LINE SENSOR LENS

WD and Magnification Chart for Line Scan Lens

Model No.	Image Circle	∞	0.3x	0.4x	0.5x	0.6x	0.7x	0.8x	0.9x	1x	1.5x	2x	3.5x	Page
LS05	ϕ36				188mm (0.5x)									P8
LS07	ϕ36						151mm (0.7x)							P8
LS10	ϕ36									123mm (1.0x)				P8
LS15	ϕ36										102mm (1.5x)			P8
LSTL10H-F	ϕ44									113mm (1.0x)				P10
LSTL15H-F	ϕ44										109mm (1.5x)			P10
LSTL20H-F	ϕ44											109mm (2.0x)		P10
SP05	ϕ62				276mm (0.5x)									P4
SP07	ϕ62						211mm (0.7x)							P4
SP10	ϕ62									165mm (1.0x)				P4
SP14	ϕ62										112mm (1.4x)			P4
SP20	ϕ62											90mm (2.0x)		P4
LSP350	ϕ62												100mm (3.5x)	P3
XLS03	ϕ90	680mm (0.2x)	477mm (0.3x)	376mm (0.4x)										P6
XLS05	ϕ90			386mm (0.4x)	324mm (0.5x)	274mm (0.625x)								P6
XLS075	ϕ90					279mm (0.625x)	246mm (0.75x)	222mm (0.875x)						P6
XLS10	ϕ90							215mm (0.875x)		197mm (1.0x)	177mm (1.2x)			P6
XLS14	ϕ90									185mm (1.2x)	170mm (1.4x)	154mm (1.7x)		P6
XLS20	ϕ90										157mm (1.7x)	146mm (2.0x)	133mm (2.5x)	P6

Model No.	Image Circle	∞	0.05x	0.1x	0.15x	0.2x	0.25x	0.3x	0.35x	0.4x	0.45x	0.5x	Page
LSF2528	ϕ45	1,000mm (0.025x)			142mm (0.15x)								P12
LSF3528	ϕ45	1,413mm (0.025x)			223mm (0.15x)								P12
LSF5028	ϕ45	2064mm (0.025x)						163mm (0.3x)					P12
FV3526L	ϕ36			507mm (0.07x)		178mm (0.2x)							P16
FV5026W	ϕ45	2,063mm (0.025x)				297mm (0.18x)							P17
FV5026L	ϕ45			521mm (0.1x)		246mm (0.22x)							P16
HB5014	ϕ45	2,058mm (0.025x)				266mm (0.2x)							P18
FV8528W	ϕ62	3,423mm (0.025x)				463mm (0.2x)							P17
FV8528L	ϕ62					445mm (0.2x)				250mm (0.4x)			P16

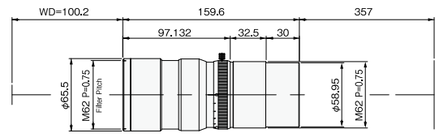
LSP350

Super High Resolution of 3.5x Lens for 8K/12K Line Scan Camera

Suitable for the inspection in high accuracy such as LCD, TFT, and wafer

- Compatible with 8K and 12K line scan camera
- Maximum compatible sensor is 62mm
- Long working distance, WD100mm
- Reduce relative illumination and excellent uniformity
- Very low distortion
- Excellent brightness, suitable for high speed applications
- Customized mount is available

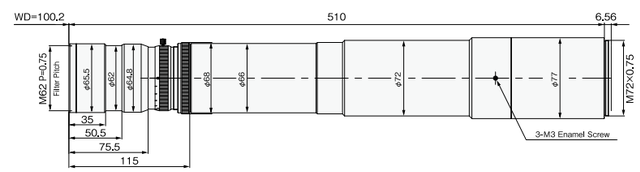
LSP350



Magnification	3.5×	OI	616mm
F No.	11	Maximum Compatible sensor	ϕ62mm
WD	100mm		

※Indicated specifications are design values.

Dimension of LSP350 + Dalsa HS Mount



* Please ask for customized mount.

