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## MACHINE VISION LENSES



# MACHINE VISION LENS



About Us

**Kowa Optronics Co., Ltd.** is part of Kowa Company, Ltd., one of the largest privately owned companies in Japan. Founded in 1894, Kowa produces a wide variety of products in a number of industries, including but not limited to healthcare, industrial, and energy conservation sectors.

Since 1946, Kowa has developed and manufactured high-end optical equipment such as CCTV and machine vision lenses, spotting scopes, handheld binoculars, and coin operated binoculars.

With over 70 years of technical experience, Kowa Optronics Co., Ltd. continues its tradition of being a leader in its industries by providing innovative solutions and new technologies to solve even the toughest vision system obstacles.



Function Icons

- FLOAT** Floating Mechanism Design
- XD** Extra Low Dispersion
- LO-DIS** Low Distortion
- RUGGED** Ruggedized lens
- WR** Water Resistance
- DR** Dust Resistance
- WBMC** Wide-Band Multi-Coating
- SWIR** SWIR Coating
- IR** IR-Corrected
- 3CMOS** 3CMOS Camera

2" 50MEGAPIXEL 3.1μm

**VM Series**

- ▶ Large image size of φ32mm with M42-mount or TFL-mount.
- ▶ High quality lenses with a resolving power of 3.1μm.
- ▶ Suitable for 8K resolution and are rated at up to 50 megapixels for use with top performance cameras.



2/3" 10MEGAPIXEL (Better than 2.4μm)

**JC10M Series**

- ▶ 200lp/mm center resolution and low distortion maximize performance of high-end inspection.
- ▶ Short minimum object distance and compact design using aspherical lenses (6 models/f=3.7~25mm) allow for easy installation in compact machine vision systems.



2/3" ULTRA COMPACT 5 MEGAPIXEL 3.45μm

**JC5MC Series**

- ▶ One of the industry's smallest and lightest 5 megapixel lenses.
- ▶ Unique mechanical design to guard against strong vibration and shock.
- ▶ Easy to change the iris to the marked F-number by click-type iris mechanism. (F2.8, 4, 5.6, 8 and 16)



1" 12 MEGAPIXEL IR-CORRECTED (VIS-SWIR) 3.1μm

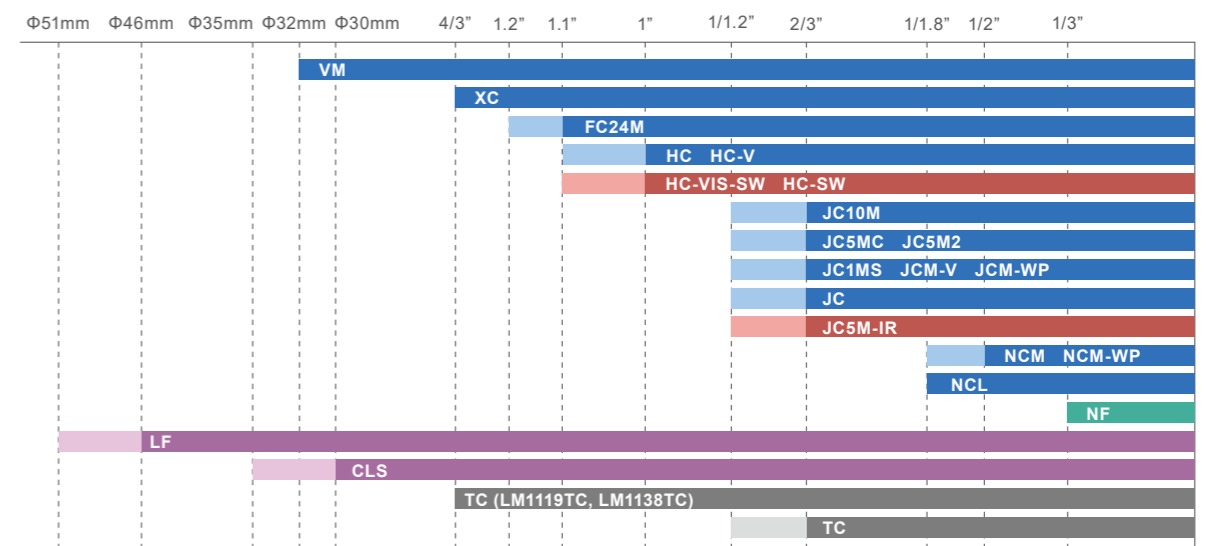
**HC-VIS-SW Series**

- ▶ A maximum of 12 megapixel and 3.1μm performance can be found at select wavelength ranges.
- ▶ Virtually zero focus shift from visible to 2000nm wavelength range.



	<b>2" 50MEGAPIXEL 3.1µm VM SERIES</b> ————— 06 <small>LM18VM42/LM18VM35 LM25VM42/LM25VM35 LM35VM42/LM35VM35</small>
	<b>4/3" 20 MEGAPIXEL PLUS XC SERIES</b> ————— 08 <small>LM8XC2 LM12XC2 LM16XC2 LM25XC2 LM35XC2 LM50XC2</small>
	<b>1.1" 24 MEGAPIXEL 2.5µm FC24M SERIES</b> ————— 10 <small>LM6FC24M LM8FC24M LM12FC24M LM16FC24M LM25FC24M LM35FC24M LM50FC24M</small>
	<b>1" MEGAPIXEL PLUS HC SERIES</b> ————— 12 <small>LM4HC LM6HC LM8HC LM12HC LM16HC LM25HC LM35HC LM50HC LM75HC</small>
	<b>1" RUGGEDIZED MEGAPIXEL PLUS HC-V SERIES</b> ————— 15 <small>LM8HC-V LM12HC-V LM16HC-V LM25HC-V LM35HC-V LM50HC-V</small>
	<b>2/3" 10 MEGAPIXEL JC10M SERIES</b> ————— 16 <small>LM3JC10M LM5JC10M LM8JC10M LM12JC10M LM16JC10M LM25JC10M LM35JC10M LM50JC10M</small>
	<b>2/3" 5 MEGAPIXEL 3.45µm JC5M2 SERIES</b> ————— 18 <small>LM12JC5M2 LM16JC5M2 LM25JC5M2 LM35JC5M2</small>
	<b>2/3" ULTRA COMPACT 5 MEGAPIXEL 3.45µm JC5MC SERIES</b> ————— 20 <small>LM8JC5MC LM12JC5MC LM16JC5MC LM25JC5MC LM35JC5MC LM50JC5MC</small>
	<b>WIDE MEGAPIXEL NCM/JCM SERIES</b> ————— 23 <small>LM3NC1M LM4NC1M LM6NC1M LM5JC1M</small>
	<b>2/3" MEGAPIXEL JC1MS SERIES</b> ————— 24 <small>LM8JC1MS LM12JC1MS LM16JC1MS LM25JC1MS LM35JC1MS LM50JC1MS LM75JC1MS LM100JC1MS</small>
	<b>2/3" RUGGEDIZED MEGAPIXEL JCM-V SERIES</b> ————— 26 <small>LM5JCM-V LM8JCM-V LM12JCM-V LM16JCM-V LM25JCM-V LM35JCM-V LM50JCM-V</small>
	<b>2/3" RUGGEDIZED WATER AND DUST RESISTANCE MEGAPIXEL NCM-WP/JCM-WP SERIES</b> ————— 28 <small>LM8NCM-WP LM5JCM-WP LM8JCM-WP LM12JCM-WP LM16JCM-WP LM25JCM-WP LM35JCM-WP LM50JCM-WP</small>
	<b>2/3" STANDARD JC SERIES</b> ————— 30 <b>1/1.8" STANDARD NCL SERIES</b> ————— 31 <small>LM6JC LM8JC LM12JC LM16JC LM25JC LM35JC LM50JC LM4NC1L LM5NC1L LM6NC1L LM12NC1L</small>

	<b>NEW 1" 12 MEGAPIXEL IR-CORRECTED (VIS-SWIR) 3.1µm HC-VIS-SW SERIES</b> ————— 33 <small>LM8HC-VIS-SW LM12HC-VIS-SW LM16HC-VIS-SW LM25HC-VIS-SW LM35HC-VIS-SW LM50HC-VIS-SW</small>
	<b>2/3" 5 MEGAPIXEL IR-CORRECTED (VIS-NIR) 3.45µm JC5M-IR SERIES</b> ————— 34 <small>LM16JC5M-IR LM25JC5M-IR LM35JC5M-IR</small>
	<b>1" SWIR MEGAPIXEL HC-SW SERIES</b> ————— 35 <small>LM8HC-SW LM12HC-SW LM16HC-SW LM25HC-SW LM35HC-SW LM50HC-SW</small>
	<b>LINE SCAN LF SERIES</b> ————— 36 <small>LM28LF LM35LF LM50LF</small>
	<b>3CCD LARGE FORMAT CLS SERIES</b> ————— 36 <small>LM28CL1S LM35CL1S LM50CL1S</small>
	<b>1/2.5" MEGAPIXEL S-MOUNT LENS</b> ————— 37 <small>LM3QS28 LM3QS40 LM3QS56</small>
	<b>1/3" NF-MOUNT NF SERIES</b> ————— 37 <small>LM3NF LM5NF LM6NF</small>
	<b>TELECENTRIC TC SERIES</b> ————— 38 <small>LM1119TC LM1138TC LM1120TC LM1121TC LM1122TC LM1123TC LM1125TC</small>
	<b>VARIFOVAL / MACRO ZOOM</b> ————— 40 <small>LMVZ4411 LMVZ990-R LMZ69M</small>
	<b>BUILT-TO-ORDER MODELS</b> ————— 41
	<b>ACCESSORIES</b> ————— 42



## VM Series

- ▶ Large image size of  $\phi 32$ mm with M42-mount or TFL-mount.
- ▶ High quality lenses with a resolving power of 3.1 $\mu$ m.
- ▶ Suitable for 8K resolution and are rated at up to 50 megapixels for use with top performance cameras.
- ▶ Kowa's new and innovative switch locking screw mechanism prevents thumb screws from falling off.
- ▶ The flange back distance can be modified by attaching optional mount adapters to convert to TFL-II or other formats.
- ▶ High magnification design with a focusing range as close as 0.1m away.

### Optional Mount Adapters

The flange back can change by using optional mount adapters included with each lens.

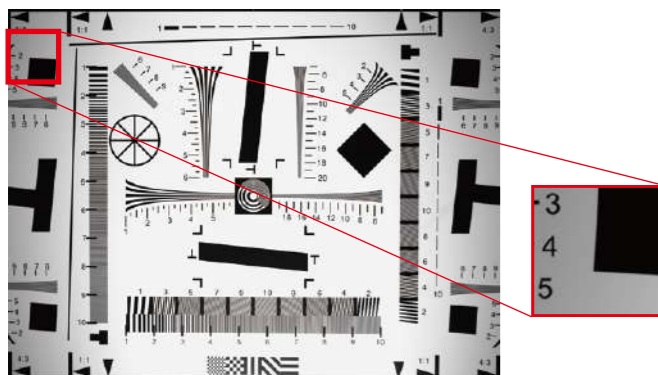
**Standard :** M42-mount has a 17.526mm flange back distance.



Series	Mount Adapter	Flange Back (mm)	Mount
VM42	FB-1600VM	16	M42 Mount
	FB-1148VM	11.48	M42 Mount
	FB-1000VM	10	M42 Mount
	FB-0656VM	6.56	M42 Mount
	FB-1750VM	17.5	TFL-II Mount

\*Mount adapters do not work with VM35 series lenses.

### High Resolution Image at the Corners (LM25VM).



### Switch Locking Screw Mechanism Prevents Fatigue Failure of Thumb Screws

Kowa's VM series features a newly designed switch locking screw mechanism that prevents thumb screws from falling off by utilizing a fixing screw that does not rotate in a set position. The thumb screw locks into place by sliding the fixing screw to the right side. It can then be detached by sliding the fixing screw to the left side.



The thumb screw can detach by sliding the fixing screw to the left side.

### Applications

- Line Scan
- FPD Inspection
- Aerial photography
- Drones

✓ Compatible ◇ Suitable — Incompatible

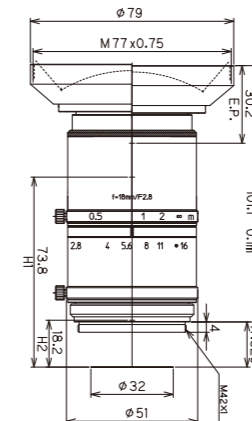
Model	Format Size( $\phi$ )						
	38.0	35.0	32.0	30.0	APS-C	4/3"	1.2" 1.1"
LM18VM42	—	—	✓	✓	✓	✓	✓
LM18VM35	—	—	—	—	—	—	—
LM25VM42	◇	◇	✓	✓	✓	✓	✓
LM25VM35	—	—	—	—	—	—	—
LM35VM42	◇	◇	✓	✓	✓	✓	✓
LM35VM35	—	—	—	—	—	—	—



### LM18VM42 LM18VM35



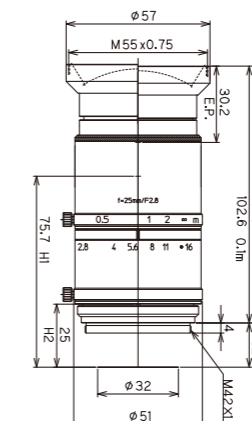
**LO-DIS** **FLOAT** **XD** **WBMC**  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating



### LM25VM42 LM25VM35



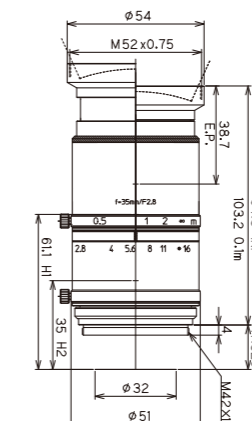
**LO-DIS** **FLOAT** **XD** **WBMC**  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating



### LM35VM42 LM35VM35



**LO-DIS** **FLOAT** **XD** **WBMC**  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating



Model	LM18VM42	LM18VM35
Focal Length(mm)	18	
Image Size(mm)	$\phi 32$	
Iris Range(F-stop)	F2.8~F16	
Focusing Range(m)	0.1~ $\infty$	
Control	Manual	
Iris	Manual	
Focus	Manual	
Shooting Range at M.O.D.(mm)	172(H) $\times$ 128(V)	
Angle of View	70.5 $\times$ 56.1	
2 Inch	70.5 $\times$ 56.1	
APS-C Inch	63.4 $\times$ 49.7	
(Degrees)	54.1 $\times$ 41.8	
4/3 Inch	54.1 $\times$ 41.8	
Resolution(Center, Corner)	160lp/mm,100lp/mm	
TV Distortion(%)	1.25	
Back Focus in Air(mm)	15.5	
Flange Focus in Air(mm)	17.526	
Mount	M42-mount	TFL-mount
Filter Thread(mm)	M77 $\times$ P0.75	
Size(mm)( $\infty$ )	$\phi 79 \times 99.6$	
Weight(g)	460	
Temperature Range	-10 $^{\circ}$ C~+50 $^{\circ}$ C	

Model	LM25VM42	LM25VM35
Focal Length(mm)	25	
Image Size(mm)	$\phi 32$	
Iris Range(F-stop)	F2.8~F16	
Focusing Range(m)	0.1~ $\infty$	
Control	Manual	
Iris	Manual	
Focus	Manual	
Shooting Range at M.O.D.(mm)	125(H) $\times$ 93(V)	
Angle of View	54.0 $\times$ 42.0	
2 Inch	54.0 $\times$ 42.0	
APS-C Inch	48.0 $\times$ 37.0	
(Degrees)	40.4 $\times$ 30.9	
4/3 Inch	40.4 $\times$ 30.9	
Resolution(Center, Corner)	160lp/mm,100lp/mm	
TV Distortion(%)	0.59	
Back Focus in Air(mm)	20.3	
Flange Focus in Air(mm)	17.526	
Mount	M42-mount	TFL-mount
Filter Thread(mm)	M55 $\times$ P0.75	
Size(mm)( $\infty$ )	$\phi 57 \times 101.8$	
Weight(g)	400	
Temperature Range	-10 $^{\circ}$ C~+50 $^{\circ}$ C	

Model	LM35VM42	LM35VM35
Focal Length(mm)	35	
Image Size(mm)	$\phi 32$	
Iris Range(F-stop)	F2.8~F16	
Focusing Range(m)	0.1~ $\infty$	
Control	Manual	
Iris	Manual	
Focus	Manual	
Shooting Range at M.O.D.(mm)	76(H) $\times$ 57(V)	
Angle of View	40.2 $\times$ 30.7	
2 Inch	40.2 $\times$ 30.7	
APS-C Inch	35.4 $\times$ 26.9	
(Degrees)	29.5 $\times$ 22.3	
4/3 Inch	29.5 $\times$ 22.3	
Resolution(Center, Corner)	160lp/mm,100lp/mm	
TV Distortion(%)	0.12	
Back Focus in Air(mm)	19.5	
Flange Focus in Air(mm)	17.526	
Mount	M42-mount	TFL-mount
Filter Thread(mm)	M52 $\times$ P0.75	
Size(mm)( $\infty$ )	$\phi 54 \times 94.3$	
Weight(g)	375	
Temperature Range	-10 $^{\circ}$ C~+50 $^{\circ}$ C	

† Images may differ from the actual product.

