

# Line Scan Lens

## XENON-SAPPHIRE 3.2/88, beta' = -1.75 for use with Beam Splitter Prism (BSP)

This high-resolution, high-speed lens is optimized for the use with 16k pixel line scan sensors. It is broadband coated and can be used in the spectral range of 400 – 1000 nm.

The V-mount makes it easy to install and rotate into the desired azimuth position for a wide range of high resolution applications.

The XENON Sapphire 3.2/88 provides two significant stop positions that are especially marked on the stop ring:

- F#3.2 is the maximum opening of the stop and provides maximum brightness. It is free of artificial vignetting. The MTF for 100 lp/mm is very high up to the edge of a 58 mm field. Due to the high aperture the lens is more sensitive with respect to change of magnification.
- F#4.0 shows maximum MTF and practically diffraction limited performance over the whole field. Hence the depth of field is bigger.



XENON-SAPPHIRE lens

### Key Features

- for 16k line scan cameras (57.3mm length / pixel sizes 3.5µm and 82mm length / pixel size 5.1µm) as well as
- for 12k line scan cameras (62.5mm length / pixel sizes appr. 5µm)
- High resolution optics from 400 - 1000 nm
- Use with suitable BSP (25 mm thick BK7) for illumination
- Robust mechanics for industrial environment
- Vibration insensitive
- Focus and iris setting lockable

### Applications

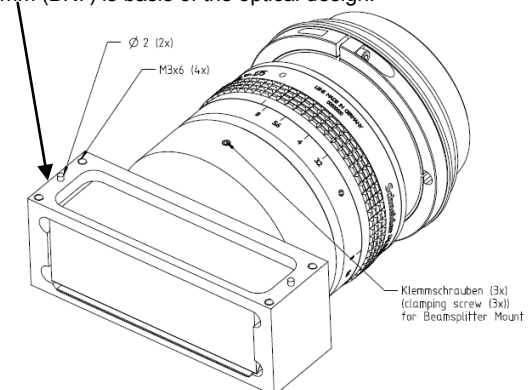
- High-resolution 16k line scan applications with coaxial illumination for inspecting reflective objects
- Bright field applications
- 12k TDI inspection
- Machine Vision and other imaging applications with high throughput
- Flat panel inspection
- Digitalization
- Detection of micro defects

Technical Specifications	XENON-SAPPHIRE 3,2/88
F# range	3.2 - 8
Focal length	88.2 mm
Image circle	62.5 mm
Beta'	-1.75 (-1.65 ... -1.85 )
Object to image distance	380 (375 ... 386) mm
Transmission	400 -1000 nm
Interface	Schneider V-mount 70
Weight without BSP	765 gr.
Code no. lens only	1072762
lens including mounted BSP	1073347

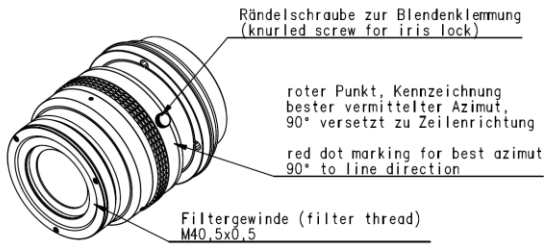
### Accessories

Beam Splitter Prism in mount	Code no. # 1073831
Adapter V70 / M72 x 0.75 10 mm	# 1072419
Extension tube 5 mm	# 1072420
Extension tube 10 mm	# 1072421
Extension tube 25 mm	# 26406
Extension tube 50 mm	# 1054733

A BSP must be used with this lens as its thickness of 25 mm (BK7) is basis of the optical design.



