

Large Format **FA** Lenses



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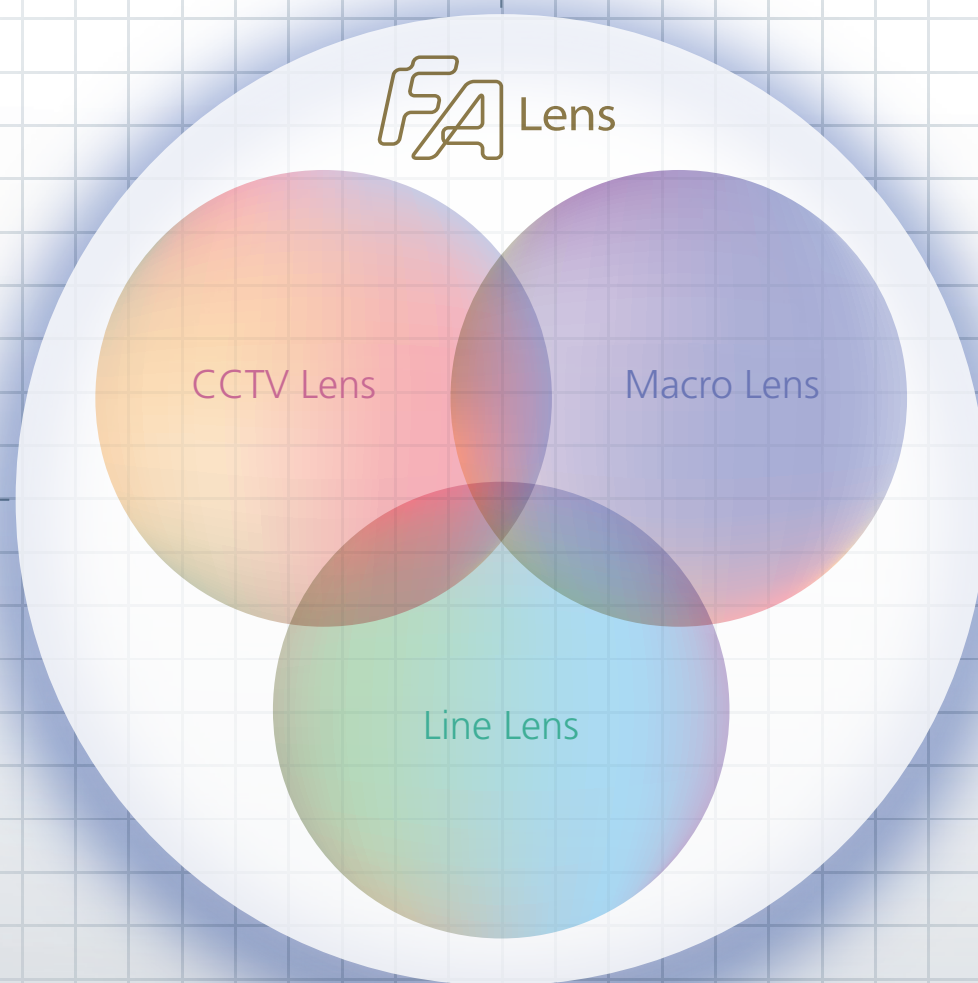
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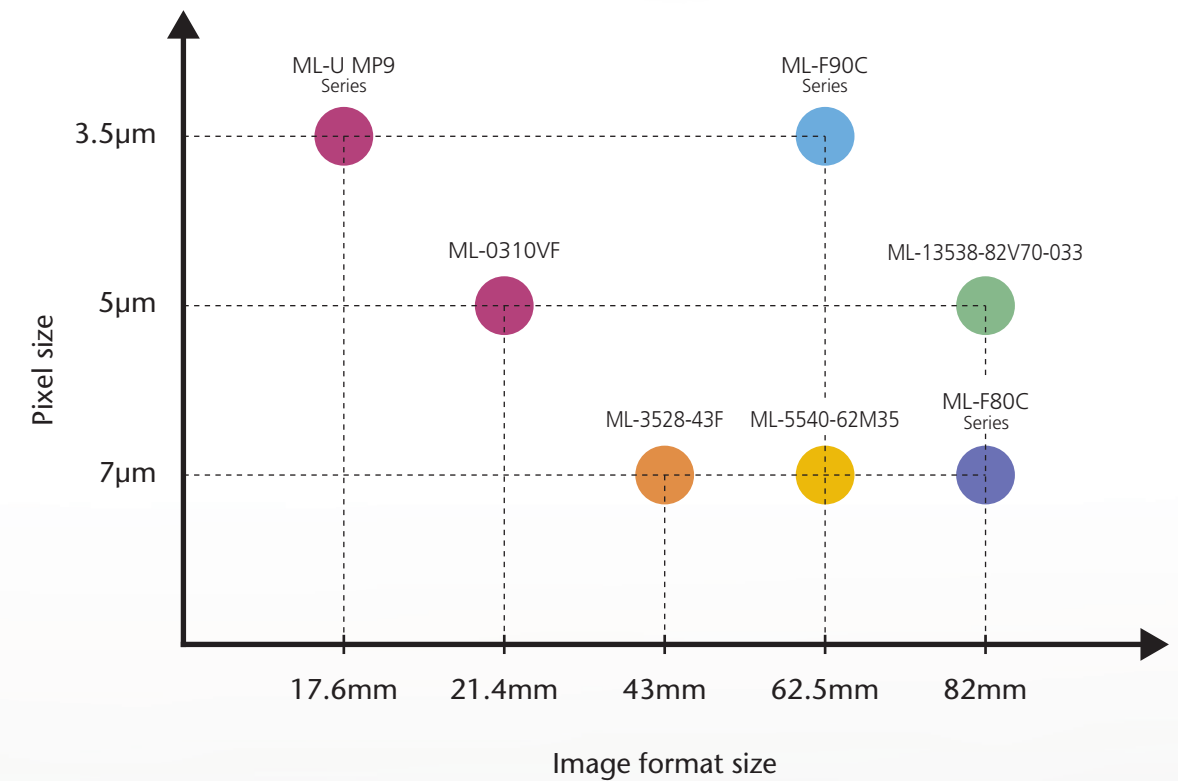
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FA Lens offered by MORITEX performs its performance not only with legacy line sensor camera but also shows its best performance with emerging large format area sensor camera.
Our wide variety of macro and micro inspection oriented lenses provide solution to the problems the customers may have.

