.25	5.7	92.4°	-3	16	8		B8M4028S118NDC
B8M4418S23	4.41	1.8	2/3"	0.1	7.33	139.6	-18	8.0	8		B8M4418S23C
B10M45545ND	4.55	4.5	1/2.3"	0.1	3.44	81.7°	<0.5	8.2	10		B10M45545NDC
B10M5425	5.4	2.5	1/2.3"	0.2	6.6	70°	-2	6.0	10	•	B10M5425C
B10M7224V2	7.2	2.4	1/2.3"	0.3	7.23	57°	-1.8	12.6	10	•	B10M7224V2C
B8M8020S118ND	8.0	2.0	1/1.7"	0.1	6.06	60.8	-2	-	8		B8M8020S118NDC
B8M12020S118ND	12.0	2.0	1/1.8"	0.15	5.64	44.9	-2	-	8		B8M12020S118NDC

S-MOUNT TO C-MOUNT SCHEIMPFLUG ADAPTER

The tilt mechanism allows overall image sharpness to be controlled in a different way than conventional lenses. Used in conjunction with aperture, the tilt feature of these lenses allows objects or features within an image plane to be kept in focus. This is helpful when imaging objects at oblique angles.

If absolute sharpness in the foreground and background is required, it is necessary to first focus on the closest foreground object and then tilt the lens until the background object is focus. After selecting the correct aperture, both objects will be sharp. Using such tilt mechanisms provides an additional means of controlling depth of field and allows greater freedom over the aperture and shutter speed combinations.



<http://www.optowiki.info/glossary/scheimpflug-principle/>

(CAD image)

S-MOUNT LENSES (M12X0.5)

5 MEGAPIXEL BOARD LENSES

Our broad portfolio of high resolution lenses.

Perfect for the new Sony Starvis, the On Semi AR series or the Omnivision image sensors.

Supporting pixel sizes down to 2.2µm.



	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Distortion (%)	Weight (g)	Mega Pixel	IR corr.	IR cut filter or option
B5M2524	2.5	2.4	1/2.5"	0.1	4.98	166°	-83	6.1	5		B5M2524C
B5M2916	2.9	2.0	1/2.5"	0.1	4.47	152°	-63	7.2	5	•	B5M2916C
B5M2920S118	2.95	2.8	1/1.8"	0.3	6.81	180°	-4.3	15.6	5	•	B5M2920S118C
B5M29740ND	2.97	4.0	1/2.5"	0.2	2.97	102°	< 1	3.5	5		B5M29740NDC
B5M3428S123	3.4	2.8	1/2.3"	0.1	6.3	150°	-12	8.2	5		B5M3428S123C
B5M3618	3.6	1.8	1/2.5"	0.2	7.25	128°	-0.5	5.0	5		B5M3618C
BK5M3920 (MOQ)	3.9	2.0	1/2"	0.8	6.1	127°	-	11.0	5	•	
B5M4018	4.0	1.8	1/2.5"	0.2	7.72	112°	-41.5	5.0	5		B5M4018C
B5M4020	4.0	2.0	1/2.5"	0.3	6.7	114°	-62.9	5.0	5		B5M4020C
B5M41430ND	4.14	3.0	1/2.5"	0.2	5.25	82°	< 0.2	8.3	5		B5M41430NDC
B5M6018	6.0	1.8	1/2.5"	0.2	9.58	75°	-21.4	6.5	5		B5M6018C
B5M6020	6.0	2.0	1/2.5"	0.3	7.3	67°	-19.6	6.0	5		B5M6020C
B5M6532S123ND	6.0	3.2	1/2.3"	0.3	7.55	62°	0.8	3.1	5		B5M6532S123NDC
B5M7630	7.6	3.0	1/1.8"	0.2	5.38	58°	1.9	6.0	5		B5M7630C
B5M8018	8.0	1.8	1/2"	0.2	7.8	56°	-14.4	6.5	5		B5M8018C
B5M8020	8.0	2.0	1/2.5"	0.3	8.0	50°	-7.7	5.0	5		B5M8020C
B5M12020	12.0	2.0	1/2.5"	0.3	7.6	35°	-4.4	5.0	5	•	B5M12020C
B5M12028	12.0	2.8	1/1.8"	0.1	8.57	41°	-1.75	7.0	5		B5M12028C
B5M12056	12.0	5.6	1/1.8"	0.1	8.57	41°	-1.75	7.0	5		B5M12056C
B5M16020V2	16.0	2.0	1/2.5"	0.3	7.1	28°	0.24	5.0	5	•	B5M16020V2C
B5M25020S23ND	25.0	2.0	2/3"	0.25	5.2	25°	0.05	8.4	5		
B5M25024V2	25.0	2.4	1/2"	0.3	11.98	18.8°	1.13	5.0	5	•	B5M25020V2C
B5M35020S23ND	35.0	2.0	2/3"	0.35	5.5	21.3°	0.05	14.5	5		

4 MEGAPIXEL BOARD LENSES

Our f=1.93mm offers the widest low distortion Field Of View of all M12 lenses. The unique 50mm M12 lens is perfect for 2k x 2k cameras.