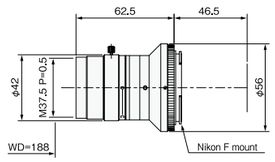
LS Series

Fixed Magnification Lens for F Mount

High Resolution and high contrast
Suitable for LCD, film, and PCB inspection

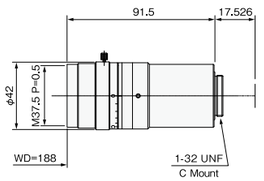
- Excellent uniformity
- High resolution from the center to the edge of image
- Compact design
- High durability
- Optical distortion less than 0.1%
- Suitable for area sensor, over 1 inch
- TFL- Ⅱ mount is available

LS05F (F Mount)



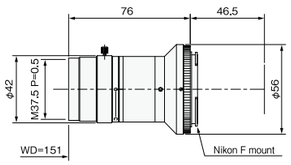
Magnification	0.5×	Resolution	11μ
WD	188mm	Optical distortion	-0.01%
Depth of field	0.94mm	Maximum Compatible sensor	φ36mm
F No.	5.1	Mount	F

LS05C (C Mount)



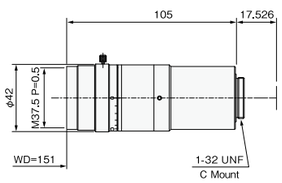
Magnification	0.5×	Resolution	11μ
WD	188mm	Optical distortion	-0.01%
Depth of field	0.94mm	Maximum Compatible sensor	4/3 (φ22.6mm)
F No.	5.1	Mount	C

LS07F (F Mount)



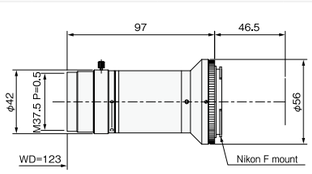
Magnification	0.7×	Resolution	10μ
WD	151mm	Optical distortion	-0.07%
Depth of field	0.54mm	Maximum Compatible sensor	φ36mm
F No.	6	Mount	F

LS07C (C Mount)



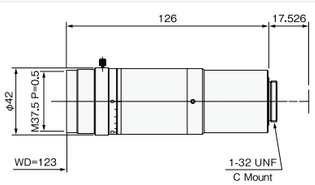
Magnification	0.7×	Resolution	10μ
WD	151mm	Optical distortion	-0.07%
Depth of field	0.54mm	Maximum Compatible sensor	4/3 (φ22.6mm)
F No.	6	Mount	C

LS10F (F Mount)



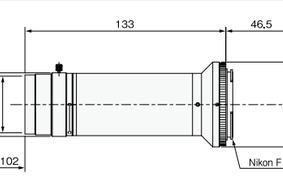
Magnification	1.0×	Resolution	8μ
WD	123mm	Optical distortion	-0.01%
Depth of field	0.31mm	Maximum Compatible sensor	φ36mm
F No.	7.5	Mount	F

LS10C (C Mount)



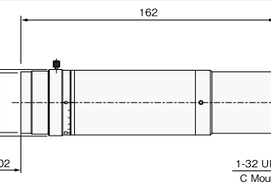
Magnification	1.0×	Resolution	8μ
WD	123mm	Optical distortion	-0.01%
Depth of field	0.31mm	Maximum Compatible sensor	4/3 (φ22.6mm)
F No.	7.5	Mount	C

LS15F (F Mount)



Magnification	1.5×	Resolution	7μ
WD	102mm	Optical distortion	0.26%
Depth of field	0.17mm	Maximum Compatible sensor	φ36mm
F No.	9.9	Mount	F

LS15C (C Mount)



Magnification	1.5×	Resolution	7μ
WD	102mm	Optical distortion	0.26%
Depth of field	0.17mm	Maximum Compatible sensor	4/3 (φ22.6mm)
F No.	9.9	Mount	C

* Indicated specifications are design values. * Resolution is calculated based on MTF. * Resolution indicates a theoretical resolution at wavelength of 550nm.
* Depth of field is calculated assuming F No. (∞) 5.6 and resolution of 14μ camera.

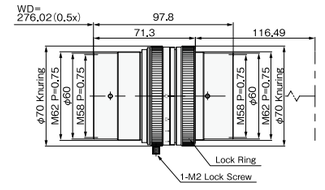
SP Series

Super High Resolution Lens for 8K/12K Line Scan Camera

Suitable for high speed and high-end applications

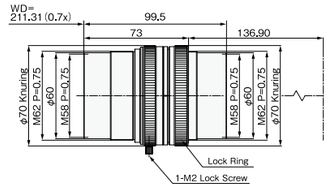
- Compatible with 8K and 12K and 16K, ϕ 62mm sensor
- Magnification can be changed by reversing a lens
- Reduce relative illumination and excellent uniformity
- Very low distortion
- Excellent brightness, ∞ F No. 2.7
- Customized mount is available