We unified those CCTV lenses,
macro lenses and line sensor lenses
as "MORITEX FA Lenses"



Positioning chart for FA Lenses





Model name	ML-U MP9	ML-0310VF	ML-3528-43F	ML-5540-62M35	ML-13538-82V70	ML-F90C	ML-F80C
IF	17.6mm	21.4mm	43mm	62.5mm	82mm	62.5mm	82mm
Resolution	≥3.5μm	≥5μm	≥7μm	≥7μm	≥5μm	≥3.5μm	≥7μm
Mount	C	C	F	F, M72	F, M72, M95	F, M72	F, M72, M95

Line	1K	10μm	●	●					
		14μm	●	●					
	2K	7μm	●	●					
		10μm		●					
	4K	14μm			●	●	●	●	●
		7μm			●	●	●	●	●
		10μm			●	●	●	●	●
	6K	14μm			●	●	●	●	●
		7μm			●	●	●	●	●
		10μm			●	●	●	●	●
	8K	3.5μm				○	○	●	○
		7μm				●	●	●	●
		10μm				●	●	●	●
	12K	3.5μm				○	○	●	○
		5μm				○	●	●	○
	16K	3.5μm				○	○	●	○
		5μm					●	●	○
	18K	3.5μm				○	○	●	○
Area	12M	3.5μm	●	○			●		
	16M	5μm			○	○			○
	25M	4.5μm			○	○	○		○
	29M	5.5μm			○	○	●	●	○
	47M	5.5μm				○	●	●	○
	71M	3.5μm				○	○	●	○
	80M over	3.5μm				○	○	●	○

● Recommendation
○ Compatible



Model name	Magnification																	
	(∞ infinity)	0.05x	0.1x	0.15x	0.2x	0.25x	0.3x	0.33x	0.4x	0.45x	0.5x	0.7x	1x	1.5x	1.75x	2.5x	3x	3.5x
ML-U MP9	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																	
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ML-5540-62M35	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																	
ML-13538-82V70-033	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																	
ML-F90C-07	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																	
ML-F90C-175	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																	
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ML-U MP9 Series



This is the latest FA Lens for machine vision, capable for large-format sensor ($\phi 17.6\text{mm}$).
It is realized to offer market-leading $3.45\mu\text{m}/\text{pix}$ high resolving design on 8 types, ranging from f6mm to f75mm.
Those FA Lens allows the latest 12M sensor to demonstrate its full performance,

Features

8 types, Products lineup from f6mm to f75mm
High resolution design : Available up to 12M sensor
Brightness : Fno 1.4 to 1.8
Image format : 17.6mm (capable for Type 1.1" sensor)

Primary Applications

Inspection

Parts	PCB	Food package	Glass bottle	Pharmaceuticals package
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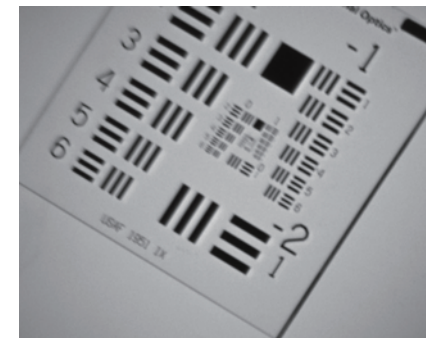
Specifications

Model name	Focal Length (mm)	Fno (∞)	IF (mm)	Pixel size (μm)	Distance of closest approach (m)	Mag. of closest approach (X)	FOV*1 (mm)	TV Distortion (%)
ML-U0618MP9	6	1.8	17.6	3.45	0.1	0.05	201×273	-2.408
ML-U0814MP9	8	1.4			0.1	0.067	144×192	-2.235
ML-U1214MP9	12	1.4			0.1	0.1	92×122	-0.39
ML-U1614MP9	16	1.4			0.1	0.14	69×92	-0.458
ML-U2514MP9	25	1.4			0.1	0.24	40×53	-0.037
ML-U3514MP9	35	1.4			0.15	0.25	39×52	-0.286
ML-U5016MP9	50	1.6			0.3	0.19	50×66	-0.053
ML-U7518MP9	75	1.8			0.8	0.11	84×112	0.008