	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Distortion (%)	Weight (g)	Mega Pixel	IR corr.	IR cut filter / option
B4M1920NDC	1.93	2.0	1/2.9"	-	1.137	117°	-5 (opt.)	5.7	4		•
B4M3516S12	3.5	1.6	1/2"	0.85	4.8	160°	-13.9 (TV)	7.7	4		B4M3516S12C
B4M50028S117	50	2.8	1/1.7"	1.0	18.7	18.7°	-0.1 (opt.)	34.3	4		B4M50028S117C

3 MEGAPIXEL BOARD LENSES

High resolution lenses for the popular Full HD resolution of 1920x1080 or 1920x1200 pixels

Also perfect for the classic 2048x1536 format.

Supports a pixel size down to the 2.5µm class.



	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Distortion (%)	Weight (g)	Mega Pixel	IR corr.	IR cut filter / option
B3M21835ND	2.18	3.5	1/4"	0.1	1.30	94°	<0.6	4.0	3		B3M21835NDC
B3M2818	2.8	2.2	1/2.5"	0.3	6.2	147°	< 1.9	5.0	3	•	
BM3516ND	3.5	1.6	1/3"	0.2	5.97	81°	< 1.9	10.0	3	•	BM3516NDC
BM3518S125ND	3.5	1.8	1/2.5"	0.2	5.97	90°	< 1.9	12.0	3	•	BM3518S125NDC
BM3524S12ND	3.5	2.4	1/2"	0.1	6.09	97°	<-3.1	21.8	3	•	BM3524S12NDC
B3M4016	4.0	2.2	1/2.5"	0.2	7.28	112°	-12	5.4	3	•	
BM4018S118	4.0	1.8	1/1.8"	0.2	8.0	126°	-45	10.0	3	•	BM4018S118C
BM4518S125ND	4.5	1.8	1/2.5"	0.2	6.14	76.4°	< 1.9	13.0	3	•	BM4518S125NDC
BM5518S12ND*	5.5	1.8	1/1.8"	0.2	6.87	76°	< 1.9	10.0	2	•	BM5518S12NDC
BM5822S118ND	5.8	2.2	1/1.8"	0.3	6.5	76.2°	-2.4	12.15	2		BM5822S118ND
BM6020ND	6.0	2.0	1/3"	0.2	6.27	57°	<-2.6	5.9	3	•	BM6020NDC
B3M6016	6.0	2.2	1/2.5"	0.3	6.8	72°	-19	5.8	3	•	
B3M6020S12	6.0	2.0	1/2"	0.5	8.3	81°	-	9.9	3		
B3M8016	8.0	2.2	1/2.5"	0.4	8.0	54°	-3.8	5.0	3		
B3M8018S12	8.0	1.8	1/2"	0.5	7.9	57.7°	-	10.7	3		
B3M8556S118ND	8.5	5.6	1/1.8"	0.1	2.9	54.3°	-1.15	6.6	3		B3M8556S118NDC
B3M12016	12.0	2.3	1/2.5"	0.3	6.44	35°	-6	5.0	3	•	
B3M16018V2	16.3	1.83	1/2"	0.5	7.35	28.8°	-0.72	-	3	•	
B3M25024	25.0	2.4	1/2"	0.4	10.26	18°	3.3	7.1	3	•	B3M25024C
B3M35025V2	35.0	2.8	1/1.7"	0.5	14.42	15.5°	0.1	15.5	3	•	B3M35025CV2

* Limited

S-MOUNT LENSES (M12X0.5)

1-2 MEGAPIXEL BOARD LENSES

Broad portfolio for cameras in the 1.2 / 1.3 and 2.0 Megapixel class.

For common resolutions like

- 1280x 960
- 1280x1024
- 1600x1200
- 1920x1080
- 1920x1200

For Sony Starvis / Pregius image sensors. Also for Teledyne Ruby / Sapphire and Snappy image sensors. Perfect for a pixel size down to 3µm.