SP05



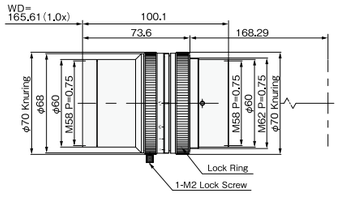
Magnification	0.5×	OI	463mm
F No.	4.3	Maximum Compatible sensor	ϕ 62mm
WD	276mm		

SP07



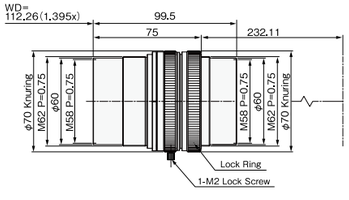
Magnification	0.7×	OI	421mm
F No.	5	Maximum Compatible sensor	ϕ 62mm
WD	211mm		

SP10



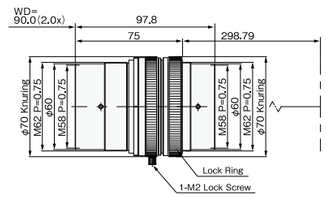
Magnification	1.0×	OI	407mm
F No.	5.8	Maximum Compatible sensor	ϕ 62mm
WD	165mm		

SP14



Magnification	1.4×	OI	419mm
F No.	6.8	Maximum Compatible sensor	ϕ 86mm
WD	112mm		

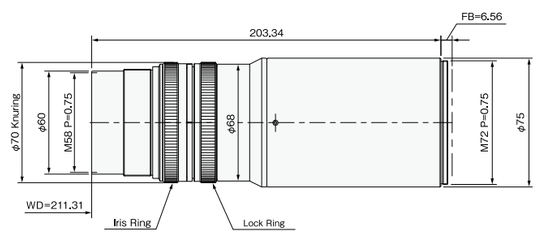
SP20



Magnification	2.0×	OI	463mm
F No.	8.6	Maximum Compatible sensor	ϕ 100mm
WD	90mm		

* Indicated specifications are design values.

Dimension of SP07 + Dalsa HS Mount



* Please ask for customized mount.

XLS Series

Line Scan Lens for Large Image Circle, ϕ 90mm

Compatible with large image circle, up to ϕ90mm sensor

- Suitable for large sensor such as「5μ x 12288 bit 」, 「3.5μ x 16384 bit」, 「5μ x 16384bit」, etc...
- Suitable for large area sensor of high resolution such as 12 Mega, 16 Mega, and 29 Mega
- Reduce color aberration, suitable for 3 line sensor
- Excellent uniformity of brightness and resolution
- Possible to adjust ±0.05x from the original magnification by using the optional mount
- Customized mount is available
- 「SP Series (Page 4)」is suitable if brightness is essential for the application

How to request if magnification is other than standard.

Ex.) 0.67x for Dalsa P3-12K

XLS075(067)-H

Model No. of a lens
Required magnification
Model No. of mount

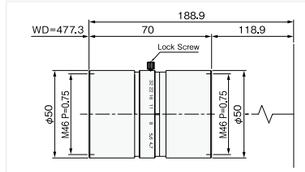
* If a lens is not used at the standard magnification, adjustable range is not ±0.05x.
* Please select one of XLS series which magnification is the closest from required magnification.

Model No. of Mount

Model	Compatible Camera	Screw Pitch	Back Focal Distance
XLS□□□-F	F Mount Camera	F Mount	46.5mm
XLS□□□-Q	NED：3 Line Camera NUCLi7300	M84.5 (P=0.5)	41mm
XLS□□□-N	NED：CLISBee 8k	M72 (P=0.75)	31.8mm
XLS□□□-M	DALSA：Piranha 2 8k ／ TAKEX：TL-16000CL	M72 (P=0.75)	19.55mm
XLS□□□-D	DALSA：Piranha 4 8k　Piranha HS 3 16k	M72 (P=0.75)	12mm
XLS□□□-H	DALSA：Piranha 3 12k　Piranha HS 8k 12k　Piranha ES 8k	M72 (P=0.75)	6.56mm
XLS□□□-E	e2V: ELIIXA + 16K Pixels	M95 x 1	9.4mm
XLS□□□ - V58	SVS: SVCam-HR	M58 (P = 0.75)	11.48mm
XLS□□□ - V42	SVS	M42 (P = 1)	11.48mm
XLS□□□ - B42	Basler	M42 (P = 1)	16mm
XLS□□□ – B42/2	Basler	M42 (P = 0.75)	16mm

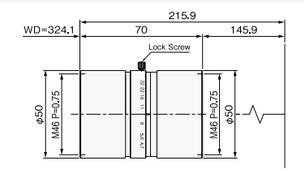
* ±0.05x can be adjusted from the standard magnification by using the mount mentioned above.
* Customized mount is also available. Please contact us for further information.