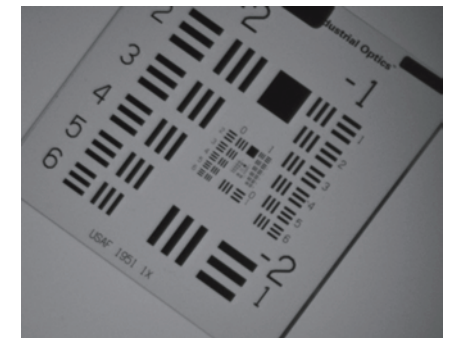
*1 FOV for 1" sensor

Relative data of similar products

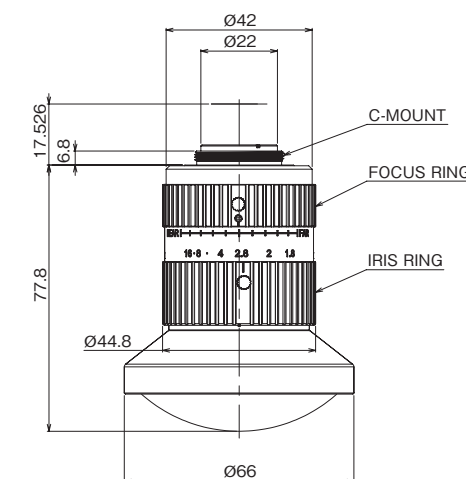
Similar product



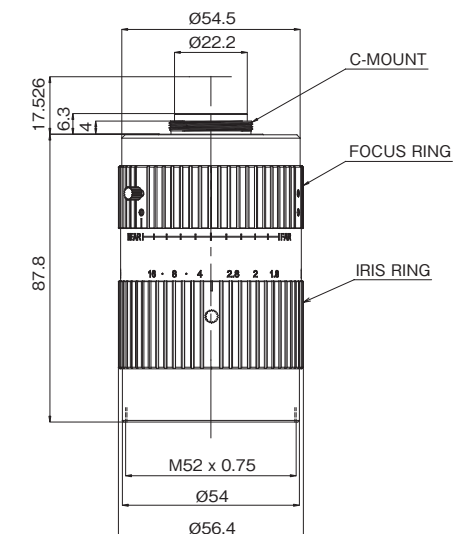
ML-U0618MP9



Drawing



ML-U0618MP9

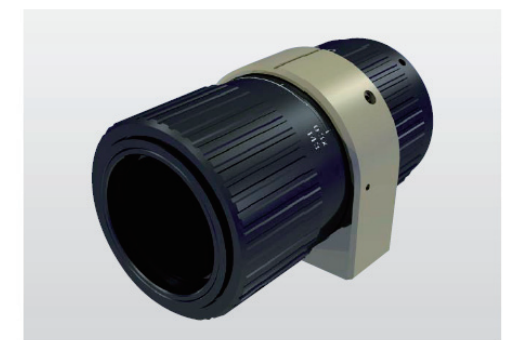


ML-U7518MP9

for 4/3" sensor ML-0310VF

Varifocal lens with optimized magnification and working distance for FA.

The key features of this lens are the support of large, up to 1.2" camera and the varifocal, variable magnification for wide field of views. This lens is great for high speed and high resolution image recognition.



ML-3528-43F



This is the latest high-performance FA Lens, capable for large-format sensor ($\phi 43\text{mm}$).
Convenience which is similar to handling lens for consumer and outstanding performance from center to edge at adjacent area is realized.
High performance FA Lens for both area sensor camera and line sensor camera.

Features

Focal length : 35mm
Magnification : Infinity to 0.5X
Brightness : Fno 2.8
Image format : 43mm

Primary Applications

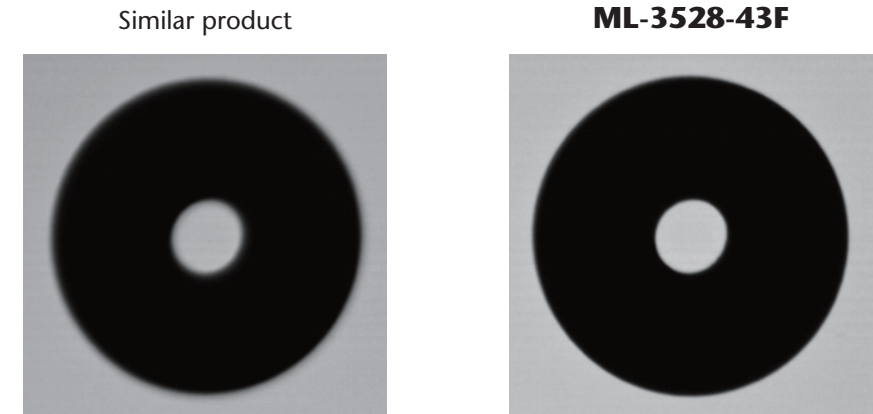
Inspection

Parts	PCB	Film	Printing	Color filter	Black matrix
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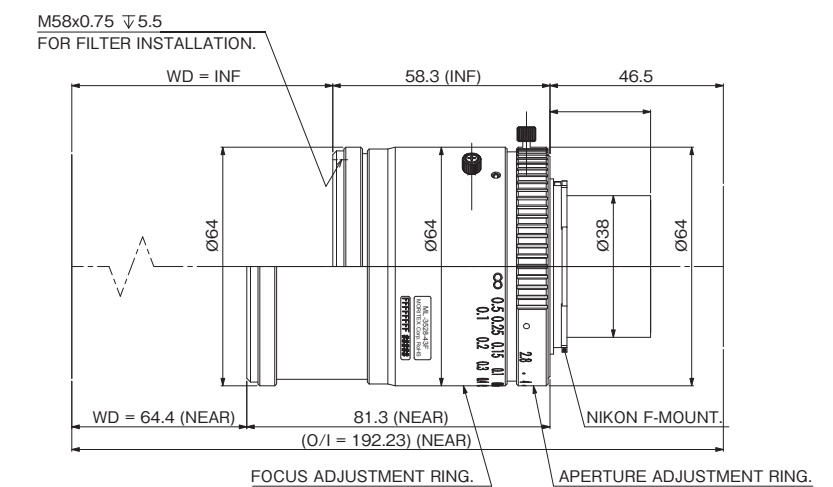
Specifications

