QIOPTIQ
Photonics for Innovation
An Excelitas Technologies Company

Optical Inspection

LINOS Machine Vision Lenses and Micro Inspection Systems

Company Profile

Qioptiq, an Excelitas Technologies Company, designs and manufactures photonic products and solutions that serve a wide range of markets and applications in the areas of medical and life sciences, industrial manufacturing, defense and aerospace, and research and development.

Qioptiq benefits from having integrated the knowledge and experience of Avimo, Gsänger, LINOS, Optem, Point Source, Rodenstock, Spindler & Hoyer and others. In October 2013, Qioptiq was acquired by Excelitas Technologies Corp., a global technology leader focused on delivering innovative, customized solutions to meet the lighting, detection and other high-performance technology needs of OEM customers. The combined companies have approximately 6,700 employees in North America, Europe and Asia, serving customers across the world.

Visit www.excelitas.com for more information.

1877

RODENSTOCK

Rodenstock founded

1898

SPINDLER & HOYER

Spindler & Hoyer founded

1966

Pilkington PE Ltd. founded, which later becomes THALES Optics

1969

Gsänger

Gsänger Optoelektronik founded

1984

OPTEM INTERNATIONAL

Optem International founded

1991

POINT SOURCE

Point Source founded

1996

LINOS

LINOS founded through the merger of Spindler & Hoyer, Steeg & Reuter Präzisionsoptik, Franke Optik and Gsänger Optoelektronik

Content

2000

RODENSTOCK

Rodenstock Präzisionsoptik acquired by LINOS

2001

AVIMO

AVIMO Group acquired by THALES

2005

Qioptiq founded as THALES sells High Tech Optics Group

2006 / 2007

QIOPTIQ Optics with Intelligence

Qioptiq acquires LINOS and Point Source as "members of the Qioptiq group"

2010

QIOPTIQ Photonics for Innovation

The new Qioptiq consolidates all group members under one brand

2013

QIOPTIQ Photonics for Innovation An Excelitas Technologies Company

Qioptiq is aquired by Excelitas Technologies

EXCELITAS TECHNOLOGIES®

QIOPTIQ
Photonics for Innovation
An Excelitas Technologies Company

Introduction

Our Optical Inspection products cover the broad spectrum from classical Machine Vision to non-industrial imaging with applications in life science, biometrics and direct consumer interaction. All these different applications have their very unique set of requirements that often result in application specific products. With the ever increasing range of different imaging tasks and the enormous diversity of requirements for this multitude of applications it is a huge challenge for manufacturers of inspection components to keep up and offer components that meet the latest requirements. Excelitas with its brand Qioptiq is determined to support as many of these requirements as possible and as a result we constantly add new products to our portfolio.

This brochure provides an overview of our product portfolio as of 2019 and shows the wide range of applications and requirements that is covered with a product offering which spans from traditional enlarging lenses which support large image sensors to super flexible micro imaging solutions with integrated liquid lens focusing and high speed zooming.

mag.x system 125 - modular system for high resolution micro-inspection

The bracket around this product offering is our MachVis software that is available for more than 10 years and proved to be a reliable guide for finding the optimum solution as well as a comprehensive product database in thousands of cases.

Lens selection software MachVis

The huge part of the Optical Inspection portfolio that cannot be shown in any brochure is the vast array of customer specific products. From custom variants of standard lenses to fully integrated turnkey sub-modules this collection of specifically designed products is built with the same attention to detail using top notch optical manufacturing technologies and decades of experience in optical and mechanical design as well as patented mounting technologies for performance that matches requirements – not above, not below – just as required.

inspec.x L serie, one of our premium lens programs to meet all conceivable high resolution applications in image processing

Components of the comprehensive OPTEM FUSION system with highest versatility

The basis for custom as well as off-the-shelf products however is a profound understanding of market and application needs. Close collaboration with customers around the world helps us to understand what is really needed and to provide the right solution with the right performance.

A closer look

Please find additional information in our detailed separate brochures to the Qioptiq optical inspection series.
Receive your personal print copy:
Inspection@excelitas.com

inspec.x L 105 mm Lens Series

The inspec.x L Series was developed to meet the highest requirements in industrial image processing with very large sensors. This Lens Series shows even contrast and resolution over an image circle of up to 82 mm. The field-proven performance makes these lenses a perfect match for sensors like the popular 12k/5µm and 16k/5µm line-scan sensors. Very large area-scan sensors also benefit from the high resolution, low distortion and excellent color correction of these lenses.

inspect.x L prism lens with prism module

- Outstanding MTF performance
- Diffraction limited optical design
- Perfect match with 5 µm pixel size
- Full-metal barrel
- Lockable aperture
- Focal length: 105 mm
- Aperture: 3.5 … 22
- Spectral range: 400-750 nm
- Large image circle up to 82 mm
- Camera mount: V-groove

inspec.x L

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
inspec.x L 5.6/105 1.0x	105	5.6	-0.85 ... -1.2	82	V-groove	0703-082-000-20
inspec.x L 5.6/105 0.76x	105	5.6	-0.6 ... -0.9	82	V-groove	0703-083-000-20
inspec.x L 5.6/105 0.5x	105	5.6	-0.4 ... -0.65	82	V-groove	0703-084-000-20
inspec.x L 5.6/105 0.33x	105	5.6	-0.25 ... -0.45	82	V-groove	0703-085-000-20

inspec.x L 5.6/105 float

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
inspec.x L 5.6/105 float	105	5.6	-0.3 ... -3.0	82	V-groove	0703-114-000-20

inspec.x L 4/105

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
inspec.x L 4.0/105 -3.5x	105	4.0	-3.3 ... -3.7	82	V-groove	0703-095-000-21
inspec.x L 3.5/105 -5.0x	105	3.5	-4.8 ... -5.2	82	V-groove	0703-102-000-20
inspec.x L 4.0/105 -3.0x	105	4.0	-2.8 ... -3.3	82	V-groove	0703-104-000-20
inspec.x L 4.0/105 -3.0x prism	105	4.0	-2.8 ... -3.3	82	V-groove	0703-105-000-20
inspec.x L 4.0/105 -3.5x prism	105	4.0	-3.3 ... -4.0	82	V-groove	0703-107-000-20
inspec.x L 3.5/105 -5.0x prism	105	3.5	-4.8 ... -5.2	82	V-groove	0703-108-000-20

Prism module

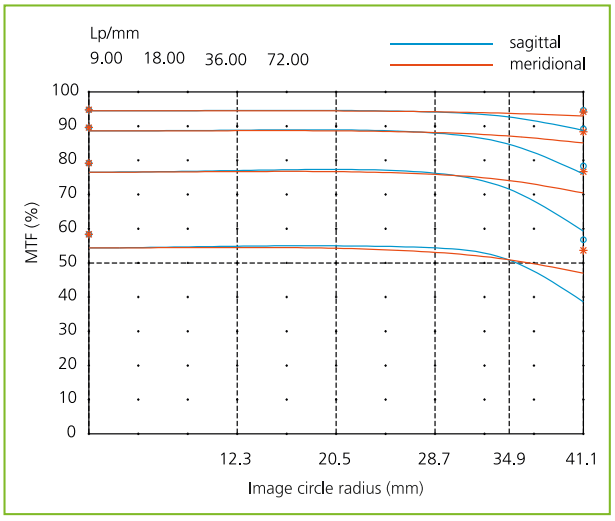
Product	Part No.
Prism module	0703-107-824-00

Some example applications are:

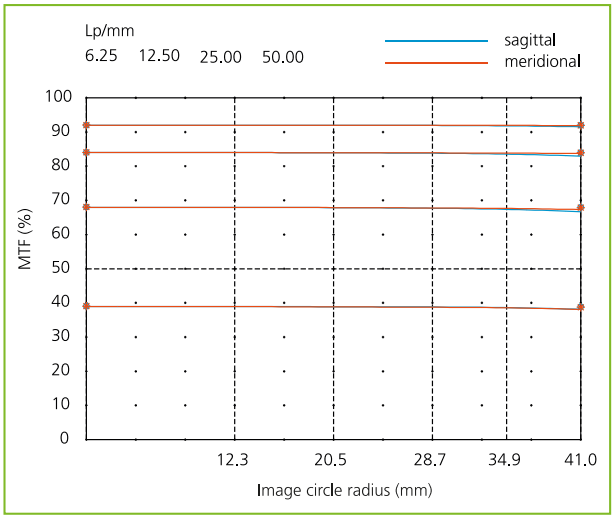
- PCB inspection
- Display inspection
- Film and slide digitization
- High-end book scanning
- Glass inspection
- High-resolution web inspection
- 3D imaging

A closer look

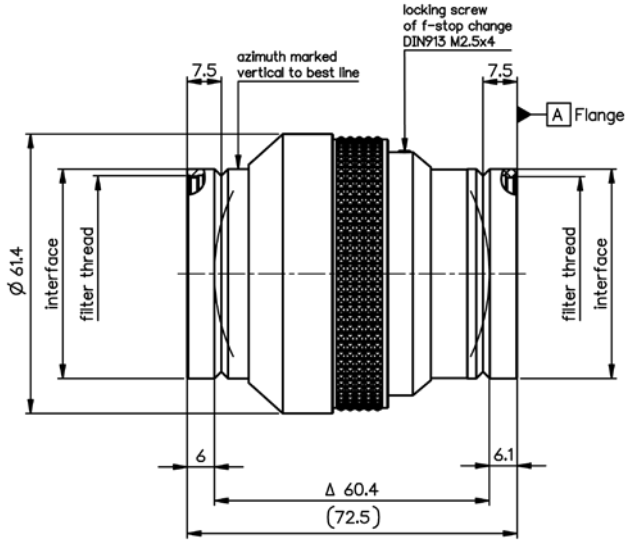
Do you know our Machine Vision Lens Selection freeware MachVis?
On page 26 you find detailed information.



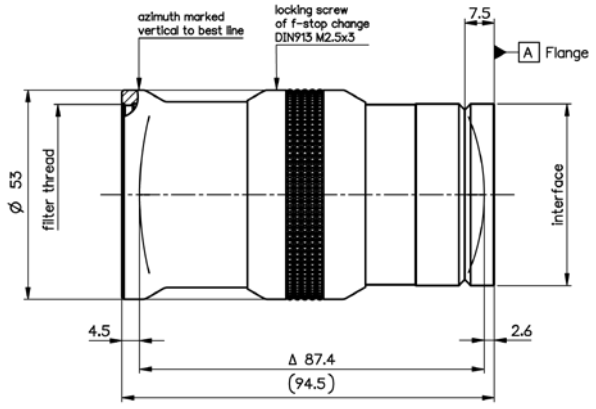
MTF of inspect.x L 5.6/105 -0.5x @ β'= -0.5 and f-stop = 5.6



MTF of inspect.x L 4.0/105 -3.5x @ β'= -3.5 and f-stop = 4



inspect.x L 5.6/105 -0.5x



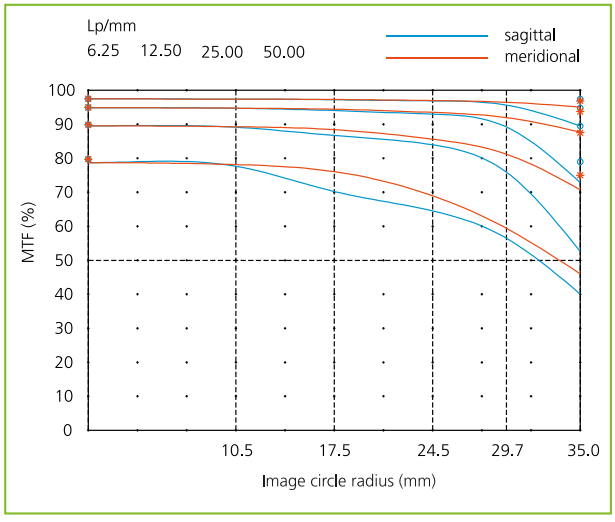
inspect.x L 4.0/105 -3.5x

inspec.x L 4/60 and 4/100

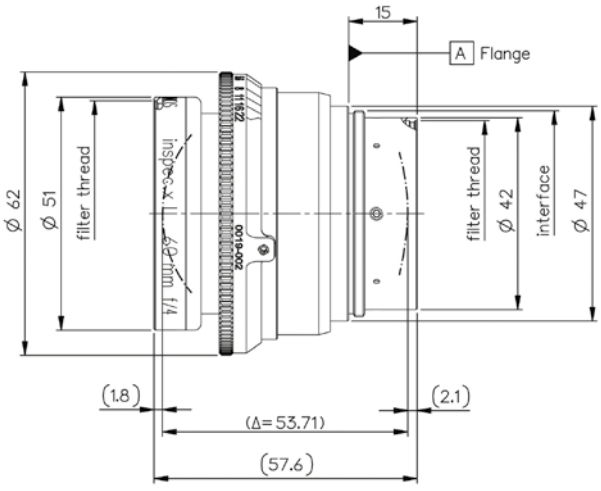
The inspec.x L 4/60 and 4/100 are optimized for the use from infinity down through magnifications of around 0.2x. In this range these lenses show exceptional contrast over a large sensor size of up to 70mm. High contrast goes along with very good color correction and low distortion. Especially the 60mm lens provides unusually high performance for such a short focal length and enables imaging of large objects in space constrained environments with large sensors.

Both lenses feature a threaded interface to use them with the popular Modular Focus helical mount that provides access to virtually all existing cameras via different camera adapters.

- High contrast for small magnifications
- Excellent color correction
- Focal length: 60 and 100 mm
- Magnifications: infinity … 0.2
- Image circle up to 70 mm
- Spectral range: 400-750 nm
- Iris diaphragm: manual, klick-stop or continuous with set screw
- Mount: compatible to Modular Focus



MTF of inspect.x L 4/100 @ β'= -0.05 and f-stop = 5.6



inspect.x L 4/60

inspec.x L 4/60 and 4/100

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
inspec.x L 4.0/60	60	4.0	0 ... -0.2	70.8	M45x0.75	0019-002-000-50
inspec.x L 4.0/100	100	4.0	0 ... -0.2	70.4	M45x0.75	0019-003-000-50

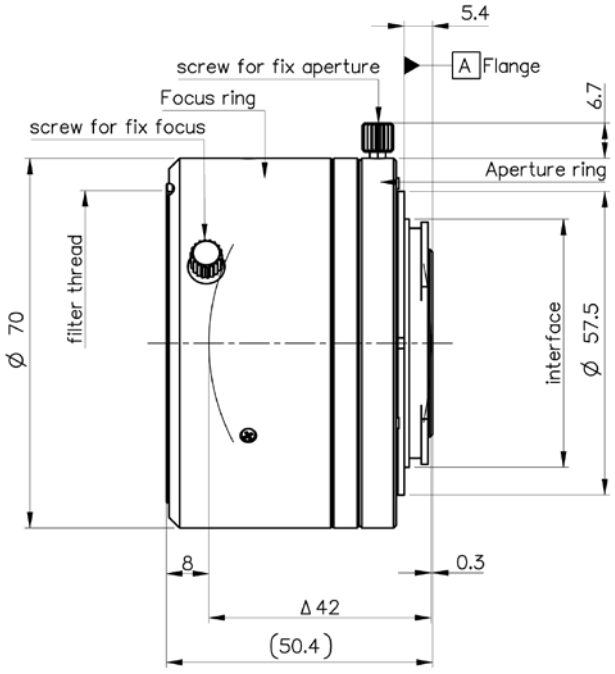
inspec.x M

The inspec.x M Series closes the gap between the outstanding C-Mount MeVis-C lenses and the large format inspec.x L lenses.

