FIXED FOCAL LENSES

1/3" TO 2/3" SENSORS	108 - 115
UP TO 4/3" SENSORS	115 - 116
VERY LARGE & LINESCAN SENSORS	117

A wide range of solutions for every machine vision challenge.

Opto Engineering® family of fixed focal lenses comprises many optics with special features, in addition to the most common types of optics used in machine vision: we offer a wide variety of fixed focal lenses for small, medium and large detectors, including very high resolution and UV imaging options.

At Opto Engineering® we are constantly working to provide **added-value** products to our customers and this family is no exception.

For more information please contact:

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Refer to specific datasheets available at www.opto-e.com for product compliancy with regulations, certifications and safety labels.

EN2MP series

Megapixel fixed focal lenses for 2/3" sensors

KEY ADVANTAGES

Suitable for wide range of applications
Designed to satisfy simple vision tasks.

Wide product range
Covers the most popular focal lengths used in factory automation.

High quality / price ratio
High performance with reasonable cost.

Locking screws
Locking screws for fixing focus and iris.

EN2MP series is a series of fixed focal lenses designed for use in factory automation. Its high quality to price ratio allows simple vision tasks to be achieved easily and efficiently. The lenses are designed to withstand harsh working environments.

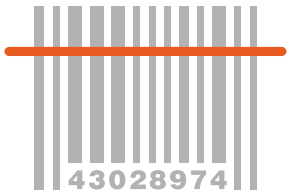
The lenses are suitable for a wide range of vision tasks. E.g. Pattern matching, positioning, barcode recognition, packaging inspection, presence/absence, robot guide, pick and place, orientation check, 3D measurement...etc.

With many years of experience in the machine vision industry, Opto Engineering® can provide bundle solutions including a suitable lens, camera and illuminator that are optimized for your specific application requirements.

FULL RANGE OF COMPATIBLE CAMERAS

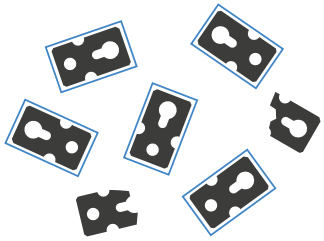
Area scan cameras p. 196-205

Application examples

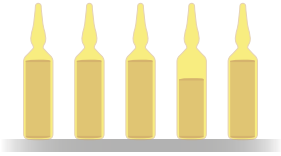


Barcode recognition.

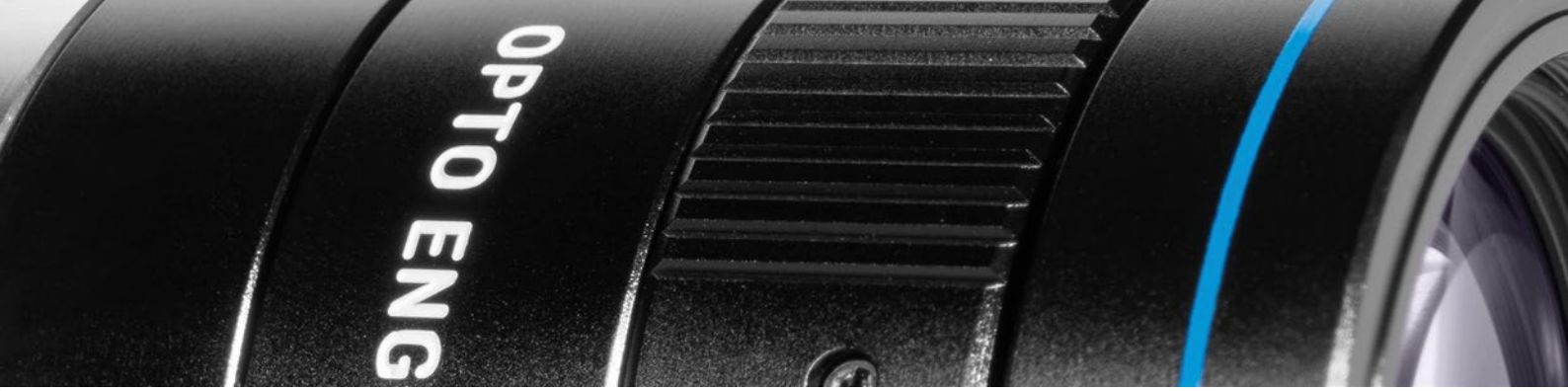
Color sorting.