Model name	Focal Length (mm)	Fno (∞)	Magnification	WD (mm)	Image Format (mm)	Pixel size (μm)
ML-3528-43F	35.1	2.8-22	∞ - 0.5	∞ - 64.4	43	7

Relative data of similar products

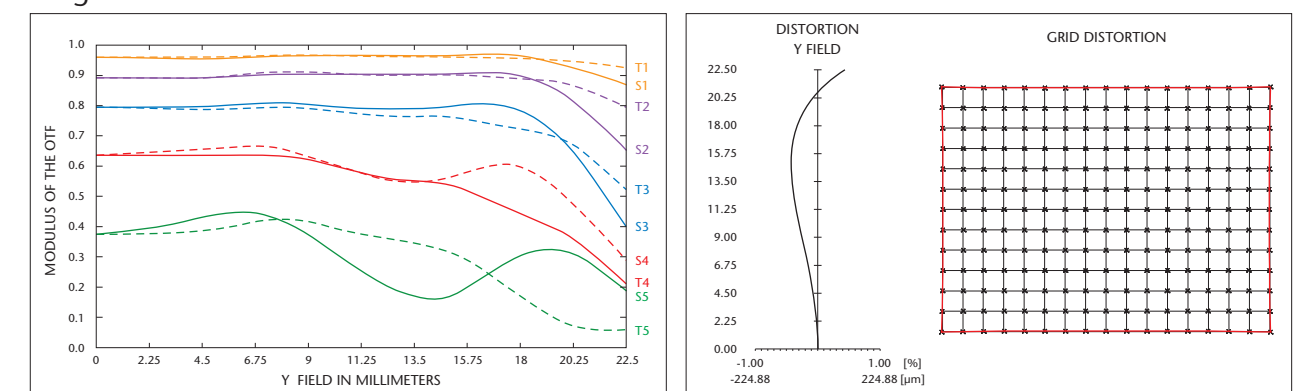


Drawing



MTF data

Magnification: 0.2x Fno2.8



ML-5540-62M35



This is the latest high-performance macro lens, capable for large format sensor ($\phi 62.5\text{mm}$).
FA Lens designed to achieve outstanding performance from center to edge at adjacent area.