XLS03



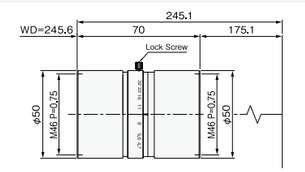
Magnification	0.3×
∞F No.	4.7
F No.	6.0
WD	477mm
OI	666mm
Maximum Compatible sensor	ϕ90mm

XLS05



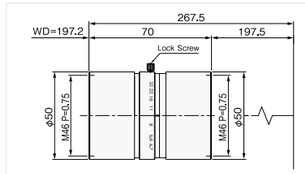
Magnification	0.5×
∞F No.	4.7
F No.	7.0
WD	324mm
OI	540mm
Maximum Compatible sensor	ϕ90mm

XLS075



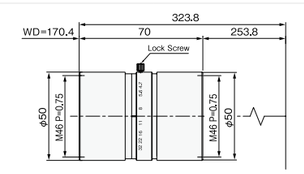
Magnification	0.75×
∞F No.	4.7
F No.	8.1
WD	246mm
OI	491mm
Maximum Compatible sensor	ϕ90mm

XLS10



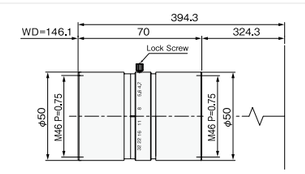
Magnification	1.0×
∞F No.	4.7
F No.	9.0
WD	197mm
OI	465mm
Maximum Compatible sensor	ϕ90mm

XLS14



Magnification	1.4×
∞F No.	4.7
F No.	11.4
WD	170mm
OI	494mm
Maximum Compatible sensor	ϕ90mm

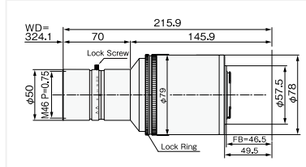
XLS20



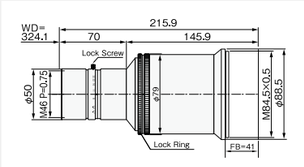
Magnification	2.0×
∞F No.	4.7
F No.	14.5
WD	146mm
OI	540mm
Maximum Compatible sensor	ϕ90mm

Example of a lens with mount (XLS05)

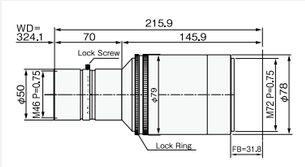
XLS05-F



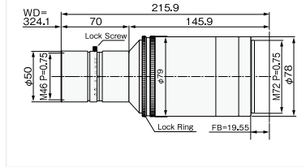
XLS05-Q



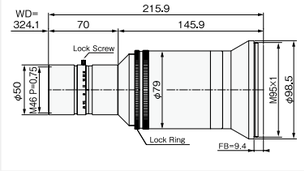
XLS05-N



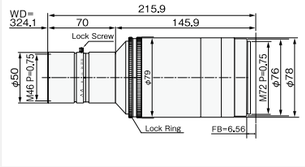
XLS05-M



XLS05-E

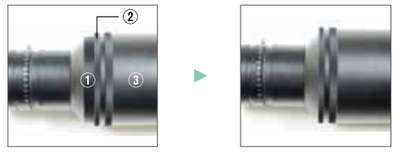


XLS05-H



How to adjust magnification

- Mount tube is composed by three mechanical parts ①, ②, and ③.
- Magnification increases by extending the mount and decreases by shortening.



* Indicated specifications are design values.

