

# Line scan lens

## Makro-Symmar 5.6/120-0.33x

Wherever complex web and surface inspections are concerned, the line scan image capture method is used in most cases. Due to the principle used, this method requires a very careful choice of camera and an optimally adapted lens in order to achieve maximum system performance. It is essential to observe important application-specific and physical parameters: the size of the CCD or CMOS imaging sensor in the camera defines the minimum required image circle of the lens.



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### Key Features

- Very high optical image quality in the large sensor range
- Vibration-insensitive for stable optical performance
- Reverse position of the lens possible to enlarge the magnification range
- Lockable distance and aperture settings
- Use in best azimuth position possible
- Industry-compatible V-mount interface
- 100% quality control guarantees reliability and constant quality
- Low maintenance requirements, therefore high system availability

### Applications

- Web and surface inspections
- Quality control
- FPD inspection
- PCB inspection
- OLED inspection
- Line scan applications

### Technical Specifications

F-number	5.6
Focal length	118.9 mm
Image circle	86 mm
Magnification	-0.33
Transmission	400 - 1000 nm
Interface	V-Mount
Weight	170 gr.
Option	Optical filter

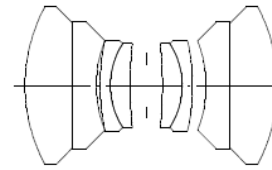
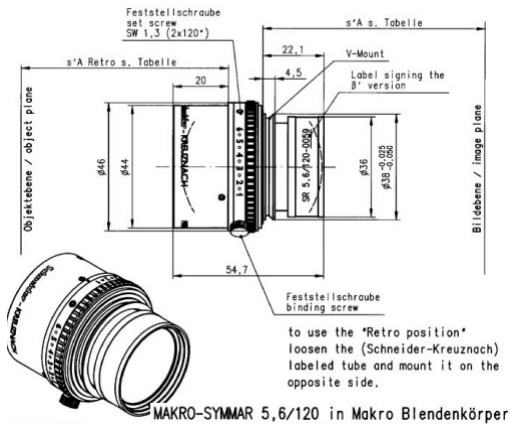
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# Makro-Symmar 5.6/120-0.33



M-SR 5.6/120

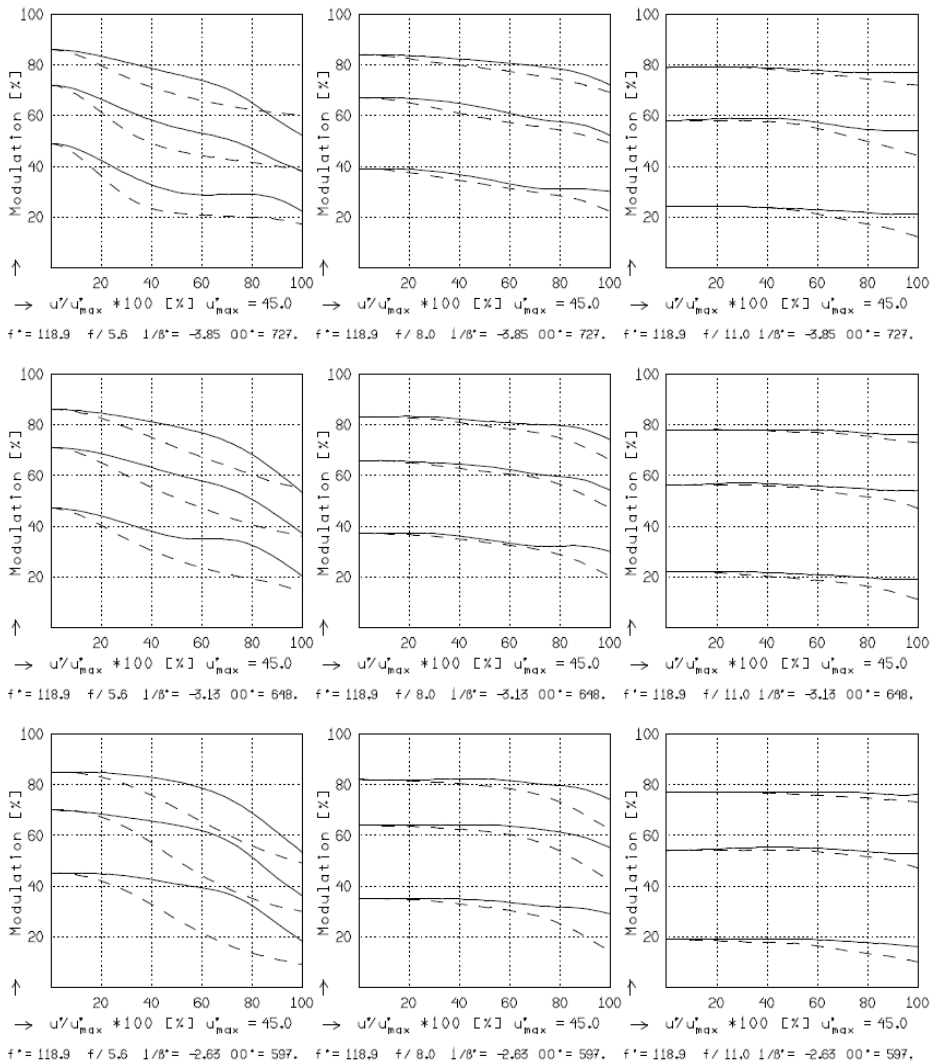
$f^*$	= 118.9 mm	$\beta_p$	= 1.001
$s_F$	= -96.3 mm	$s_{EP}$	= 22.6 mm
$s_F^*$	= 93.7 mm	$s_{AP}$	= -25.3 mm
$HH^*$	= 0.6 mm	$\Sigma d$	= 48.5 mm