Features

Focal length : 55mm

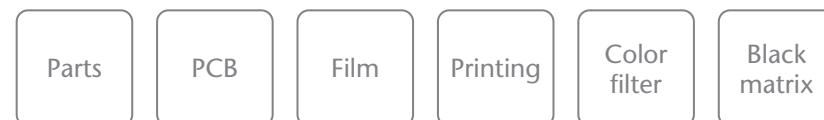
Magnification : Infinity to 0.3X

Brightness : Fno 4.0

Image format : 62.5mm

Primary Applications

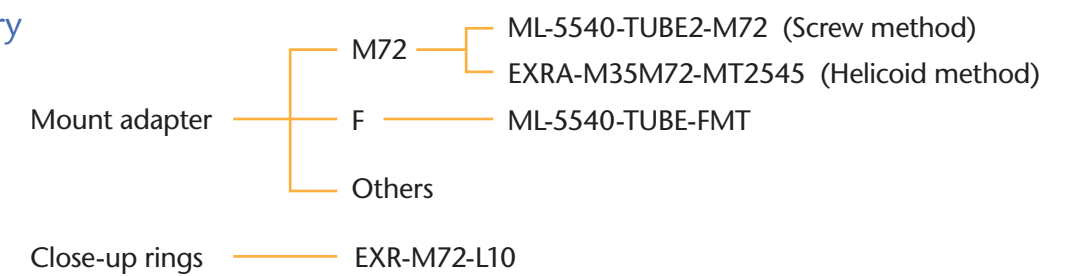
Inspection



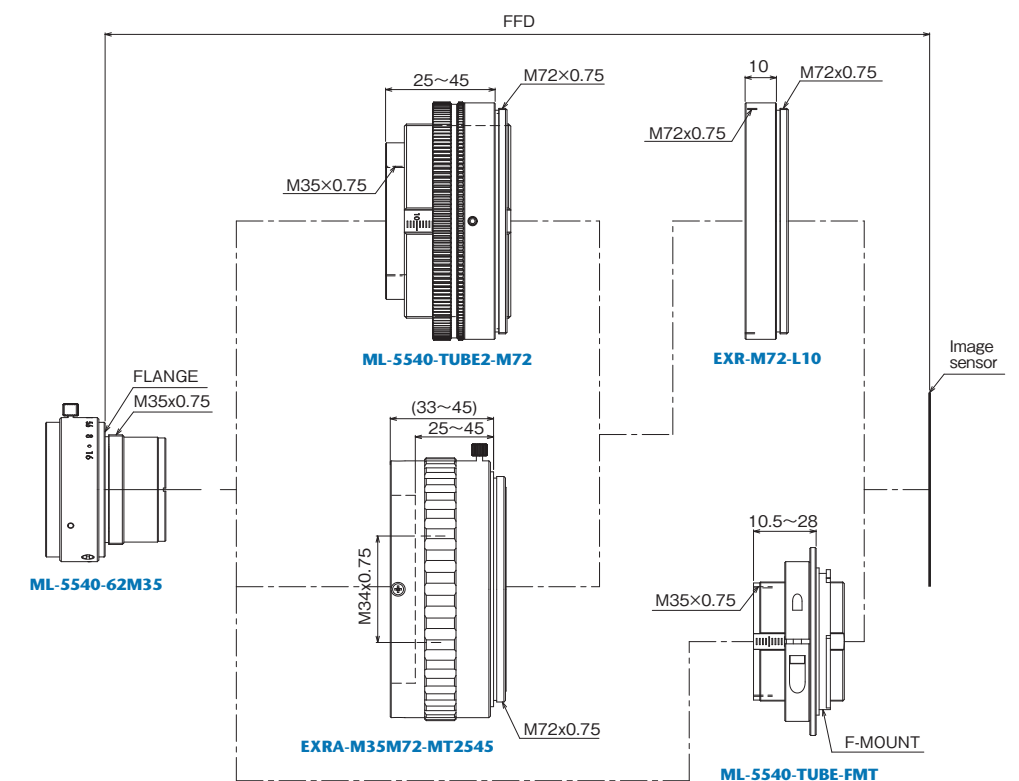
Specifications

Model name	Focal Length (mm)	Fno (∞)	Magnification	WD (mm)	Image Format (mm)	Pixel size (μm)
ML-5540-62M35	55.3	4.0-16	∞ - 0.30	∞ - 216	62.5	7

Accessory

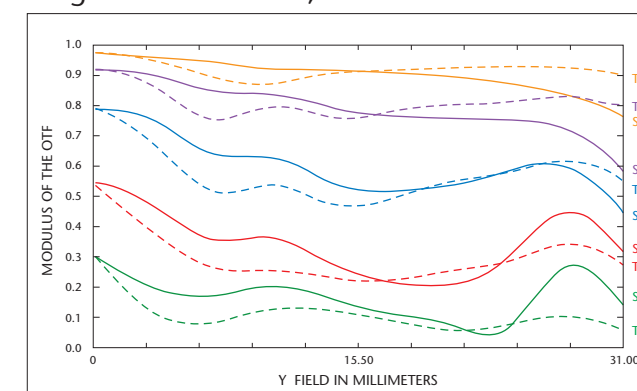


System chart

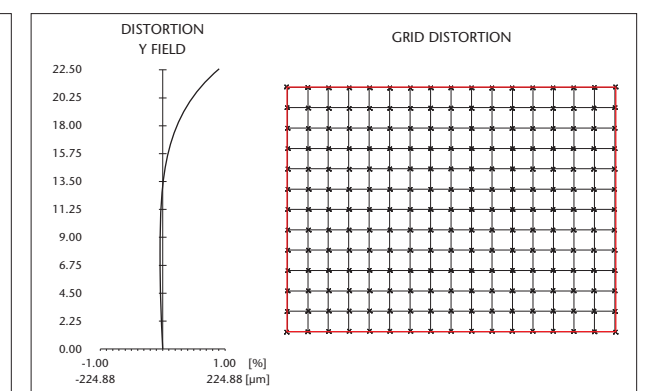


MTF data

Magnification: 0.01x , Fno4.0



ML-5540-62M35 MTF VS. FIELD



ML-5540-62M35 DISTORTION DIAGRAM

ML-13538-82V70-033



This is the latest FA Lens, capable for large-format sensor ($\phi 82\text{mm}$).

This lens offers high resolution ($>130\text{ lp/mm}$) and bright $F_{\text{no}}3.8$, and capable for both line sensor lens and area sensor lens up to 82mm sensor size.

Features

Focal length : 135mm

Magnification : 0.33X

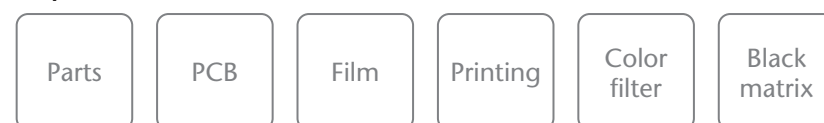
High resolution : 130lp/mm $>10\%$

Brightness : $F_{\text{no}} 3.8$

Image format : 82mm

Primary Applications

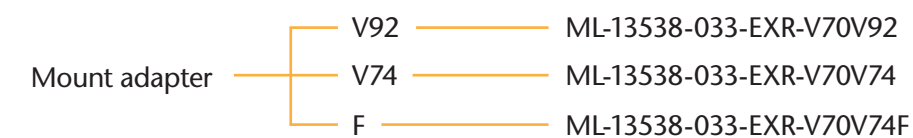
Inspection



Specifications

Model name	Focal Length (mm)	F_{no} (∞)	Magnification	WD (mm)	Image Format (mm)	Pixel size (μm)
ML-13538-82V70-033	133.1	3.8-22	0.33 (0.27-0.39)	462 (552.5-399.7)	82	5