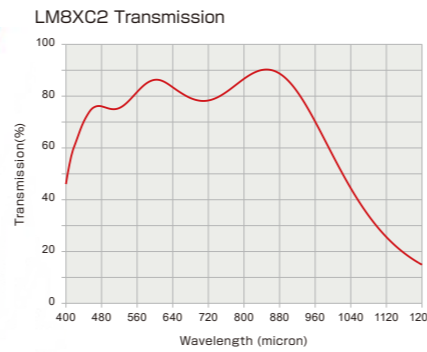
† Images may differ from the actual product.

## XC Series

- ▶ Large image size of Φ23mm incorporated within a C-mount design.
- ▶ Megapixel resolution is maintained throughout the entire image even when the iris is fully opened.
- ▶ High precision aspherical lens greatly reduces distortion and produces a high-definition picture.
- ▶ The LM8XC generates a very wide 93.5° horizontal angle of view.
- ▶ Kowa's floating mechanism system virtually eliminates optical aberrations from close distance to infinity.

✓ Compatible ◇ Suitable — Incompatible

Model	Format Size(Inch)						
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8
LM8XC	✓	✓	✓	✓	✓	✓	✓
LM12XC	✓	✓	✓	✓	✓	✓	✓
LM16XC	✓	✓	✓	✓	✓	✓	✓
LM25XC	✓	✓	✓	✓	✓	✓	✓
LM35XC	✓	✓	✓	✓	✓	✓	✓
LM50XC	✓	✓	✓	✓	✓	✓	✓



LO-DIS FLOAT KD WPMC  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating

Model	LM8XC
Focal Length(mm)	8.5
Image Size(mm)	18.4×13.8(Φ23)
Iris Range(F-stop)	F2.8~F22
Focusing Range(m)	0.1~∞
Control	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	238.4(H)×179.1(V)
	4/3 Inch: 93.5×77.1 1.1 Inch: 78.2×62.7 1 Inch: 72.9×57.9 2/3 Inch: 53.8×41.6
Resolution(Center, Corner)	160lp/mm, 80lp/mm
Avg Distortion(%)	0.12
Back Focus in Air(mm)	12.9
Diagnoses	C-mount
Filter Thread(mm)	M72×P0.75
Size(mm)(∞)	Φ74×82.5
Weight(g)	245
Temperature Range	-10°C~+50°C



LO-DIS FLOAT KD WPMC  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating

Model	LM12XC
Focal Length(mm)	12
Image Size(mm)	18.4×13.8(Φ23)
Iris Range(F-stop)	F2.0~F22
Focusing Range(m)	0.1~∞
Control	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	181.5(H)×135.5(V)
	4/3 Inch: 74.9×59.6 1.1 Inch: 60.6×47.1 1 Inch: 55.9×43.1 2/3 Inch: 39.8×30.2
Resolution(Center, Corner)	160lp/mm, 80lp/mm
Avg Distortion(%)	0.59
Back Focus in Air(mm)	13.0
Diagnoses	C-mount
Filter Thread(mm)	M55×P0.75
Size(mm)(∞)	Φ57×85
Weight(g)	270
Temperature Range	-10°C~+50°C

LM16XC



LO-DIS FLOAT KD WPMC  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating

LM25XC



LO-DIS FLOAT KD WPMC  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating

LM35XC



LO-DIS FLOAT WPMC  
Low Distortion Floating Wide-Band Multi-Coating

LM50XC



LO-DIS FLOAT WPMC  
Low Distortion Floating Wide-Band Multi-Coating

Model	LM16XC	LM25XC	LM35XC	LM50XC
Focal Length(mm)	16	25	35	50
Image Size(mm)	18.4×13.8(Φ23)	18.4×13.8(Φ23)	18.4×13.8(Φ23)	18.4×13.8(Φ23)
Iris Range(F-stop)	F2.0~F22	F2.0~F16	F2.0~F16	F2.0~F22
Focusing Range(m)	0.1~∞	0.15~∞	0.2~∞	0.3~∞
Control	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	134.6(H)×100.8(V)	124.8(H)×93.0(V)	100.3(H)×75.3(V)	100.2(H)×75.5(V)
	4/3 Inch: 60.6×47.2 1.1 Inch: 48.0×36.8 1 Inch: 44.0×33.6 2/3 Inch: 30.9×23.3	40.9×31.1 31.8×24.0 28.9×21.8 20.1×15.2	29.6×22.4 22.8×17.2 20.8×15.6 14.3×10.8	20.6×15.7 16.0×12.0 14.6×11.0 10.1×7.6
Resolution(Center, Corner)	160lp/mm, 80lp/mm	160lp/mm, 80lp/mm	160lp/mm, 80lp/mm	160lp/mm, 80lp/mm
Avg Distortion(%)	0.02	-0.57	-0.17	0.8
Back Focus in Air(mm)	13.0	24.3	15.2	21.6
Diagnoses	C-mount	C-mount	C-mount	C-mount
Filter Thread(mm)	M40.5×P0.5	M40.5×P0.5	M37.5×P0.5	M37.5×P0.5
Size(mm)(∞)	Φ45×79.5	Φ45×89	Φ45×74	Φ47×78
Weight(g)	250	255	210	235
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

Diagram of M.O.D. / Magnification Using A Close Up Ring

Model	LM8XC	LM12XC	LM16XC	LM25XC	LM35XC	LM50XC
(Non)M.O.D./Magnification	100mm/0.08×	100mm/0.10×	100mm/0.14×	150mm/0.15×	200mm/0.18×	300mm/0.18×
(1mm Ring)M.O.D./Magnification	30mm/0.19×	48mm/0.19×	64mm/0.20×	115mm/0.19×	174mm/0.21×	273mm/0.20×
(5mm Ring)M.O.D./Magnification	-	-	21mm/0.46×	56mm/0.35×	117mm/0.33×	204mm/0.28×
(10mm Ring)M.O.D./Magnification	-	-	-	31mm/0.55×	85mm/0.48×	158mm/0.39×
(20mm Ring)M.O.D./Magnification	-	-	-	12mm/0.96×	58mm/0.77×	115mm/0.59×

† Images may differ from the actual product.

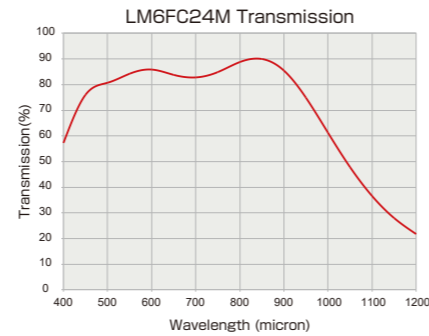
† Images may differ from the actual product.

## FC24M Series NEW

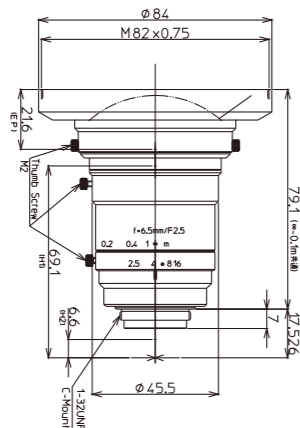
✓ Compatible   ◇ Suitable   ✗ Incompatible

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM6FC24M	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM8FC24M	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM12FC24M	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM16FC24M	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM25FC24M	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM35FC24M	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM50FC24M	✓	✓	✓	✓	✓	✓	✓	✓	✓

- ▶ 2.5 $\mu$ m pixel pitch high resolution compact lens.
- ▶ Compatible with maximum 1.2inch format size.
- ▶ Excellent corner brightness and low distortion.
- ▶ Kowa's floating mechanism system virtually eliminates optical aberrations from close distance to infinity.
- ▶ Kowa's wide-band multi-coating effectively decreases ghost and flare and produces a high transmission from the visible to NIR wavelength range.
- ▶ High traceability by QR code management.



**LM6FC24M**



Model	LM6FC24M
Focal Length(mm)	6.5
Image Size(mm)	14.1×10.6(Φ17.6)
Iris Range(F-stop)	F2.5-F16
Focusing Range(m)	0.1-∞
Control	Manual
Focus	Manual
Shooting Range at M.O.D.(mm)	256(H)×190(V)
Angle of View	1.1 Inch 95.7×78.7
(Degrees)	1 Inch 89.9×73.0
2/3 Inch	68.1×53.5
Resolution(Center, Corner)	200lp/mm, 100lp/mm
TV Distortion(%)	-1.51
Back Focus in Air(mm)	10.9
Mount	C-mount
Filter Thread(mm)	M82×P0.75
Size(mm)(∞)	Φ84×79.1
Weight(g)	300
Temperature Range	-10°C~+50°C



**LM8FC24**



**LM12FC24M**



**LM16FC24M**



**LM25FC24M**



**LM35FC24M**



**LM50FC24M**



Model	LM8FC24M	LM12FC24M	LM16FC24M	LM25FC24M	LM35FC24M	LM50FC24M
Focal Length(mm)	8.5	12	16	25	35	50
Image Size(mm)	14.1×10.6(Φ17.6)	14.1×10.6(Φ17.6)	14.1×10.6(Φ17.6)	14.1×10.6(Φ17.6)	14.1×10.6(Φ17.6)	14.1×10.6(Φ17.6)
Iris Range(F-stop)	F2.5-F16	F1.8-F16	F1.8-F16	F1.8-F16	F1.8-F16	F1.8-F16
Focusing Range(m)	0.1-∞	0.1-∞	0.1-∞	0.1-∞	0.2-∞	0.2-∞
Control	Manual	Manual	Manual	Manual	Manual	Manual
Focus	Manual	Manual	Manual	Manual	Manual	Manual
Shooting Range at M.O.D.(mm)	184(H)×138(V)	135(H)×101(V)	102(H)×77(V)	64(H)×48(V)	84(H)×63(V)	59(H)×44(V)
Angle of View	1.1 Inch 79.2×63.8	1 Inch 60.0×46.9	2/3 Inch 48.0×36.7	2/3 Inch 31.5×23.9	2/3 Inch 22.1×16.7	2/3 Inch 16.1×12.1
(Degrees)	1 Inch 73.9×58.8	2/3 Inch 55.3×42.9	2/3 Inch 43.6×33.4	2/3 Inch 28.7×21.7	2/3 Inch 20.2×15.2	2/3 Inch 14.6×11.0
Resolution(Center, Corner)	200lp/mm, 100lp/mm	200lp/mm, 100lp/mm	200lp/mm, 100lp/mm	200lp/mm, 100lp/mm	200lp/mm, 100lp/mm	200lp/mm, 100lp/mm
TV Distortion(%)	0.55	0.26	-0.4	-0.3	0.01	-0.03
Back Focus in Air(mm)	12.9	14.5	11.9	13.3	15.5	14.8
Mount	C-mount	C-mount	C-mount	C-mount	C-mount	C-mount
Filter Thread(mm)	M62×P0.75	M49×P0.75	M35.5×P0.5	M35.5×P0.5	M40.5×P0.5	M40.5×P0.5
Size(mm)(∞)	Φ64×73.3	Φ51×73.8	Φ43×65.7	Φ45×67.9	Φ45×66	Φ45×74.5
Weight(g)	230	260	200	220	205	205
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

Diagram of M.O.D. / Magnification Using A Close Up Ring

Model	LM6FC24M	LM8FC24M	LM12FC24M	LM16FC24M	LM25FC24M	LM35FC24M	LM50FC24M
(Non)M.O.D./Magnification	100mm/0.06×	100mm/0.08×	100mm/0.11×	100mm/0.14×	100mm/0.22×	200mm/0.17×	200mm/0.24×
(1mm Ring)M.O.D./Magnification	-	28mm/0.19×	50mm/0.18×	64mm/0.20×	82mm/0.26×	170mm/0.20×	184mm/0.26×
(5mm Ring)M.O.D./Magnification	-	-	-	20mm/0.45×	45mm/0.41×	106mm/0.31×	140mm/0.35×
(10mm Ring)M.O.D./Magnification	-	-	-	-	25mm/0.61×	71mm/0.46×	108mm/0.46×
(20mm Ring)M.O.D./Magnification	-	-	-	-	-	42mm/0.75×	76mm/0.68×

† Images may differ from the actual product.

† Images may differ from the actual product.

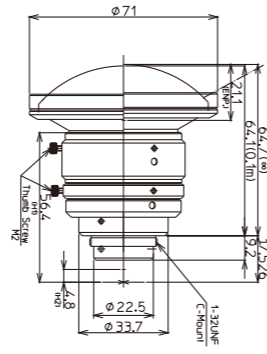
## HC Series

- ▶ Wide product range: 9 lenses in HC series
- ▶ Up to 5 megapixels performance
- ▶ Excellent corner brightness
- ▶ High performance compact lenses
- ▶ Low distortion

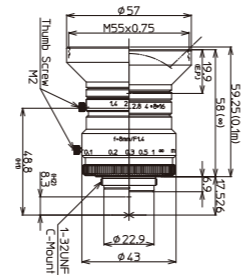
✓ Compatible ◊ Suitable ✗ Incompatible

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM4HC	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM6HC	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM8HC	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM12HC	✓	✓	◊	✓	✓	✓	✓	✓	✓
LM16HC	✓	✓	◊	✓	✓	✓	✓	✓	✓
LM25HC	✓	✓	◊	✓	✓	✓	✓	✓	✓
LM35HC	✓	✓	◊	✓	✓	✓	✓	✓	✓
LM50HC	✓	✓	◊	✓	✓	✓	✓	✓	✓
LM75HC	✓	✓	◊	✓	✓	✓	✓	✓	✓

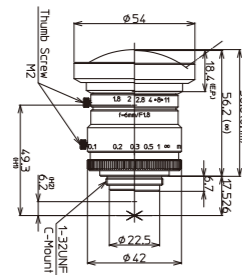
LM4HC



LM8HC



LM6HC

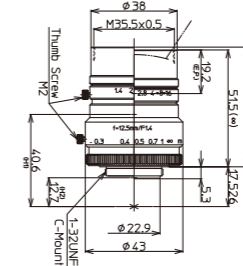


Model	LM4HC	LM6HC	LM8HC
Focal Length(mm)	4.7	6	8
Image Size(mm)	12.8×9.6 (Φ16)	12.8×9.6(Φ16)	12.8×9.6(Φ16)
Iris Range(F-stop)	F2.4~F11	F1.8~F11	F1.4~F16
Focusing Range(m)	0.1~∞	0.1~∞	0.1~∞
Control	Manual	Manual	Manual
Focus	Manual	Manual	Manual
Shooting Range at M.O.D.(mm)	375.6(H)×272.1(V)	267.4(H)×196.3(V)	196.0(H)×143.2(V)
Angle of View	112.2×95.4	96.8×79.4	79.4×63.0
(Degrees)	2/3 Inch	74.1×58.0	58.3×44.7
1/1.8 Inch	77.4×60.8	62.6×48.2	48.5×36.9
Resolution(Center, Corner)	100lp/mm, 50lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm
TV Distortion(%)	-0.58	-0.2	-1.2
Back Focus in Air(mm)	9.0	11.1	11.2
Mount	C-mount	C-mount	C-mount
Filter Thread(mm)	*	-	M55×P0.75
Size(mm)(∞)	Φ71×64.7	Φ54×56.2	Φ57×58
Weight(g)	360	215	205
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

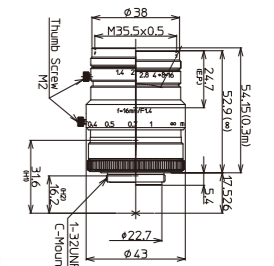
\*Optional filter holder can be attached.

† Images may differ from the actual product.

