

# Line scan lens

## Makro-Symmar 5.6/120-1.0x

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.



Makro-Symmar 5.6/120

### 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	120.7 mm
Image circle	86 mm
Magnification	-1.0
Transmission	400 - 1000 nm
Interface	V-Mount
Weight	170 gr.
Option	Optical filter

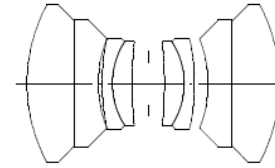
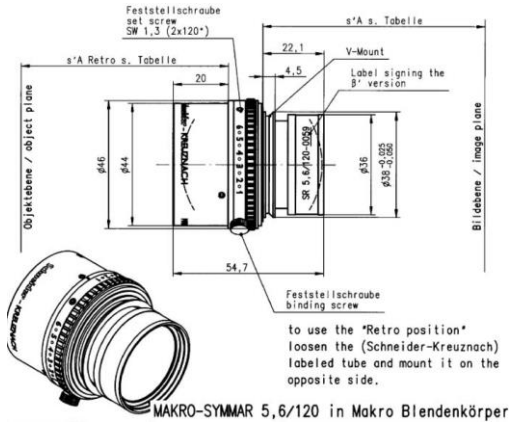
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# Makro-Symmar 5.6/120-1.0



M-SR 5.6/120 BETA -0.875..-1.125

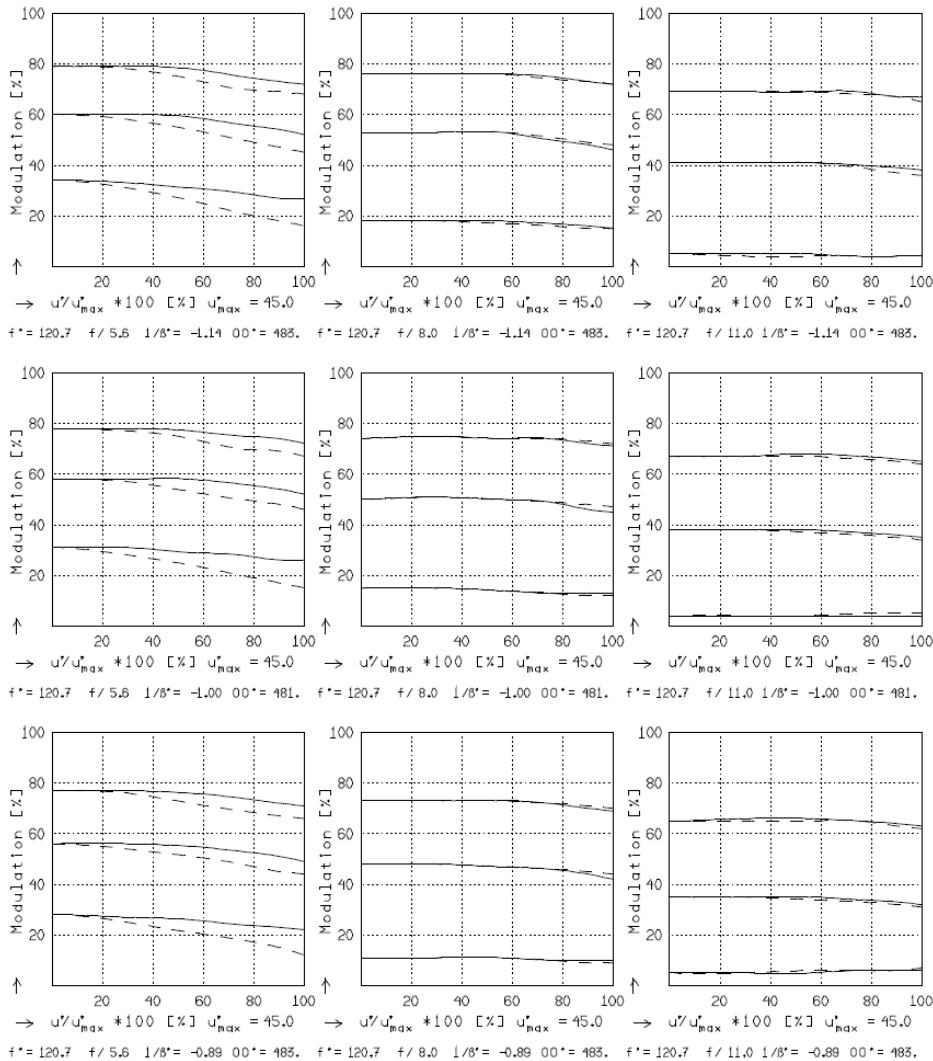
$f'$ = 120.7 mm	$\beta'_p$ = 1.002
$s_F$ = -94.3 mm	$s_{EP}$ = 26.1 mm
$s_{F\cdot}$ = 94.3 mm	$s_{AP}$ = -26.6 mm
$HH'$ = -1.8 mm	$\Sigma d$ = 50.9 mm