Object identification.



Liquid level inspection.



Product range

EN2MP0814

EN2MP1214

EN2MP1614

EN2MP2514

EN2MP3514

EN2MP5018

EN2MP7528

	Optical specifications							Dimensions			
Part number	**Focal length** (mm)	**Image circle** Ø (mm)	**Max detector size**	**F/#**	**Angle of view (D x H x V)** (°) 1	**Max Distortion** (%) 2	**Mount**	**Length** (mm)	**Diameter** (mm)	**Mass** (g)	**Filter mount** (mm)
EN2MP0814	8	11	2/3"	1.4 - C	-	2.81	C	40.5	40.9	77	M34.5 x 0.5
EN2MP1214	12	11	2/3"	1.4 - C	49.0 x 40.0 x 30.3	1.8	C	37.5	38.3	71	M30.5 x 0.5
EN2MP1614	16	11	2/3"	1.4 - 22	37.6 x 30.4 x 22.9	1.0	C	37.9	38.2	76	M30.5 x 0.5
EN2MP2514	25	11	2/3"	1.4 - C	24.7 x 19.9 x 15.0	0.27	C	40.5	38.0	83	M30.5 x 0.5
EN2MP3514	35	11	2/3"	1.4 - C	17.7 x 14.2 x 10.7	0.33	C	37.8	39.1	90	M30.5 x 0.5
EN2MP5018	50	11	2/3"	1.8 - C	12.5 x 9.1 x 7.5	0.22	C	40.1	45.5	98	M30.5 x 0.5
EN2MP7528	75	11	2/3"	2.8 - C	8.4 x 6.7 x 5.0	0.36	C	53.4	42.0	140	M30.5 x 0.5

1 Angle of view while using max detector size.

2 Max distortion while using max dector size.

EN5MP series

5 Megapixel high resolution fixed focal lenses for 2/3" sensors

KEY ADVANTAGES

High resolution
Designed for high resolution cameras up to 5 Megapixel with 2/3" sensor.

Suitable for more complex applications
Ideal to achieve complex vision tasks.

Cost saving solution
High optical performance with reasonable cost.

Robust design
Designed for use in machine vision applications.

Wide product range
Covers the most popular focal lengths used.

EN5MP series is a series of high resolution fixed focal lenses designed for use in machine vision applications. A wide range of focal lengths provides more choices of field of view and working distance for many different system configurations.

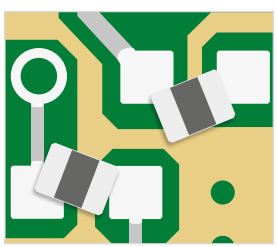
Together with high resolution cameras and proper illumination, EN5MP lenses allow you to design high resolution vision systems to solve complex or critical tasks. E.g. OCR/OCV, robot guidance...etc. and for the inspection of critical samples like connectors, electronic components, vials...etc.

Opto Engineering® can save you time and money by providing bundle solutions including a suitable lens, camera and illuminator, optimized for your applications requirements and type of samples.

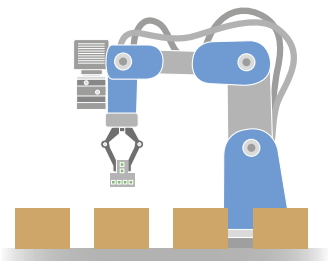
FULL RANGE OF COMPATIBLE CAMERAS

Area scan cameras p. 196-205

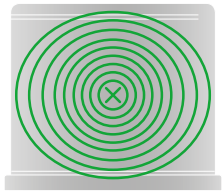
Application examples



PCB parts inspection.



Robot guidance for fast pick and place.



3D measurement.

Packaging / labeling inspection.