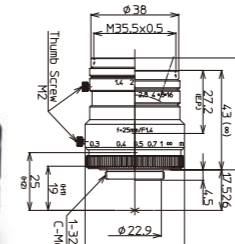
LM12HC



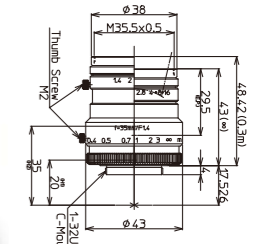
LM16HC



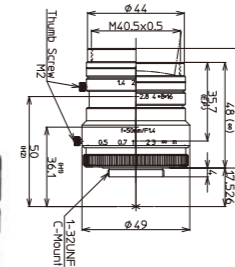
LM25HC



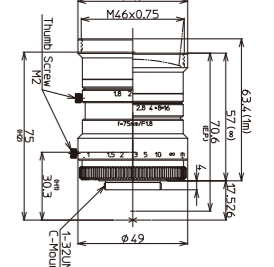
LM35HC



LM50HC



LM75HC



Model	LM12HC	LM16HC	LM25HC	LM35HC	LM50HC	LM75HC
Focal Length(mm)	12.5	16	25	35	50	75
Image Size(mm)	12.8×9.6(Φ16)	12.8×9.6(Φ16)	12.8×9.6(Φ16)	12.8×9.6(Φ16)	12.8×9.6(Φ16)	12.8×9.6(Φ16)
Iris Range(F-stop)	F1.4~F16	F1.4~F16	F1.4~F16	F1.4~F16	F1.4~F16	F1.8~F16
Focusing Range(m)	0.3~∞	0.3~∞	0.3~∞	0.3~∞	0.5~∞	1.0~∞
Control	Manual	Manual	Manual	Manual	Manual	Manual
Focus	Manual	Manual	Manual	Manual	Manual	Manual
Shooting Range at M.O.D.(mm)	330.6(H)×243.5(V)	251.5(H)×186.2(V)	160.7(H)×119.2(V)	110.1(H)×82.0(V)	121.8(H)×91.3(V)	165.5(H)×123.9(V)
Angle of View	55.6×42.5	44.3×33.6	29.3×22.0	20.9×15.8	14.5×10.8	9.7×7.3
(Degrees)	2/3 Inch	39.1×29.5	30.8×23.2	20.2×15.1	14.4×10.8	10.0×7.5
1/1.8 Inch	32.1×24.2	25.3×19.0	16.5×12.4	11.8×8.8	8.2×6.2	5.5×4.1
Resolution(Center, Corner)	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm
TV Distortion(%)	-1.58	-1.0	-1.0	-0.5	0.05	-0.2
Back Focus in Air(mm)	12.6	12.6	16.5	16.8	14.8	14.5
Mount	C-mount	C-mount	C-mount	C-mount	C-mount	C-mount
Filter Thread(mm)	M35.5×P0.5	M35.5×P0.5	M35.5×P0.5	M35.5×P0.5	M40.5×P0.5	M46×P0.75
Size(mm)(∞)	Φ43×51.5	Φ43×52.9	Φ43×43	Φ43×43	Φ49×48	Φ49×57
Weight(g)	160	150	135	135	210	195
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

Diagram of M.O.D. / Magnification Using A Close Up Ring

Model	LM4HC	LM6HC	LM8HC	LM12HC	LM16HC	LM25HC	LM35HC	LM50HC	LM75HC
(Non)M.O.D./Magnification	100mm/0.04×	100mm/0.05×	100mm/0.07×	300mm/0.04×	300mm/0.05×	300mm/0.08×	300mm/0.12×	500mm/0.11×	1000mm/0.078×
(1mm Ring)M.O.D./Magnification	-	-	-	93mm/0.12×	134mm/0.11×	200mm/0.12×	243mm/0.15×	424mm/0.13×	858mm/0.091×
(5mm Ring)M.O.D./Magnification	-	-	-	-	-	83mm/0.28×	138mm/0.26×	269mm/0.20×	553mm/0.14×
(10mm Ring)M.O.D./Magnification	-	-	-	-	-	-	91mm/0.40×	189mm/0.30×	389mm/0.21×
(20mm Ring)M.O.D./Magnification	-	-	-	-	-	-	-	124mm/0.50×	251mm/0.34×

† Images may differ from the actual product.



## HC-V Series

✓ Compatible ◊ Suitable ✗ Incompatible

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM8HC-V	✗	✗	✗	✓	✓	✓	✓	✓	✓
LM12HC-V	✗	✗	◊	✓	✓	✓	✓	✓	✓
LM16HC-V	✗	✗	✗	✓	✓	✓	✓	✓	✓
LM25HC-V	✗	◊	◊	✓	✓	✓	✓	✓	✓
LM35HC-V	✗	✗	✗	✓	✓	✓	✓	✓	✓
LM50HC-V	✗	✗	✗	✓	✓	✓	✓	✓	✓
LM75HC-V	✗	✗	✗	✓	✓	✓	✓	✓	✓

The HC-V series is made for use in high vibration and shock environments. With a design based on Kowa's standard 1" HC lenses, this ruggedized megapixel lens series is ideal for applications that require increased durability and high optical performance.

- ▶ Up to 5 megapixels performance
- ▶ Unique mechanical design to guard against strong vibration and shock.
- ▶ Two way reversible nut is utilized instead of thumb screws in order to tightly lock the focus adjustment ring in place.
- ▶ Utilizing two way reversible nut contributes to the prevention of screw dropping troubles.
- ▶ All internal glass elements are glued to the inside housing to improve stability.
- ▶ Interchangeable iris plates are used to select the F-stop.



### Interchangeable Iris Plates

- The HC-V series uses interchangeable iris plates instead of mechanical iris diaphragms with moving blades. You can choose from four iris plates to adjust the F-stop.



### Interchangeable Iris Plates

### Focus Adjustment Procedure

- Unscrew the bottom ring of the outside body to adjust the focus to optimal position.
- Screw the red two way reversible nut on the center body towards the bottom ring to lock in the focus.



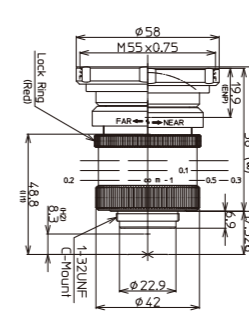
### Two Way Reversible Nut

Instruction Video

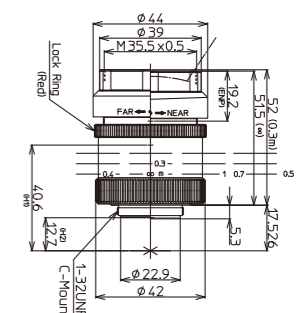


† Images may differ from the actual product.

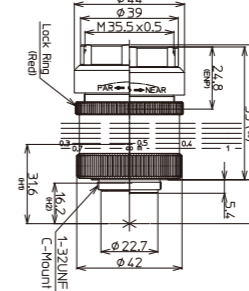
### LM8HC-V



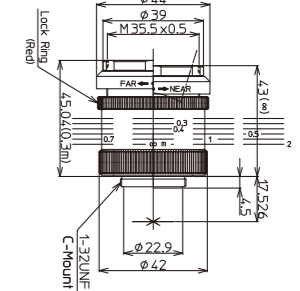
### LM12HC-V



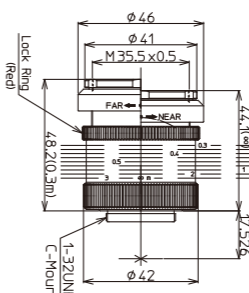
### LM16HC-V



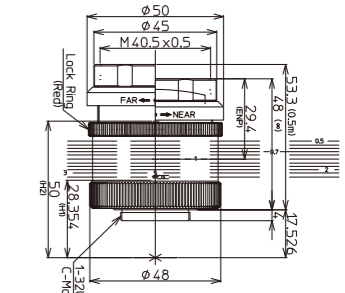
### LM25HC-V



### LM35HC-V



### LM50HC-V



Model	LM8HC-V	LM12HC-V	LM16HC-V	LM25HC-V	LM35HC-V	LM50HC-V
Focal Length (mm)	8	12.5	16	25	35	50
Image Size (mm)	12.8×9.6 (Φ16)	12.8×9.6 (Φ16)	12.8×9.6 (Φ16)	12.8×9.6 (Φ16)	12.8×9.6 (Φ16)	12.8×9.6 (Φ16)
Iris Range (F-stop)	F1.4 / F2.8 / F4 / F8	F1.4 / F2.8 / F4 / F8	F1.4 / F2.8 / F4 / F8	F1.4 / F2.8 / F4 / F8	F1.4 / F2.8 / F4 / F8	F1.4 / F2.8 / F4 / F8
Focusing Range (m)	0.1~∞	0.3~∞	0.3~∞	0.3~∞	0.3~∞	0.5~∞
Control	Iris	-	-	-	-	-
Focus	Manual	Manual	Manual	Manual	Manual	Manual
Shooting Range at M.O.D. (mm)	196.0(H)×143.0(V)	330.6(H)×243.5(V)	251.5(H)×186.2(V)	160.7(H)×119.2(V)	110.1(H)×82.0(V)	121.8(H)×91.3(V)
Angle of View	1 Inch 79.7×63.0	55.6×42.5	44.3×33.6	29.3×22.0	20.9×15.8	14.5×10.8
2/3 Inch	58.3×44.7	39.1×29.5	30.8×23.2	20.2×15.1	14.4×10.8	10.0×7.5
(Degrees) 1/1.8 Inch	48.5×36.9	32.1×24.2	25.3×19.0	16.5×12.4	11.8×8.8	8.2×6.2
Resolution(Center, Corner)	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm
TV Distortion (%)	-1.2	-1.58	-1.0	-1.0	-0.5	0.05
Back Focus in Air(mm)	11.2	12.6	12.6	16.5	16.8	14.8
Mount	C-mount	C-mount	C-mount	C-mount	C-mount	C-mount
Filter Thread (mm)	M55×P0.75	M35.5×P0.5	M35.5×P0.5	M35.5×P0.5	M35.5×P0.5	M40.5×P0.5
Size (mm)(∞)	Φ58×58	Φ44×51.5	Φ44×53	Φ44×43	Φ46×44.1	Φ50×48
Weight(g)	183	130	120	104	133	170
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

† Images may differ from the actual product.

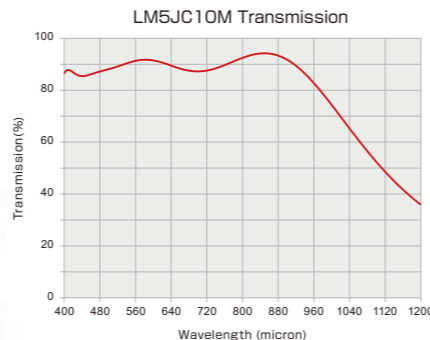


# JC10M Series

- ▶ 200lp/mm center resolution and low distortion maximize performance of high-end inspection.
- ▶ Incorporating Kowa's wide-band multi-coating and floating mechanism system, the JC10M lens series greatly reduces chromatic aberration from close distance to infinity and maintains a high transmission from visible to NIR.
- ▶ Short minimum object distance and compact design using aspherical lenses (6models/f=3.7~25mm) allow for easy installation in compact machine vision systems.

✓ Compatible ◊ Suitable — Incompatible

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM3JC10M	—	—	—	—	◊	✓	✓	✓	✓
LM5JC10M	—	—	—	—	—	—	—	—	✓
LM8JC10M	—	—	—	—	—	—	—	—	✓
LM12JC10M	—	—	—	—	—	—	—	—	✓
LM16JC10M	—	—	—	—	—	—	—	—	✓
LM25JC10M	—	—	—	—	—	—	—	—	✓
LM35JC10M	—	—	—	—	—	—	—	—	✓
LM50JC10M	—	—	—	—	—	—	—	—	✓



LM8JC10M



LO-DIS FLOAT XD WBMC  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating

LM12JC10M



LO-DIS FLOAT XD WBMC  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating

LM16JC10M



LO-DIS FLOAT WBMC  
Low Distortion Floating Wide-Band Multi-Coating

LM25JC10M



LO-DIS FLOAT WBMC  
Low Distortion Floating Wide-Band Multi-Coating

LM35JC10M



LO-DIS FLOAT WBMC  
Low Distortion Floating Wide-Band Multi-Coating

LM50JC10M



LO-DIS FLOAT XD WBMC  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating

LM3JC10M



LO-DIS FLOAT XD WBMC  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating

Model	LM3JC10M
Focal Length(mm)	3.7
Image Size(mm)	8.8×6.6(Φ11)
Iris Range(F-stop)	F2.8-F16
Focusing Range(m)	0.1~∞
Control Iris	Manual
Focus	Manual
Shooting Range at M.O.D.(mm)	278.7(H)×207.3(V)
Angle of 2/3 Inch	100.2×83.7
View 1/1.8 Inch	88.7×72.4
(Degrees) 1/2 Inch	82.0×66.1
Resolution(Center, Corner)	200lp/mm, 125lp/mm
TV Distortion(%)	-0.09
Back Focus in Air(mm)	9.9
Mount	CC-mount
Filter Thread(mm)	M55×0.75
Size(mm)(∞)	Φ57×54
Weight(g)	120
Temperature Range	-10°C~+50°C

LM5JC10M



LO-DIS FLOAT XD WBMC  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating

Model	LM5JC10M
Focal Length(mm)	5
Image Size(mm)	8.8×6.6(Φ11)
Iris Range(F-stop)	F1.8-F16
Focusing Range(m)	0.1~∞
Control Iris	Manual
Focus	Manual
Shooting Range at M.O.D.(mm)	197.0(H)×147.0(V)
Angle of 2/3 Inch	82.2×66.5
View 1/1.8 Inch	71.1×56.5
(Degrees) 1/2 Inch	64.9×51.1
Resolution(Center, Corner)	200lp/mm, 140lp/mm
TV Distortion(%)	-0.33
Back Focus in Air(mm)	10.3
Mount	C-mount
Filter Thread(mm)	M46×P0.75
Size(mm)(∞)	Φ48×59.4
Weight(g)	120
Temperature Range	-10°C~+50°C

Model	LM8JC10M	LM12JC10M	LM16JC10M	LM25JC10M	LM35JC10M	LM50JC10M
Focal Length(mm)	8.5	12	16	25	35	50
Image Size(mm)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)
Iris Range(F-stop)	F1.8-F22	F1.8-F11	F1.8-F16	F1.8-F16	F2.0-F16	F2.8-F16
Focusing Range(m)	0.1~∞	0.1~∞	0.1~∞	0.1~∞	0.1~∞	0.1~∞
Control Iris	Manual	Manual	Manual	Manual	Manual	Manual
Focus	Manual	Manual	Manual	Manual	Manual	Manual
Shooting Range at M.O.D.(mm)	133.2(H)×99.6(V)	80.7(H)×60.2(V)	61.1(H)×45.7(V)	36.7(H)×27.5(V)	23.4(H)×17.6(V)	19.1(H)×14.3(V)
Angle of 2/3 Inch	54.0×41.9	39.1×29.8	30.0×22.7	20.0×15.1	14.3×10.8	10.1×7.6
View 1/1.8 Inch	45.3×34.8	32.4×24.6	24.7×18.6	16.4×12.3	11.7×8.8	8.2×6.1
(Degrees) 1/2 Inch	40.8×31.2	28.9×21.9	22.0×16.6	14.6×11.0	10.4×7.8	7.3×5.5
Resolution(Center, Corner)	200lp/mm, 160lp/mm	200lp/mm, 160lp/mm	200lp/mm, 160lp/mm	200lp/mm, 160lp/mm	200lp/mm, 160lp/mm	200lp/mm, 160lp/mm
TV Distortion(%)	0.31	-0.12	-0.2	-0.09	0.05	-0.02
Back Focus in Air(mm)	12.1	13.9	14.6	17.9	14.2	12.8
Mount	C-mount	C-mount	C-mount	C-mount	C-mount	C-mount
Filter Thread(mm)	M34×P0.5	M25.5×P0.5	M25.5×P0.5	M25.5×P0.5	M34×P0.5	M30.5×P0.5
Size(mm)(∞)	Φ36×56	Φ33×53.5	Φ33×47.5	Φ33×45.5	Φ43×49	Φ38×77
Weight(g)	115	105	90	95	160	170
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

Diagram of M.O.D. / Magnification Using A Close Up Ring

Model	LM3JC10M	LM5JC10M	LM8JC10M	LM12JC10M	LM16JC10M	LM25JC10M	LM35JC10M	LM50JC10M
(Non)M.O.D./Magnification	100mm/0.03×	100mm/0.05×	100mm/0.07×	100mm/0.11×	100mm/0.15×	100mm/0.24×	100mm/0.38×	100mm/0.46×
(1mm Ring)M.O.D./Magnification	-	-	20mm/0.20×	48mm/0.19×	61mm/0.21×	79mm/0.28×	85mm/0.40×	91mm/0.48×
(5mm Ring)M.O.D./Magnification	-	-	-	-	18mm/0.45×	46mm/0.44×	65mm/0.50×	76mm/0.58×
(10mm Ring)M.O.D./Magnification	-	-	-	-	-	29mm/0.63×	49mm/0.62×	64mm/0.70×
(20mm Ring)M.O.D./Magnification	-	-	-	-	-	-	31mm/0.87×	49mm/0.94×

† Images may differ from the actual product.

† Images may differ from the actual product.