Equipped with lockable manual focus and manual iris these F-Mount lenses are the ideal choice for sensors up to 35 mm format when a fast f/# is required. The 1.4/50 mm lens is available for visible spectral range or near-infrared. The NIR version lens features a coating for the range from 900 to 1350 nm, making it an ideal choice for applications like electro- and photoluminescence

- Large magnification range
- Very high numerical aperture
- Low distortion

- Optical magnification: -0.07
- Image circle: 43.3 mm
- Max. sensor size: 35 mm format
- Camera mount: F-Mount
- Focusing: manual, lockable
- Iris diaphragm: manual, lockable



inspec.x M

Product	Focal length mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
inspec.x M 1.4/50	50	1.4	0 ... -0.15	43.3	F-Mount	0009-243-000-40
inspec.x M NIR 1.4/50	50	1.4	0 ... -0.15	43.3	F-Mount	0009-243-000-42

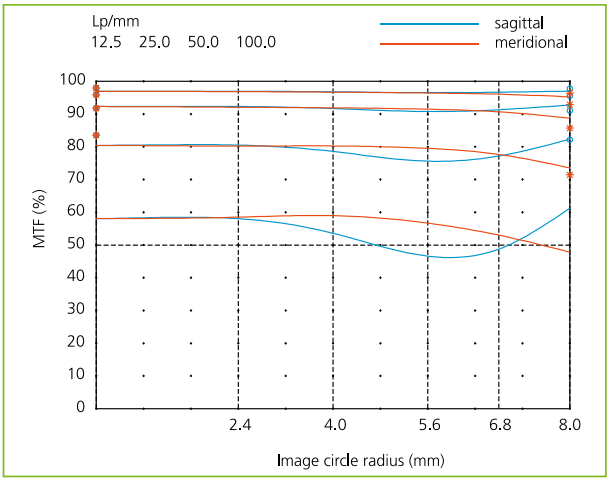
MeVis-C Lens Series

The LINOS MeVis-C lenses are specifically developed to be used with the highest resolution sensors available on the market. Exceptionally high resolution across the entire sensor ensures optimal performance for the most demanding applications.

High resolution is paired with low distortion, minimal light fall off and excellent chromatic correction across the entire spectral range of 450 to 900 nm. These lenses can resolve up to 200 lp/mm, even to the extreme corners of a 1" sensor.

- Highest optical performance
- Large image circle up to 1 inch
- For pixel size even below 2 µm
- High numerical aperture

- Focal length: 12 ... 50 mm
- Magnification range: -0.1 ... 0
- Spectral range: 450-900 nm
- Focusing: manual, lockable



MTF of MeVis-C 1.6/35 @ β'= -0.05 and f-stop = 2.8

MeVis-C

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
MeVis-C 1.8/12	12	1.8	-0.25 ... 0	11	C-Mount	0020-005-000-40
MeVis-C 1.6/16	16	1.6	-0.1 ... 0	11	C-Mount	0020-004-000-40
MeVis-C 1.6/25	25	1.6	-0.1 ... 0	16	C-Mount	0020-002-000-40
MeVis-C 1.6/35	35	1.6	-0.1 ... 0	16	C-Mount	0020-001-000-40
MeVis-C 1.8/50	50	1.8	-0.075 ... 0	16	C-Mount	0020-003-000-40

MeVis-CF

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
MeVis-CF 1.6/16	16	1.6	-0.1 ... 0	11	C-Mount	0020-009-000-20
MeVis-CF 2.8/16	16	2.8	-0.1 ... 0	11	C-Mount	0020-009-000-21
MeVis-CF 4.0/16	16	4.0	-0.1 ... 0	11	C-Mount	0020-009-000-22
MeVis-CF 1.6/25	25	1.6	-0.1 ... 0	16	C-Mount	0020-007-000-20
MeVis-CF 2.8/25	25	2.8	-0.1 ... 0	16	C-Mount	0020-007-000-22
MeVis-CF 4.0/25	25	4.0	-0.1 ... 0	16	C-Mount	0020-007-000-21
MeVis-CF 1.6/35	35	1.6	-0.1 ... 0	16	C-Mount	0020-008-000-20
MeVis-CF 2.8/35	35	2.8	-0.1 ... 0	16	C-Mount	0020-008-000-21
MeVis-CF 4.0/35	35	4.0	-0.1 ... 0	16	C-Mount	0020-008-000-22
MeVis-CF 1.8/50	50	1.8	-0.075 ... 0	16	C-Mount	0020-010-000-20
MeVis-CF 2.8/50	50	2.8	-0.075 ... 0	16	C-Mount	0020-010-000-21
MeVis-CF 4.0/50	50	4.0	-0.075 ... 0	16	C-Mount	0020-010-000-22

MeVis-C/CF Traffic

The new MeVis-C traffic lenses feature optimized color correction to eliminate focus-shift between daylight and NIR illumination around 850 nm. This optimized optical design removes the need for refocusing when switching between wavelengths as the focal plane for both illumination cases is identical. The field-proven and well known mechanics of the MeVis-C and MeVis-CF lenses remain unchanged to ensure a robust lens ready for the most demanding industrial use cases.

- Optimized for visual spectrum and NIR with identical focus plane over broad wavelength range
- Highest optical performance
- Large image circle up to 1 inch
- For pixel size even below 2 µm
- High numerical aperture

- Spectral range: 450-900 nm
- Focusing: manual, lockable
- Iris diaphragm: manual, lockable
- Filter thread: M35.5x0.5
- Lens diameter: 42 mm

MeVis-C Traffic / MeVis-CF Traffic

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
MeVis-C traffic 1.6/25	25	1.6	-0.1 ... 0	16	C-Mount	0020-002-000-45
MeVis-CF traffic 1.6/25	25	1.6	-0.1 ... 0	16	C-Mount	0020-007-000-30

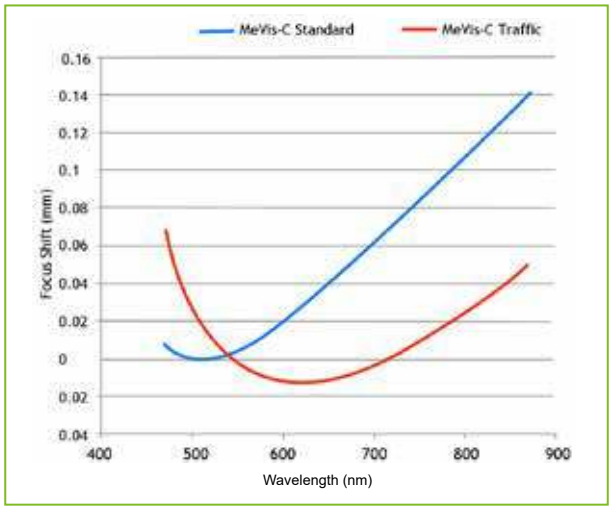
Application

Some example applications are:

- License plate reading (ANPR)
- Tolling
- High-resolution surveillance and recognition
- Multispectral/Hyperspectral imaging
- Document verification

Solution MeVis-C/CF Traffic:
Adapted longitudinal color aberration curve for zero focus shift at 540 nm and 710 nm.

Performance



Longitudinal color aberration comparison

APO-Rodagon-Series

The high resolution of the Apo-Rodagon lense series makes them an optimum solution for cameras with a pixel size down to 5 µm. The high resolution is accompanied by ultra-low distortions and negligible color fringing.

Distortion is corrected to near zero and cannot be seen even in critical subjects with straight-lined structures.