## M-SR 5.6/120

MODULATION with reference to the relative image height

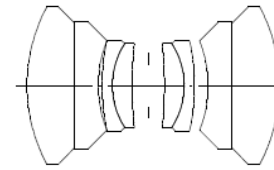
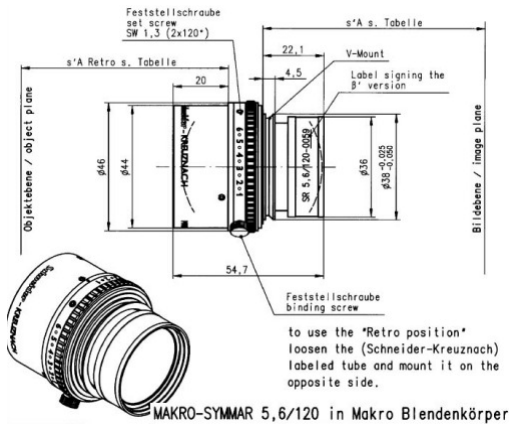
Wavelength $\lambda$ [nm]	: 555	655	605	505	455	405
Spectral weighting [%]	: 19.6	23.7	22.2	15.7	12.1	6.7
Spatial frequency R [1/mm]	: 20	40	80			
Format [mm X mm]	: 90.0	0.0				
Diagonal $2u'$ [mm]	: 90.0					

radial —  
tangential - - -



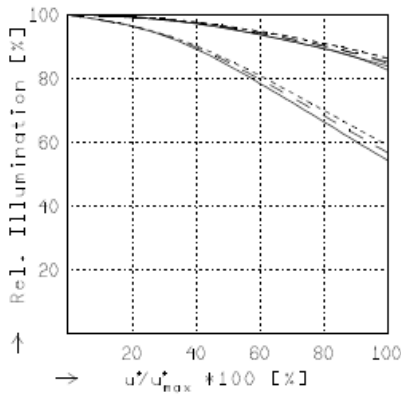
Focusing :  $MTF_{max}$  at  $f / 5.6$  ,  $R = 72$  1/mm.  $u'/u'_{max} = 0$

# Makro-Symmar 5.6/120-0.33



M-SR 5.6/120

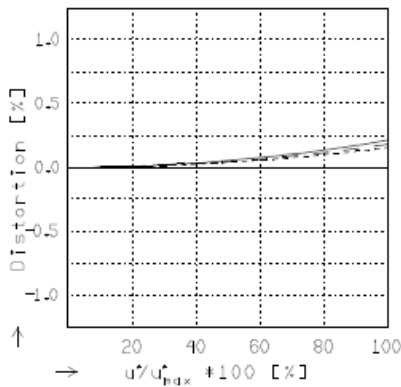
$f^*$ = 118.9 mm	$\beta_p$ = 1.001
$s_F$ = -96.3 mm	$s_{EP}$ = 22.6 mm
$s_F^*$ = 93.7 mm	$s_{AP}$ = -25.3 mm
$HH^*$ = 0.6 mm	$\Sigma d$ = 48.5 mm



## RELATIVE ILLUMINATION

The relative illumination is shown for the given focal distances or magnifications.

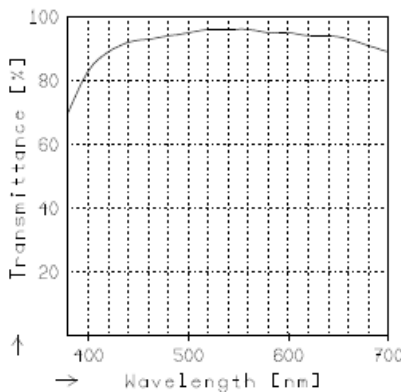
	$f / 5.6$	$f / 8.0$	$f / 11.0$
— $\beta' = -0.2600$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$
- - $\beta' = -0.3200$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$
- · - $\beta' = -0.3800$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$



## DISTORTION

Distortion is shown for the given focal distances or magnifications. Positive values indicate pincushion distortion and negative values barrel distortion.

— $\beta' = -0.2600$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$
- - $\beta' = -0.3200$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$
- · - $\beta' = -0.3800$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$	$u_{max}^* = 45.1$



## TRANSMITTANCE

Relative spectral transmittance is shown with reference to wavelength.