

Basler Accessories



Technical Specification BASLER LENS C23-0816-2M

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Table of Contents

- 1 Key Features 2**
- 2 Terms and Conventions 3**
- 3 Mechanical Specifications and Environmental Requirements 4**
- 4 Optical Specifications 5**
- 5 Performance Chart 6**
- Revision History 7**

1 Key Features

Key Features	
<ul style="list-style-type: none">• Compact lens for 2 megapixel machine vision / factory automation• Part of the Basler C23 lens series: 8, 12, 16, 25, 35, and 50 mm focal length models available• Metal housing• C-Mount interface• Locking screws for iris and focus	
Optimum working distance	0.5 m
Aperture range	$f/1.6 - f/16$
Focal length	8.6 mm
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2 Terms and Conventions

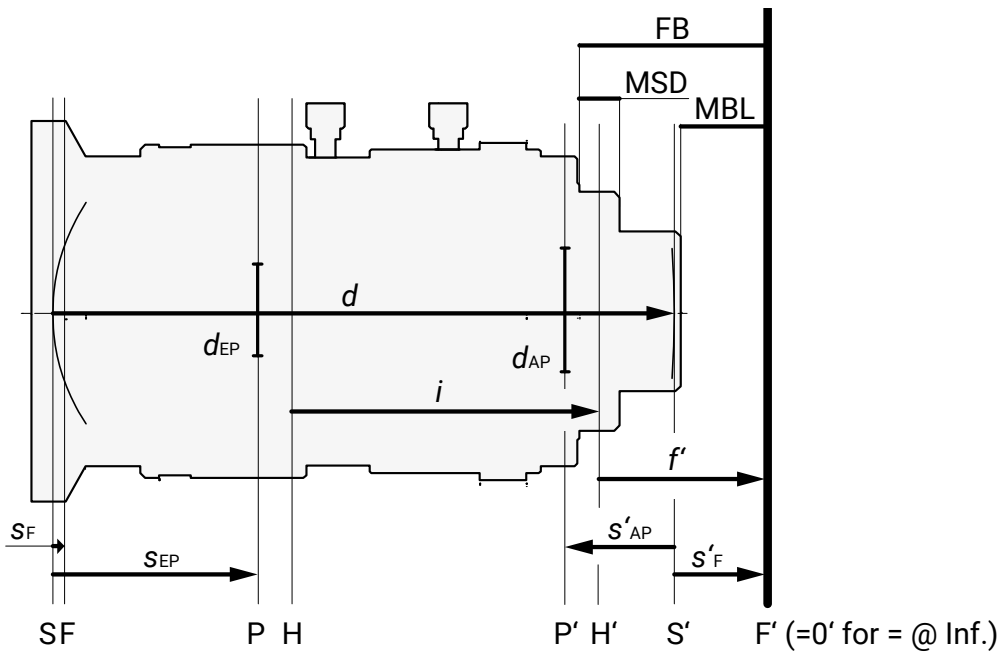


Figure 1: Terms for Lenses; Not to Scale

Designations according to DIN 1335			
O	Object position	$f' (=HF')$	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
		$\beta'_P (=d_{AP}/d_{EP})$	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

