

2 Terms and Conventions

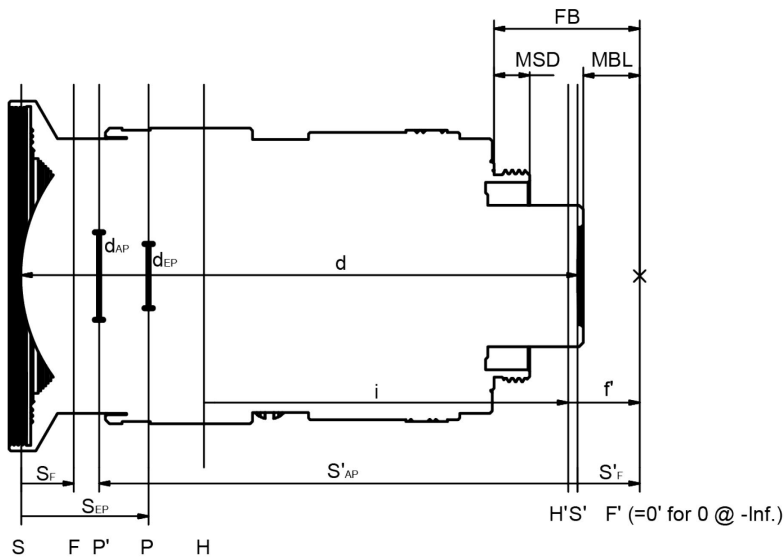


Figure 1: Terms for Lenses; Not to Scale

Designations according to DIN 1335			
O	Object position	f' (=H'F')	Focal length
O'	Image position	k (=f'/d _{EP})	f-number (indicated as "f/k")
H	Front principal plane	i (=HH')	Principal point separation
H'	Back principal plane	s_F (=SF)	Front focal length
F	Front focal plane	s'_F (=S'F')	Back focal length
F'	Back focal plane	s_{EP} (=SP)	Entrance pupil position
P	Entrance pupil plane	s'_{AP} (=S'P')	Exit pupil position
P'	Exit pupil plane	d (=SS')	Overall optical length
S	Vertex of first lens surface	d_{EP}	Entrance pupil diameter
S'	Vertex of last lens surface	d_{AP}	Exit pupil diameter
		β'_P (=d _{AP} /d _{EP})	Pupil magnification
Other Designations			
FB	Flange back	MOD	Minimum object distance
MSD	Maximum screw-in depth	CRA	Chief ray angle
MBL	Mechanical back length	Inf.	Infinity
WD	Working distance	MTF	Modulation transfer function
		SFR	Spatial frequency response

3 Mechanical Specifications and Environmental Requirements

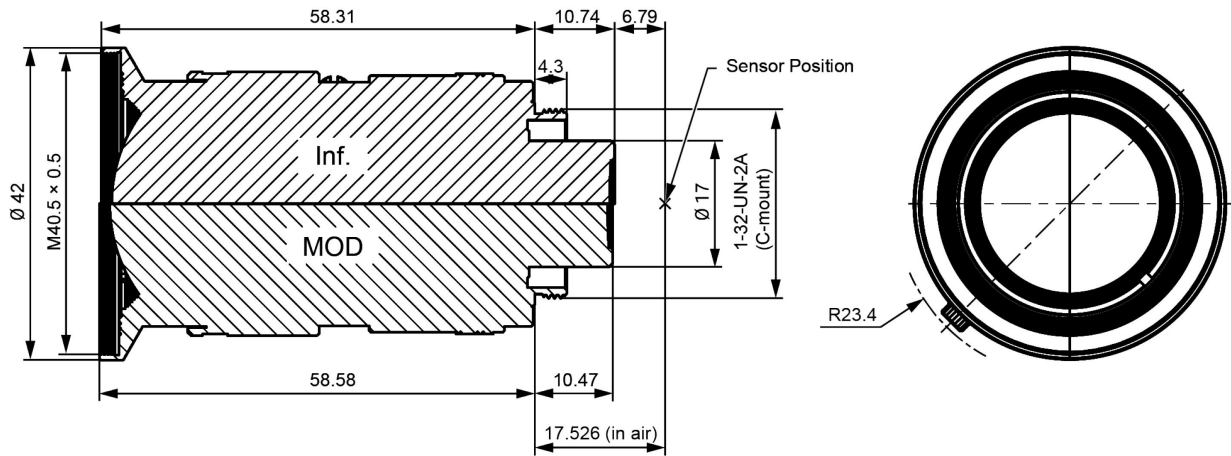


Figure 2: Mechanical Dimensions (in mm), Not to Scale

Mechanical Specifications		
Environmental requirements	During storage	-20 – 70 °C, 20 – 70 % relative humidity, non-condensing
	During operation	-10 – 60 °C, 20 – 80 % relative humidity, non-condensing (For best results, focus when the temperature has stabilized.)
	Flange back	17.526 mm
	Weight	Approx. 136 g
	Focus operation	Manual Operating angle: 190°