# XENON-SAPPHIRE 3.2/88 for use with BSP



## XENON SAPPHIRE 3.2/88

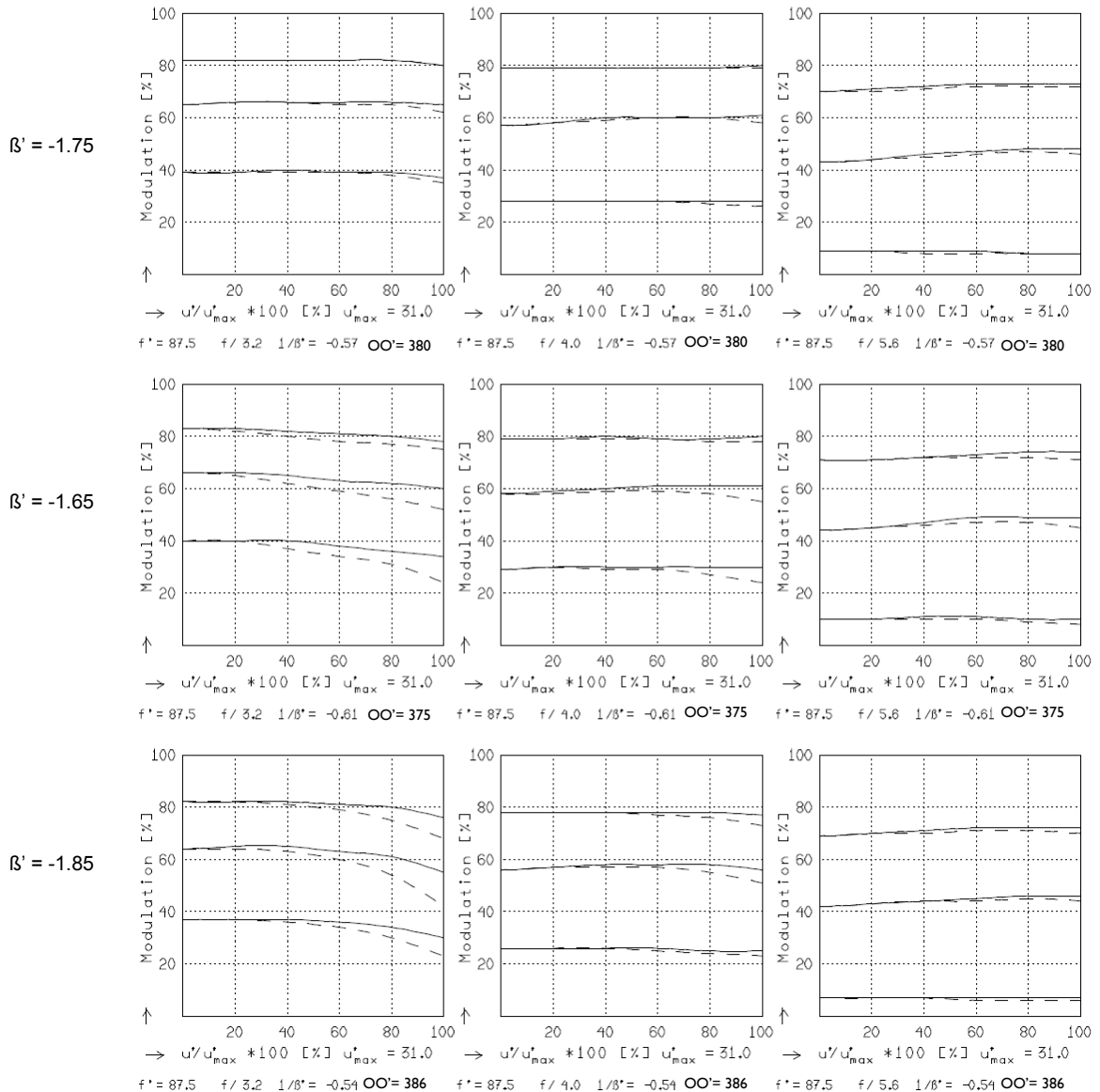
$f = 88,2 \text{ mm}$	$\beta'_p = 1,10$
$s_F = -46,0 \text{ mm}$	$s_{EP} = 34,6 \text{ mm}$
$s'_F = 56,9 \text{ mm}$	$s'_{AP} = -39,5 \text{ mm}$
$HH' = -0,9 \text{ mm}$	$\Sigma d = 72,8 \text{ mm}$