	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Distortion (%)	Weight (g)	Mega Pixel	IR corr.	IR cut filter / option
BMK2119C	2.1	1.9	1/3"	0.2	2.2	160°	-73	2.8	1		SLAR coating 550nm
BM2118V2	2.1	2.2	1/3"	0.2	6.3	170°	-88.1	6.5	1	•	BM2118V2C
BMK2320C	2.3	2.0	1/3"	0.16	2.3	140°	-	2.8	1		SLAR coating 550nm
BM2420	2.4	2.0	1/3"	0.15	4.56	132°	-25	6.0	1	•	BM2420C
BM2820	2.8	2.0	1/3"	0.2	5.29	122°	-40	6.0	1	•	BM2820C
BM3618	3.6	1.8	1/3"	0.2	6.59	100°	34.1	6.0	1	•	BM3618C
B2M3814	3.85	1.4	1/2.5"	0.2	6.76	122°	-	9.0	2		B2M3814C
BM4218	4.2	1.8	1/3"	0.2	7.21	89°	-29	7.0	1	•	BM4218C
BM4518S118ND-810	4.5	1.8	1/1.8"	0.1	6.4	90°	<2.8	14.0	1	•	810nm Coating
BM4525S118ND	4.5	2.5	1/1.8"	0.1	6.4	90°	-2.8	15.0	1		
BM4620DN	4.6	2.0	1/3"	0.2	5.63	80°	-22	6.0	1	•	BM4620DNC
BM6018	6.0	1.8	1/3"	0.2	9.33	60°	-17	6.0	1	•	BM6018C
BSM6016S12	6.0	1.8	1/2"	0.2	8.73	88°	-32	4.5	2	•	
BM8021S118ND	7.84	2.1	1/1.8"	0.5	7.8	60°	-2.9 (opt.)	14.3	1	•	BM8021S118NDC
BM8018	8.0	1.8	1/3"	0.2	5.4	45°	-8.3	6.0	1	•	BM8018C
BSM8016S12	8.0	1.9	1/2"	0.2	5.4	62°	-12	6.0	2	•	
BM9040	9.0	4.0	1/3"	0.1	8.0	34°	-	3.9	1.3	•	
BM9050	9.0	5.0	1/3"	0.1	8.0	34°	1.0	3.9	1.3	•	
BM10028S12	10.0	2.8	1/2"	0.4	8.0	44°	1.0	6.0	1.2		BM10028S12C
BSM12016S12	12.0	2.0	1/2"	0.2	6.54	39°	-	6.0	2	•	
BM16018	16.0	1.8	1/3"	0.2	6.59	21°	3.4	6.0	1	•	BM16018C
BT25020S12	25.0	2.0	1/2"	0.2	8.29	18.6°	-	7.0	1-2		BT25020S12C

BOARD LENSES UP TO 1 MEGAPIXEL

- For cameras up to 1024x768 (4:3) and 1280x720 (16:9) resolution
- Pixel size class down to 3µm

	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Weight (g)	Mega Pixel	IR cut filter or option
BK1820	1.8	2.0	1/4"	0.2	3.65	160°	5.5	1	BK1820C
BT1922	1.9	2.2	1/4"	0.05	4.7	156°	3.5	1	BT1922C
BT2120	2.1	2.0	1/3"	0.2	4.92	151°	6.5	1	BT2120C
BT2520	2.5	2.0	1/3"	0.2	5.18	140°	5.3	1	BT2520C
BT2920	2.9	2.0	1/3"	0.2	5.02	138°	4.5	1	BT2920C
BT3020	3.0	2.0	1/3"	0.2	5.35	124°	3.5	1	BT3020C
BT3620	3.6	2.0	1/3"	0.2	5.00	100°	4.1	1	BT3620C
BT6020V2	6.1	2.0	1/3"	0.2	8.03	62°	6.5	1	BT6020V2C
BT12020	12.0	2.0	1/3"	0.4	8.97	29°	3.2	1	BT12020C
B16020S12	16.0	2.0	1/2"	0.2	12.3	27.8°	4.2	1	
B25020S12	25.0	2.0	1/2"	0.2	11.8	18.2°	17.6	1	
B35020S12	35.0	2.0	1/2"	0.2	18.9	13.0°	15.4	1	
B50020S12	50.0	2.0	1/2"	0.4	33.9	9.2°	27.1	1	