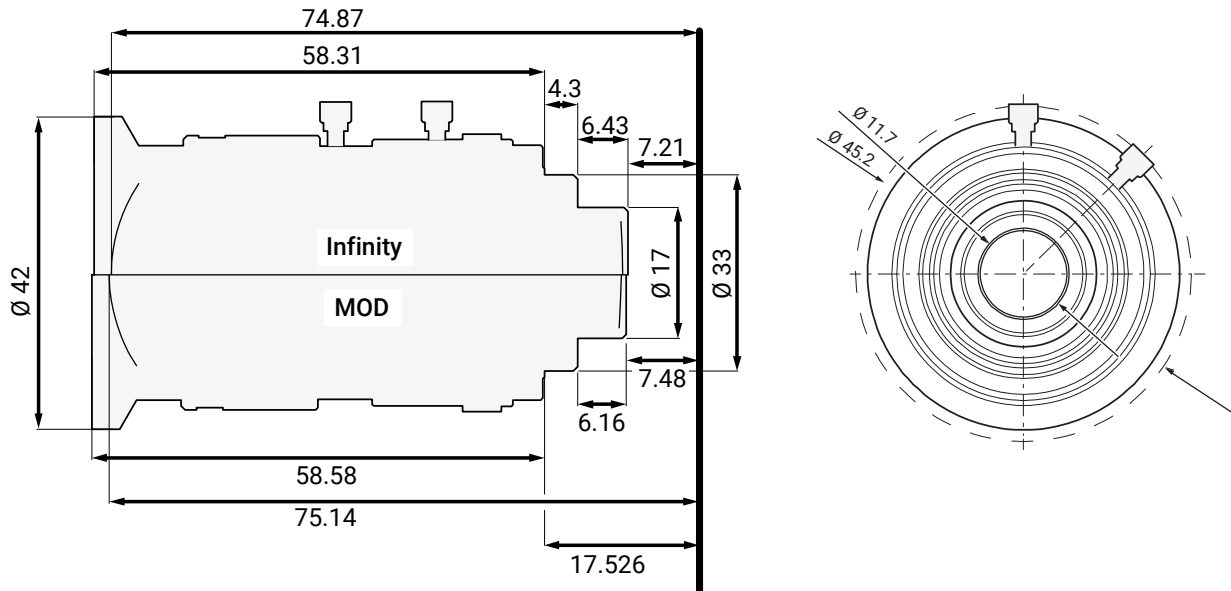


Figure 2: Mechanical Dimensions (in mm), Not to Scale

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

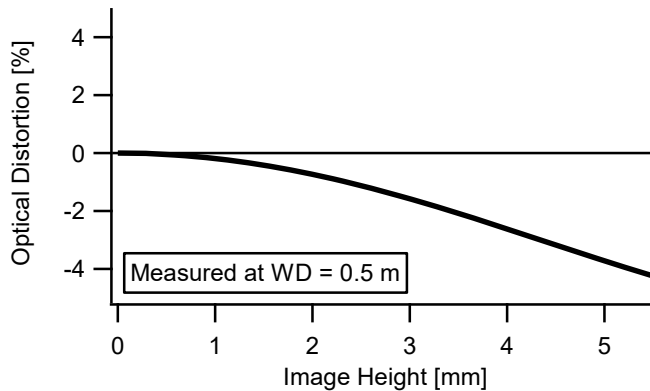


Figure 3: Optical Distortion vs. Image Height

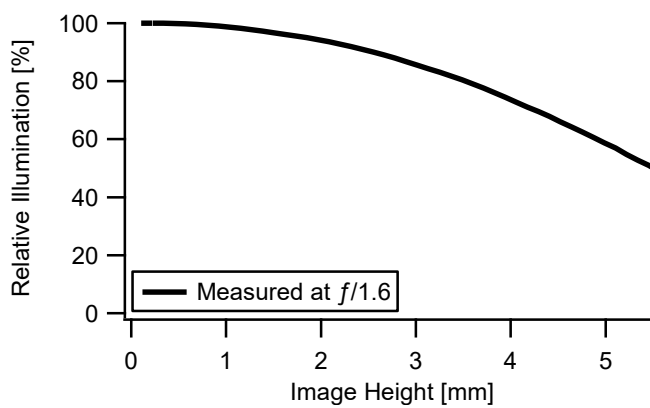


Figure 4: Relative Illumination vs. Image Height

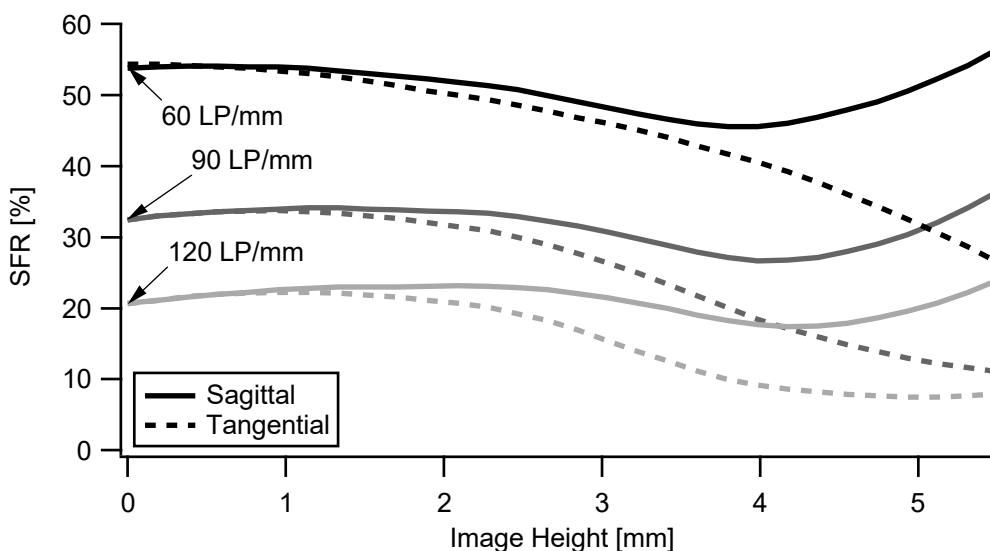


Figure 5: Measured Resolution vs. Image Height

Conditions for 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 real values of the delivered products may deviate from the Nominal Design Values.

Revision History

Document Number	Date	Changes
DG00191101000	02 Aug 2019	Initial release of this document.
DG00191102000	12 Aug 2019	Corrected references to figures in Chapter 4.