Product range

EN5MP0816

EN5MP1216

EN5MP1616

EN5MP2514

EN5MP3514

EN5MP5018

EN5MP7520

	Optical specifications							Dimensions			
Part number	**Focal length** (mm)	**Image circle** Ø (mm)	**Max detector size**	**F/#**	**Angle of view (D x H x V)** (°) 1	**Max Distortion** (%) 2	**Mount**	**Length** (mm)	**Diameter** (mm)	**Mass** (g)	**Filter mount** (mm)
EN5MP0816	8	11	2/3"	1.6 - 22	66.8 x 55.8 x 43.3	0.73	C	58.7	49.5	170	M40.5 x 0.5
EN5MP1216	12	11	2/3"	1.6 - 22	48.6 x 39.8 x 30.4	0.35	C	64.6	47.7	178	M37.5 x 0.5
EN5MP1616	16	11	2/3"	1.6 - 22	38.0 x 30.8 x 23.4	0.07	C	69.2	47.7	181	M37.5 x 0.5
EN5MP2514	25	11	2/3"	1.4 - 22	24.8 x 20.0 x 15.0	0.19	C	59.7	47.5	148	M37.5 x 0.5
EN5MP3514	35	11	2/3"	1.4 - 22	17.9 x 14.3 x 10.8	0.06	C	62.2	47.1	156	M37.5 x 0.5
EN5MP5018	50	11	2/3"	1.8 - 22	12.6 x 10.1 x 7.6	0.03	C	63.2	46.2	173	M37.5 x 0.5
EN5MP7520	75	11	2/3"	2.0 - 22	8.4 x 6.7 x 5.0	0.02	C	76.7	49.5	223	M40.5 x 0.5

1 Angle of view while using max detector size.

2 Max distortion while using max dector size.

WILL BE RELEASED SOON

EN8MP series

8 Megapixel high resolution fixed focal lenses for 1" sensors

	Optical specifications							Dimensions			
Part number	**Focal length** (mm)	**Image circle** Ø (mm)	**Max detector size**	**F/#**	**Angle of view (D x H x V)** (°) 1	**Max Distortion** (%) 2	**Mount**	**Length** (mm)	**Diameter** (mm)	**Mass** (g)	**Filter mount** (mm)
EN8MPL0818	8	16	1"	1.8 - C	90.06 x 77.16 x 61.30	4.12	C	67.0	56.8	76.6	-
EN8MPL1220	12	16	1"	2.0 - 22	69.63 x 60.71 x 44.33	4.10	C	52.9	44.2	-	M35.5 x 0.5
EN8MPL1620	16	16	1"	2.0 - 22	53.74 x 43.89 x 33.43	2.22	C	50.8	43.9	112.6	M34.0 x 0.5
EN8MPL2518	25	16	1"	1.8 - C	36.01 x 28.99 x 21.85	1.53	C	43.3	39.8	93.0	M30.5 x 0.5
EN8MPL3520	35	16	1"	2.0 - C	25.74 x 20.74 x 15.64	0.30	C	43.6	40.3	74.4	M30.5 x 0.5
EN8MPL5020	50	16	1"	2.0 - 22	18.18 x 14.60 x 10.96	0.01	C	52.3	47.6	120.4	M37.5 x 0.5

EN10MP series

10 Megapixel high resolution fixed focal lenses for 4/3" sensors

	Optical specifications							Dimensions			
Part number	**Focal length** (mm)	**Image circle** Ø (mm)	**Max detector size**	**F/#**	**Angle of view (D x H x V)** (°) 1	**Max Distortion** (%) 2	**Mount**	**Length** (mm)	**Diameter** (mm)	**Mass** (g)	**Filter mount** (mm)
EN10MPL1220	12	23	4/3"	2 - 22	89.02 x 75.46 x 61.08	2.40	C	88.4	80.0	447	M77.0 x 0.75
EN10MPL1620	16	23	4/3"	2 - 22	72.92 x 60.92 x 47.28	2.81	C	89.9	59.8	338	M58.0 x 0.75
EN10MPL2520	25	23	4/3"	2 - 22	49.7 x 40.6 x 31.0	0.66	C	86.7	52.8	251	M46.0 x 0.75
EN10MPL3520	35	23	4/3"	2 - 22	36.6 x 29.6 x 22.4	0.56	C	58.9	49.9	173	M40.5 x 0.5
EN10MPL5020	50	23	4/3"	2 - 22	25.9 x 20.9 x 15.7	0.14	C	57.9	48.8	170	M40.5 x 0.5

1 Angle of view while using max detector size.

2 Max distortion while using max dector size.

ENMT series

Fixed focal length lenses with motorized focus and aperture control

DISCONTINUED

The ENMT series has been discontinued.
Today the last pieces are available at special price.

KEY ADVANTAGES

Motorized focus and aperture
for fine and repeatable tuning of image focus and F-number setting.

Fully automated installations with remote operation possibility.

Compact and robust design.

High optical resolution.