VGA AND BELOW MEGAPIXEL HIGH RESOLUTION LENSES

- Perfect for standard image applications
- Entry level pricing
- Suited for standard resolution cameras
- Pixel size class down to 4µm



	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Weight (g)	Mega Pixel	IR cut filter or option
BK1220	1.2	2.0	1/4"	0.2	3.4	192°	5.2	0.3	BK1220C
BHR2125	2.1	2.5	1/3"	0.2	4.25	165.7°	6.1	0.7	
BHR2525	2.5	2.5	1/3"	0.2	5.04	142.7°	6.8	0.7	
BHR3020	3.0	2.0	1/3"	0.2	5.67	126.0°	5.9	0.7	
BHR4318	4.3	1.8	1/3"	0.2	6.16	83.1°	4.0	0.7	
BHR5620	5.6	2.0	1/3"	0.2	8.07	65.3°	4.0	0.7	
BT8020N	8.0	2.0	1/3"	0.2	8.25	44°	3.5	0.3	BT8020NC
BHR8020	8.0	2.0	1/3"	0.2	7.6	43.0°	6.0	0.7	
BHR12020	12.0	2.0	1/3"	0.2	6.7	28.0°	4.5	0.7	
BHR16012S12	16.0	1.2	1/2"	0.3	7.2	21.8°	11.0	0.7	

S-MOUNT LENSES (M12X0.5)

PINHOLE BOARD LENSES

- Suited for standard resolution cameras
- Easy to clean
- Wide field-of-view
- Perfect for LED Illumination with a ring light



BP2824S13



BPM3725C



BP3M3728S127

	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Weight (g)	Mega Pixel	IR cut filter or option
BP2824S13	2.8	2.4	1/3"	0.1	3.1	125°	1.5		BP2824S13C
BPM3725C	3.7	2.5	1/3"	0.2	3.64	106°	1.7	1	•
BP3M3728S127	3.7	2.8	1/2.7"	0.3	3.7	108.4°	1.8	3	BP3M3728S127C

TIME-OF-FLIGHT BOARD LENSES

- Light sensitive lenses including a special bandpass filter for Time-of-Flight 3D Cameras
- Ideal for factory automation, robotics and logistics



BTOF2512-850



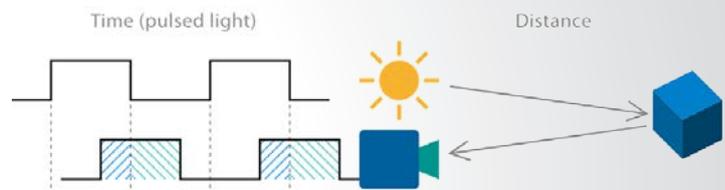
BTOF2512-940



BTOF2512-850



BTOF2512-940



	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Chief ray	Optical Distortion %	bandpass filter
BTOF2512-850	2.5	2.0	1/3"	0.2	5.18	140°	13.07°	-53	850nm
BTOF2512-940	2.5	2.0	1/3"	0.2	5.18	140°	13.07°	-53	940nm
BTOF1114S12-850	11.3	1.4	1/2"	0.1	5.96	38.1°	12.6°	2.1	850nm
BTOF1114S12-940	11.3	1.4	1/2"	0.1	5.96	38.1°	12.6°	2.1	940nm

M16 CCTV LENSES

- Light sensitive lenses with 16mm thread
- Applications are inspection of bottles, caps and tubes
- Up to 4 times more light sensitive compared to a conventional M12 lens
- All lenses including a 2-hole mount M16 lens holder



M16B6M4010S125



M16B4M5009S118C



M16B8M54310S118

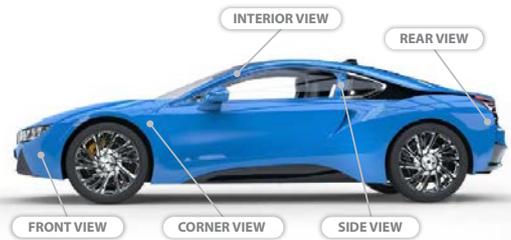


	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Weight (g)	Mega Pixel	IR cut filter or option
M16B6M4010S125	4.0	1.0	1/2.5"	1.0	5.36	106°	9	6	
M16B4M5009S118C	5.0	0.9	1/1.8"	0.5	6.48	118°	-	4	• (inside holder)
M16B8M54310S118	5.43	1.0	1/1.8"	1.0	5.98	105°	10	8	

WATERPROOF AUTOMOTIVE BOARD LENSES

Protected against dust and humidity. Compact size, wide FOV.