4 Optical Specifications

Optical Specifications		
Focal length f'	8.6 mm \pm 5 %	
Aperture range	$f/1.6 - f/16$	
Image circle	11 mm (2/3" format)	
Focus range	0.25 m (= MOD) to infinity	
Optimum working distance	0.5 m	
Optimum magnification	0.032	
Relative illumination at full aperture	At least 50 % (see Figure 4)	
Resolution (25 % MTF, center, full aperture)	Designed for 90 LP/mm (5.5 μ m pixel size, see Figure 5)	
Optical distortion	-4.8 % (barrel distortion, see Figure 3)	
Angle of view, 1/1.8" format (using an IMX265 sensor)	horizontal	46.2° (@ MOD) to 46.6°
	vertical	35.1° (@ MOD) to 35.5°
Angle of view, 2/3" format (using PYTHON 2000 sensor)	horizontal	55.7° (@ MOD) to 56.2°
	vertical	42.9° (@ MOD) to 43.1°
Wavelength range	Visible (400 to 700 nm)	
Pupil magnification β_p	6.73	
Chief ray angle, CRA	9.9°	
Front focal length, s_F	6.3 mm	
Back focal length, s'_F	8.4 mm	
Principal point separation, HH'	43.79 mm	
Entrance pupil position, s_{EP}	15.3 mm	
Exit pupil position, s'_{AP}	-57.55 mm	
Overall optical length, d	75.01 mm	

5 Performance Chart

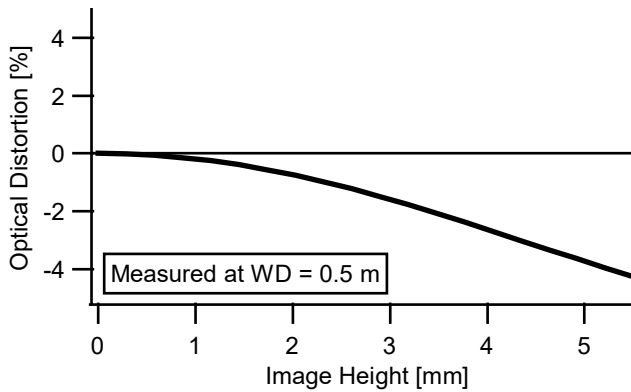


Figure 3: Optical Distortion vs. Image Height

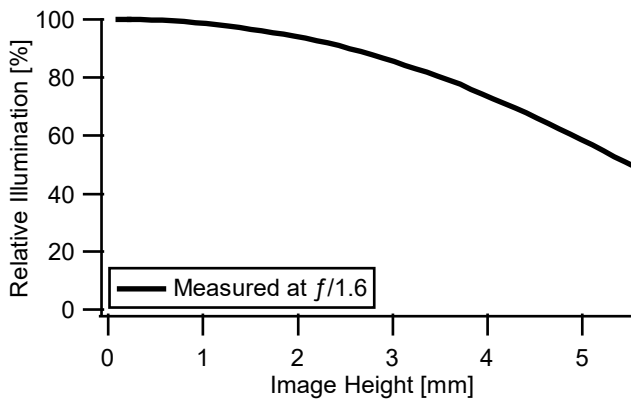


Figure 4: Relative Illumination vs. Image Height

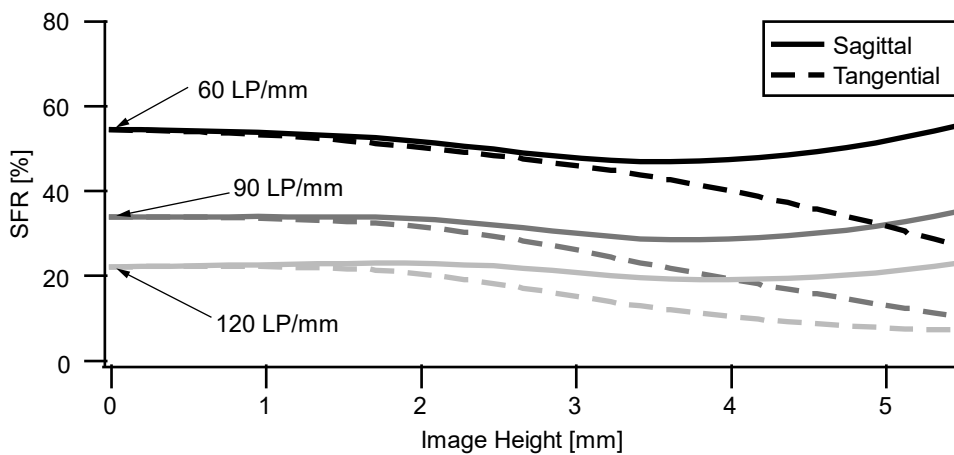


Figure 5: Measured Resolution vs. Image Height

Conditions for spatial frequency response (SFR) calculation: $f/1.6$, polychromatic, WD 0.5 m, average result from ten samples. The technical data shown in chapters 1 to 5 are nominal design values. The actual values of the delivered products may deviate from the nominal design values.