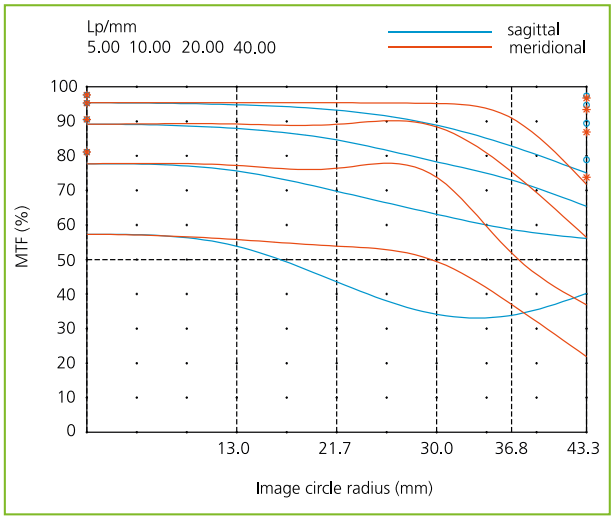
All standard models are fitted with click-stop or fix aperture rings. The metal version has a continuous iris with set screw.

- Specially designed for scanning applications and large imaging sensors
- Large image circle up to 102 mm

- Focal length: 50 ... 120 mm
- Magnification range: -0.05 ... -3.0
- Spectral range: 400-750 nm
- Iris diaphragm: fix, manual, click-stop or continuous with set screw

Apo-Rodagon-D 4.0/75 1x

Apo-Rodagon-D 4.5/120 2x metal



MTF of Apo-Rodagon-D 4.5/75 2x @ β'= -0.5 and f-stop = 5.6

Apo-Rodagon-HR

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
Apo-Rodagon-HR 5.6/75 0.5x	75	5.6	-0.65 ... -0.35	62	V-groove	0703-109-000-20
Apo-Rodagon-HR 8/75 0.5x	75	8	-0.65 ... -0.35	62	V-groove	0703-109-000-21

Apo-Rodagon-D

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
Apo-Rodagon-D 4.0/75 1x	75	4.0	-1.2 ... -0.8	82	M39x1/26"	0703-005-000-40
Apo-Rodagon-D 4.5/75 2x	75	4.5	-0.8 ... -0.4	86.8	M39x1/26"	0703-028-000-21
Apo-Rodagon-D 5.6/120 2x	120	5.6	-0.8 ... -0.33	102	M39x1/26"	0703-043-000-20
Apo-Rodagon-D 5.6/120 2x metal	120	5.6	-0.8 ... -0.33	102	M39x1/26"	0703-043-000-22

Apo-Rodagon-N

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
Apo-Rodagon-N 2.8/50	50	2.8	-0.5 ... -0.05	44	M39x1/26"	0701-349-000-40
Apo-Rodagon-N 4.0/80	80	4.0	-0.5 ... -0.067	86	M39x1/26"	0703-092-000-40
Apo-Rodagon-N 4.0/90	90	4.0	-0.5 ... -0.066	90	M39x1/26"	0703-094-000-20
Apo-Rodagon-N 4.0/105	105	4.0	-0.5 ... -0.06	100	M39x1/26"	0703-096-000-40
Apo-Rodagon-N 4.0/105 metal	105	4.0	-0.5 ... -0.06	100	M39x1/26"	0703-096-000-41

Rodagon-F/M42

The Rodagon-F/M42 Series was developed by Qioptiq to adapt precision industrial-grade optics to an F or M42 Mount camera, with a great price/performance ratio. Now, for the first time, users can integrate world reknowned Rodenstock image quality in 40 - 60 mm focal lengths directly onto F-Mount cameras. A revolutionary design eliminates all moving parts to offer exceptionally robust performance. The smooth focusing is locked with a massive retaining ring that is fixed with additional screws.

The Rodagon-F/M42 lenses are available in different versions with fixed apertures. The fixed aperture prevents accidental misadjustment of the iris or slowly shifting aperture values due to vibrations. The image circle is large enough for sensors with 35 mm format and the popular 41 mm line sensors.

- Integrated manual focussing
- Suitable for line-scan cameras and large imaging sensors
- Large image circle up to 46 mm
- High numerical aperture

- Focal length: 40 ... 60 mm
- Magnification range: 0 … -0.5
- Spectral range: 400-750 nm
- Iris diaphragm: fix
- Mount: F-Mount/M42x1
- Filter thread: M40.5x0.5

Rodagon-F

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
Rodagon-F 4/40	40	4	-0.5 ... 0	44	F-Mount	0703-090-000-25
Rodagon-F 5.6/40	40	5.6	-0.5 ... 0	44	F-Mount	0703-090-000-26
Rodagon-F 8/40	40	8	-0.5 ... 0	44	F-Mount	0703-090-000-27
Rodagon-F 2.8/50	50	2.8	-0.5 ... 0	46	F-Mount	0703-089-000-24
Rodagon-F 4/50	50	4	-0.5 ... 0	46	F-Mount	0703-089-000-25
Rodagon-F 5.6/50	50	5.6	-0.5 ... 0	46	F-Mount	0703-089-000-26
Rodagon-F 4/60	60	4	-0.5 ... 0	44	F-Mount	0703-087-000-25
Rodagon-F 5.6/60	60	5.6	-0.5 ... 0	44	F-Mount	0703-087-000-26
Rodagon-F 8/60	60	8	-0.5 ... 0	44	F-Mount	0703-087-000-27

Rodagon-M42

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
Rodagon-M42 4/40	40	4	-0.5 ... 0.05	41.2	M42x1	0703-118-000-25
Rodagon-M42 5.6/40	40	5.6	-0.5 ... 0.05	41.2	M42x1	0703-118-000-26
Rodagon-M42 8/40	40	8	-0.5 ... 0.05	41.2	M42x1	0703-118-000-27
Rodagon-M42 2.8/50	50	2.8	-0.5 ... 0.03	40.0	M42x1	0703-119-000-24
Rodagon-M42 4/50	50	4	-0.5 ... 0.03	40.0	M42x1	0703-119-000-25
Rodagon-M42 5.6/50	50	5.6	-0.5 ... 0.03	40.0	M42x1	0703-119-000-26
Rodagon-M42 4/60	60	4	-0.5 ... 0.03	39.6	M42x1	0703-120-000-25
Rodagon-M42 5.6/60	60	5.6	-0.5 ... 0.03	39.6	M42x1	0703-120-000-26
Rodagon-M42 8/60	60	8	-0.5 ... 0.03	39.6	M42x1	0703-120-000-27

Rodagon, Rodagon-WA, Rogonar S

The Linos measuring lenses developed by Qioptiq feature the highest resolution, excellent contrast, minimum distortion and color neutrality. They sharply reproduce images all the way to the very edges of the object.

- Suitable for line-scan cameras and large imaging sensors
- Large image circle up to 105 mm
- High numerical aperture
- Adapter available for all common camera interfaces

- Focal length: 28 … 135 mm
- Magnification range: -0.03 … -0.5
- Spectral range: 400-750 nm
- Iris diaphragm: manual, click-stop or continuous with set screw
- Filter thread: M40.5x0.5

Rodagon

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
Rodagon 2.8/28	28	2.8	-0.2 ... -0.03	32	M32x0.5	0701-389-000-20
Rodagon 4.0/35	35	4.0	-0.2 ... -0.03	40	M39x1/26"	0701-401-000-40
Rodagon 2.8/50	50	2.8	-0.5 ... -0.07	44	M39x1/26"	0701-345-000-40
Rodagon 4.0/60	60	4.0	-0.5 ... -0.06	56	M39x1/26"	0701-393-000-40
Rodagon 4.0/60 azimuth	60	4.0	-0.5 ... -0.06	56	M39x1/26"	0701-393-000-43
Rodagon 4.0/80	80	4.0	-0.5 ... -0.06	62	M39x1/26"	0701-391-000-40
Rodagon 4.0/80 azimuth	80	4.0	-0.5 ... -0.06	62	M39x1/26"	0701-391-000-42
Rodagon 4.0/80 metal	80	4.0	-0.5 ... -0.06	62	M39x1/26"	0701-391-000-44
Rodagon 5.6/105	105	5.6	-0.5 ... -0.06	104	M39x1/26"	0701-394-000-40
Rodagon 5.6/105 azimuth	105	5.6	-0.5 ... -0.06	104	M39x1/26"	0701-394-000-41
Rodagon 5.6/105 metal	105	5.6	-0.5 ... -0.06	104	M39x1/26"	0701-394-000-42
Rodagon 5.6/135	135	5.6	-0.5 ... -0.1	105	M39x1/26"	0701-398-000-40