- Waterproof with IP54 classification
- Hard-coating against oil, fog and pollution



	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Weight (g)	Megapixel	IR cut filter
BA1520WPC	1.5	2.0	1/4"	0.2	2.2	163.0°	5.5	<1	•
BA1825WPC	1.8	2.5	1/4"	0.2	2.2	160.0°	5.5	<1	•
BA2325WPC	2.3	2.5	1/3"	0.2	2.7	163.0°	6.0	<1	•

FISHEYE BOARD LENSES

Lenses for a wide field-of-view.

For image sensors up to 16 Megapixels. Typical applications are surround view, inspection of tubes and pipes. We also offer software for unwarped images or to simulate rectified PTZ Cameras.

Important: The image circle diameter you need depends on your application. Choose the image circle larger than the equivalent sensor dimension (h/v/d)



	Image Circle	Focal length (mm)	Aperture (f-number)	Image format	MOD (m)	BFL (mm)	FOV (diag.)	Weight (g)	Megapixel	IR corr.	IR cut filter or option
BF5M12721	2.8	1.27	2.1	1/4.0"	0.1	4.18	185°	4.7	5	•	BF5M12721C
BF13M0922S13C	2.9	0.9	2.2	1/3.2"	0.1	2.01	200°	5.6	13		•
BF5M11920	3.24	1.19	2.0	1/3.2"	0.2	6.44	180°	14.7	5	•	BF5M11920C
BF10M10526S132	3.5	1.05	2.6	1/3.2"	0.1	3.2	200°	13.7	10	•	BF10M10526S132C
BFM1220C	3.84	1.2	2.0	1/3.0"	0.2	2.91	190°	7.5	1.3		•
BF5M15828S125	4.1	1.58	2.8	1/2.5"	0.1	5.75	180°	10.9	5	•	BF5M15828S125C
NEW BF16M220DV2	4.2	1.2	2.5	1/2.3"	0.1	2.94	220°	26	16		BF16M220DV2C
BF9M1422	4.5	1.41	2.2	1/2.3"	0.1	3.69	183°	24.0	9	•	BF9M1422C
BF10M14522S18	4.6	1.45	2.2	1/1.8"	0.1	4.62	190°	14.0	10	•	BF10M14522S18C
BFM1524S125	4.7	1.49	2.4	1/2.5"	0.06	2.94	183°	4.0	1.3		BFM1524S125C
BF3M2122S13	4.8	2.1	2.2	1/3.0"	0.1	3.67	184°	3.9	3	•	BF3M2122S13C
BF5M19622	5.6	1.96	2.2	1/2.5"	0.1	2.77	180°	2.3	5	•	BF5M19622C
BF10M19828S118	5.6	1.98	2.8	1/1.8"	0.1	6.32	180°	15.6	10	•	BF10M19828S118C
BF5M2223S129	6.2	2.2	2.3	1/2.9"	0.1	4.71	195°	4.8	5	•	BF5M2223S129C
NEW BF5M2023S23	6.6	2.0	2.3	2/3	0.1	6.11	195°	18.8	5	•	BF5M2023S23C
BF10M2628S123	8.0	2.6	2.8	1/2.3"	0.1	3.67	150°	6.8	10		BF10M2628S123C

ACCESSORIES

S-MOUNT (M12X0.5)



ST05

M12 Extension ring 5mm

Material: Aluminium, Height: 5 mm



ST10

M12 Extension ring 10mm

Material: Aluminium, Height: 10 mm



M12TM14

M12 to M14 Adapter

Material: Aluminium. For using M12x0.5 lenses in M14x0.5 mounts

NEW



SH04F85

S-mount lens holder 8.5mm

Material: Plastic, mounting hole distance 22mm, Height: 8.9 mm, Base width: 19.8 mm



SH02M13V3

S-mount lens holder 13mm

Material: Plastic, mounting hole distance 22mm, Height: 13 mm, Width: 20.3 mm



SH03H16V4

S-mount lens holder 16mm

Material: Plastic, mounting hole distance 22mm, side hole for lock screw. Inner height 5mm



LRM12V2

M12 x 0.5 Lock Ring

Material: Aluminium, Black anodized, Height: 2 mm, Diameter: 15.8 mm



FAM12D14H08

Iris/Filter adapter for M12x0.5

allows to add a filter to standard S-Mount (M12x0.5) Lenses or to modify the F-Number.