## JC5M2 Series

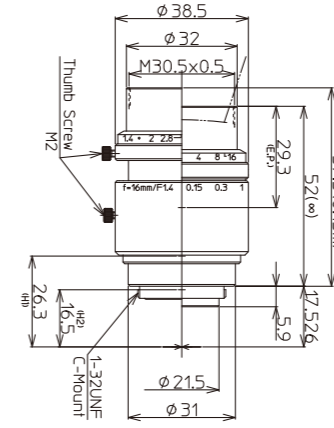
- ▶ Incorporating Kowa's floating mechanism system, the JC5M2 lens series greatly reduces chromatic aberration from close distance to infinity.
- ▶ Good performance at the edge as well as the center.
- ▶ Available in F1.4. (LM12JC5M2 and LM16-JC5M2)

✓ Compatible ◊ Suitable — Incompatible

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM12JC5M2	—	—	—	—	—	✓	✓	✓	✓
LM16JC5M2	—	—	—	—	—	✓	✓	✓	✓
LM25JC5M2	—	—	—	—	◊	✓	✓	✓	✓
LM35JC5M2	—	—	—	◊	◊	✓	✓	✓	✓

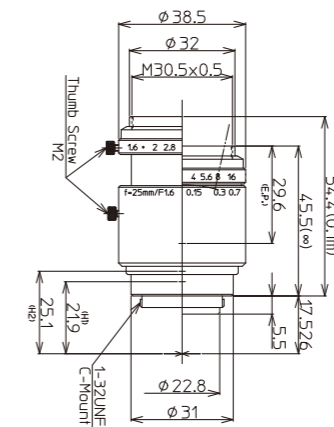


### LM16JC5M2



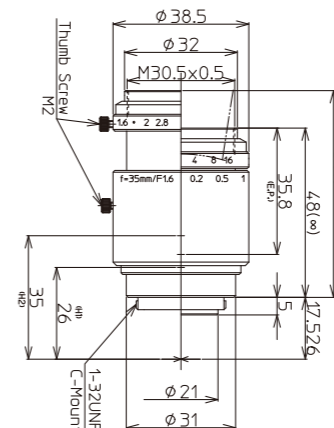
**LO-DIS** **FLOAT**  
Low Distortion Floating

### LM25JC5M2



**LO-DIS** **FLOAT**  
Low Distortion Floating

### LM35JC5M2



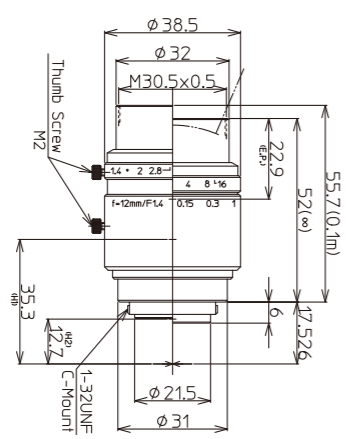
**LO-DIS** **FLOAT**  
Low Distortion Floating

Model	LM16JC5M2
Focal Length(mm)	16
Image Size(mm)	8.8×6.6(Φ11)
Iris Range(F-stop)	F1.4~F16
Focusing Range(m)	0.1~∞
Control	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	64.6(H)×48.4(V)
Angle of View	2/3 Inch: 29.9×22.7 1/1.8 Inch: 24.7×18.6 1/2 Inch: 22.0×16.6
Resolution(Center, Corner)	160lp/mm, 125lp/mm
TV Distortion(%)	0.03
Back Focus in Air(mm)	11.6
Mount	C-mount
Filter Thread(mm)	M30.5×P0.5
Size(mm)(∞)	Φ38.5×52
Weight(g)	125
Temperature Range	-10°C~+50°C

Model	LM25JC5M2
Focal Length(mm)	25
Image Size(mm)	8.8×6.6(Φ11)
Iris Range(F-stop)	F1.6~F16
Focusing Range(m)	0.1~∞
Control	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	35.1(H)×26.3(V)
Angle of View	2/3 Inch: 19.9×15.0 1/1.8 Inch: 16.4×12.3 1/2 Inch: 14.6×10.9
Resolution(Center, Corner)	160lp/mm, 125lp/mm
TV Distortion(%)	-0.01
Back Focus in Air(mm)	11.2
Mount	C-mount
Filter Thread(mm)	M30.5×P0.5
Size(mm)(∞)	Φ38.5×45.5
Weight(g)	115
Temperature Range	-10°C~+50°C

Model	LM35JC5M2
Focal Length(mm)	35
Image Size(mm)	8.8×6.6(Φ11)
Iris Range(F-stop)	F1.6~F16
Focusing Range(m)	0.18~∞
Control	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	42.1(H)×31.6(V)
Angle of View	2/3 Inch: 14.3×10.8 1/1.8 Inch: 11.7×8.8 1/2 Inch: 10.4×7.8
Resolution(Center, Corner)	160lp/mm, 125lp/mm
TV Distortion(%)	-0.03
Back Focus in Air(mm)	12.2
Mount	C-mount
Filter Thread(mm)	M30.5×P0.5
Size(mm)(∞)	Φ38.5×48
Weight(g)	120
Temperature Range	-10°C~+50°C

### LM12JC5M2



Model	LM12JC5M2
Focal Length(mm)	12.5
Image Size(mm)	8.8×6.6(Φ11)
Iris Range(F-stop)	F1.4~F16
Focusing Range(m)	0.1~∞
Control	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	81.4(H)×60.9(V)
Angle of View	2/3 Inch: 38.4×29.2 1/1.8 Inch: 31.7×24.0 1/2 Inch: 28.4×21.4
Resolution(Center, Corner)	160lp/mm, 125lp/mm
TV Distortion(%)	-0.06
Back Focus in Air(mm)	11.5
Mount	C-mount
Filter Thread(mm)	M30.5×P0.5
Size(mm)(∞)	Φ38.5×52
Weight(g)	130
Temperature Range	-10°C~+50°C

**LO-DIS** **FLOAT**  
Low Distortion Floating

#### Diagram of M.O.D. / Magnification Using A Close Up Ring

Model	LM12JC5M2	LM16JC5M2	LM25JC5M2	LM35JC5M2
(Non)M.O.D./Magnification	100mm/0.109×	100mm/0.137×	100mm/0.251×	180mm/0.209×
(1mm Ring)M.O.D./Magnification	50mm/0.184×	62mm/0.195×	86mm/0.288×	160mm/0.235×
(5mm Ring)M.O.D./Magnification	-	-	54mm/0.434×	109mm/0.341×
(10mm Ring)M.O.D./Magnification	-	-	-	78mm/0.470×
(20mm Ring)M.O.D./Magnification	-	-	-	49mm/0.728×

† Images may differ from the actual product.

† Images may differ from the actual product.

## JC5MC Series

- ▶ One of the industry's smallest and lightest 5 megapixel lenses.
- ▶ Roughly half the size of Kowa's current 2/3" 5MP JC5M2 series lenses.
- ▶ Unique mechanical design to guard against strong vibration and shock.
- ▶ Easy to change the iris to the marked F-number by click-type iris mechanism. (F2.8, 4, 5.6, 8 and 16)

**50%\* Size Reduction**  
 \*50% smaller than the JC5M2 series lenses

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM8JC5MC	-	-	-	-	✓	✓	✓	✓	✓
LM12JC5MC	-	-	-	-	✓	✓	✓	✓	✓
LM16JC5MC	-	-	-	-	✓	✓	✓	✓	✓
LM25JC5MC	-	-	-	-	✓	✓	✓	✓	✓
LM35JC5MC	-	-	-	◇	◇	✓	✓	✓	✓
LM50JC5MC	-	-	-	-	◇	✓	✓	✓	✓



*LM16JC5MC*



*LM25JC5MC*



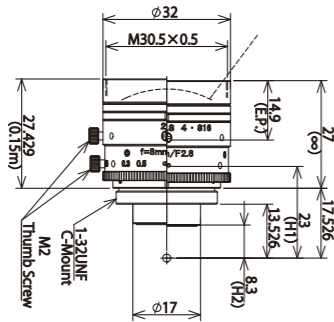
*LM35JC5MC*



*LM50JC5MC*

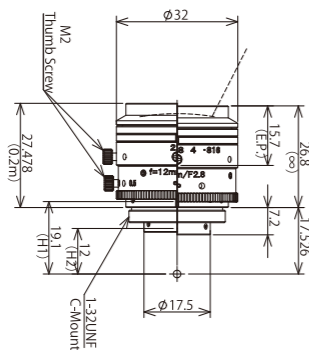


*LM8JC5MC*



Model	LM8JC5MC
Focal Length(mm)	8
Image Size(mm)	8.8×6.6(Φ11)
Iris Range(F-stop)	F2.8~F16
Focusing Range(m)	0.15~∞
Control Iris	Manual
Focus	Manual
Shooting Range at M.O.D.(mm)	178.0(H)×132.0(V)
Angle of 2/3 Inch	57.6×44.4
View 1/1.8 Inch	48.1×36.7
(Degrees) 1/3 Inch	43.1×32.8
Resolution(Center, Corner)	160lp/mm, 100lp/mm
TV Distortion(%)	-0.85
Back Focus in Air(mm)	10.8
Mount	C-mount
Filter Thread(mm)	M30.5×P0.5
Size(mm)(∞)	Φ32×27
Weight(g)	55
Temperature Range	-10°C~+50°C

*LM12JC5MC*



Model	LM12JC5MC
Focal Length(mm)	12
Image Size(mm)	8.8×6.6(Φ11)
Iris Range(F-stop)	F2.8~F16
Focusing Range(m)	0.2~∞
Control Iris	Manual
Focus	Manual
Shooting Range at M.O.D.(mm)	159.0(H)×118.0(V)
Angle of 2/3 Inch	41.0×31.2
View 1/1.8 Inch	33.9×25.6
(Degrees) 1/3 Inch	30.3×22.8
Resolution(Center, Corner)	160lp/mm, 100lp/mm
TV Distortion(%)	-0.43
Back Focus in Air(mm)	12.6
Mount	C-mount
Filter Thread(mm)	*
Size(mm)(∞)	Φ32×26.8
Weight(g)	55
Temperature Range	-10°C~+50°C

Model	LM16JC5MC	LM25JC5MC	LM35JC5MC	LM50JC5MC
Focal Length(mm)	16	25	35	50
Image Size(mm)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)
Iris Range(F-stop)	F2.8~F16	F2.8~F16	F2.8~F16	F2.8~F16
Focusing Range(m)	0.2~∞	0.2~∞	0.3~∞	0.3~∞
Control Iris	Manual	Manual	Manual	Manual
Focus	Manual	Manual	Manual	Manual
Shooting Range at M.O.D.(mm)	117.0(H)×88.0(V)	75.0(H)×56.0(V)	48.0(H)×36.0(V)	49.0(H)×37.0(V)
Angle of 2/3 Inch	30.9×23.4	20.0×15.0	14.0×10.6	10.0×7.5
View 1/1.8 Inch	25.5×19.2	16.4×12.4	11.5×8.7	8.2×6.2
(Degrees) 1/3 Inch	22.7×17.2	14.6×11.0	10.3×7.7	7.3×5.5
Resolution(Center, Corner)	160lp/mm, 100lp/mm	160lp/mm, 100lp/mm	160lp/mm, 125lp/mm	160lp/mm, 125lp/mm
TV Distortion(%)	-0.09	0.06	-0.02	-0.01
Back Focus in Air(mm)	14.7	11.7	13.3	14.9
Mount	C-mount	C-mount	C-mount	C-mount
Filter Thread(mm)	*	*	M30.5×P0.5	M30.5×P0.5
Size(mm)(∞)	Φ32×26.5	Φ32×25	Φ32×27.9	Φ32×34.7
Weight(g)	55	55	50	60
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

\*Optional filter holder can be attached. (M30.5×P0.5)

Diagram of M.O.D. / Magnification Using A Close Up Ring

Model	LM8JC5MC	LM12JC5MC	LM16JC5MC	LM25JC5MC	LM35JC5MC	LM50JC5MC
(Non)M.O.D./Magnification	150mm/0.05×	200mm/0.06×	200mm/0.08×	200mm/0.12×	200mm/0.183×	300mm/0.180×
(1mm Ring)M.O.D./Magnification	35mm/0.18×	75mm/0.13×	105mm/0.14×	145mm/0.16×	174mm/0.211×	272mm/0.201×
(5mm Ring)M.O.D./Magnification	-	-	-	66mm/0.32×	115mm/0.325×	201mm/0.280×
(10mm Ring)M.O.D./Magnification	-	-	-	-	82mm/0.465×	154mm/0.381×
(20mm Ring)M.O.D./Magnification	-	-	-	-	53mm/0.748×	109mm/0.579×

† Images may differ from the actual product.

† Images may differ from the actual product.

## NCM/JCM Series

✓ Compatible ◇ Suitable — Incompatible

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM3NCM	—	—	—	—	—	—	✓	✓	✓
LM6NCM	—	—	—	—	—	—	—	◇	✓
LM5JCM	—	—	—	—	—	—	—	✓	✓

- ▶ Super wide optical design
- ▶ Large angle of view
- ▶ Expansion angle  
(Horizontal angle 82degree, Vertical angle 66degree)

† 2/3" model: LM5JCM, 1/1.8" model: LM3NCM

### Low distortion

- ▶ Reduces the distortion to corner

† LM5JCM: Under 0.5%, LM3NCM: Under 0.4% (TV distortion)

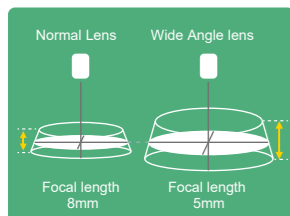
### High quality

- ▶ Adapts to 2 megapixel cameras
- ▶ Improves center and corner resolution
- ▶ High transmittance

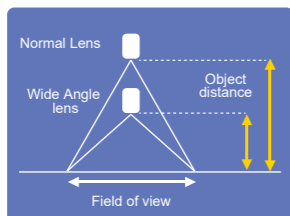


Corner image comparison  
(Super wide angle lens vs. Standard lens)

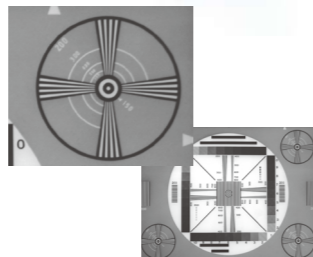
#### Long Depth of field



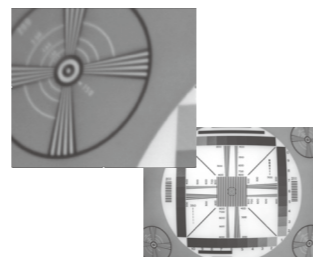
#### Short Close distance



LM5JCM: 2/3inch f=5mm

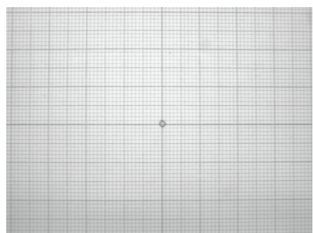


LM6JC: 2/3inch f=6mm

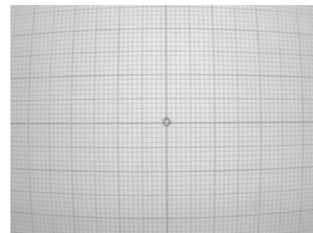


#### Distortion comparison at short distance object

LM5JCM: 2/3inch f=5mm



LM6JC: 2/3inch f=6mm

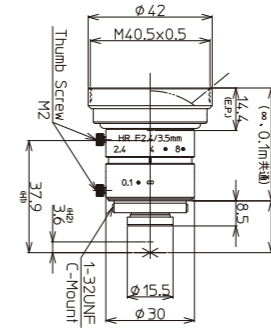


Capture image taken by 2megapixel camera

### LM3NCM



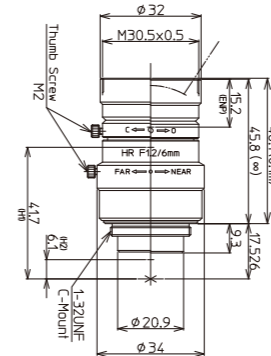
LO-DIS  
Low Distortion



### LM6NCM



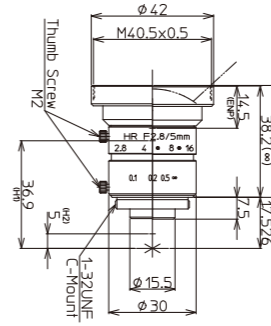
LO-DIS  
Low Distortion



### LM5JCM



LO-DIS  
Low Distortion



Model	LM3NCM
Focal Length(mm)	3.5
Image Size(mm)	7.2×5.4(Φ9)
Iris Range(F-stop)	F2.4~F14
Focusing Range(m)	0.1~∞
Control	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	226.3(H)×171.4(V)
Angle of View (Degrees)	2/3 inch: - 1/1.8 inch: 89.0×73.8 1/2 inch: 82.4×66.9 1/3 inch: 66.9×52.7
Resolution(Center, Corner)	120lp/mm, 100lp/mm
TV Distortion(%)	0.4
Back Focus in Air(mm)	9.7
Mount	C-mount
Filter Thread(mm)	M40.5×P0.5
Size(mm)(∞)	Φ42×38.2
Weight(g)	85
Temperature Range	-10°C~+50°C

Model	LM6NCM
Focal Length(mm)	6
Image Size(mm)	6.4×4.8(Φ8)
Iris Range(F-stop)	F1.2~Close
Focusing Range(m)	0.1~∞
Control	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	122.2(H)×91.0(V)
Angle of View (Degrees)	2/3 inch: - 1/1.8 inch: - 1/2 inch: 56.2×43.5 1/3 inch: 43.5×33.2
Resolution(Center, Corner)	120lp/mm, 100lp/mm
TV Distortion(%)	-0.2
Back Focus in Air(mm)	8.2
Mount	C-mount
Filter Thread(mm)	M30.5×P0.5
Size(mm)(∞)	Φ34×45.8
Weight(g)	100
Temperature Range	-10°C~+50°C

Model	LM5JCM
Focal Length(mm)	5
Image Size(mm)	8.8×6.6(Φ11)
Iris Range(F-stop)	F2.8~F16
Focusing Range(m)	0.1~∞
Control	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	200.8(H)×150.8(V)
Angle of View (Degrees)	2/3 inch: 82.4×66.9 1/1.8 inch: 71.7×57.1 1/2 inch: 65.2×51.3 1/3 inch: -
Resolution(Center, Corner)	120lp/mm, 100lp/mm
TV Distortion(%)	0.5
Back Focus in Air(mm)	10.0
Mount	C-mount
Filter Thread(mm)	M40.5×P0.5
Size(mm)(∞)	Φ42×38.2
Weight(g)	84
Temperature Range	-10°C~+50°C

† Images may differ from the actual product.