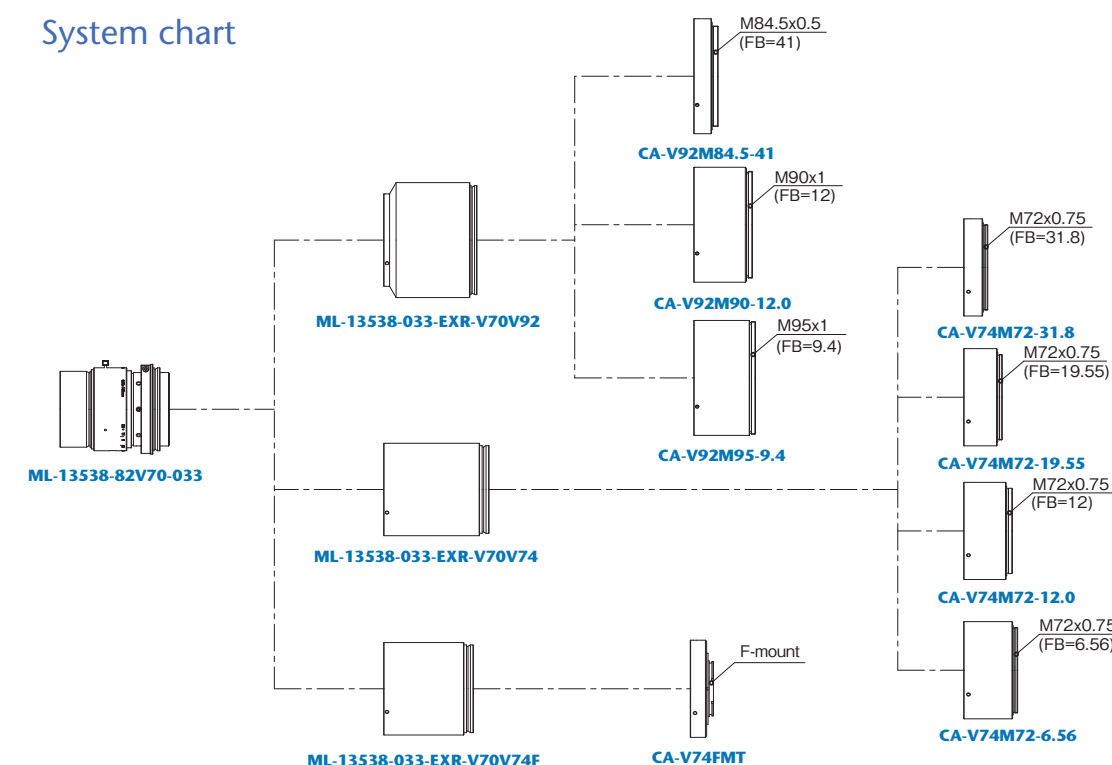
Accessory



Camera adapter — CA Series

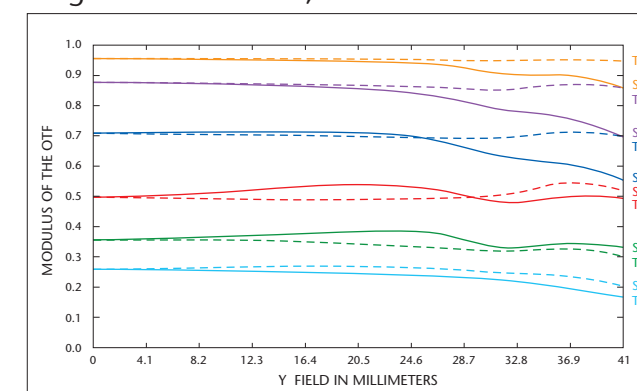
Camera adapters for FB (Flange Back) of various camera are available.
Reference to p19

System chart

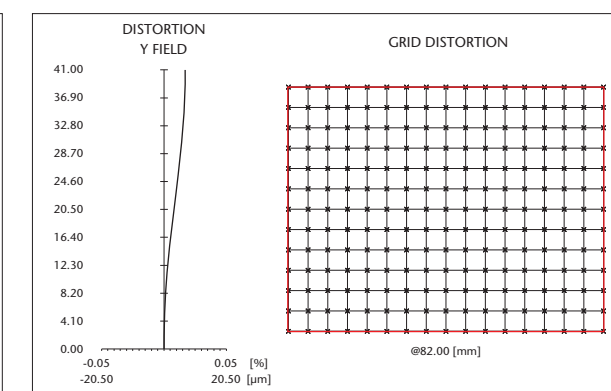


MTF data

Magnification: 0.33x , $F_{\text{no}}3.8$



ML-13538-82V70-033 MTF VS. FIELD



ML-13538-82V70-033 DISTORTION DIAGRAM

ML-F90C Series



This is high-performance FA Lens, capable for the latest 18K line sensor camera. 150 lp/mm high resolution enables to bring out the performance of 3.5μm sensor to the maximum.

Also, brightness focused designing work (Fno 2.8~) makes this lens best fit to the application which requires fast processing.

True color realization is realized, thanking to RGB color correction.

Features

Focal length : 97mm

Magnification : 0.7x 1.75x

High resolution : 150lp/mm > 10%

Brightness : Fno 2.8

Image format : 62.5mm

Primary Applications

Inspection

FPD
high
resolution

TFT
high
resolution

Fine-pitch
PCB

Functional
film

Semiconductor
back side

Specifications

Model name	Focal Length (mm)	Fno (∞)	Magnification	WD (mm)	Image Format (mm)	Pixel size (μm)
ML-F90C-07	97.8	2.8-22	0.7x	181.3	62.5	3.5
ML-F90C-175	97.7	2.8-22	1.75x	95.7		