## XENON SAPPHIRE 3.2/88 for use with BSP

### MODULATION with reference to the relative image height

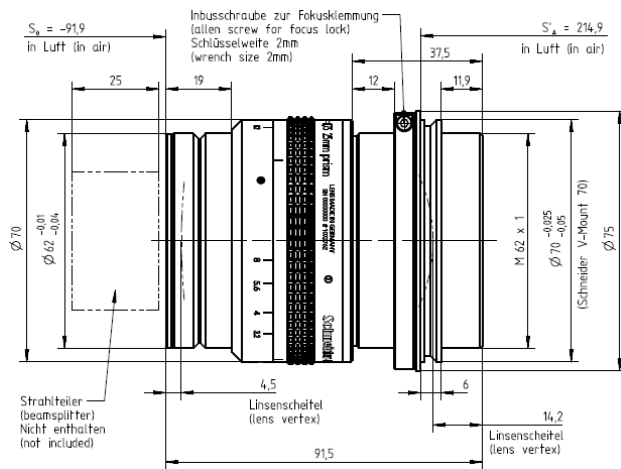
Wavelength $\lambda$ [nm] :	525	675	625	575	475	425
Spectral weighting [%] :	26.5	6.4	24.2	27.8	13.6	1.5
Spatial frequency R [1/mm] :	25	50	100			
Image- $\emptyset$ $f / 3.2$ [mm] :	62.0					
Image- $\emptyset$ $f / 5.6$ [mm] :	62.0					

radial —  
tangential - -



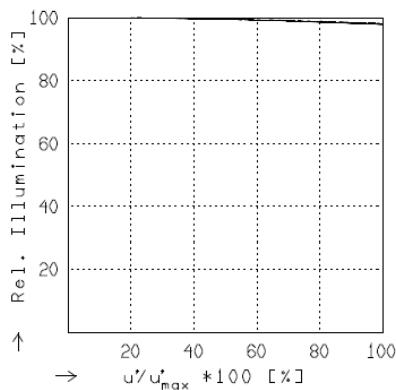
Focusing :  $MTF_{max}$  at  $f / 4.8$  ,  $R = 50$  1/mm,  $u'/u'_{max} = 0$

# XENON-SAPPHIRE 3.2/88 for use with BSP



## XENON SAPPHIRE 3.2/88

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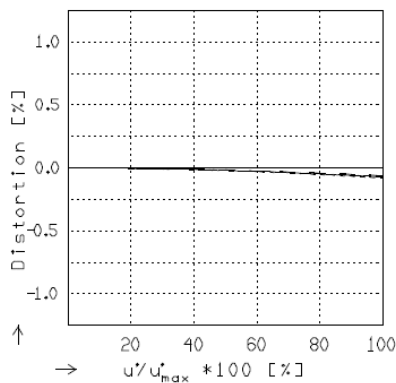


## RELATIVE ILLUMINATION

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

$f / 3.2$        $f / 4.0$        $f / 5.6$

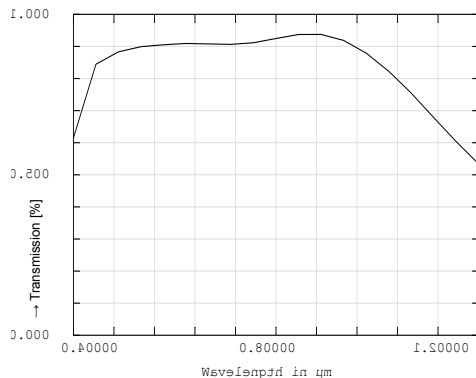
—	$\beta' = -1,7500$	$u'_{max} = 31,0$	OO' = 380
- -	$\beta' = -1,6500$	$u'_{max} = 31,0$	OO' = 375
- - -	$\beta' = -1,8500$	$u'_{max} = 31,0$	OO' = 386