Rodagon-WA

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
Rodagon-WA 4.0/40	40	4.0	-0.25 ... -0.066	46	M39x1/26"	0701-399-000-40
Rodagon-WA 4.0/40 metal	40	4.0	-0.25 ... -0.066	46	M39x1/26"	0701-399-000-42
Rodagon-WA 4.0/60	60	4.0	-0.25 ... -0.066	82	M39x1/26"	0701-276-000-40

Rogonar-S

Product	Focal length (mm)	F-number	Magnification range	Image circle (mm)	Interface	Part No.
Rogonar-S 2.8/50	50	2.8	-0.4 ... -0.075	44	M39x1/26"	0801-397-000-40
Rogonar-S 4.5/60	60	4.5	-0.5 ... -0.1	56	M39x1/26"	0801-324-000-40
Rogonar-S 4.5/75	75	4.5	-0.5 ... -0.1	44	M39x1/26"	0801-325-000-40
Rogonar-S 4.5/75 metal	75	4.5	-0.5 ... -0.1	44	M39x1/26"	0801-325-000-41
Rogonar-S 4.5/90	90	4.5	-0.5 ... -0.125	82	M39x1/26"	0801-398-000-41

Modular and Smart Focus

The Modular Focus is a helical mount with 25mm of travel range and a locking screw. The Smart Focus is an economical version of the Modular Focus with a M39.1/26" (Leica) lens tread and 12.4mm of travel range.

Modular Focus

Product	Part No.
Modular Focus Helical mount	2408-009-000-42
Extension tube 24.5 mm M45x0.75	2408-009-113-00
Extension tube 60 mm M45x0.75	2408-009-123-00
Extension tube 87.5 mm M45x0.75	2408-009-122-00

Smart Focus

Product	Part No.
Smart focus	2408-021-000-43
Extension tube 12 mm M39x1/26"	2408-021-108-00
Extension tube 24 mm M39x1/26"	2408-021-109-00
Extension tube 48 mm M39x1/26"	2408-021-110-00
Extension tube 120 mm M39x1/26"	2408-021-111-00

Camera Adapter

Product	Part No.
Camera adapter C-Mount	2408-009-106-00
Camera adapter F-Mount	2408-009-142-00
Camera adapter M42x1	2408-009-119-00
Camera adapter M48x0.75	2408-009-148-00
Camera adapter M58x0.75	2408-009-132-00
Camera adapter M72x0.75	2408-009-134-00
Camera adapter M90x1.0	2408-009-166-00
Camera adapter M95x1.0	2408-009-155-00

Camera Extension Tubes

Product	Part No.
Extension tube M72x0.75-24mm	2408-009-135-00
Extension tube M90x1.0-24mm	2408-009-167-00
Extension tube M95x1.0-24mm	2408-009-156-00

Lens Adapter

Product	Part No.
Lens adapter M32.5x0.5	2408-009-111-00
Lens adapter M39x1/26"	2408-009-118-00
Lens adapter M39x1/26" *)	2408-009-112-00
Lens adapter M45-V-groove	2408-009-147-00

*) To be used with Rodagon 5.6/135; Apo-Rodagon-D 4.5/75 2x; Apo-Rodagon-D 5.6/120 2x; Apo-Rodagon-N 4.0/105

Retro Rings

Product	Part No.
Retro ring M40.5x0.5 - M39x1/26"	2408-009-158-00
Retro ring M37x0.75 - M45x0.75	2408-009-152-00

Focus Tube inspec.x L 105

Product	Part No.
Focus tube M72 for inspec.x L 105 mm -0.33x and -0.5x	2408-012-000-31
Focus tube M72 for inspec.x L 105 mm -0.76x and -1.0x	2408-012-000-30
Focus tube M72 for inspec.x L 105 mm -3.0x and -3.5x	2408-012-000-47
Focus tube M72 for inspec.x L 105 mm -5.0x	2408-012-000-33
Focus tube M95 for inspec.x L 105 mm -0.33x and -0.5x	2408-012-000-41
Focus tube M95 for inspec.x L 105 mm -0.76x and -1.0x	2408-012-000-43
Focus tube M95 for inspec.x L 105 mm -3.0x and -3.5x	2408-012-000-46
Focus tube M95 for inspec.x L 105 mm -5.0x	2408-012-000-45

Modular focus

Smart focus

Camera adapter M42

Lens adapter

Optem FUSION

Extreme Micro-Imaging Versatility

The all new Optem FUSION Lens System incorporates expanded functionality, bi-directional infinity optics, and a uniform modular matrix to provide OEMs with the ideal lens solution for streamlined integration of high-magnification imaging across they key Visible (400nm - 700nm), NIR (700nm - 1100nm) and **SWIR** (900nm - 1700nm) wavelength ranges.

Simply change-out modules to modify the form, function and performance of your Optem FUSION Lens System to meet the exact wavelength range, spatial, functional, mounting and imaging requirements of your system.

OEM-Optimized to Streamline Time-to-Market

A FUSION imaging solution can be designed and configured in minutes... not hours. And FUSION's modular offering of universally interchangeable components means your prototype is in place in days... not months.

Configured to Your Application

Using standard FUSION Lens matrix components, Qioptiq has the optical design prowess and manufacturing expertise to incorporate virtually any optical microscopy feature into your Optem FUSION Lens System. Specialized components and custom-tailored configurations are simple, expedient and cost effective.

40 years of experience

We coalesces 40 years of Optem® Lens manufacturing expertise into the perfect fusion of performance, simplicity and flexibility.

Unmatched Modular Imaging Flexibility

- Configure for versatile 7:1 or 12.5:1 zoom optics or for a wide range of economical fixed magnifications
- NOW, All FUSION Lens System accessories are compatible with the NEW Fetura+ High-Performance Automated Zoom Lens
- NOW, Optem FUSION enables extreme broadband imaging support across the visible and **SWIR** wavebands (400nm - 1700nm)
- Swap out lower lenses or LWD objectives to configure a wide range of imaging envelopes
- Interchange Camera Mounts and Camera Tubes to optimize sensor coverage for virtually any camera format or mount
- Integrate coaxial or ringlight LED illumination and automate focus and/or zoom with stepper motors
- Plug-n-play programmable control for multi-axis illumination focus and zoom
- Incorporate accessories at virtually any point of the lens assembly
- Space-efficient inline multi-point mounts ensure added imaging stability

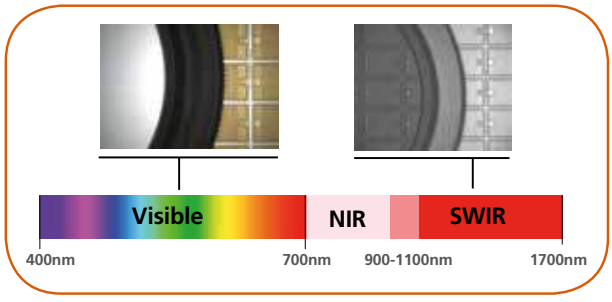
Camera Mount
Mates FUSION with C, CS, F, EOS, 4/3-mount cameras and more

Camera Tube
Modifies magnification to your camera optimizing chip coverage and performance

Core Optical Module
Determines optical function: Fixed, 7:1 or 12.5:1 zoom magnification - motorized or manual

Lower Function Module
Integrates internal focus - motorized or manual - and coaxial LED illumination options

Lower Lens
Modifies taking magnification to affect field of view, NA and working distance



Broad wavelength support makes FUSION the perfect solution for:

- Through silicon defect inspection and alignment
- Hyperspectral imaging
- Fluorescence imaging
- Metrology

FUSION Performance

Fixed Magnification

MINIMUM CONFIGURATION

Magnification	0.16X
NA	0.005
Resolution	15.0 lp/mm
Depth-of-Field	23 mm
Field-of-View*	41 x 55 mm
Working Distance	490 mm

MAXIMUM CONFIGURATION

Magnification	12X
NA	0.18
Resolution	540 lp/mm
Depth-of-Field	0.018 mm
Field-of-View*	0.55 x 0.73 mm
Working Distance	32 mm

7:1 Zoom Magnification

MINIMUM CONFIGURATION

	Low Zoom	High Zoom
Magnification	0.067X	0.46X
NA	0.0047	0.016
Resolution (lp/mm)	14 lp/mm	47 lp/mm
Depth-of-Field (mm)	25 mm	2.4 mm
Field-of-View* (mm)	131 x 98 mm	19 x 14 mm
Working Dist. (mm)	490 mm	490 mm

MAXIMUM CONFIGURATION

	Low Zoom	High Zoom
Magnification	5X	35X
NA	0.047	0.16
Resolution (lp/mm)	142 lp/mm	465 lp/mm
Depth-of-Field (mm)	0.25 mm	0.024 mm
Field-of-View* (mm)	1.7 x 1.3 mm	0.25 x 0.19 mm
Working Dist. (mm)	32 mm	32 mm

12.5:1 Zoom Magnification

MINIMUM CONFIGURATION

	Low Zoom	High Zoom
Magnification	0.045X	0.55X
NA	0.0036	0.019
Resolution (lp/mm)	11 lp/mm	58 lp/mm
Depth-of-Field (mm)	44 mm	1.5 mm
Field-of-View* (mm)	196 x 147 mm	16 x 12 mm
Working Dist. (mm)	490 mm	490 mm

MAXIMUM CONFIGURATION

	Low Zoom	High Zoom
Magnification	3.4X	41X
NA	0.036	0.19
Resolution (lp/mm)	108 lp/mm	576 lp/mm
Depth-of-Field (mm)	0.44 mm	0.015 mm
Field-of-View* (mm)	2.6 x 1.9 mm	0.21 x 0.16 mm
Working Dist. (mm)	32 mm	32 mm

* - All field-of-view data calculated for 2/3" camera

FUSION Features

Optem FUSION is engineered to deliver unprecedented configuration and performance flexibility. A wide array of interchangeable components affords OEMs with forward flexibility to evolve imaging capability with the life cycle of their system, and affords researchers with quick swap-out flexibility for benchtop video microscopy applications.

Extreme Imaging Versatility

FUSION delivers three distinct optomechanical capabilities within a single Lens System. Specify economical Fixed Magnification imaging modules or 7:1 and 12.5:1 Zoom Optical Modules to meet your exact micro-imaging needs. Infinity Optics and uniform fitting components streamline swap-out and maximize flexibility in the development and forward evolution of your system.

Optomechanical Flexibility

Integrate 90° Mirror Cubes and 50/50 Cubes at most any point along the optical path to modify the shape and fit of FUSION to your specific integration requirements. Combinations of multiple Cube Modules permit multiple cameras and lens functions to be integrated over a single optical subject.

Achieve Higher Magnification

FUSION is optimized to image through Optem Long-Working Distance Objectives. Select from 2X to 50X in High-Resolution and M-Plan APO and Objectives.

Tunable Lens Module

Space saving liquid lens module provides fast autofocus capabilities without cumbersome motorized focus drives. Simply inserts directly above the chosen Lower Function Module.

Fluorescence Imaging

Two modules utilizing user supplied Zeiss type 91029 cubes. Lower module provides system fluorescence illumination and imaging. The upper module will allow two different wavelengths to be directed to separate cameras.

Fetura+ High Speed Zoom

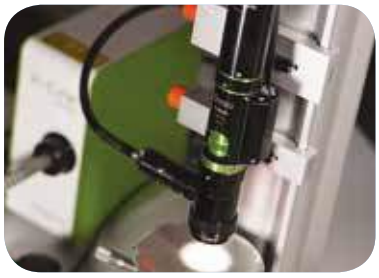
Replace the standard 12.5:1 FUSION core zoom module with NEW Fetura+ for increased speed and durability. Fetura+ travels through the entire zoom range in less than 1sec and offers service life in excess of 1-million cycles. Motorization and control is already built in.

Optical Accessories

Bi-directional infinity optics allow a range of Accessory Modules including iris, filter wheels, polarizers and apertures to be integrated at most any point along the optical path.

SWIR Compatibility

When the most detailed information is critical to your application, broad 400nm - 1700nm wavelength support facilitates multi-modality imaging and is perfect for advanced imaging techniques including hyperspectral imaging and image fusion.



LED Illuminator

The LED illuminator provides variable illumination levels to Optem fiber optic cables that exceed a Halogen 150W light source. The illuminator is small and compact in size weighing only 2.7KG/5.9 lbs. It has a lifetime of more than 25,000 hours. RoHS compliant; UL and CE approved.

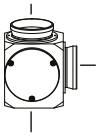
Image Stable Design

Enlarged barrel diameters and wall thickness combine with a 3-point dovetail coupling interface to promote robust lens assembly. Additionally, low profile, Inline Mount Blocks allow multiple mounting points along the assembly length to ensure maximum integration stability.

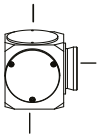
Optem® FUSION Visible/SWIR Compone

ACCESSORIES

35-07-01-000
50/50 CUBE

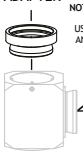


35-07-00-000
MIRROR CUBE



35-07-02-000
MIRROR CUBE ADAPTER

NOTE: 35-07-11 USES 65mm WORKING DISTANCE WHEN USED BELOW LOWER LENS. USE THIS COMBINATION WHEN PLACING RIGHT ANGLE BELOW SYSTEM. REMOVE DOVETAIL TO INCREASE WORKING DISTANCE.



35-07-11-000
INLINE MOUNT

35-07-21-000
25.4MM FILTER HOLDER

35-07-20-000
APERTURE SET

NOTE: NOT EVERY COMBINATION WILL PRESENT DESIRED RESULTS.

35-07-25-000
ADJUSTABLE IRIS

35-07-04-000
FLUORESENCE CUBE HOLDER UPPER
(NOTE: USES ZEISS TYPE 91029 Cube)

35-03-50-000
TUNABLE LENS FOCUS MODULE
(NOTE: ATTACH DIRECTLY ABOVE LOWER FUNCTION MODULE ONLY)

ACCESSORIES

CAMERA

CAMERA MOUNTS

25-60-23-000
EOS CAMERA MOUNT

25-60-24-000
F CAMERA MOUNT

35-08-70-000
C \ CS CAMERA MOUNT

25-60-26-000
4/3 CAMERA MOUNT

CAMERA TUBES

35-08-00-000
CAMERA TUBE
0.4X \ 80 FL

35-08-01-000
CAMERA TUBE
0.5X \ 100 FL

35-08-02-000
CAMERA TUBE
0.6X \ 120 FL

35-08-04-000
CAMERA TUBE
0.8X \ 160 FL

35-08-11-000
MINI CAMERA TUBE
0.8X \ 160 FL

35-08-06-000
CAMERA TUBE
1X \ 200 FL

ACCESSORIES

FIXED MAGNIFICATION

7:1 ZOOM

35-31-10-000
7:1 ZOOM MANUAL

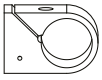
35-31-40-000
7:1 ZOOM MANUAL DETENT

35-31-60-000
7:1 ZOOM STEPPER MOTORIZED

A CONTROL

35-07-20-000
APERTURE SET
REQUIRED FOR FIXED MAGNIFICATION SYSTEMS

35-07-10-000
CAMERA TUBE CLAMP



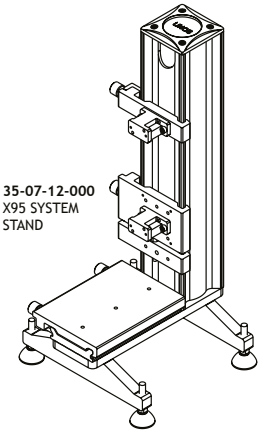
35-07-14-000
TUBE CLAMP MOUNT, 76mm dia.