M-SR 5.6/120 BETA -0.875..-1.125

MODULATION with reference to the relative image height

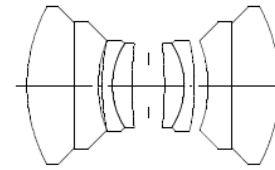
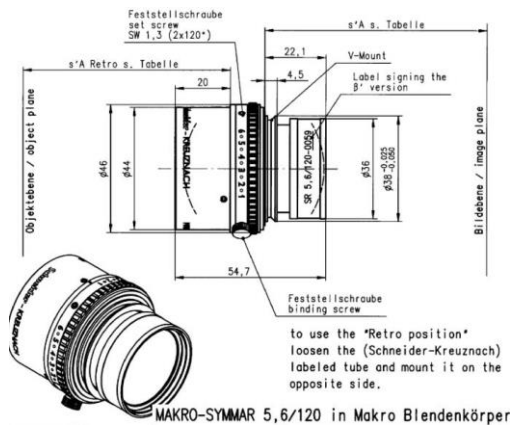
Wavelength $\lambda$ [nm] :	555	655	605	505	455	405
Spatial weighting [%] :	19.6	23.7	22.2	15.7	12.1	6.7
Spatial frequency R [1/mm] :	20	40	80			
Format [mm X mm] :	90.0	X	0.0			
Diagonal $2u'$ [mm] :	90.0					

radial —  
tangential - - -



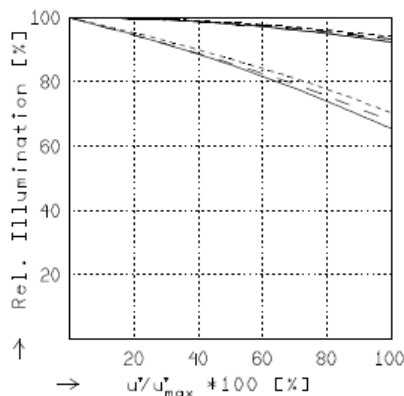
Focusing :  $MTF_{max}$  at  $f / 5.6$  ,  $R = 80$  1/mm.  $u'/u'_{max} = 0$

# Makro-Symmar 5.6/120-1.0



M-SR 5.6/120 BETA -0.875..-1.125

$f' = 120.7 \text{ mm}$	$\beta_{\beta} = 1.002$
$s_F = -94.3 \text{ mm}$	$s_{EP} = 26.1 \text{ mm}$
$s_F^* = 94.3 \text{ mm}$	$s_{AP}^* = -26.6 \text{ mm}$
$HH' = -1.8 \text{ mm}$	$\Sigma d = 50.9 \text{ mm}$

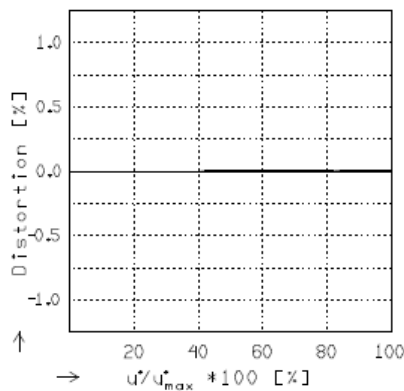


## RELATIVE ILLUMINATION

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

$f / 5.6$        $f / 8.0$        $f / 11.0$

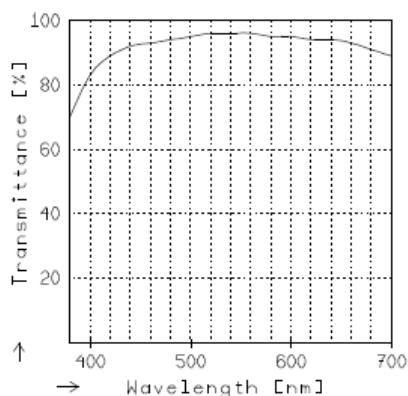
— $\beta' = -0.8750$	$u_{max}^* = 45.0$	$00' = 483.$
- - $\beta' = -1.0000$	$u_{max}^* = 45.0$	$00' = 481.$
- · - $\beta' = -1.1250$	$u_{max}^* = 45.0$	$00' = 483.$



## DISTORTION

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

— $\beta' = -0.8750$	$u_{max}^* = 45.0$	$00' = 483.$
- - $\beta' = -1.0000$	$u_{max}^* = 45.0$	$00' = 481.$
- · - $\beta' = -1.1250$	$u_{max}^* = 45.0$	$00' = 483.$



## TRANSMITTANCE

Relative spectral transmittance is shown with reference to wavelength.