## DISTORTION

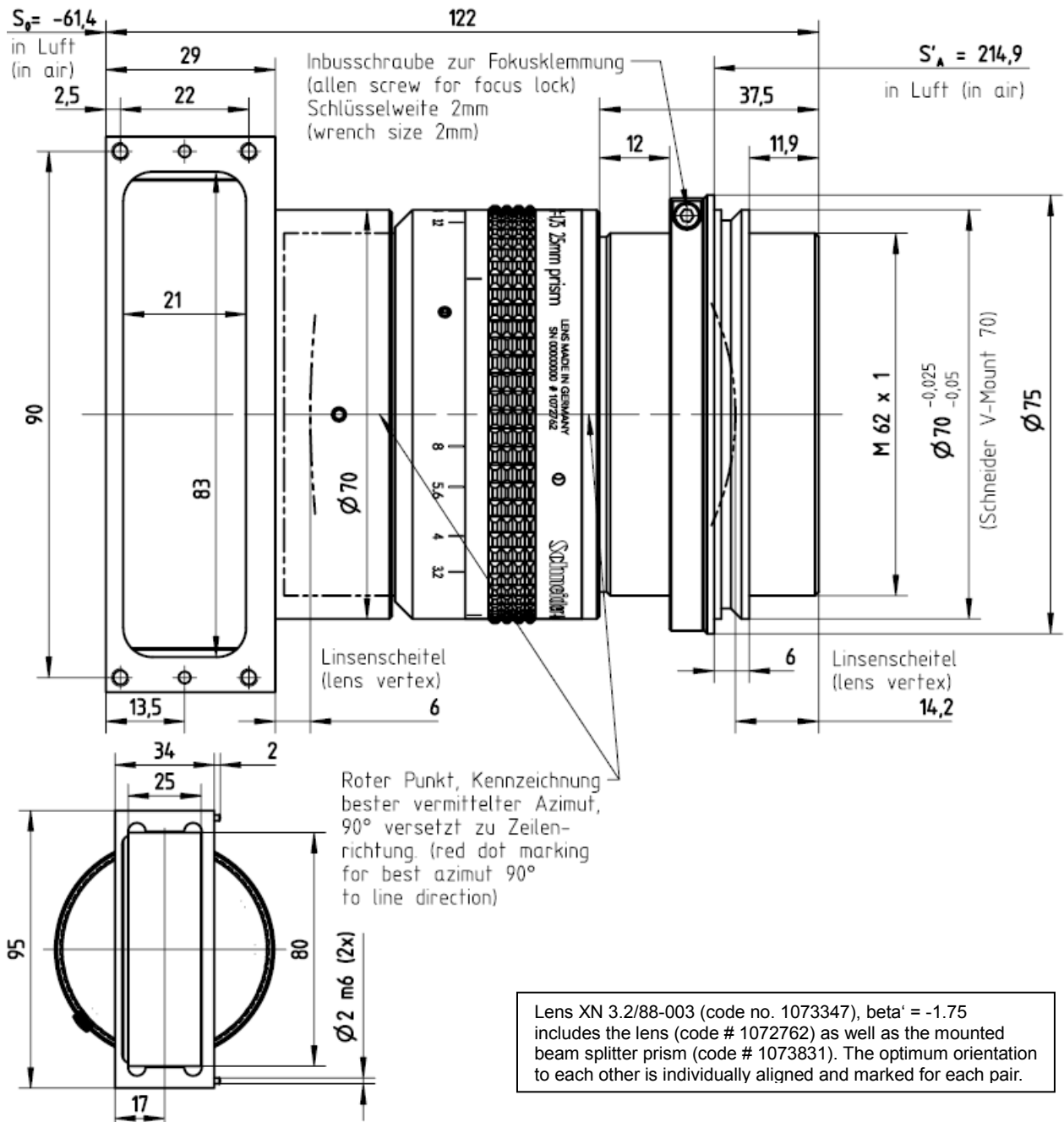
Distortion is shown for the given focal distances or magnifications. Positive values indicate pincushion distortion and negative values barrel distortion.

—	$\beta' = -1,7500$	$u'_{max} = 31,0$	OO' = 380
- -	$\beta' = -1,6500$	$u'_{max} = 31,0$	OO' = 375
- - -	$\beta' = -1,8500$	$u'_{max} = 31,0$	OO' = 386



## TRANSMITTANCE without Beam Splitter Prism

Relative spectral transmittance is shown with reference to wavelength.



Lens XN 3.2/88-003 (code no. 1073347),  $\beta' = -1.75$   
includes the lens (code # 1072762) as well as the mounted  
beam splitter prism (code # 1073831). The optimum orientation  
to each other is individually aligned and marked for each pair.