† Images may differ from the actual product.

# JC1MS Series

- ▶ Wide product range: 9 lenses in JC1MS series
- ▶ Equivalent to 2 megapixels performance
- ▶ World standard and popular lens series
- ▶ Excellent corner brightness
- ▶ Low distortion

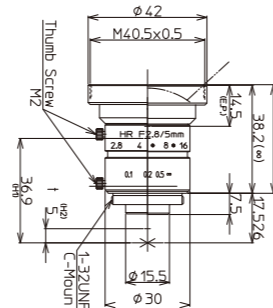
✓ Compatible ◊ Suitable — Incompatible

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM5JCM	—	—	—	—	—	✓	✓	✓	✓
LM8JC1MS	—	—	—	—	—	✓	✓	✓	✓
LM12JC1MS	—	—	—	—	—	✓	✓	✓	✓
LM16JC1MS	—	—	—	—	—	✓	✓	✓	✓
LM25JC1MS	—	—	—	—	—	✓	✓	✓	✓
LM35JC1MS	—	—	—	—	—	✓	✓	✓	✓
LM50JC1MS	—	—	—	—	—	✓	✓	✓	✓
LM75JC1MS	—	—	—	—	—	✓	✓	✓	✓
LM100JC1MS	—	—	—	—	—	✓	✓	✓	✓

### LM5JCM



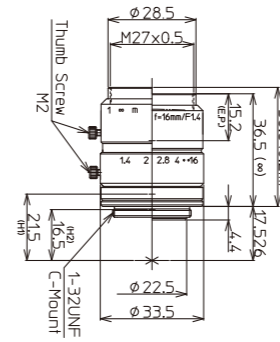
**LO-DIS**  
Low Distortion



### LM16JC1MS



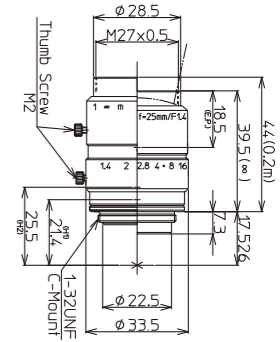
**LO-DIS FLOAT**  
Low Distortion Floating



### LM25JC1MS



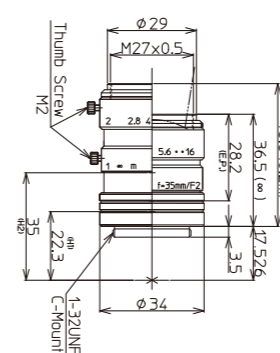
**LO-DIS FLOAT**  
Low Distortion Floating



### LM35JC1MS



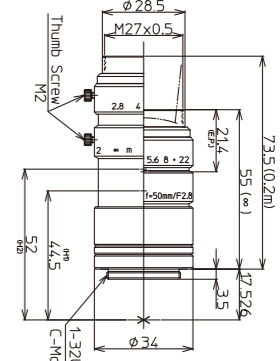
**FLOAT**  
Floating



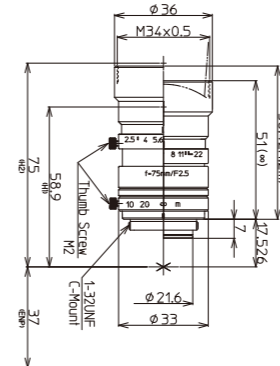
### LM50JC1MS



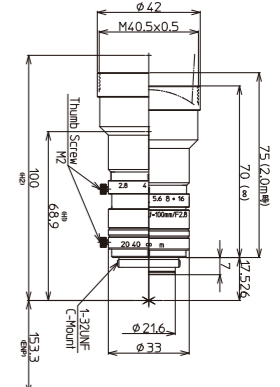
**LO-DIS FLOAT**  
Low Distortion Floating



### LM75JC1MS



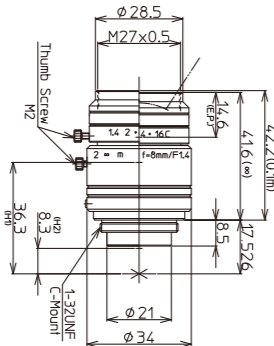
### LM100JC1MS



### LM8JC1MS



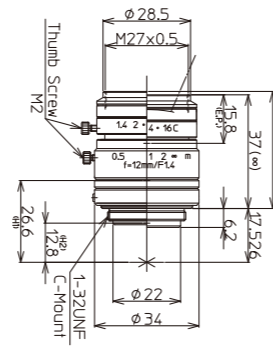
**LO-DIS**  
Low Distortion



### LM12JC1MS



**LO-DIS**  
Low Distortion



Model	LM5JCM	LM8JC1MS	LM12JC1MS
Focal Length(mm)	5	8	12
Image Size(mm)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)
Iris Range(F-stop)	F2.8-F16	F1.4-Close	F1.4-Close
Focusing Range(m)	0.1-∞	0.1-∞	0.15-∞
Control	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	200.8(H)×150.8(V)	120.3(H)×90.0(V)	110.0(H)×82.5(V)
Angle of View	2/3 Inch: 82.4×66.9 1/1.8 Inch: 71.7×57.1 (Degrees) 1/2 Inch: 65.2×51.3	56.5×43.9 47.4×36.3 42.6×32.5	38.3×29.1 31.7×24.0 28.3×21.4
Resolution(Center, Corner)	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm
TV Distortion(%)	0.5	-0.6	-0.07
Back Focus in Air(mm)	10.0	9.74	11.7
Mount	C-mount	C-mount	C-mount
Filter Thread(mm)	M40.5×P0.5	M27×P0.5	M27×P0.5
Size(mm)(∞)	Φ42×38.2	Φ34×41.6	Φ34×37
Weight(g)	84	90	85
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

Model	LM16JC1MS	LM25JC1MS	LM35JC1MS	LM50JC1MS	LM75JC1MS	LM100JC1MS
Focal Length(mm)	16	25	35	50	75	100
Image Size(mm)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)
Iris Range(F-stop)	F1.4-F16	F1.4-F16	F2.0-F16	F2.8-F22	F2.5-F22	F2.8-F32
Focusing Range(m)	0.2-∞	0.2-∞	0.2-∞	0.2-∞	1.2-∞	2.0-∞
Control	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	112.8(H)×84.4(V)	71.1(H)×53.3(V)	47.9(H)×35.8(V)	29.3(H)×21.9(V)	132.6(H)×99.6(V)	168.8(H)×126.6(V)
Angle of View	2/3 Inch: 30.0×22.7 1/1.8 Inch: 24.7×18.6 (Degrees) 1/2 Inch: 21.8×16.4	19.6×14.8 16.1×12.1 14.0×10.5	14.4×10.8 11.8×8.8 10.5×7.9	9.6×7.2 7.9×5.9 7.0×5.2	6.7×5.0 5.5×4.1 4.9×3.7	5.0×3.8 4.1×3.1 3.7×2.8
Resolution(Center, Corner)	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm
TV Distortion(%)	-0.05	-0.04	-0.2	-0.03	-0.1	-0.05
Back Focus in Air(mm)	13.1	11.7	20.1	35.5	18.0	19.0
Mount	C-mount	C-mount	C-mount	C-mount	C-mount	C-mount
Filter Thread(mm)	M27×P0.5	M27×P0.5	M27×P0.5	M27×P0.5	M34×P0.5	M40.5×P0.5
Size(mm)(∞)	Φ33.5×36.5	Φ33.5×39.5	Φ34×36.5	Φ34×55	Φ36×51	Φ42×70
Weight(g)	85	90	70	95	105	145
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

Diagram of M.O.D. / Magnification Using A Close Up Ring

Model	LM5JCM	LM8JC1MS	LM12JC1MS	LM16JC1MS	LM25JC1MS	LM35JC1MS	LM50JC1MS	LM75JC1MS	LM100JC1MS
(Non)M.O.D./Magnification	100mm/0.04×	100mm/0.07×	150mm/0.08×	200mm/0.08×	200mm/0.12×	200mm/0.18×	200mm/0.30×	1200mm/0.07×	2000mm/0.05×
(1mm Ring)M.O.D./Magnification	-	30mm/0.20×	70mm/0.16×	110mm/0.14×	150mm/0.16×	175mm/0.21×	190mm/0.32×	1010mm/0.08×	1700mm/0.06×
(5mm Ring)M.O.D./Magnification	-	-	-	-	73mm/0.31×	115mm/0.32×	160mm/0.39×	630mm/0.13×	1060mm/0.10×
(10mm Ring)M.O.D./Magnification	-	-	-	-	-	81mm/0.46×	135mm/0.48×	440mm/0.20×	740mm/0.15×
(20mm Ring)M.O.D./Magnification	-	-	-	-	-	51mm/0.73×	105mm/0.65×	285mm/0.34×	480mm/0.25×

† Images may differ from the actual product.

† Images may differ from the actual product.

## JCM-V Series

✓ Compatible ◇ Suitable — Incompatible

Model	Format Size(Inch)						
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8
LM5JCM-V	-	-	-	-	✓	✓	✓
LM8JCM-V	-	-	-	-	✓	✓	✓
LM12JCM-V	-	-	-	-	✓	✓	✓
LM16JCM-V	-	-	-	-	✓	✓	✓
LM25JCM-V	-	-	-	-	✓	✓	✓
LM35JCM-V	-	-	◇	◇	✓	✓	✓
LM50JCM-V	-	◇	◇	◇	✓	✓	✓

The JCM-V Series is designed for use in high vibration and shock environments. With a design based on Kowa's standard 2/3" JC1MS lenses, this ruggedized megapixel lens series is ideal for applications that require increased durability and high optical performance.

- ▶ Equivalent to 2 megapixels performance
- ▶ Two way reversible nut is utilized instead of thumb screws in order to tightly lock the focus adjustment ring in place.
- ▶ Utilizing two way reversible nut contributes to the prevention of screw dropping troubles.

- ▶ Interchangeable iris plates are used to select the F-stop.
- ▶ Unique mechanical design to guard against strong vibration and shock.
- ▶ All internal glass elements are glued to the inside housing to improve stability.

### Interchangeable Iris Plates

- The JCM-V series uses interchangeable iris plates instead of mechanical iris diaphragms with moving blades. You can choose from four iris plates to adjust the F-stop.



Interchangeable Iris Plates

### Focus Adjustment Procedure

- Unscrew the bottom ring of the outside body to adjust the focus to optimal position.
- Screw the red two way reversible nut on the center body towards the bottom ring to lock in the focus.

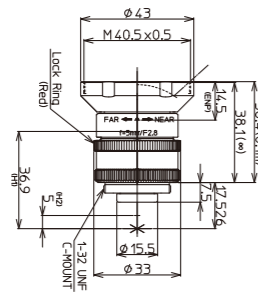


Instruction Video



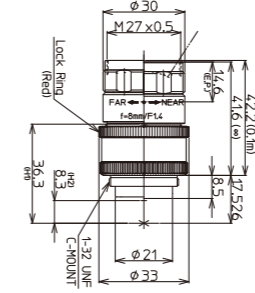
Two Way Reversible Nut

### LM5JCM-V



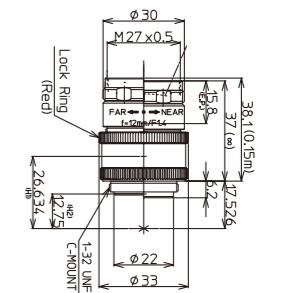
Model	LM5JCM-V
Focal Length (mm)	5
Image Size (mm)	8.8×6.6 (Φ11)
Iris Range (F-stop)	F2.8 / F4 / F5.6 / F8
Focusing Range (m)	0.1~∞
Control Iris	-
Control Focus	Manual
Shooting Range at M.O.D. (mm)	200.8(H)×150.8(V)
Angle of View (Degrees)	2/3 Inch: 82.4×66.9 1/1.8 Inch: 71.7×57.1 1/2 Inch: 65.2×51.3
Resolution(Center, Corner)	120lp/mm, 100lp/mm
TV Distortion (%)	0.5
Back Focus in Air(mm)	10.0
Mount	C-mount
Filter Thread (mm)	M40.5×P0.5
Size (mm)(∞)	Φ43×38.4
Weight(g)	73
Temperature Range	-10°C~+50°C

### LM8JCM-V



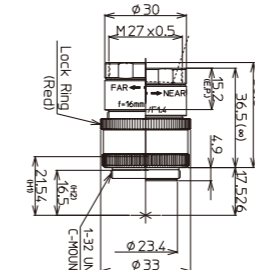
LO-DIS RUGGED Low Distortion Ruggedized lens

### LM12JCM-V



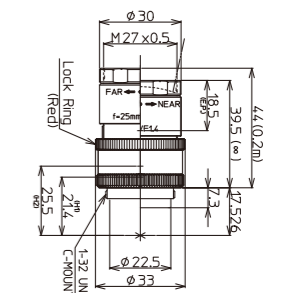
LO-DIS RUGGED Low Distortion Ruggedized lens

### LM16JCM-V



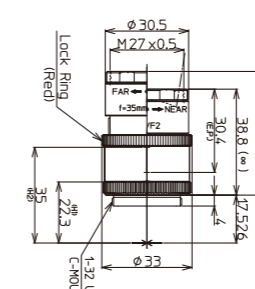
LO-DIS RUGGED Low Distortion Ruggedized lens

### LM25JCM-V



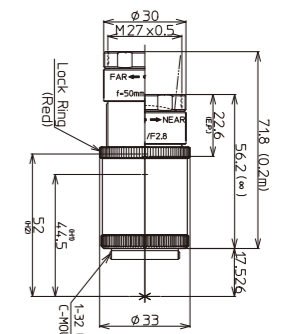
LO-DIS RUGGED Low Distortion Ruggedized lens

### LM35JCM-V



LO-DIS RUGGED Low Distortion Ruggedized lens

### LM50JCM-V



LO-DIS RUGGED Low Distortion Ruggedized lens

Model	LM8JCM-V	LM12JCM-V	LM16JCM-V	LM25JCM-V	LM35JCM-V	LM50JCM-V
Focal Length (mm)	8	12	16	25	35	50
Image Size (mm)	8.8×6.6 (Φ11)	8.8×6.6 (Φ11)	8.8×6.6 (Φ11)	8.8×6.6 (Φ11)	8.8×6.6 (Φ11)	8.8×6.6 (Φ11)
Iris Range (F-stop)	F1.4 / F4 / F8 / F16	F1.4 / F4 / F8 / F16	F1.4 / F4 / F8 / F16	F1.4 / F4 / F8 / F16	F2 / F4 / F8 / F16	F2.8 / F4 / F8 / F16
Focusing Range (m)	0.1~∞	0.15~∞	0.2~∞	0.2~∞	0.2~∞	0.2~∞
Control Iris	-	-	-	-	-	-
Control Focus	Manual	Manual	Manual	Manual	Manual	Manual
Shooting Range at M.O.D. (mm)	120.3(H)×90.0(V)	110.0(H)×82.5(V)	112.8(H)×84.4(V)	71.1(H)×53.3(V)	47.9(H)×35.8(V)	29.3(H)×21.9(V)
Angle of View (Degrees)	2/3 Inch: 56.5×43.9 1/1.8 Inch: 47.4×36.3 1/2 Inch: 42.6×32.5	2/3 Inch: 38.3×29.1 1/1.8 Inch: 31.7×24.0 1/2 Inch: 28.3×21.4	2/3 Inch: 30.0×22.7 1/1.8 Inch: 24.7×18.6 1/2 Inch: 21.8×16.4	2/3 Inch: 19.6×14.8 1/1.8 Inch: 16.1×12.1 1/2 Inch: 14.0×10.5	2/3 Inch: 14.4×10.8 1/1.8 Inch: 11.8×8.8 1/2 Inch: 10.5×7.9	2/3 Inch: 9.6×7.2 1/1.8 Inch: 7.9×5.9 1/2 Inch: 7.0×5.2
Resolution(Center, Corner)	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm
TV Distortion (%)	-0.6	-0.07	-0.05	-0.04	-0.2	-0.03
Back Focus in Air(mm)	9.74	11.7	13.1	11.7	20.1	35.5
Mount	C-mount	C-mount	C-mount	C-mount	C-mount	C-mount
Filter Thread (mm)	M27×P0.5	M27×P0.5	M27×P0.5	M27×P0.5	M27×P0.5	M27×P0.5
Size (mm)(∞)	Φ33×41.6	Φ33×37.0	Φ33×36.5	Φ33×39.5	Φ33×38.8	Φ33×56.2
Weight(g)	88	75	76.5	83	72.5	85
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

† Images may differ from the actual product.