NEW



SHM16

M16 to S-Mount Lens Holder

Material: Plastic

NEW



DC-D27H11 / DC-D46H27

Scratch Resistant Dome Cover

Hard coating 1.2 or 2 inch dome with plating, 3.5/7.6cm, PE film

C-MOUNT



ADCTS

C-Mount to CS-Mount Adapter

with male and female thread, 5mm effective height, for use of c-mount lenses with cs-mount cameras



CT40

Extension Tube 40mmMaterial: Aluminium, Height: 40 mm
40mm extension tube for C-Mount lenses.

AD02F

S-Mount to C-Mount Adapter Flat

Male c-mount thread and female M12x0.5 thread, for use of s-mount lenses in c-mount cameras.



AD03H

S-Mount to C-Mount Adapter High

Male c-mount thread and female M12x0.5 thread, for use of s-mount lenses in c-mount cameras.



AD01S

S-Mount to C-Mount Adapter Standard

Male c-mount thread and female M12x0.5 thread, for use of s-mount lenses in c-mount cameras.



AD04M

S-Mount to C-Mount Adapter Medium

Male c-mount thread and female M12x0.5 thread, H: 6mm, for s-mount lenses in c-mount cameras.



LRICM / LROCM

C-Mount Lock RingsOutside thread: Dia.: 20mm, H: 2.5mm
Inside thread: Dia.: 31mm, Height 2mm

ADM16TCF / ADM16TCM

M16 to C-Mount AdaptersOutside thread: C-Mount (1-32 UN 2A)
Inside thread: M16x0.5mm

We like to move it!



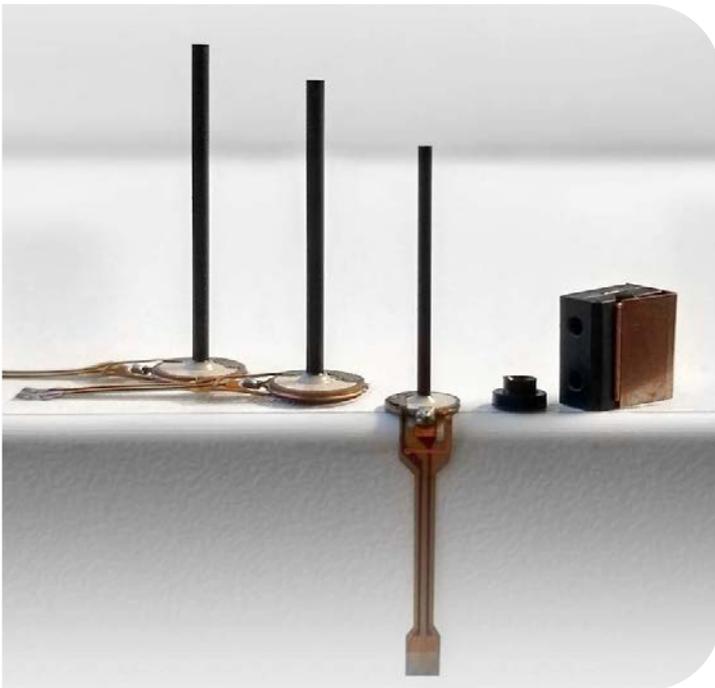
PIEZOLUTION

You can find with ease your motion solutions with our piezoelectric linear drives. They are quick-responsive, highly accurate and very simple to control.

Be it the basic piezoelectric drives, focus-modules or micro-stages. Camera modules for smartphones, code scanners, medical devices, haptic devices, scientific instruments, robotics are just some of the potential applications.

We are both, passionate developer and stock-keeping custom manufacturer.

Together, we'll find an piezo-driven solution for you.



M12 FOCUS MODULE

A compact one-chip focus module for M12 lenses, driven by piezoelectric ultrasonic linear motor. Precise, quick-responsive and simple to integrate.



Connection with 5Pin flat cable, communication over UART or I²C. The 6mm stroke in Z-axis enables a wide scope of motorized solutions.

Customizing available on demand.