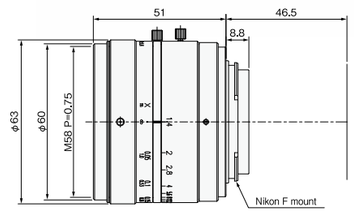
HB5014-F

Line Scan Lens for Large Aperture

Large aperture and design for machine vision

- Excellent brightness, F No. 1.4
- Suitable for high speed applications such as printing, food inspection, etc..
- High durability
- Metal design, avoid aged deterioration of plastic and gum, concerned about photographic lenses
- Suitable for large image circle and high speed camera

HB5014-F



Focal length	50mm	Optical distortion	0.17%
∞F No.	1.4	Maximum Compatible sensor	φ45mm
Range of WD	0.27m - ∞	Mount	F
Magnification at MOD	0.2×		

* Indicated specifications are design values.

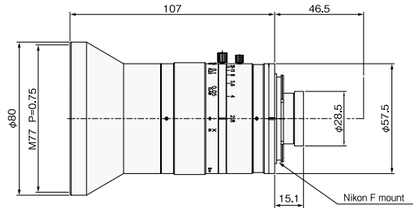
LSF Series

High Resolution and Wide Angle Lens for Area and Line Scan Camera

Excellent relative illumination High resolution at whole working distance

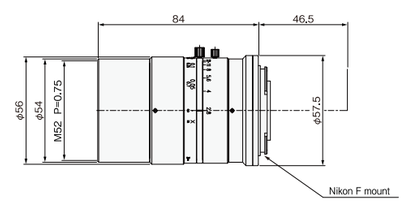
- Design for high resolution and low distortion, stable performance at whole working distance
- Possible to use for small pixel size, 3.5 μ line scan camera
- Very low color aberration, compatible with 3-line camera
- 「LSF5028-F」 is possible to use at 0.3x without extension ring
- Wide angle, f25mm is available
- Suitable for large area sensor, 12 Mega, 16 Mega, and 29 Mega

LSF2528-F



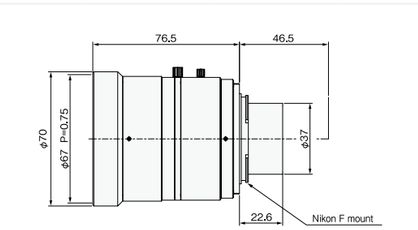
Focal length	25mm	Optical distortion	0.66%
∞F No.	2.8	Maximum Compatible sensor	ϕ44mm
Range of WD	140mm - ∞	Mount	F
Magnification at MOD	0.15×		

LSF3528-F



Focal length	35mm	Optical distortion	-0.31%
∞F No.	2.8	Maximum Compatible sensor	ϕ44mm
Range of WD	230mm - ∞	Mount	F
Magnification at MOD	0.15×		

LSF5028-F



Focal length	50mm	Optical distortion	-0.40%
∞F No.	2.8	Maximum Compatible sensor	ϕ44mm
Range of WD	190mm - ∞	Mount	F
Magnification at MOD	0.3×		

* Indicated specifications are design value.

Model No. for Different Mount

Model	Compatible Camera	Screw Pitch	Back Focal Distance
LSF □□□□-V58	SVS: SVCam-HR	M58 (P = 0.75)	11.48mm
LSF □□□□-B42	Basler	M42 (P = 1)	16mm
LSF □□□□-B42/2	Basler	M42 (P = 0.75)	16mm
LSF □□□□-V42	SVS	M42 (P = 1)	11.48mm
LSF □□□□-S42	Sentech	M42 (P = 1)	10mm
LSF □□□□-D42	Dalsa: Spyder 3	M42 (P = 1)	6.56mm

* Customized mount is also available. Please contact us for further information.

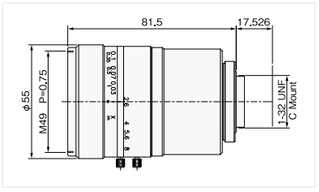
FV-L Series

Macro Lens for Area and Line Scan Camera

Design for macro imaging, suitable for large area and line scan camera

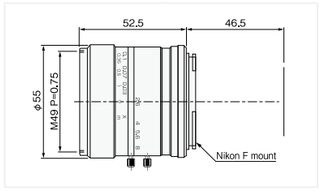
- Adjustable focus and iris
- Design for macro imaging, suitable for machine vision application
- Suitable for inspection of wafer, PCB, electronic parts, etc..., required for high resolution at short working distance
- FV8528L-M is compatible with M72 mount
- Compatible with large image format of high resolution area camera