† Images may differ from the actual product.



# JCM-WP Series

The JCM-WP series is a water and dust resistant high-resolution lens with a design based on Kowa's ruggedized megapixel JCM-V lenses.

\*Performance may not be secured depending on environment and condition to be used.

\*Not intended for underwater use.

\*Refer to the instructions and our web page for more information.

- ▶ Water repellency and easy cleaning of the front lens surface by applying Kowa's special coating.
- ▶ Two way reversible nut is utilized instead of thumb screws in order to tightly lock the focus adjustment ring in place.
- ▶ Utilizing two way reversible nut contributes to the prevention of screw dropping troubles.

- ▶ Interchangeable iris plates are used to select the F-stop.
- ▶ All internal glass elements are glued to the inside housing to improve stability.
- ▶ Equivalent to 2 megapixels performance



† Image is for illustration purposes

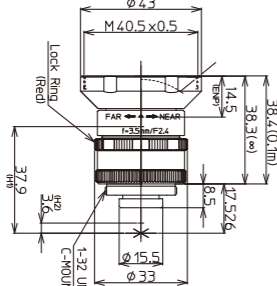
Model	Format Size(Inch)						
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8
LM3NCM-WP	-	-	-	-	-	✓	✓
LM5JCM-WP	-	-	-	-	-	✓	✓
LM8JCM-WP	-	-	-	-	-	✓	✓
LM12JCM-WP	-	-	-	-	-	✓	✓
LM16JCM-WP	-	-	-	-	-	✓	✓
LM25JCM-WP	-	-	-	-	-	✓	✓
LM35JCM-WP	-	-	-	◇	◇	✓	✓
LM50JCM-WP	-	-	-	◇	◇	✓	✓

✓ Compatible ◇ Suitable - Incompatible

### Interchangeable Iris Plates

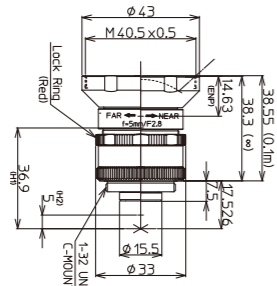
- The JCM-WP series uses interchangeable iris plates instead of mechanical iris diaphragms with moving blades. You can choose from four iris plates to adjust the F-stop.

#### LM3NCM-WP



LO-DIS RUGGED WR DR  
Low Distortion Ruggedized lens Water Resistance Dust Resistance

#### LM5JCM-WP



LO-DIS RUGGED WR DR  
Low Distortion Ruggedized lens Water Resistance Dust Resistance

### Focus Adjustment Procedure

- Unscrew the bottom ring of the outside body to adjust the focus to optimal position.
- Screw the red two way reversible nut on the center body towards the bottom ring to lock in the focus.



Interchangeable Iris Plates

Two Way Reversible Nut

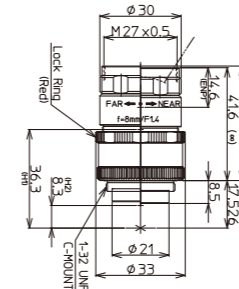
Instruction Video



Model	LM3NCM-WP	LM5JCM-WP
Focal Length (mm)	3.5	5
Image Size (mm)	7.2×5.4 (Φ9)	8.8×6.6 (Φ11)
Iris Range (F-stop)	F2.8 / F4 / F5.6 / F8	F2.8 / F4 / F5.6 / F8
Focusing Range (m)	0.1~∞	0.1~∞
Control Iris	-	-
Focus	Manual	Manual
Shooting Range at M.O.D. (mm)	226.3(H)×171.4(V)	200.8(H)×150.8(V)
Angle of View	-	82.4×66.9
(Degrees)	-	82.4×66.9
Resolution(Center, Corner)	100lp/mm, 80lp/mm	120lp/mm, 100lp/mm
TV Distortion (%)	0.4	0.5
Back Focus in Air(mm)	10.0	10.2
Mount	C-mount	C-mount
Filter Thread (mm)	M40.5×P0.5	M40.5×P0.5
Size (mm)(∞)	Φ43×38.3	Φ43×38.3
Weight(g)	80	75
Temperature Range	-10°C~+50°C	-10°C~+50°C

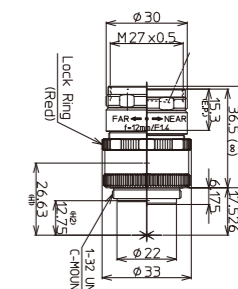
† Images may differ from the actual product.

#### LM8JCM-WP



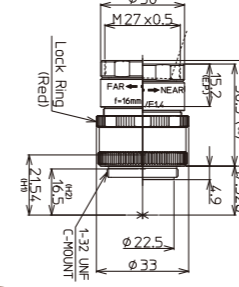
LO-DIS RUGGED WR DR  
Low Distortion Ruggedized lens Water Resistance Dust Resistance

#### LM12JCM-WP



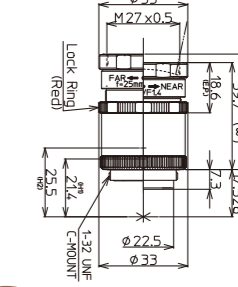
LO-DIS RUGGED WR DR  
Low Distortion Ruggedized lens Water Resistance Dust Resistance

#### LM16JCM-WP



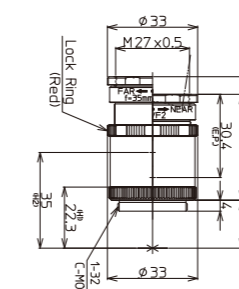
LO-DIS RUGGED WR DR  
Low Distortion Ruggedized lens Water Resistance Dust Resistance

#### LM25JCM-WP



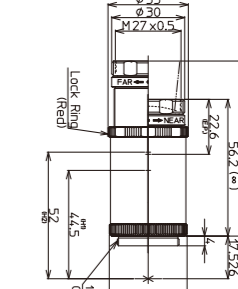
LO-DIS RUGGED WR DR  
Low Distortion Ruggedized lens Water Resistance Dust Resistance

#### LM35JCM-WP



LO-DIS RUGGED WR DR  
Low Distortion Ruggedized lens Water Resistance Dust Resistance

#### LM50JCM-WP



LO-DIS RUGGED WR DR  
Low Distortion Ruggedized lens Water Resistance Dust Resistance

Model	LM8JCM-WP	LM12JCM-WP	LM16JCM-WP	LM25JCM-WP	LM35JCM-WP	LM50JCM-WP
Focal Length (mm)	8	12	16	25	35	50
Image Size (mm)	8.8×6.6 (Φ11)	8.8×6.6 (Φ11)	8.8×6.6 (Φ11)	8.8×6.6 (Φ11)	8.8×6.6 (Φ11)	8.8×6.6 (Φ11)
Iris Range (F-stop)	F1.4 / F4 / F8 / F16	F1.4 / F4 / F8 / F16	F1.4 / F4 / F8 / F16	F1.4 / F4 / F8 / F16	F2 / F4 / F8 / F16	F2.8 / F4 / F8 / F16
Focusing Range (m)	0.1~∞	0.15~∞	0.2~∞	0.2~∞	0.2~∞	0.2~∞
Control Iris	-	-	-	-	-	-
Focus	Manual	Manual	Manual	Manual	Manual	Manual
Shooting Range at M.O.D. (mm)	120.3(H)×90.0(V)	110.0(H)×82.5(V)	112.8(H)×84.4(V)	71.1(H)×53.3(V)	47.9(H)×35.8(V)	29.3(H)×21.9(V)
Angle of View	56.5×43.9	38.3×29.1	30.0×22.7	19.6×14.8	14.4×10.8	9.6×7.2
(Degrees)	56.5×43.9	38.3×29.1	30.0×22.7	19.6×14.8	14.4×10.8	9.6×7.2
Resolution(Center, Corner)	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm	120lp/mm, 100lp/mm
TV Distortion (%)	-0.6	-0.07	-0.05	-0.04	-0.2	-0.03
Back Focus in Air(mm)	9.74	11.7	13.1	11.7	19.9	35.4
Mount	C-mount	C-mount	C-mount	C-mount	C-mount	C-mount
Filter Thread (mm)	M27×P0.5	M27×P0.5	M27×P0.5	M27×P0.5	M27×P0.5	M27×P0.5
Size (mm)(∞)	Φ33×41.6	Φ33×36.5	Φ33×36.5	Φ33×39.7	Φ33×38.8	Φ33×56.2
Weight(g)	85	75	75	75	65	85
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

† Images may differ from the actual product.



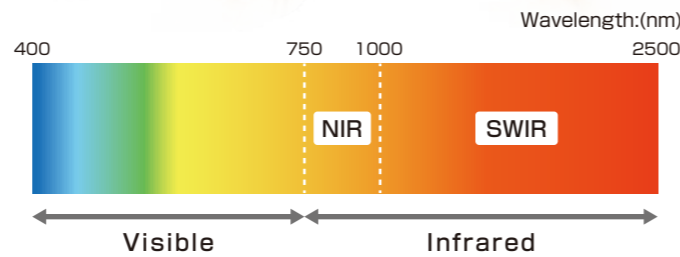
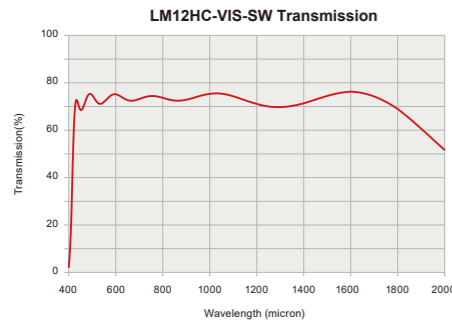


## HC-VIS-SW Series

- A maximum of 12 megapixel and 3.1 $\mu$ m performance can be found at select wavelength ranges.
- Virtually zero focus shift from visible to 2000nm wavelength range.
- Utilizes ultra wideband multi-coatings to increase transmission.
- Special extra low dispersion (XD) glass significantly reduces chromatic aberration, otherwise known as color fringing.

✓ Compatible ◊ Suitable — Incompatible

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM8HC-VIS-SW	—	—	—	✓	✓	✓	✓	✓	✓
LM12HC-VIS-SW	—	—	—	✓	✓	✓	✓	✓	✓
LM16HC-VIS-SW	—	—	—	✓	✓	✓	✓	✓	✓
LM25HC-VIS-SW	—	—	◊	✓	✓	✓	✓	✓	✓
LM35HC-VIS-SW	—	◊	◊	✓	✓	✓	✓	✓	✓
LM50HC-VIS-SW	◊	◊	◊	✓	✓	✓	✓	✓	✓

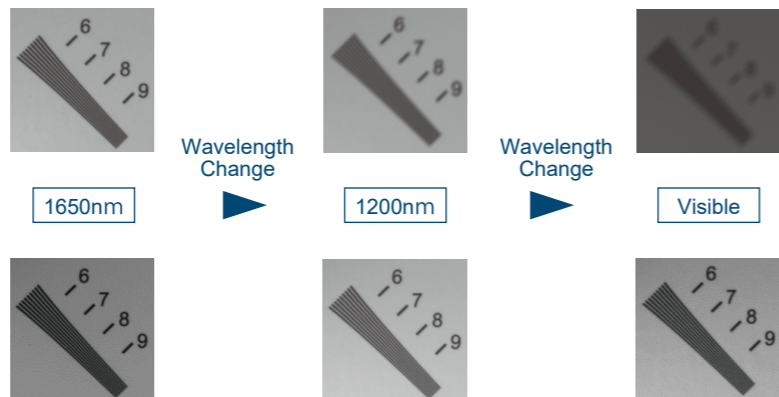
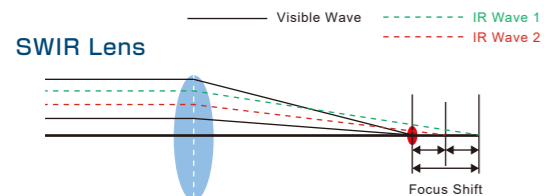


### Design of IR-Corrected Lenses

In addition to having high transmission, Kowa's HC-VIS-SW series is IR-Corrected. The primary benefit for IR-Correction is that it allows an image to remain in focus even when the wavelength changes from visible to infrared or vice versa. With a standard visible, NIR or SWIR lens, a focus shift will occur due to differences in the refractive index if the wavelength fluctuates. However, by incorporating extra low dispersion (XD) glass and carefully aligning all internal lens elements, such focus shift problems are eliminated.

### Example of Focus Shift

\* Focusing at 1650nm



### LM8HC-VIS-SW



LO-DIS FLOAT XD WPMC IR  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating IR-Corrected

### LM12HC-VIS-SW



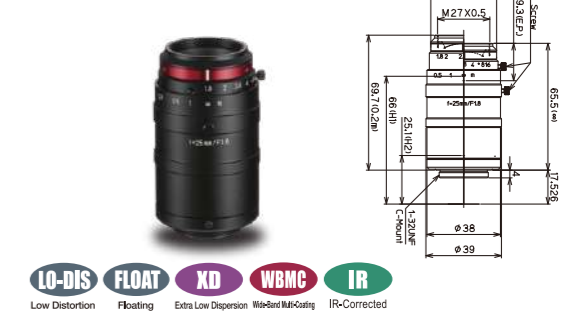
LO-DIS FLOAT XD WPMC IR  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating IR-Corrected

### LM16HC-VIS-SW



LO-DIS FLOAT XD WPMC IR  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating IR-Corrected

### LM25HC-VIS-SW



LO-DIS FLOAT XD WPMC IR  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating IR-Corrected

### LM35HC-VIS-SW



LO-DIS FLOAT XD WPMC IR  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating IR-Corrected

### LM50HC-VIS-SW



LO-DIS FLOAT XD WPMC IR  
Low Distortion Floating Extra Low Dispersion Wide-Band Multi-Coating IR-Corrected

Model	LM8HC-VIS-SW	LM12HC-VIS-SW	LM16HC-VIS-SW	LM25HC-VIS-SW	LM35HC-VIS-SW	LM50HC-VIS-SW
Focal Length(mm)	8	12	16	25	35	50
Image Size(mm)	12.8x9.6 (Φ16)	12.8 x 9.6 (Φ16)	12.8 x 9.6 (Φ16)	12.8 x 9.6 (Φ16)	12.8 x 9.6 (Φ16)	12.8 x 9.6 (Φ16)
Iris Range(F-stop)	F1.8~F16	F1.8~F16	F1.8~F16	F1.8~F16	F1.8~F16	F2.5~F16
Focusing Range(m)	0.2~∞	0.2~∞	0.2~∞	0.2~∞	0.2~∞	0.5~∞
Control	Iris Manual	Iris Manual	Iris Manual	Iris Manual	Iris Manual	Iris Manual
Focus	Manual	Manual	Manual	Manual	Manual	Manual
Shooting Range at M.O.D.(mm)	387.0(H)×272.0(V)	237.0(H)×175.0(V)	174.0(H)×129.0(V)	109.0(H)×81.0(V)	68.0(H)×51.0(V)	127.0(H)×95.0(V)
Angle of View (Degrees)	1 Inch: 81.3×63.5 2/3 Inch: 58.7×44.8 1/1.8 Inch: 48.6×36.9	58.0×44.5 41.0×31.1 33.8×25.5	44.2×33.6 31.0×23.3 25.4×19.1	29.2×22.0 20.2×15.0 16.5×12.3	20.4×15.4 14.0×10.6 11.5×8.6	14.6×11.0 10.0×7.6 8.2×6.2
Resolution(Center, Corner)	160lp/mm, 80lp/mm	160lp/mm, 100lp/mm	160lp/mm, 100lp/mm	160lp/mm, 100lp/mm	160lp/mm, 100lp/mm	160lp/mm, 100lp/mm
TV Distortion(%)	-3.1	-1.6	-0.81	-0.97	-0.37	-0.11
Back Focus in Air(mm)	11.1	11.1	15.0	24.5	16.4	34.9
Mount	C-mount	C-mount	C-mount	C-mount	C-mount	C-mount
Filter Thread(mm)	M55×P0.75	M34×P0.5	M30.5×P0.5	M27×P0.5	M34×P0.5	M30.5×P0.5
Size(mm)(∞)	Φ58×79.5	Φ38×73.5	Φ39×78.2	Φ39×65.5	Φ39×56.42	Φ39.5×71
Weight(g)	210	175	190	160	150	155
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