Compatible MTDV controller
designed to drive ENMT stepper motors via Ethernet (TCP/IP).

ENMT series are high resolution fixed focal length lenses with automated adjustment of focus and aperture.
These motorized lenses guarantee precise and repeatable adjustment of both the aperture and focus to realize fully automated systems. This feature is ideal for installations where remote operation is necessary (e.g. in clean rooms where an operator cannot manually adjust the optical parameters), besides those requiring possibility to change format, lighting conditions, working distance or even inspection task. Additionally, different machines can be set with the exact same aperture/focus setting by automatically loading a pre-set configuration.
Thanks to ENMT precise motorized design, the user can fully exploit the high resolution of ENMT fixed focal length optics.
In fact, when compared to coarse manual operation, motorized adjustment allows for very fine and repeatable tuning of both the image focus and F-number setting.
Opto Engineering® motorization design integrates two bipolar stepper motors that respectively control focusing and aperture with fine incremental movements and accurate repeatable positioning. ENMT moving parts are conveniently shielded and integrated within a compact and robust enclosure.
Focus and aperture can be adjusted by means of dedicated MTDV controller (available separately) specifically designed to drive up to four bi-polar stepper motors via Ethernet (TCP/IP).

Product combinations*

ENMT lens + CBMT001 cable + MTDV controller.

* To be ordered separately.

ENMT series integrate high resolution optics featuring minimum distortion and 11 mm image circle for 5 Megapixel detectors up to 2/3".

Electrical specifications		
Iris		motorized
Focusing		
Connector		circular standard DIN 13Pos Male
Motor		
Number		2
Type		Stepper - bipolar
Supply voltage	(V, DC)	5 - 24
Amps/phase	(A)	0.5
Resistance/phase 1	(Ω)	10 ± 7%
Inductance/phase 2	(mH)	2.3 ± 20%
Holding Torque	(N·m)	0.135
Ratio		1:50
Step angle	(°)	18/50
Step accuracy		± 7%
Rotor inertia	(Kg/m^2)	1.0 x 10-7
Temperature rise	(°C)	80
Ambient temperature	(°C)	0 ÷ 50
Insulation resistance	(MΩ)	100
Insulation class		E - 120 °C
Dielectric strength 3	(V AC)	500
Ambient humidity		max 85% (no condensation)
Compatibility 4		
Stepper motors controller		MTDV3CH-00A1
Cable 5		CBMT001 (circular standard DIN 12Pos Female to DB15M connector cable, 2 m)

1 At 25 °C.
2 At 1 KHz.
3 For 1 min between the motor coils and the motor case.
4 All compatible products must be ordered separately.
5 Cable is required to connect ENMT series to MTDV3CH-00A1 controller and must be ordered separately.

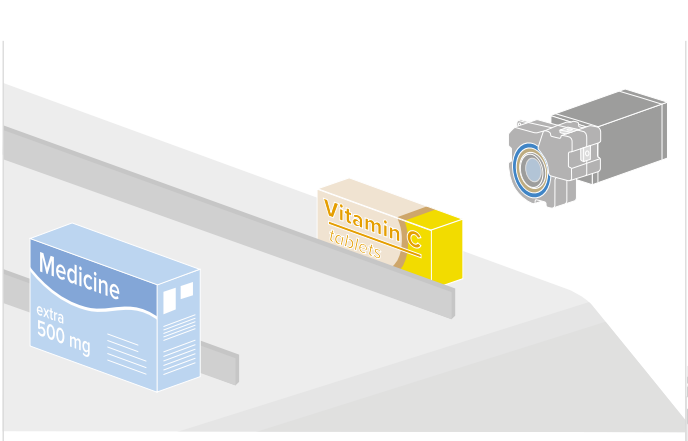
FOR MOTORIZED MACRO ZOOM LENSES SEE ALSO		
	MZMT12X series	p. 98
FULL RANGE OF COMPATIBLE ILLUMINATORS		
	Dome lights LTDM series	p. 142
COMPATIBLE STEPPER MOTOR CONTROLLER		
	MTDV	p. 262
FULL RANGE OF COMPATIBLE CAMERAS		
	Area scan cameras	p. 196-205