FV3526L-C



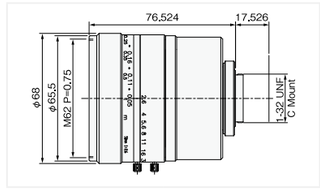
Magnification	35mm
∞F No.	2.6
Range of WD	0.18m - 0.4m
Magnification at MOD	0.2×
Optical distortion	-0.05%
Maximum Compatible sensor	1.2 inch (φ21.4mm)
Mount	C

FV3526L-F



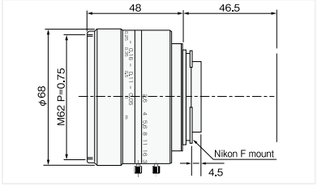
Magnification	35mm
∞F No.	2.6
Range of WD	0.18m - 0.4m
Magnification at MOD	0.2×
Optical distortion	-0.42%
Maximum Compatible sensor	φ36mm
Mount	F

FV5026L-C



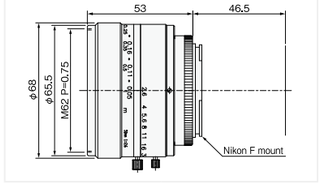
Magnification	50mm
∞F No.	2.6
Range of WD	0.25m - 0.4m
Magnification at MOD	0.22×
Optical distortion	-0.01%
Maximum Compatible sensor	1.2 inch (φ21.4mm)
Mount	C

FV5026L-F



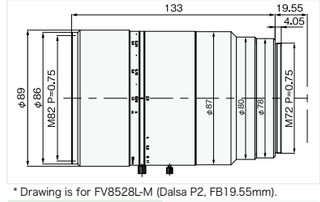
Magnification	50mm
∞F No.	2.6
Range of WD	0.25 - 0.4m
Magnification at MOD	0.22×
Optical distortion	-0.24%
Maximum Compatible sensor	φ45mm
Mount	F

FV5026LⅡ-F



Magnification	50mm
∞F No.	2.6
Range of WD	0.17m - 0.35m
Magnification at MOD	0.32×
Optical distortion	-0.80%
Maximum Compatible sensor	φ45mm
Mount	F

FV8528L-□



* Drawing is for FV8528L-M (Dalsa P2, FB19.55mm).

Magnification	85mm
∞F No.	2.8
Range of WD	0.25m - 0.45m
Magnification at MOD	0.4×
Optical distortion	-0.18%
Maximum Compatible sensor	φ62mm
Mount	F or M72

* Indicated specifications are design value. * □ = Mount: F = Nikon F Mount, M = Dalsa P2 (FB19.55mm), H = Dalsa P2-HS and P3 (FB6.56mm), N = NED ClisBee (FB31.8mm)

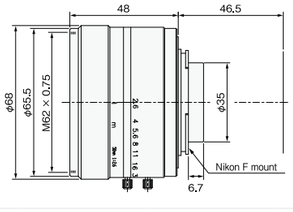
FV-W Series

Area and Line Scan Lens for Wide Field of View

Machine vision lens for large field of view

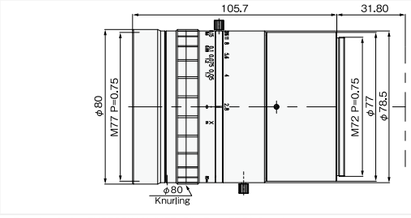
- Adjustable focus and iris
- Design for infinite distance (∞), suitable for wide field of view
- Design for machine vision application
- Suitable for various applications such as printing, large size of PCB and glass, textile, etc..
- FV8528W is compatible with M72 mount
- FV5026W is compatible with TFL-Ⅱ mount
- Compatible with large image format of high resolution area camera

FV5026W-F



Focal length	50mm	Optical distortion	0.23%
∞F No.	2.6	Maximum Compatible sensor	φ45mm
Range of WD	0.32m - ∞	Mount	F
Magnification at MOD	0.18×		

FV8528W-□



* Drawing is for FV8528W-N (NED Clis Bee, FB31.8mm).

Focal length	85 mm	Optical distortion	0.04%
∞F No.	2.8	Maximum Compatible sensor	φ62mm
Range of WD	0.46m - ∞	Mount	F or M72
Magnification at MOD	0.2×		

* Indicated specifications are design value. * □ = Mount: F = Nikon F Mount, M = Dalsa P2 (FB19.55mm), H = Dalsa P2-HS and P3 (FB6.56mm), N = NED ClisBee (FB31.8mm)