### Diagram of M.O.D. / Magnification Using A Close Up Ring

Model	LM8HC-VIS-SW	LM12HC-VIS-SW	LM16HC-VIS-SW	LM25HC-VIS-SW	LM35HC-VIS-SW	LM50HC-VIS-SW
(Non)M.O.D./Magnification	200mm/0.0377x	200mm/0.0562x	200mm/0.0753x	200mm/0.120x	200mm/0.189x	500mm/0.101x
(1mm Ring)M.O.D./Magnification	35mm/0.160x	73mm/0.139x	101mm/0.138x	147mm/0.159x	173mm/0.216x	418mm/0.121x
(5mm Ring)M.O.D./Magnification	-	12mm/0.485x	26mm/0.389x	68mm/0.316x	115mm/0.323x	252mm/0.200x
(10mm Ring)M.O.D./Magnification	-	-	-	37mm/0.514x	81mm/0.457x	168mm/0.301x
(20mm Ring)M.O.D./Magnification	-	-	-	16mm/0.895x	51mm/0.722x	102mm/0.497x



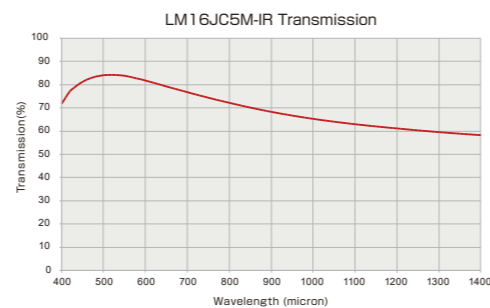
# 2/3" 5 MEGA PIXEL IR-CORRECTED (VIS-NIR) 3.45 μm

# NIR & DAY/NIGHT

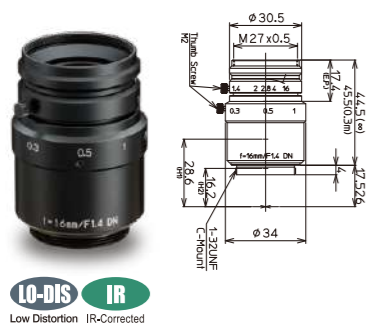
## JC5M-IR Series

- ▶ 5 megapixel lens
- ▶ IR corrected design
- ▶ Fast F-stop of F1.4 \*LM35JC5M-IR is F2.0
- ▶ Low distortion

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM16JC5M-IR	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM25JC5M-IR	✓	✓	✓	◇	✓	✓	✓	✓	✓
LM35JC5M-IR	✓	✓	✓	◇	✓	✓	✓	✓	✓



### LM16JC5M-IR



### LM25JC5M-IR



### LM35JC5M-IR



Model	LM16JC5M-IR	LM25JC5M-IR	LM35JC5M-IR
Focal Length(mm)	16	25	35
Image Size(mm)	8.8×6.6(Φ11)	8.8×6.6(Φ11)	8.8×6.6(Φ11)
Iris Range(F-stop)	F1.4~F16	F1.4~F16	F2.0~F22
Focusing Range(m)	0.3~∞	0.3~∞	0.3~∞
Control	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	171.4(H)×127.4(V)	113.3(H)×84.5(V)	75.8(H)×56.6(V)
Angle of View	2/3 Inch: 30.9×23.2 1/1.8 Inch: 25.4×19.0 1/2 Inch: 22.6×16.9	2/3 Inch: 20.1×15.1 1/1.8 Inch: 16.5×12.4 1/2 Inch: 14.6×11.0	2/3 Inch: 13.9×10.5 1/1.8 Inch: 11.4×8.3 1/2 Inch: 10.2×7.6
Resolution(Center, Corner)	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm
TV Distortion(%)	-0.8	-0.3	-0.3
Back Focus in Air(mm)	14.7	12	19.2
Mount	C-mount	C-mount	C-mount
Filter Thread(mm)	M27×P0.5	M30.5×P0.5	M30.5×P0.5
Size(mm)(∞)	Φ34.0×44.5	Φ34.0×47.0	Φ34.0×43.0
Weight(g)	100	110	110
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

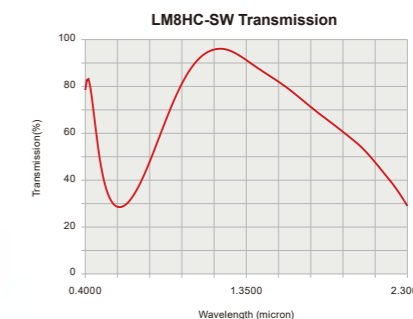


# 1" SWIR MEGA PIXEL

## HC-SW Series

- ▶ Incorporating Kowa's special coating technology, the 1" format HC-SW series will maintains high transmission from 800nm to 1900nm.
- ▶ Designed for Near Infrared(NIR) and Short Wavelength Infrared (SWIR) applications.

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM8HC-SW	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM12HC-SW	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM16HC-SW	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM25HC-SW	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM35HC-SW	✓	✓	✓	✓	✓	✓	✓	✓	✓
LM50HC-SW	✓	✓	✓	✓	✓	✓	✓	✓	✓



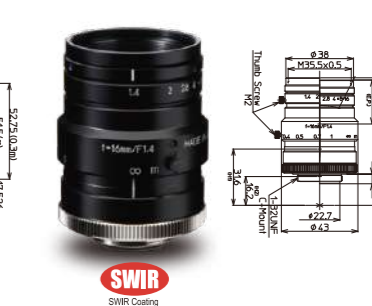
### LM8HC-SW



### LM12HC-SW



### LM16HC-SW



### LM25HC-SW



### LM35HC-SW



### LM50HC-SW



Model	LM8HC-SW	LM12HC-SW	LM16HC-SW	LM25HC-SW	LM35HC-SW	LM50HC-SW
Focal Length(mm)	8	12.5	16	25	35	50
Image Size(mm)	12.8×9.6(Φ16)	12.8×9.6(Φ16)	12.8×9.6(Φ16)	12.8×9.6(Φ16)	12.8×9.6(Φ16)	12.8×9.6(Φ16)
Iris Range(F-stop)	F1.4~F16	F1.4~F16	F1.4~F16	F1.4~F16	F1.4~F16	F1.4~F16
Focusing Range(m)	0.1~∞	0.3~∞	0.3~∞	0.3~∞	0.3~∞	0.5~∞
Control	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual	Iris: Manual Focus: Manual
Shooting Range at M.O.D.(mm)	196.0(H)×143.2(V)	330.6(H)×243.5(V)	251.5(H)×186.2(V)	160.7(H)×119.2(V)	110.1(H)×82.0(V)	121.8(H)×91.3(V)
Angle of View	1 inch: 79.4×63.0 2/3 inch: 58.3×44.7 1/1.8 inch: 48.5×36.9	1 inch: 55.6×42.5 2/3 inch: 39.1×29.5 1/1.8 inch: 32.1×24.2	1 inch: 44.3×33.6 2/3 inch: 30.8×23.2 1/1.8 inch: 25.3×19.0	1 inch: 29.3×22.0 2/3 inch: 20.2×15.1 1/1.8 inch: 16.5×12.4	1 inch: 20.9×15.8 2/3 inch: 14.4×10.8 1/1.8 inch: 11.8×8.8	1 inch: 14.5×10.8 2/3 inch: 10.0×7.5 1/1.8 inch: 8.2×6.2
Resolution(Center, Corner)	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm	120lp/mm, 80lp/mm
TV Distortion(%)	-1.2	-1.58	-1.0	-1.0	-0.5	0.05
Back Focus in Air(mm)	11.2	12.6	12.6	16.5	16.8	14.8
Mount	C-mount	C-mount	C-mount	C-mount	C-mount	C-mount
Filter Thread(mm)	M55×P0.75	M35.5×P0.5	M35.5×P0.5	M35.5×P0.5	M35.5×P0.5	M40.5×P0.5
Size(mm)(∞)	Φ57×58	Φ43×51.5	Φ43×52.9	Φ43×43	Φ43×43	Φ49×48
Weight(g)	205	160	150	135	135	210
Temperature Range	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C	-10°C~+50°C

### Reduction of visible-NIR focus shift

Visible design lens

IR Corrected design lens

Kowa's IR-lens



Wavelength Change

Visible

Focus Shift



Visible



Wavelength Change

NIR

Maintains sharp Focus



Visible



Wavelength Change

NIR

Maintains sharp Focus



NIR

† Images may differ from the actual product.

† Images may differ from the actual product.



# LINE SCAN $\Phi 46.0\text{mm}$ IMAGE SIZE $\Phi 30.0\text{mm}$ IMAGE SIZE (3CMOS)

## LF Series

- ▶ Large format (Image size  $\Phi 46.0\text{mm}$ )
- ▶ Corresponds to 4K Line Scan Camera
- ▶ Low distortion
- ▶ Suitable for close distance inspection

Optimized design for machine vision

LM28LF



LM35LF



LM50LF



✓ Compatible ◇ Suitable - Incompatible

Model	Format Size( $\Phi$ )							
	57.0	51.0	46.0	38.0	35.0	30.0	23.0	18.0
LM28LF	-	-	✓	✓	✓	✓	✓	✓
LM35LF	-	◇	✓	✓	✓	✓	✓	✓
LM50LF	-	◇	✓	✓	✓	✓	✓	✓

Model	LM28LF	LM28LF-48	LM35LF	LM35LF-48	LM50LF	LM50LF-48
Focal Length(mm)	28		35		50	
Image Size(mm)	46.0( $\Phi 46$ )		46.0( $\Phi 46$ )		46.0( $\Phi 46$ )	
Iris Range(F-stop)	F2.8~F22		F2.8~F22		F2.8~F22	
Focusing Range(m) (FROM SENSOR)	0.5~∞		0.4~∞		0.4~∞	
Control	Iris Focus		Manual Manual		Manual Manual	
Shooting Range at M.O.D.(mm)	424.3×281.1		239.9×160.3		162.9×108.9	
Angle of View	Full size 4/3 inch (Degrees) 1 inch		64.6×45.8 53.7×37.2 28.9×21.8 20.3×15.3		39.7×27.1 20.9×15.7 14.6×11.0	
Resolution(Center, Corner)	160lp/mm, 63lp/mm		160lp/mm, 63lp/mm		160lp/mm, 63lp/mm	
TV Distortion(%)	-0.17		-0.15		-0.04	
Flange Back in Air(mm)	46.5		46.5		46.5	
Mount	Nikon F-mount TFL-II mount		Nikon F-mount TFL-II mount		Nikon F-mount TFL-II mount	
Filter Thread(mm)	M72×P0.75		M52×P0.75		M52×P0.75	
Size(mm)(∞)	$\Phi 75 \times 98$ $\Phi 75 \times 127$		$\Phi 57.5 \times 71$ $\Phi 57.5 \times 100$		$\Phi 57.5 \times 77$ $\Phi 57.5 \times 106$	
Weight(g)	500		430		470	

Nikon is a trademark of Nikon Corporation.

## CLS Series

- ▶ For industrial 3CMOS color line scan camera
- ▶ Ultra high resolution
- ▶ For use with 30mm length line sensor
- ▶ Low chromatic aberration
- ▶ Excellent corner brightness
- ▶ Close up lens is available for close distance applications

LM28CLS



LM35CLS



LM50CLS



✓ Compatible ◇ Suitable - Incompatible

Model	Format Size( $\Phi$ )							
	57.0	51.0	46.0	38.0	35.0	30.0	23.0	18.0
LM28CLS	-	-	-	-	✓	✓	✓	✓
LM35CLS	-	-	-	-	✓	✓	✓	✓
LM50CLS	-	-	-	◇	✓	✓	✓	✓

Model	LM28CLS	LM35CLS	LM50CLS
Focal Length(mm)	28		
Image Size(mm)	30.0( $\Phi 30$ )		
Iris Range(F-stop)	F2.8~F22		
Focusing Range(m) (FROM SENSOR)	0.5~∞		
Control	Iris Focus		
Shooting Range at M.O.D.(mm)	317.9(V) 259.1(V) 157.7(V)		
Angle of View(Degrees)	55.2(V) 46.1(V) 32.3(V)		
Resolution(Center, Corner)	160lp/mm, 63lp/mm		
TV Distortion(%)	-0.1 0.06 -0.1		
Flange Back in Air(mm)	46.5		
Mount	Nikon F-mount		
Filter Thread(mm)	M72×P0.75		
Size(mm)(∞)	$\Phi 75 \times 108$ $\Phi 65 \times 108$ $\Phi 58 \times 63.5$		
Weight(g)	482 480 358		

Nikon is a trademark of Nikon Corporation.

† Images may differ from the actual product.



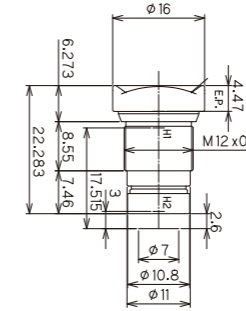
# 1/2.5" MEGAPIXEL S-MOUNT LENS (3.2 $\mu\text{m}$ )

- ▶ Low distortion
- ▶ Wide optical design
- ▶ High transmission from VIS to NIR

✓ Compatible ◇ Suitable - Incompatible

Model	Format Size(Inch)							
	1.1	1	1/1.2	2/3	1/1.8	1/2	1/2.5	1/3
LM3QS28	-	-	-	-	-	✓	-	-
LM3QS40	-	-	-	-	-	✓	-	-
LM3QS56	-	-	-	-	-	-	✓	-

LM3QS28 / 40 / 56



Model	LM3QS28	LM3QS40	LM3QS56
Focal Length(mm)	3		
Image Size	1/2.5		
Iris Range(F-stop)	F2.8	F4	F5.6
Focusing Range(m)	0.1~∞		
Angle of View	1/2.5 inch 1/2.8 inch (Degrees) 1/3 inch		
Resolution(Center, Corner)	160lp/mm, 125lp/mm		
TV Distortion(%)	0.02		
Back Focus in Air(mm)	2.6		
Mount	S-mount (M12×0.5)		
Size(mm)(∞)	$\Phi 16 \times 22.3$		
Weight(g)	6		
Temperature Range	-10°C~+50°C		



# 1/3" NF-MOUNT

## Compact NF-mt. lens Series

- ▶ Introducing the lineup of megapixel NF-mount lenses. The compact body and high resolution design will maximize the performance of NF-mount camera.

LM3NF



LM5NF



LM9NF



Model	LM3NF	LM5NF	LM9NF
Focal Length(mm)	2.7		
Image Size(mm)	4.8×3.6( $\Phi 6$ )		
Iris Range(F-stop)	F1.8~F11		
Focusing Range(m)	0.1~∞		
Control	Iris Focus		
Shooting Range at M.O.D.(mm)	262.7(H)×167.8(V) 122.9(H)×89.9(V) 58.1(H)×43.3(V)		
Angle of View(Degrees) 1/3 Inch	102.3×76.7 59.2×45.0 30.2×22.8		
Resolution(Center, Corner)	100lp/mm, 60lp/mm		
TV Distortion(%)	-7.3 -2.8 -0.6		
Back Focus in Air(mm)	7.8 8.1 8.6		
Mount	NF-mount		
Size(mm)(∞)	$\Phi 21 \times 27$ $\Phi 21 \times 31$ $\Phi 22 \times 34$		
Weight(g)	30 35 40		
Temperature Range	-10°C~+50°C		

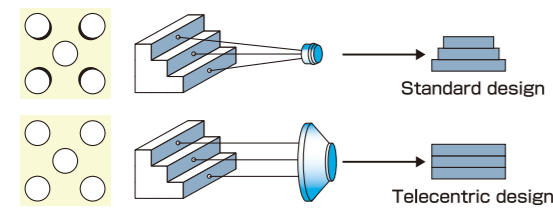
✓ Compatible ◇ Suitable - Incompatible

Model	Format Size(Inch)								
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8	1/2	1/3
LM3NF	-	-	-	-	-	-	-	-	✓
LM5NF	-	-	-	-	-	-	-	-	✓
LM9NF	-	-	-	-	-	-	-	◇	✓

† Images may differ from the actual product.

## TELECENTRIC Series

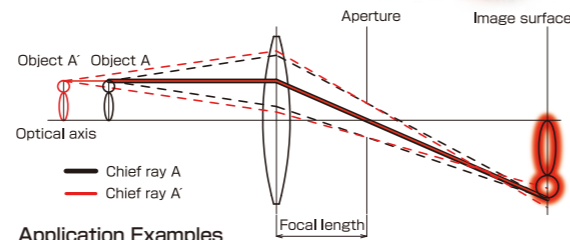
- Produces high contrast and resolution in both the center and corners.
- Virtually no TV distortion of entire image area.



Telecentric Optical System

In a telecentric optical system, there is no change in magnification when focusing. Thus, the magnification remains constant at different working distances. Similarly, the movement of an object also does not change the magnification, which makes a telecentric lens ideal for measuring objects with high accuracy.

In a telecentric optical system, the chief rays are parallel to the optical axis. As a result, the aperture becomes greater as the magnification is fixed by the focusing rays. This means that the F-number on a telecentric lens tends to be larger when compared to a standard megapixel lens.