35-07-15-000
TUBE CLAMP MOUNT, 82mm dia.

35-07-16-000
TUBE CLAMP MOUNT, 83mm dia.

35-07-17-000
TUBE CLAMP MOUNT, 84mm dia.

35-07-12-000
X95 SYSTEM STAND



LOWER FUNCTION MODULES

35-03-10-000
15mm FOCUS MANUAL

35-03-30-000
15mm FOCUS STEPPER MOTOR

35-07-03-000
FLUORESENT CUBE HOLDER LOWER

NOTE: USES ZEISS TYPE 91029 CUBE. USE WITH 35-01-00-000 BASIC LOWER FUNCTION MODULE RECOMMENDED.

35-01-00-000
BASIC

ILLUMINATION

B CONTROL

35-00-03-000
2X \ 100 FL

42-35-41-000
INFINITY MACRO LENS

LOWER LENSES

35-00-11-000
0.4X \ 500 FL

35-00-10-000
0.5X \ 400 FL

35-00-09-000
0.67X \ 300 FL

35-00-08-000
1X \ 200 FL

35-00-06-000
1.25X \ 160 FL

NOTE:

- Products listed in **RED TYPE** Indicate **SWIR** version available.
- For ordering purposes, VISIBLE components are identified by a "35" prefix, while **SWIR** components use a **"45"** e.g. 35-XX-XX-XXX VISIBLE, and **45**-YY-YY-YYY **SWIR**
- All "35-XX" modules are compatible with one another; and all **"45**-YY" modules are compatible with one another.
- Using "35-XX" and **"45**-YY" modules with one another is not recommended.
- Non-optics mounts/modules are cross-compatible between VISIBLE and **SWIR**

ent Matrix

ILLUMINATION

25-60-27-000
MICRO 4/3
CAMERA MOUNT

25-60-28-000
SONY ALPHA
CAMERA MOUNT

25-60-29-000
PENTAX K
CAMERA MOUNT

MINI CAMERA TUBES

-08-12-000
MINI
AMERA TUBE
X \ 200 FL

35-08-13-000
MINI CAMERA TUBE
1.5X \ 300 FL

35-08-14-000
MINI CAMERA TUBE
2X \ 400 FL

35-08-15-000
MINI CAMERA TUBE
2.5X \ 500 FL

35-08-16-000
MINI CAMERA TUBE
3X \ 600 FL

12.5:1 ZOOM

35-41-10-000
12.5:1 ZOOM
MANUAL

35-41-40-000
12.5:1 ZOOM
MANUAL
DETENT

35-41-60-000
12.5:1 ZOOM
STEPPER
MOTORIZED

4401-592-000-22
Fetura+
12.5:1 ZOOM
(SELF-CONTROLLED)

ACCESSORIES

A CONTROL

35-04-00-000
COAX
ILLUMINATION

35-04-10-000
COAX ILLUMINATION 5mm FOCUS
MANUAL

35-04-30-000
COAX ILLUMINATION 5mm FOCUS
STEPPER MOTOR

35-04-03-000
COAX
ILLUMINATION
WITH
ANALYZER

ILLUMINATION

35-04-13-000
COAX ILLUMINATION 5mm FOCUS
MANUAL W/ANALYZER

ILLUMINATION

35-04-33-000
COAX ILLUMINATION 5mm FOCUS
STEPPER MOTOR
W/ANALYZER

B CONTROL

ACCESSORIES

ILLUMINATION

-00-05-000
43X \ 140 FL

35-00-04-000
1.67X \ 120 FL

35-00-03-000
2X \ 100 FL

35-00-01-000
3X \ 67 FL

35-00-02-000
4X \ 50 FL

NOTE: COAX ILLUMINATION HAS LIMITED FIELD ILLUMINATION WITH LARGE FOVs.

LIGHTING ACCESSORIES

35-07-50-000
LED COAX
ILLUMINATOR

29-69-13-000
LED COAX
RIGHT ANGLE

29-69-02-000
POLARIZER

30-16-02-000
FIBER OPTIC
LAMPHOUSE

30-16-01-000
10mm FIBER
OPTIC ADAPTER

30-16-60-000
60" FLEXIBLE
FIBER OPTIC

COAX

OBLIQUE

29-69-21-000
FIBER OPTIC
RINGLIGHT
ADAPTER

29-60-81-000
FIBER OPTIC
RINGLIGHT

29-60-83-000
110v HALOGEN
ILLUMINATOR

29-60-84-000
220v HALOGEN
ILLUMINATOR

35-07-35-000
LED ILLUMINATOR
90/264V 50/60Hz

35-07-40-000
LED RINGLIGHT
ADAPTER

35-07-41-000
LED
RINGLIGHT

A CONTROL

35-05-20-000
2 AXIS STEPPER CONTROLLER
24v POWER SUPPLY INC

35-05-00-000
2 AXIS STEPPER CONTROLLER
OEM BOARD

30-17-37-000
(N. AMER CORD)

30-17-36-000
(EURO CORD)

30-17-33-000
(U.K. CORD)

B CONTROL

SENSOR
STEPPER MOTOR
35-05-99-000
DC MOTOR
FUSION

35-05-99-000
CONTROLLER
ADAPTER
FOR FOCUS
MODULES
(REQUIRED FOR
ALL MOTORIZED
FOCUS MODULES.)

30-17-03-000
OBJECTIVE
ADAPTER

LWD OBJECTIVES
28-21-02-001 2X M PLAN APO
28-21-05-001 5X M PLAN APO
28-21-10-000 10X M PLAN APO
28-21-11-001 20X M PLAN APO
28-21-50-001 50X M PLAN APO

28-20-44-000 5X HI-RES
28-20-45-000 10X HI-RES
28-20-46-000 20X HI-RES

CERTAIN LIMITATIONS APPLY WITH HI-RES OBJECTIVES.
SEE BROCHURE FOR DETAILS.

30-16-50-000
OBJECTIVE RINGLIGHT
40 INCHES

QIOPTIQ
Photonics for Innovation
An Excelitas Technologies Company

mag.x 125 Micro-Inspection System

Modular System

High resolution inspection is being used in many applications. Each application has its own requirements and constraints. In order to cater for all these diverse needs the mag.x system 125 is as modular as possible. Integration of customized elements is easy and enables a system that integrates seamlessly into the surrounding equipment.

Base units

Heart of the system is always the base unit which is available in different variations. All other components are attached to these base units. Mounting of the system to the surrounding equipment is also provided by the base unit.

Objective lenses

The optical performance of the system is mainly defined by the objective lenses. These are the components that make the mag.x system 125 really unique. All of Qioptiq's highest end technology is being used in manufacturing and testing of these lenses.

Tube lenses

System magnification and maximum sensor size are the result of the combination of tube lens and objective lens. The current selection of tube lenses allows the use of sensors with a diagonal of up to 57 mm. All tube lenses are also telecentric on image side.

Illumination

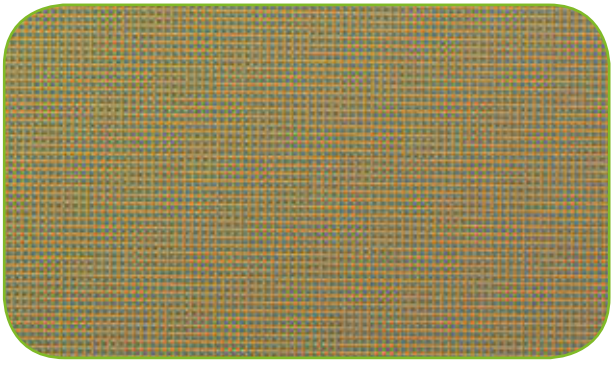
For coaxial bright field illumination Koehler illumination optics are included that can be interfaced to light sources via optical fibers or directly to LED sources.