	Optical specifications								Mechanical specifications				
Part number	**Focal length** (mm)	**Mag.**	**Image circle** Ø (mm)	**Max detector size**	**WD** (mm)	**F/#**	**Horizontal angle of view** (°) 1	**Max distortion** (%) 2	**Mount**	**Length** (mm)	**Width** (mm)	**Height** (mm)	**Filter thread** (mm)
ENMT-M1224-MPW2-MM	12	0.100 - 0	11	2/3"	100 - ∞	2.4 - 16	14.4	0.35	C	81.5	41.3	70	M27 x 0.5
ENMT-M1620-MPW2-MM	16	0.075 - 0	11	2/3"	200 - ∞	2.0 - 16	14.7	0.1	C	81.5	41.3	70	M27 x 0.5
ENMT-M2518-MPW2-MM	25	0.081 - 0	11	2/3"	300 - ∞	1.8 - 16	13.8	0.03	C	81.5	41.3	70	M27 x 0.5
ENMT-M3520-MPW2-MM	35	0.190 - 0	11	2/3"	200 - ∞	2.0 - 22	18.0	0.01	C	81.5	41.3	70	M27 x 0.5
ENMT-M5028-MPW2-MM	50	0.138 - 0	11	2/3"	400 - ∞	2.8 - 32	27.7	0.027	C	81.5	52.3	70	M27 x 0.5

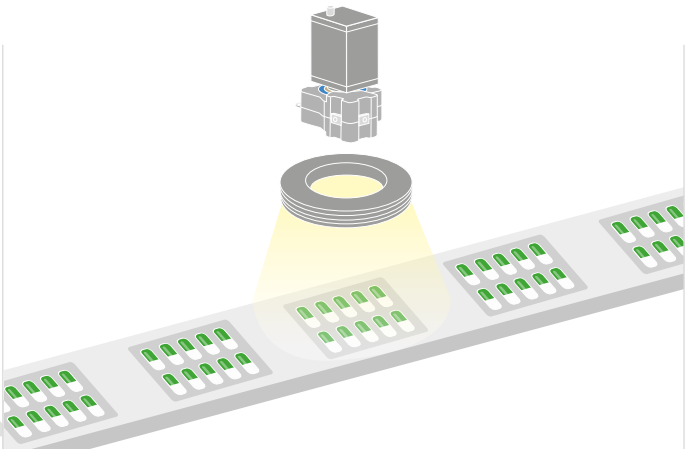
1 Horizontal angle of view while using max dector size.

2 Max distortion while using max dector size.

Application examples



Pharmaceutical carton inspection



Blister inspection

ENMP series

Megapixel C-mount lenses for detectors up to 2/3"

*RT

	Optical specifications								Mechanical specifications				
Part number	Focal length	Magnification	Image circle	Max detector size	WD	F/#	Horizontal angle of view	Max Distortion	Mount	Length	Diameter	Mass	Filter thread
	(mm)	(x)	Ø (mm)		(mm)		(°) 1	(%) 2		(mm)	(mm)	(g)	(mm)
RT-H0514-MP2	5	0.044 - 0	8	1/2"	100 - ∞	1.4 - 16C	65.5	0.5	C	45.5	44.5	102.0	M43 x 0.75
RT-M0814-MP2	8	0.075 - 0	11	2/3"	100 - ∞	1.4 - 16C	56.3	0.1	C	28.2	33.5	62.6	M30.5 x 0.5
RT-M1214-MP2	12	0.074 - 0	11	2/3"	150 - ∞	1.4 - 16C	40.4	0.1	C	28.2	33.5	62.0	M30.5 x 0.5
RT-M1614-MP2	16	0.052 - 0	11	2/3"	300 - ∞	1.4 - 16C	30.8	0.1	C	28.2	33.5	60.0	M30.5 x 0.5
RT-M2514-MP2	25	0.084 - 0	11	2/3"	300 - ∞	1.4 - 16C	20	0.3	C	36.0	33.5	71.0	M30.5 x 0.5
RT-M3514-MP	35	0.110 - 0	11	2/3"	300 - ∞	1.4 - 16C	13.9	0.8	C	38.2	33.5	87.0	M30.5 x 0.5
RT-M5018-MP2	50	0.100 - 0	11	2/3"	500 - ∞	1.8 - 16C	10.5	0.3	C	38.2	33.5	85.0	M30.5 x 0.5
RT-M7528-MP	75	0.214 - 0	11	2/3"	300 - ∞	2.8 - 16C	6.8	0.4	C	57.8	35.0	113.0	M30.5 x 0.5