- Linear Motors
- Driver Boards
- Linear Stages
- OEM Design
- Consulting

OPTICAL GLOSSARY



Resolution(μm)

Resolution is a measure of how closely spaced two points may be before they cannot be distinguished. For example, 1μm resolution means that two points that are 1μm away from each other can be distinguished. Resolution values in this catalog are lenses' theoretical resolutions. The following is a formula to calculate theoretical resolution based on an aplanatic lens's ray diffraction. (Rayleigh formula) $\text{Wavelength } 0.61 \times \text{NA}$

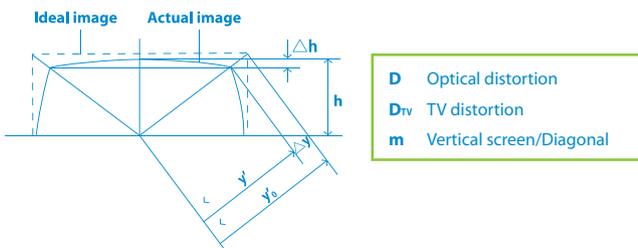
Resolving power(line/mm)

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(10μ) can be distinguished. The width of both the black and white lines is 1/200mm(5μ).

Horizontal TV resolution

The total number of black and white horizontal stripes on a TV monitor screen. It is expressed in TV lines. For example, 200TV lines of horizontal TV resolution means that 100 white horizontal lines is counted as one line. However, for TV lines, one pair is counted as 2 TV lines. For example, if a 1/2-inch CCD camera is used with a lens of 50 lines/mm resolving power, horizontal TV resolution on a TV monitor screen is calculated as follows; $50 \times 6.4(\text{CCD width}) \times 2 = 640\text{TV}$

Distortion



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

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

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.

$$D_{TV} = \frac{\Delta h}{2h} \times 100\% \quad D_{TV} = \frac{1}{2} (1 - m^2) D \quad m = 0.6 \quad D_{TV} = 0.32D$$

Object	Pincushion distortion	Barrel distortion

Aperture efficiency / Marginal light quantity (%)
 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 and CCD-TV camera. 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.

F Number (F No)

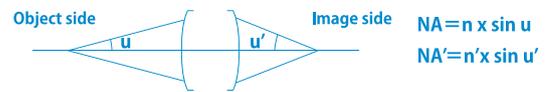
The value indicates a lens's brightness. It is calculated by dividing the lens's focal length by the lens's effective diameter(entrance pupil D mm) looking from object side. It can be also calculated by NA and Lens's optical magnification(.). The smaller the number, the brighter the lens is. $F \text{ No} = f/D$

Effective F No

The value indicates a lens's brightness. It is calculated by dividing the lens's focal length by the lens's effective diameter(entrance pupil D mm) looking from object side. It can be also calculated by NA and Lens's optical magnification(.). The smaller the number, the brighter the lens is. $\text{Effective F No} = (1 + M) \times F \text{ No}$

Numerical aperture

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'. NAs in this catalog indicate object side numerical apertures.



$NA = M/2xF, NA' = 1/2xF.$
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's ability to resolve sharp details in very fine sets of parallel lines, and a lens's 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 force from the best focal point. Depth range of the object side is called depth of field. $\text{Depth of field} = 2(\text{Permissible circle of confusion} \times \text{Effective F No} / \text{Magnification}^2)$

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 force 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. $\text{Angle of view} = 2 \times \tan^{-1} D / 2f$ Focal length

WD

Distance from the front end of a lens system to the object under inspection.

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.

How to calculate optical magnification

Most of Lensagon lens series are designed at finite distance. Optical magnification is the image size (CCD) ratio against the object size (FOV) and the most important for selection of a lens.

Sensor size

Area Sensor

Examples of area sensor used for machine vision. It is expected that various sensors will be available for next generation.

Image Size inch	1/4	1/3	1/2	1/1.8	2/3	1	1.1
Vertical mm	2.7	3.6	4.8	5.35	6.6	9.6	12
Horizontal mm	3.6	4.8	6.4	7.14	8.8	12.8	12
Diagonal mm	4.5	6	8	8.93	11	16	17

Line Sensor

Length of line sensor is formed, depended on pixel size and resolution. As the line sensor is larger, the dimension of a lens becomes larger. Design and manufacture of lenses for the large line sensors are required for high specification.