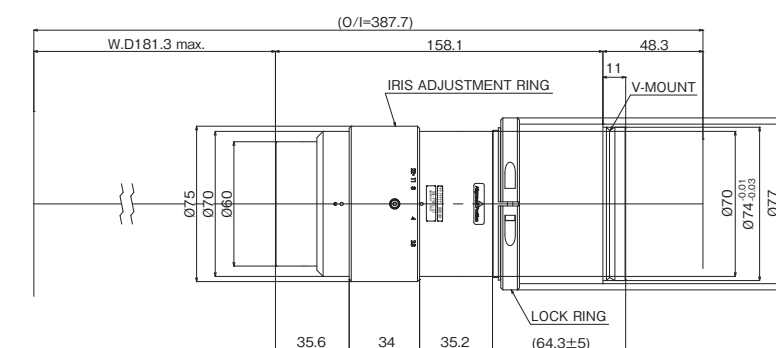
Accessory

Camera adapter CA Series

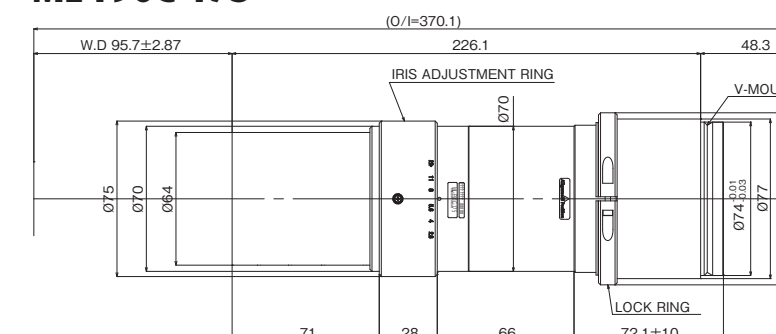
Camera adapters for FB (Flange Back) of various camera are available.
Reference to p19

Drawing

ML-F90C-07

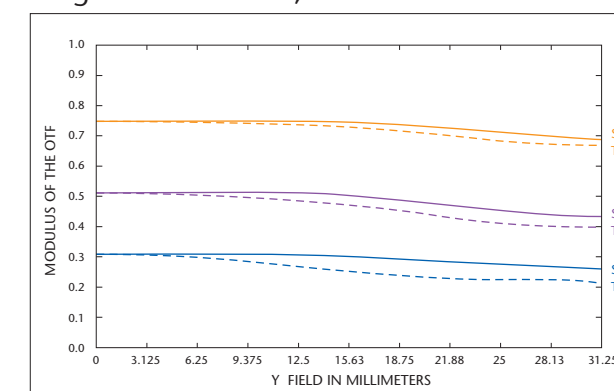


ML-F90C-175



MTF data

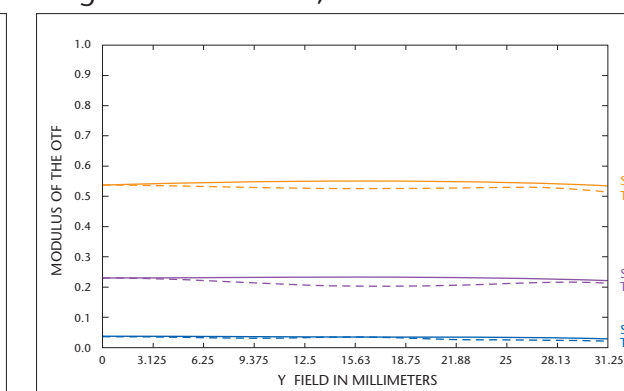
Magnification: 0.7x , Fno4.0



ML-F90C-07

MTF VS. FIELD

Magnification: 1.75x , Fno4.0



ML-F90C-175

MTF VS. FIELD

ML-F80C Series



This is the high functioning FA Lens which is ideal for using with 3-line color sensor by RGB chromatic aberration. Changeable magnification by adjusting focal distance enables us to offer best cost competitiveness by removing focus mechanism.

Features

Focal length : 85mm

Magnification : 0.2-0.5x 0.5-1.0x

Brightness : Fno 4.0

Image format : 82mm

Primary Applications

Inspection



Specifications

Model name	Focal Length (mm)	Fno (∞)	Magnification	WD (mm)	Image Format (mm)	Pixel size (μm)
ML-F80C-0205	84.6	4.0-22	0.2-0.5x	476.8-223.2	82	7
ML-F80C-0510	83.7-82.5	4.0-22	0.5-1.0x	220.1-133.3		