1 Horizontal angle of view while using max dector size.

2 Max distortion while using max dector size.

FIXED FOCAL LENSES | 1/3" TO 2/3" SENSORS

ENHR series

5 Megapixel C-mount lenses for detectors up to 2/3"

*RT

	Optical specifications								Mechanical specifications				
Part number	Focal length	Magnification	Image circle	Max detector size	WD	F/#	Horizontal angle of view	Max Distortion	Mount	Length	Diameter	Mass	Filter thread
	(mm)	(x)	Ø (mm)		(mm)	3	(°) 1	(%) 2		(mm)	(mm)	(g)	(mm)
RT-M0824-MPW2	8	0.100 - 0	11	2/3"	50 - ∞	2.4 - 16	57.8	1.9	C	45.7	32.0	80	M30.5 x 0.5
RT-M1224-MPW2	12	0.100 - 0	11	2/3"	100 - ∞	2.4 - 16	39.8	0.35	C	42.7	29.0	72	M27 x 0.5
RT-M1620-MPW2	16	0.075 - 0	11	2/3"	200 - ∞	2.0 - 16	30.7	0.1	C	33.5	29.0	53	M27 x 0.5
RT-M2518-MPW2	25	0.081 - 0	11	2/3"	300 - ∞	1.8 - 16	19.9	0.03	C	36.3	29.0	60	M27 x 0.5
RT-M3520-MPW2	35	0.190 - 0	11	2/3"	200 - ∞	2.0 - 22	14.3	0.01	C	37.3	29.0	59	M27 x 0.5
RT-M5028-MPW2	50	0.138 - 0	11	2/3"	400 - ∞	2.8 - 32	27.7	0.027	C	45.3	29.0	69	M27 x 0.5
ENHR-Ruggedized series to minimize image aberrations after shock and vibration													
RT-M0824-MPW2-R	8	0.100 - 0	11	2/3"	50 - ∞	2.4, 4.0, 5.6, 8.0, 11.0	57.8	1.9	C	45.7	32.0	80	M30.5 x 0.5
RT-M1224-MPW2-R	12	0.100 - 0	11	2/3"	100 - ∞	2.4, 4.0, 5.6, 8.0, 11.0	39.8	0.35	C	42.7	29.0	72	M27 x 0.5
RT-M1620-MPW2-R	16	0.075 - 0	11	2/3"	200 - ∞	2.0, 4.0, 5.6, 8.0, 11.0	30.7	0.1	C	33.5	29.0	53	M27 x 0.5
RT-M2518-MPW2-R	25	0.081 - 0	11	2/3"	300 - ∞	1.8, 4.0, 5.6, 8.0, 11.0	19.9	0.03	C	36.3	29.0	60	M27 x 0.5
RT-M3520-MPW2-R	35	0.190 - 0	11	2/3"	200 - ∞	2.0, 4.0, 5.6, 8.0, 11.0	14.3	0.01	C	37.3	29.0	59	M27 x 0.5
RT-M5028-MPW2-R	50	0.138 - 0	11	2/3"	400 - ∞	2.8, 4.0, 5.6, 8.0, 11.0	27.7	0.027	C	45.3	29.0	69	M27 x 0.5

1 Horizontal angle of view while using max dector size.

2 Max distortion while using max dector size.

3 For the ruggedized series, the aperature is fixed. The available aperature are indicated.

HIGH RESOLUTION ENHR SERIES MATCH SMALL PIXEL SIZE DETECTORS:

In order to effectively create a high resolution image a lens must be capable of resolving the detector pixel size. Take full advantage of high resolution detectors with ENHR series featuring MTFs in excess of 120 lp/mm! For further details about how to match optics and sensor resolution see section "Optics and sensor resolution" in pag. XIII of our Optics Basics section.