Image Size mm	10.24	14.34	20.48	28.67	28.67	35	36	57.34	61.44
Pixel size μm	10	14	10	14	7	4.7	7	7	5
Resolution pixel	1024	1024	2048	2048	4096	7450	5150	8192	12288

Formula of optical magnification

FOV

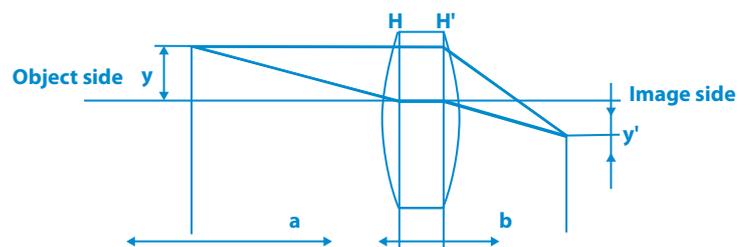
Field of view (FOV) The actual size of a viewed object that can be taken when the lens is attached to the camera.
Ex. Optical magnification: 0.5x Sensor: 1/2"

Vertical FOV $4.8 \div 0.5$ 9.6mm Horizontal FOV $6.4 \div 0.5$ 12.8mm

Magnification

Optical magnification (M) = Sensor size/FOV

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



Electronic magnification and monitor magnification

Electronic magnification

Magnification of an image on a sensor when it is displayed on a monitor screen.

Monitor magnification

Magnification of an object displayed on a monitor screen through a lens.

Ex. Optical magnification: 0.5x Sensor: 1/2 Monitor size: 15 inch (1 inch = 25.4mm)

Electronic magnification $15 \times 25.4 \div 8$ 47.6x

Monitor magnification 0.5×47.65 23.8x



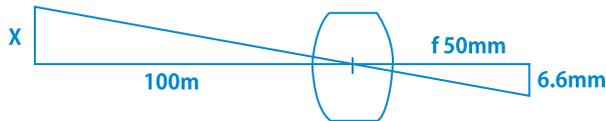
OPTICAL FORMULAS

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: 100mm Focal length: 50mm CCD: 2/3

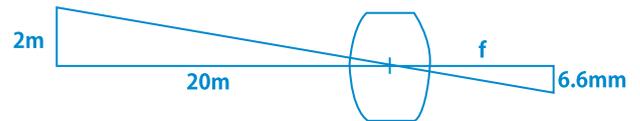


$$X = \frac{100,000 \times 6.6}{50} = 13,200 \text{ (mm)} \quad \text{Height: 13.2m}$$

Formula of Focal length

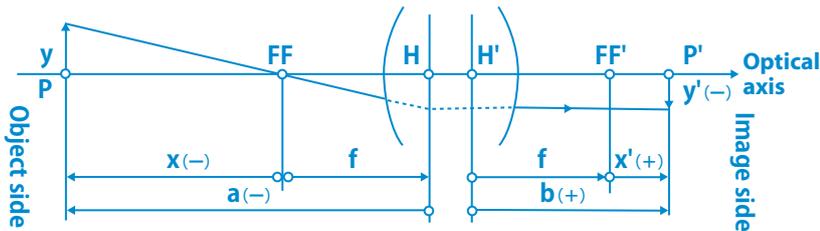
$$f = \frac{\text{Distance from lens to object} \times \text{Image size}}{\text{Height}}$$

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



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

Formula of conjugation relationship



Basics formula

$$-\frac{1}{a} + \frac{1}{b} = \frac{1}{f}$$

Horizontal magnification

$$M = \frac{y'}{y} = \frac{b}{a}$$

Object point distance

$$-a = \left(1 - \frac{1}{M}\right) \times f$$

Image point distance

$$b = (1 - M) \times f$$

f : Focal length

FF : Front side focal point

FF' : Rear side focal point

H : Front side principal point

H' : Rear side principal point

P : Object point

P' : Image point

a : Distance from front side point to object point

b : Distance from rear side principal point to image point

x : Distance from front side focal point to object point

x' : Distance from rear side focal point to image side point

M : Magnification

F No./NA Formula

Relationship of object side NA and image side NA (NA') $NA' = \frac{NA}{M}$

Relationship of F No. and Effective F no.(Ef) $Fe = (1 - M) F$

Relationship of NA and Effective F No.

$$NA' = \frac{1}{2Fe}$$

$$NA = \frac{M}{2Fe}$$

$$NA' = \frac{1}{2(1-M)F}$$

$$NA = \frac{M}{2(1-M)F}$$

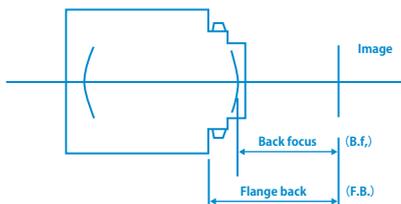
Camera mount and flange back

Back focus

Distance from the vertex of the last lens to the back focal point.

Flange back

Distance from the camera's lens mount reference surface to the focal 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
K Mount	45.5mm	Bayonet



Catalog 2025

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