Application Examples

- Surface inspection of silicon wafers
- Image defect inspections
- Inspection of dirt on prisms and glass circuit boards
- Measurement of thread pitches
- Reading 2D codes



### 2/3" TELECENTRIC 5 MEGAPIXEL PLUS

- Telecentric lens with variable magnification
- Able to adjust the magnification to match with the pixel size of the camera
- Lenses are designed with an optical magnification that is ideal for over 5 megapixels
- Distortion free lenses of less than 0.02%. TV distortion is limited to 0.25% on the entire image area even when used with a 5 megapixel camera

LM1120TC



DIS-F  
Distortion Free

LM1121TC



DIS-F  
Distortion Free

LM1122TC



DIS-F  
Distortion Free

LM1123TC



DIS-F  
Distortion Free

LM1125TC



DIS-F  
Distortion Free

### 4/3" MACRO ZOOM 21 MEGAPIXEL

- Telecentric lens with variable magnification
- Able to resolve up to 21 megapixels
- 0.5x~1.0x for macro use

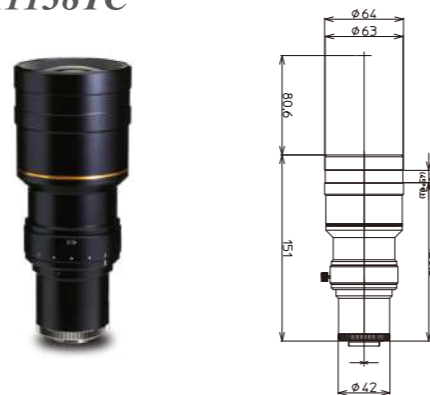
LM1119TC



### 4/3" MACRO 21 MEGAPIXEL

- 2.0x for macro use
- Able to resolve up to 21 megapixels

LM1138TC



Model	LM1119TC		LM1138TC	
Magnification Range	0.5~1.0x		2.0x	
Image Size	18.4×13.8(Φ23)		18.4×13.8(Φ23)	
Shooting Magnification	0.5x	1.0x	2.0x	
Objective N.A.	0.05	0.1	0.2	
W.D(mm)	80	81.8	80.6	
Shooting Range (mm)	4/3 inch	36.8×27.6	18.4×13.8	9.20×6.90
	1 inch	25.6×19.2	12.8×9.6	6.40×4.8
	2/3 inch	17.6×13.2	8.8×6.6	4.4×3.3
TV Distortion(%)	0.1		0.1	
Back Focus in Air(mm)	14.7		15.0	
Mount	C-mount		C-mount	
Resolution	120lp/mm		120lp/mm	
Size(mm)(∞)	Φ82×151.5		Φ64×151.0	
Weight(g)	1000		830	
Temperature Range	-10°C~+50°C		-10°C~+50°C	
Storage Temperature Range	-20°C~+60°C		-20°C~+60°C	

† Images may differ from the actual product.

✓ Compatible ◊ Suitable - Incompatible

Model	Format Size(Inch)						
	4/3	1.2	1.1	1	1/1.2	2/3	1/1.8
LM1119TC	✓	✓	✓	✓	✓	✓	✓
LM1138TC	✓	✓	✓	✓	✓	✓	✓
LM1120TC					✓	✓	✓
LM1121TC					✓	✓	✓
LM1122TC					✓	✓	✓
LM1123TC					✓	✓	✓
LM1125TC					✓	✓	✓

Model	LM1120TC			LM1121TC			LM1122TC			LM1123TC			LM1125TC			
Magnification Range	3.45~4.4x			1.725~2.2x			1.15~1.47x			0.69~0.88x			0.346~0.44x			
Image Size	8.8×6.6(Φ11)			8.8×6.6(Φ11)			8.8×6.6(Φ11)			8.8×6.6(Φ11)			8.8×6.6(Φ11)			
Shooting Magnification	3.45x	4.0x	4.4x	1.725x	2.0x	2.2x	1.15x	1.3x	1.47x	0.69x	0.8x	0.88x	0.346x	0.4x	0.44x	
Objective N.A.	0.2	0.2	0.2	0.131	0.131	0.131	0.101	0.101	0.101	0.07	0.07	0.07	0.04	0.04	0.04	
W.D(mm)	65.9	65.9	65.9	114.8	114.8	109.4	111.6	111.6	111.6	111.0	111.0	111.0	112.7	112.7	112.7	
Shooting Range (mm)	2/3 inch	2.6×1.9	2.2×1.7	2.0×1.5	5.1×3.8	4.4×3.3	4.0×3.0	7.6×5.7	6.6×5.0	6.0×4.5	12.7×9.6	11.0×8.2	10.0×7.5	25.4×19.1	22.0×16.5	20.0×15.0
	1/1.8 inch	2.1×1.6	1.8×1.4	1.6×1.2	4.2×3.1	3.6×2.7	3.3×2.4	6.3×4.7	5.5×4.1	4.9×3.7	10.4×7.8	9.0×6.7	8.2×6.1	20.9×15.7	18.1×13.6	16.5×12.3
	1/2 inch	1.9×1.4	1.6×1.2	1.5×1.1	3.7×2.8	3.2×2.4	2.9×2.2	5.6×4.2	4.9×3.7	4.3×3.3	9.3×7.0	8.0×6.0	7.3×5.5	18.6×13.9	16.1×12.1	14.6×11.0
TV Distortion(%)	0.015	0.003	-0.002	0.011	0.004	0.001	-0.015	-0.001	0.011	-0.001	-0.009	0.005	0.02	-0.009	0.01	
Back Focus in Air(mm)	17.1	24.5	30	55.8	67.7	76.3	18.7	23.6	29.8	34	28.8	25.3	17.6	17	16.5	
Mount	C-mount			C-mount			C-mount			C-mount			C-mount			
Resolution	120lp/mm			120lp/mm			120lp/mm			120lp/mm			120lp/mm			
Filter Thread(mm)	-			-			-			-			-			
Size(mm)(∞)	Φ57×180.0			Φ48×147.5			Φ50×123.9			Φ50×121.5			Φ51.5×142.3			
Weight(g)	645			420			330			290			420			
Temperature Range	-10°C~+50°C			-10°C~+50°C			-10°C~+50°C			-10°C~+50°C			-10°C~+50°C			
Storage Temperature Range	-20°C~+60°C			-20°C~+60°C			-20°C~+60°C			-20°C~+60°C			-20°C~+60°C			

† Images may differ from the actual product.













Various types of lenses are used in machine vision systems. In order to achieve the highest performance, it is important to select the lens most suitable for the application.

**Quick selection - How to calculate focal length**

Ex) A 2/3" camera is used to capture an object 100mm wide from a distance of 300mm.  
Use the picture below and the image size chart to substitute for Y, L, and Y'. Then, to capture the entire object, use the formula  $f=L*Y'/Y$  to calculate focal length.

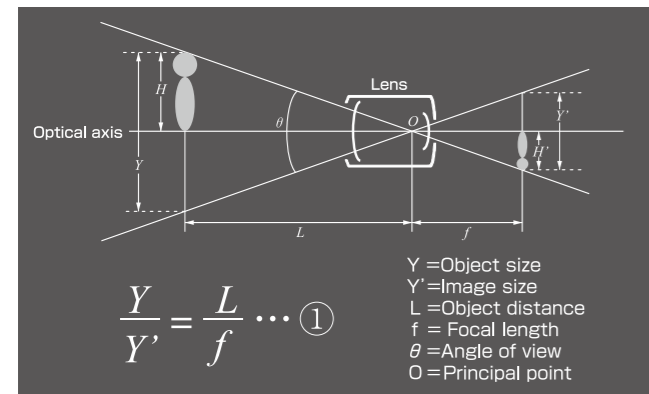
$Y=8.8\text{mm}$  (See image size chart),  $L=300\text{mm}$ ,  $Y'=100\text{mm}$   
 $f=300*8.8/100$   
 $f=26.4\text{mm}$   
The most appropriate lens is f=25mm lens, which is close but not greater than the 26.4 derived from the calculation.  
Lenses with shorter focal lengths than the given number can capture an object in its entirety.

**Quick selection - How to calculate the angle of view**

Ex) A 1/2" camera is used to shoot an object 300mm away. The focal length of the lens is 16mm. Use the picture below and image size chart to substitute for f, L, and Y1 (H or V accordingly). Then to calculate the angle of view, use the formula  $Y=L*Y'/f$ .

Width-  $Y=6.4\text{mm}$  (Horizontal),  $f=16\text{mm}$ ,  $L=300\text{mm}$   
 $Y=300*6.4/16$   
 $Y=120\text{mm}$   
Vertical-  $Y=4.8\text{mm}$  (Vertical),  $f=16\text{mm}$ ,  $L=300\text{mm}$   
 $Y=300*4.8/16$   
 $Y=90\text{mm}$   
Thus in order to capture the object in its entirety, the maximum dimensions of an object at a distance of 300mm is 120mm wide and 90mm height.

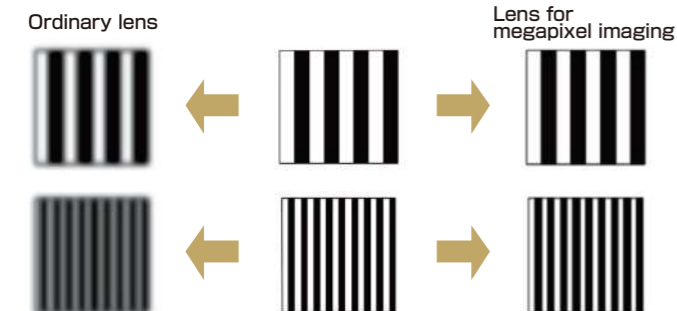
(Characteristics of lenses are described below)



- Object size ..... Field range which can be captured by the image sensor
- Image size ..... See description
- Object distance ..... Distance from the lens to the object
- Focal length ..... Distance from the principal point to the focus point
- Angle of view ..... This angle represents a shooting range in degrees. The shorter a focal length is, the bigger an angle of view is.
- Principal point ..... Optical center of the lens

**Resolving power**

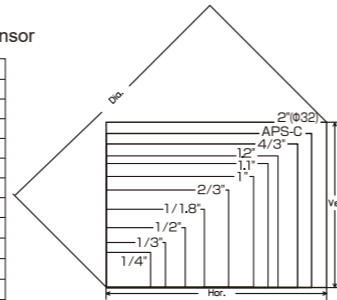
The resolving power indicates the degree of detailed information that can be acquired by the lens. In the image created by the lens, the details of black and white stripes which can be distinguished from striped patterns are shown in units of lines per mm or line pairs (LP) per mm. These units express the maximum number of lines of the striped pattern that can be discerned in a 1mm width when counting each pair of black and white lines as one line. For example, for a lens that has a resolving power of 80 lines/mm, when viewing the striped pattern through the lens, information can be acquired to discern patterns having up to 80 lines per 1mm width.



**Image size**

Image size represents size of camera sensor

Camera	Hor.(mm)	Ver.(mm)	Dia.(mm)
1/4inch	3.6	2.7	4.5
1/3inch	4.8	3.6	6
1/2inch	6.4	4.8	8
1/1.8inch	7.2	5.4	9
2/3inch	8.8	6.6	11
1inch	12.8	9.6	16
1.1inch	14.1	10.6	17.6
1.2inch	15.4	11.5	19.2
4/3inch	18.4	13.8	23
APS-C	22.3	16.7	27.9
2(Φ32)inch	25.6	19.2	32



**F-number**

The F-number represents the amount of light that passes through a lens. As the F-number decreases, the amount of light that passes through the lens increases. The F-number affects the depth of field as mentioned below.

**Depth of field**

Depth of field is the range of distance, in front of and behind a subject that appears in focus. If the depth of field is deep, an object will appear to be in focus even if it moves slightly back and forth.

The characteristics of depth of field (comparing lenses with the same specifications)

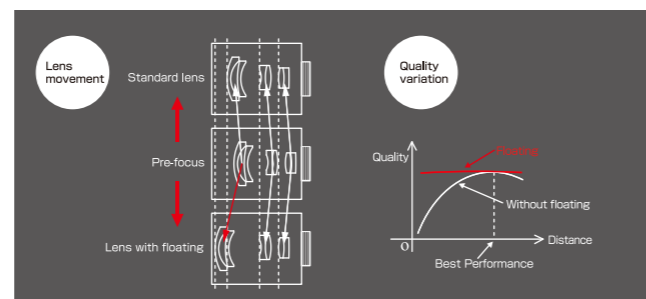
- Increasing the F-number (darker) increases the depth.
- Shortening the focal length increases the depth.
- Lengthening the object distance increases the depth.

**Floating Mechanism system**

The floating mechanism system is effective in preventing malfunction and increasing the life of the lens. It is also called the close distance aberration compensation mechanism.

In standard CCTV lenses, the whole or a part of the lens moves when focusing. However, moving one lens element and not the entire lens system changes the direction of the light rays and decreases the optical performance.

However, lenses with the floating mechanism system can vary the distance between the lens elements. This enables the lens to achieve the highest performance at various objective distances.



**Angle of view**

The angle of view indicates the shooting range of defined image size as an angle. The finite angle of view  $\theta$  can be roughly estimated from the formula ② below. However, this formula does not apply to lenses that have large distortions.

$$\theta = 2 \tan^{-1} \frac{Y}{2L} = 2 \tan^{-1} \frac{Y'}{2f} \dots \textcircled{2}$$

Y = Object size  
Y' = Image size  
L = Object distance  
f = Focal length  
 $\theta$  = Angle of view

For example, to find the angle of view  $\theta$  when shooting an object 300mm away using a 1/2" camera and 16mm focal length lens, substitute  $f = 16$  and  $Y' = 6.4$  in formula k to find  $\theta$  (Horizontal) =  $2 \tan^{-1} (6.4/2/16) = 22.6^\circ$ , and substitute  $f = 16$  and  $Y' = 4.8$  in formula k to find  $\theta$  (Vertical) =  $2 \tan^{-1} (4.8/2/16) = 17.1^\circ$ . The angle of view will therefore be  $22.6^\circ \times 17.1^\circ$ .

Would you like to create your optimum lens?

Kowa Customized Lenses

Kowa proposes consistent product creation, from designing to trial manufacturing, production, performance evaluation, and quality assurance.

Kowa accepts orders to design and manufacture a wide range of optical designs that match customer needs. In addition to designing the optics, we can provide system designs which also combine mechanical and electrical systems and software. Further, Kowa works together with customers to actively propose designs such as for improving technical levels or solving cost-related problems.

Examples of technical development

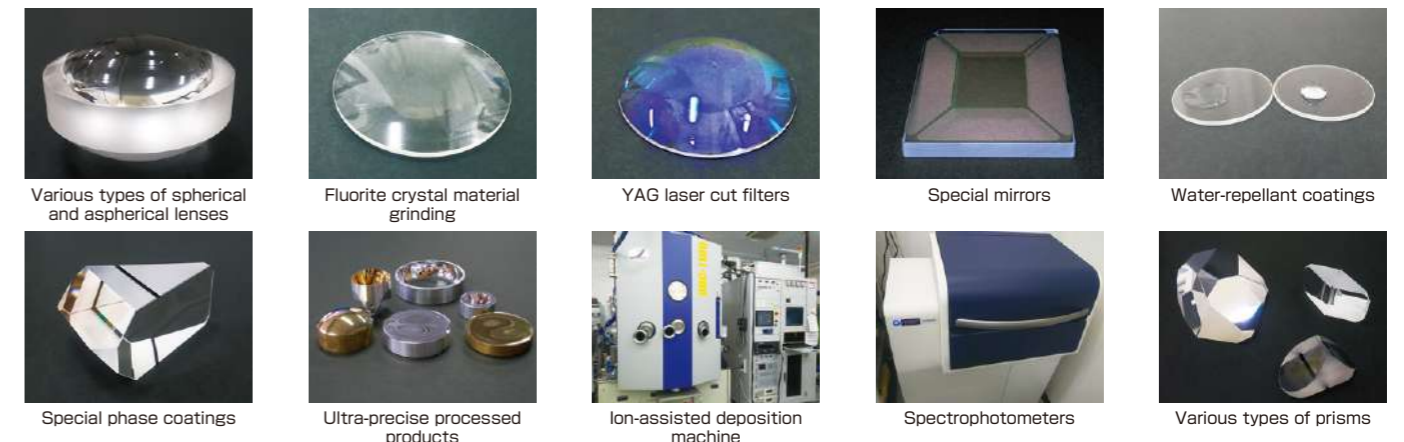
- Optical systems for image processing
- Optical systems for 3D measurement
- Optical systems with built-in lighting
- Optical systems for surveillance
- Optical systems for robot vision
- Optical systems for laser scanning
- Optical systems for semiconductor manufacturing equipment
- Temperature-resistant and vibration-resistant optical systems
- Ultra-high resolution optical systems

Optical processing technologies

Kowa will manufacture various types of optical components to meet customers' requirements regarding shape and precision. Further, we offer a variety of coatings, including anti-reflective coatings, multilayer filters, and special-purpose coatings.

Examples of technical products

- Various types of parabolic mirror processed products/glass
- Plastic molded lens mold core processed products
- Crystal processed products for IR imaging (Germanium processed products, etc.)
- Precision-cut components (Germanium processed products, etc.)



Kowa will provide suggestions about the customized optics based on the flow chart below.