FULL RANGE OF COMPATIBLE PRODUCTS

 Area scan cameras p. 196-205

 Optical filters p. 242

 LTRNDC LED direct ringlights p. 156

ENVF series

Vari-focal lenses for detectors up to 2/3"

*RT

	Optical specifications								Mechanical specifications				
Part number	Focal length	Magnification	Image circle	Max detector size	WD	F/#	Horizontal angle of view	Max distortion	Mount	Length	Diameter	Mass	Filter thread
	(mm)	(x)	Ø (mm)		(mm)		(°) 1	(%) 2		(mm)	(mm)	(g)	(mm)
RT-M3Z1228C-MP	12 - 36	~	11	2/3"	200-∞ (tele) / 50-∞<(wide)	2.8 - 16C	29.8	3.5	C	53.0	41.6	105	M35 x 0.5

1 Horizontal angle of view while using max dector size.

2 Max distortion while using max dector size.

FULL RANGE OF COMPATIBLE PRODUCTS	
	Area scan cameras p. 196-205
	Optical filters p. 242
	LTRNDC LED direct ringlights p. 156

EN2M series

Megapixel C-mount lenses for up to 1" detectors

*RT

	Optical specifications								Mechanical specifications				
Part number	Focal length	Image circle	Max detector size	WD	F/#	Horizontal angle of view	Max Distortion	Nominal resolution	Mount	Length	Diameter	Mass	Filter thread
	(mm)	Ø (mm)		(mm)		(°) 1	(%)			(mm)	(mm)	(mm)	(mm)
RT-FL-BC2518-9M	25	16	1"	100 - ∞	1.8 - 16	14.1	n.a.	135 lp/mm (9MP)	C	57.5	42	149	M40.5 x 0.5
RT-FL-BC3518-9M	35	16	1"	150 - ∞	1.8 - 22	16.8	n.a.	135 lp/mm (9MP)	C	60.0	42	150	M40.5 x 0.5
RT-FL-BC5024-9M	50	16	1"	200 - ∞	2.4 - 22	18.8	n.a.	135 lp/mm (9MP)	C	69.0	42	166	M40.5 x 0.5
RT-FL-BC7528-9M	75	16	1"	250 - ∞	2.8 - 32	21.3	n.a.	135 lp/mm (9MP)	C	81.0	42	189	M40.5 x 0.5

1 Horizontal angle of view while using max dector size.

FULL RANGE OF COMPATIBLE PRODUCTS	
	Area scan cameras p. 196-205
	Optical filters p. 242
	LTRNDC LED direct ringlights p. 156

ENUV2M series

UV C-mount lenses for up to 1" detectors

*RT

Part number	Optical specifications								Mechanical specifications				
	Focal length	Magnification	Image circle	Max detector size	WD	F/#	Horizontal angle of view	Max Distortion	Mount	Length	Diameter	Mass	Filter thread
	(mm)	(x)	Ø (mm)		(mm)		(°) 1	(%)		(mm)	(mm)	(g)	(mm)
RT-FL-BC2528-VGUV	25	0.10 - 0	16	1"	230 - ∞	2.8-16	29.7	n.a.	C	58.7	60.0	33	M25 x 0.5
RT-FL-BC7838-VGUV	78	0.15 - 0	16	1"	440 - ∞	3.8-16	9.5	n.a.	C	109.3	62.5	446	M49 x 0.75

1 Horizontal angle of view while using max dector size.

FULL RANGE OF COMPATIBLE CAMERAS

Area scan cameras p. 196-205

EN43 series

5 MP and 12 MP C-mount lenses for up to 4/3" detectors

*RT

Part number	Optical specifications								Mechanical specifications			
	Image circle	Focal length	Max detector size	WD	F/#	Horizontal angle of view	Max distortion	Nominal resolution	Mount	Length	Diameter	Filter thread
	Ø (mm)	(mm)		(mm)		(°) 1	(%) 2	(lp/mm)		(mm)	(mm)	(mm) 3
RT-A-1224MX5M	22	12	4/3"	300 - ∞	2.4 - 32	58.72	< 3.7	100lp/mm (5MP)	C	104.41	80	M77 × 0.75
RT-A-1620MX5M	22	16	4/3"	100 - ∞	2.0 - 32	45.75	< -0.6	150lp/mm (5MP)	C	102.41	76	M72 × 0.75
RT-A-2520MX5M	22	25	4/3"	150 - ∞	2.0 - 32	30.22	< 0.2	150lp/mm (5MP)	C	103.43	38.5	M35.5 x 0.5
RT-A-3520MX5M	22	35	4/3"	200 - ∞	2.0 - 22	21.83	< 1	120lp/mm (5MP)	C	103.37	42	M37.5 x 0.5
RT-V0828-MPY	17.6	8	1.1"	200 - ∞	2.8 - 16.0	83.0	< 0.6	12 MP	C	54	75	M72 x 0.75 or M67 x 0.75
RT-V1228-MPY	17.6	12	1.1"	300 - ∞	2.8 - 16.0	60.5	< 0.5	12 MP	C	36.1	42	M34.5 x 0.5
RT-V1628-MPY	17.6	16	1.1"	300 - ∞	2.8 - 16.0	48.2	< 0.5	12 MP	C	35.2	39.5	M34.5 x 0.5
RT-V2528-MPY	17.6	25	1.1"	300 - ∞	2.8 - 16.0	31.7	< 0.3	12 MP	C	34	39.5	M34.5 x 0.5
RT-V3528-MPY	17.6	35	1.1"	300 - ∞	2.8 - 16.0	22.9	< 0.1	12 MP	C	45.1	39.5	M34.5 x 0.5
RT-V5028-MPY	17.6	50	1.1"	500 - ∞	2.8 - 16.0	16.2	< 0.1	12 MP	C	45.1	39.5	M34.5 x 0.5