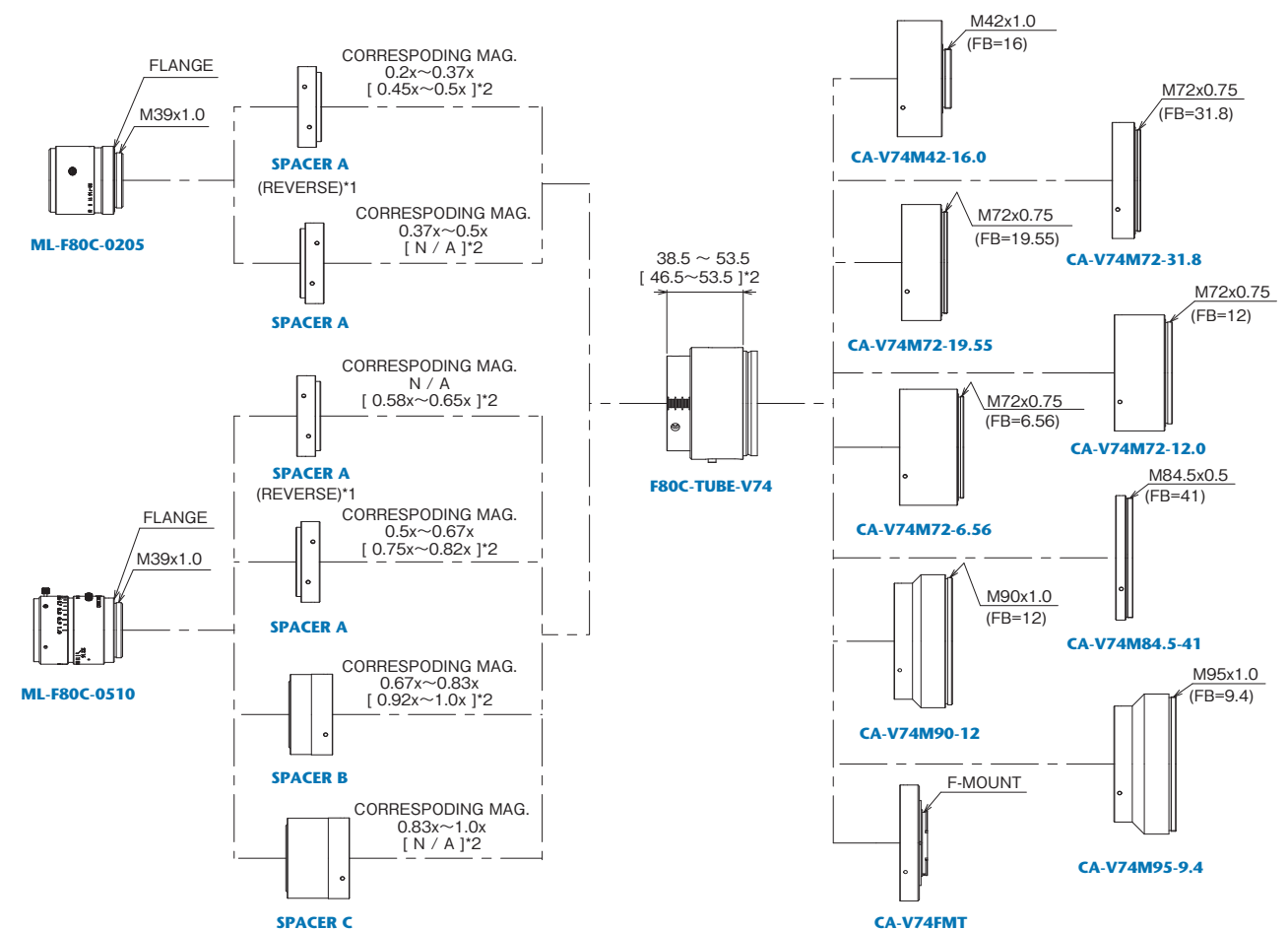
Accessory

Magnification changeable lens tube F80C-TUBE-V74

Camera adapter CA Series

Camera adapters for FB (Flange Back) of various camera are available.
Reference to p19

System chart



*1 Mount SPACER A back-wards.

*2 Magnification is the case when camera adapter CA-V74FMT is mounted.

Primary Applications

Automotive



- Engine components: cam shafts, engine cylinders, valves, valve springs, etc.
- Exhaust system: catalysts, etc.
- Exterior: window wiper blades, etc.

Electronics



- Smartphone inspection: housing, batteries, exterior components, etc.
- Inspection during smart phone assembly processes and highly accurate alignment

Foods and pharmaceuticals



- Bottle inspection
- Tablet inspection
- Blister package inspection

Machinery parts and fabrication



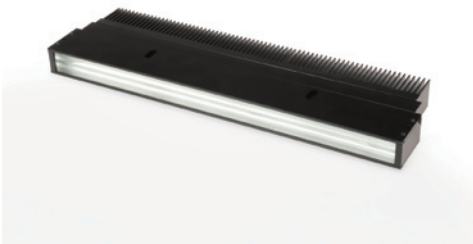
- Watch component inspection: lot manufacturing, assembly
- Machine tools: cutting tool inspection

LED illuminator for FA Lenses

High Brightness LED Light Line
MLNC Series

The top range brightness in the LED line lighting with heat-sink market is realized.

- The brightest imaging in the market is realized by the combination with FA Lens
 - * 700,000 (lx) at WD=50mm
- Beam condensing position adjustment mechanism enables the user to use various type of FA Lens from our portfolio.



Camera adapter CA Series

Camera adapter (CA series) is necessary when this LED products are used with our ML-13S38-82V70-033, ML-F90C Series and ML-F80C Series. Be noted that FB (Flange back) may vary, depends on camera you will use. Confirm your camera and choose our recommended camera adapter.

	Camera adapter CA Series											
	CA-V74										CA-V92	
	M72-31.8	M72-10.5	M72-11.98	M72-19.55	M72-12.0	M72-6.56	M72-9.54	M95-9.4	M90-12.0	FMT	M90-12.0	M95-9.4
TELEDYNE DALSA												
Piranha XL 16K					●				○		●	
Linea 16K/8K					●							
Piranha 3 12K/8K						●						
Piranha 3 16K					●							
Piranha 4 8K					●							
HS 12K/8K						●						
Linea 4K/2K										●		
Other Camera 4K/2K										●		
e2v												
UNIIQA 16K								○				●
UNIIQA 4K/2K										●		
ELIIXA 16K/8K								○				●
ELIIXA 8K/4K										●		
VIEWWORKS												
VT 18K/12K/9K		●										
VT 4K										●		
VL 16K/8K			●									
NIPPON ELECTRO-SENSORY DEVICES												
XCM 16K/8K	●											
XCM 6K										●		
Other Camera 4K/2K										●		
TAKENAKA SYSTEM												
TL 16K/8K				●								
Other Camera 4K/2K										●		
CMICRO												
FCS 16K/12K							●					
FCS 8K/6K							●					
Other Camera 4K/2K										●		

● Recommendation
○ Compatible

Description of the term

- A=FFD (Flange Focal Distance)**
Distance from the end-face at lens mount side to camera sensor surface.
- B=FB (Flange back)**
Distance from camera housing end-face to camera sensor surface.
- C= Tube length**
Distance from the end-face at lens mount side to camera housing end-face.

