

OBJECTIVE LENS

It is possible to choose objective lens for measurement object from wide variation of lineup such as normal, NIR, NUV, HR, etc.

● As for measurement of visible spectral range, M-plan Apo series, having long working distance, is recommended.

● As for measurement of NIR spectral range, M-Plan Apo NIR series, having good transmittance ratio and corrected for chromatic aberration in 480-1800nm spectral range, is recommended.

● Furthermore, M-Plan Apo HR series, improved resolution and N.A., is selectable.

About field of view and pixel resolution corresponding to the combination of objective lens and imaging detector, refer to the table below.

[Specification of objective lens]

Magnification	N.A.	W.D.(mm)	Focal length(mm)	Resolution(μm)	Focal depth(μm)
M-Plan Apo series , infinity-corrected objective lens					
M-Plan Apo 5x	0.14	34.0	40.0	2.0	14.0
M-Plan Apo 10x	0.28	33.5	20.0	1.0	3.5
M-Plan Apo 20x	0.42	20.0	10.0	0.7	1.6
M-Plan Apo 50x	0.55	13.0	4.0	0.5	0.9
M-Plan Apo 100x	0.7	6.0	2.0	0.4	0.6
M-Plan Apo HR series, high-resolution infinity-corrected objective lens					
M-Plan Apo HR 10x	0.42	15.0	20.0	0.6	1.55
M-Plan Apo HR 50x	0.75	5.2	4.0	0.3	0.5
M-Plan Apo HR 100x	0.9	1.3	2.0	0.3	0.3
M-Plan Apo NIR series, infinity-corrected objective lens for NIR					
M-Plan Apo NIR 5x	0.14	37.5	40.0	2.0	14.0
M-Plan Apo NIR 10x	0.26	30.5	20.0	1.1	4.1
M-Plan Apo NIR 20x	0.40	20.0	10.0	0.7	1.7
M-Plan Apo NIR 50x	0.42	17.0	4.0	0.7	1.6
M-Plan Apo NIR 100x	0.50	12.0	2.0	0.6	1.1
M-Plan Apo NIR HR series, high-resolution infinity-corrected objective lens for NIR					
M-Plan Apo NIR HR 50x	0.65	10.0	4.0	0.42	0.65
M-Plan Apo NIR HR 100x	0.7	10.0	2.0	0.39	0.56

[Main detectors, field of view, pixel resolution of NFP measurement (approx. value)]

Detector model	ISA071/ISA071GL		ISA041H2		ISA041HRA		ISA041HRVA	
Detector name	Hi-resolution CMOS detector		InGaAs NIR detector		InGaAs high resolution NIR detector			
Spectral range	400-1100nm		950-1700nm		400~1700nm			
Sensor size	1/1.8 inch		6.4mm×5.12mm		6.4mm×5.12mm		3.2mm×2.56mm	
Total pixels	2048×1536		320×256		1280×1024		640×512	
Pixels pitch	3.45μm		20μm		5μm			
Optical magnification	Field of view (mm)	Pixel resolution (μm)	Field of view (mm)	Pixel resolution (μm)	Field of view (mm)	Pixel resolution (μm)	Field of view (mm)	Pixel resolution (μm)
5x	1.41×1.05	0.69	1.28×1.024	4	1.28×1.024	1	0.64×0.512	1
10x	0.70×0.52	0.345	0.64×0.512	2	0.64×0.512	0.5	0.32×0.256	0.5
20x	0.35×0.26	0.173	0.32×0.256	1	0.32×0.256	0.25	0.16×0.128	0.25
50x	0.14×0.10	0.069	0.128×0.102	0.4	0.128×0.102	0.1	0.064×0.051	0.1
100x	0.07×0.05	0.035	0.064×0.051	0.2	0.064×0.051	0.05	0.032×0.025	0.05

*Pixel resolution: The measurement length equivalent to 1 pixel of the detector calculated from filed of view and sensor pitch of the detector.

*The optical magnification when using **MS-OP011-RL2** is 2 times the magnification in the table on the left, and the actual field of view and pixel resolution are 1/2.

*The optical magnification when using the **MS-OP011-RLH** is 1/2 of each magnification in the table on the left, and the actual field of view and pixel resolution are 2 times.

ND FILTER (NEUTRAL DENSITY FILTER)

ND filter with dedicated filter holder for Synos' **M-Scope series** optics. We can prepare not only standard type ND filter but also various type and specification of ND filter as customer's requirement, such as reduction ratio, special coating, etc. In addition, we can supply only filter holder for **M-Scope series** optics. Various optical filters such as polarizer, etc. can be attached.

Model	Item name	Specification
NDF-5	Visible ND filter set	for Visible, 5 pieces set (transmittance:0.01%・0.1%・1%・5%・10%)
NDF NIR-5	NIR ND filter set	for NIR, 5 pieces set (transmittance:0.01%・0.1%・1%・5%・10%)
NDF IR-5	IR ND filter set	for IR, 5 pieces set (transmittance:0.01%・0.1%・1%・5%・10%)
FH	Filter holder	for 25mmφ・30mmφ・35mmφ
Diameter	Target optics	
25mmφ	M-Scope type I・type L・type S・type F・type C・type D・type HL・type HD, etc.	
30mmφ	M-Scope type HS, etc.	
35mmφ	M-Scope type FW・type HF, etc.	

FILTER ROTATION HOLDER FHR-25

FHR-25 is filter holder with filter rotation structure, for Synos' optical measurement optics **M-Scope series**. It is possible to rotate and adjust filter such as polarizer.