1 Horizontal angle of view while using max dector size.
2 Max distortion while using max dector size.
3 For RT-V0828-MPY, need to use RT-VM0811 mount adapter for using M72 x 0.75 filter mount for 1.1" detector.
Or need to use RT-VM0810 for using M67 x 0.75 filter mount for 1" detector.

FULL RANGE OF COMPATIBLE CAMERAS

Area scan cameras p. 196-205

EN4K series

Line scan lenses for FF full frame detectors and up to 43-45 mm image circle

*RT

	Optical specifications									Mechanical specifications			
Part number	**Focal length**	**Magnification**	**Image circle**	**Max detector size**	**WD**	**F/#**	**Horizontal angle of view**	**Max distortion**	**Nominal resolution**	**Mount**	**Length**	**Diameter**	**Filter thread**
3	(mm)	(x)	Ø (mm)		(mm)		(°) **1**	(%) **2**			(mm)	(mm)	(mm)
RT-A-2428MF	24	0.16 - 0	43	Full frame - 35 mm	150 - ∞	2.8 - 22	36.0	< -4	30lp/mm (5MP)	F	40.21	60	M52x 0.75
RT-A-2428MT	24	0.16 - 0	43	Full frame - 35 mm	150 - ∞	2.8 - 22	36.0	< -4	30lp/mm (5MP)	M42x1 FD 46.5	40.21	60	M52x 0.75
RT-A-2828MF	28	0.09 - 0	43	Full frame - 35 mm	300 - ∞	2.8 - 22	35.7	< -3	30lp/mm (5MP)	F	34.17	60	M52x 0.75
RT-A-2828MT	28	0.09 - 0	43	Full frame - 35 mm	300 - ∞	2.8 - 22	35.7	< -3	30lp/mm (5MP)	M42x1 FD 46.5	34.17	60	M52x 0.75
RT-A-3525MF	35	0.11 - 0	43	Full frame - 35 mm	300 - ∞	2.5 - 22	34.35	-3	30lp/mm (5MP)	F	43.73	60	M52x 0.75
RT-A-3525MT	35	0.11 - 0	43	Full frame - 35 mm	300 - ∞	2.5 - 22	34.35	-3	30lp/mm (5MP)	M42x1 FD 46.5	43.73	60	M52x 0.75
RT-FL-YFL3528	35	0.18 - 0	45	Full frame - 35 mm	190 - ∞	2.8 - 22	33.22	n.a.	85 lp/mm (9 MP)	F	56.8	72	M62X0.75
RT-A-5018MF	50	0.12 - 0	43	Full frame - 35 mm	400 - ∞	1.8 - 22	36.33	< 1	30lp/mm (5MP)	F	39.04	60	M52x 0.75
RT-A-5018MT	50	0.12 - 0	43	Full frame - 35 mm	400 - ∞	1.8 - 22	36.33	< 1	30lp/mm (5MP)	M42x1 FD 46.5	39.04	60	M52x 0.75
RT-FL-YFL5028	50	0.2 - 0	45	Full frame - 35 mm	250 - ∞	2.8 - 22	36.99	n.a.	85 lp/mm (9 MP)	F	56.8	72	M62X0.75

1 Horizontal angle of view while using max dector size.
2 Max distortion while using max dector size.

FULL RANGE OF COMPATIBLE CAMERAS

HR Area scan cameras p. 206-209