Accessories

No system is complete without an array of accessories. The wide selection ranges from camera and fiber adapters to mounting accessories and also includes more advanced components for focusing and special contrasting methods. The optional Piezo Unit enables fine focusing with a range of 400µm. It can be combined with the AF base unit to build a true through-the-lens AF system.

Applications

Numerous applications benefit from the versatility and the high optical performance of the mag.x system 125. The large field-of-view increases throughput of inspection installations as more object space is imaged at once and the number of images that need to be acquired to image an object in its entirety is reduced drastically – in the best case only one image is necessary by maintaining sub-µ resolution.



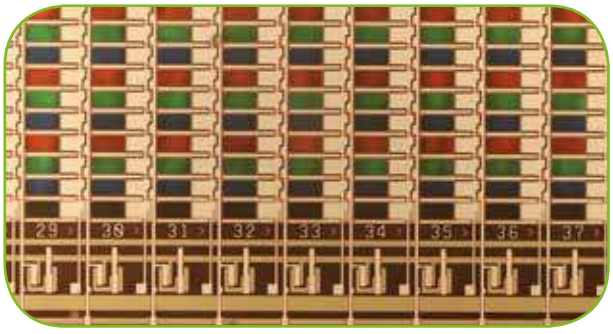
Color CCD sensor with 5.5µm pixel size

Typical applications include the inspection of large objects like

- Display panels
- Printed circuit boards
- Glass panels

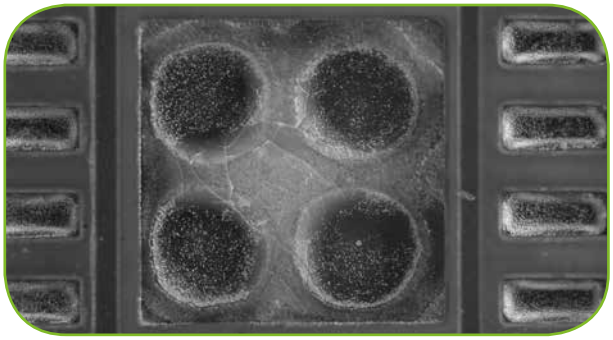
These objects are usually inspected with line scan cameras to achieve maximum resolution and throughput. Smaller objects can often be imaged at once or with only few images with an area scan camera. The 1.73x tube lens is specifically designed for the popular 35mm format cameras that achieve up to 50MPixel resolution. Typical applications here are

- Semiconductor inspection
- Biochip reading
- Fluorescence microscopy
- Digital pathology/histology
- High precision non-contact measurement machines
- Cleanliness of optical components



Color TFT display

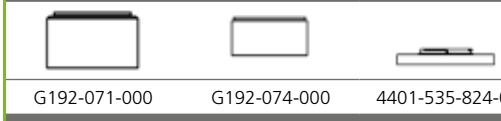
Bovine Pulmonary Artery fluorescence sample



Solder points on PCB (magnification 11.25x)

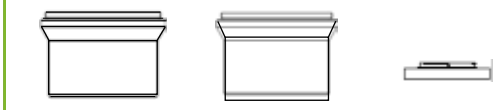
Component Matrix

Camera adapters for tube 2.25x



G192-071-000 | G192-074-000 | 4401-535-824-00

Camera adapters for tube 1.73x



G192-078-000 | G192-079-000 | 4401-535-825-00

Camera adapters for tube 1x

G192-073-000 | 4401-535-134-00 | 4401-535-136-00

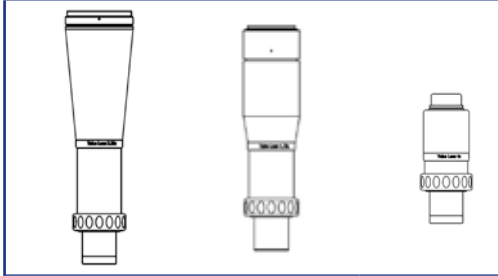
Light source

010-00340R 805-00039

Fiber guide

G405-524-000

Tube lenses



G192-032-000 | G192-034-000 | G192-031-000

Illumination tube

G192-080-905

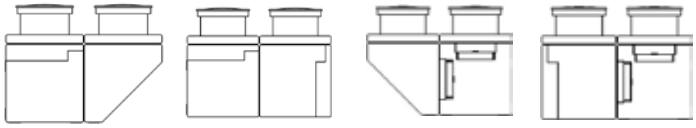
Fiber adapters

G192-043-000 | G192-045-000

Direct adapter

G192-009-000

Base units



G192-080-000 | G192-081-000 | G192-082-000 | G192-083-000

Filters

G192-080-082 | G192-080-919

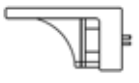
Objective lenses

G192-012-000 | 4401-552-830-00 | G192-011-000

Darkfield illumination adapter

G192-044-901

Piezo unit



4401-535-822-01

A closer look

Find additional information in our **Brochure mag.x system 125.**
Please write an email for your personal print copy or PDF to Inspection@excelitas.com

Designed for Large Sensors

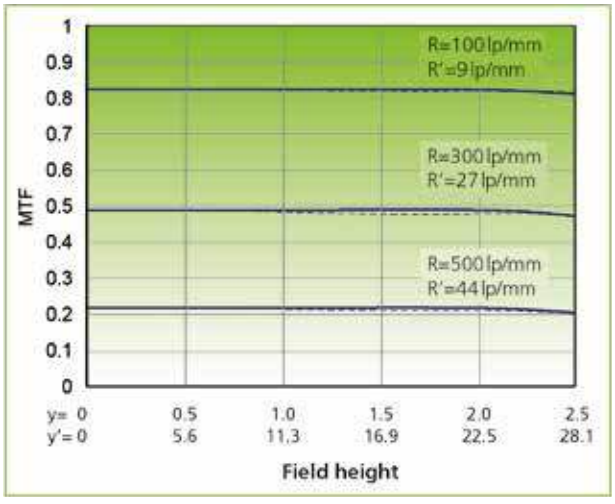
The mag.x system 125 is the first microscope system that is specifically designed for the use with large sensors to achieve true wide field imaging with high resolution. With a supported sensor diameter of 57 mm popular line scan sensors like 8k TDI sensors as well as modern super high-resolution array sensors can be used. These sensors fully utilize the high optical bandwidth of the mag.x system 125 that supports up to 50 MPixel sensor resolution.

Optical Performance

Mag.x system 125 stands out from conventional microscope systems by numerical aperture (NA) values considerably higher than those of other systems. High optical quality is not only ensured on the optical axis, but also is maintained over the entire sensor format. The MTF chart below shows the polychromatic MTF versus field height. Values for object y and image heights y' are given under the horizontal axis. Note that the high contrast values close to the diffraction limit are maintained over the entire field!

The complete system is chromatically corrected in the spectral range of 430–700 nm. High contrast is maintained over the entire spectrum and no refocusing is required if the illumination wavelength is changed. Multispectral imaging becomes possible without any additional focus needs.

To enable even the most demanding measurement tasks the mag.x system 125 features precise object space telecentricity to prevent flawed measurements of objects with varying height.



Polychromatic MTF vs. field height
LD Plan Apo 5x/0.2 + TL2.25x; 2y=5 mm, 2y'=56.3 mm

Specifications

Objective Plan Apochromat					Tube Lens System											
					1x				1.73x				2.25x			
					f'tub = 250 mm				f'tub = 432.5 mm				f'tub = 563 mm			
					2y' = 25 mm				2y' = 43.3 mm				2y' = 57 mm			
Magn./NA	WD mm	f'obj mm	δobj µm	R0 lp/mm	M	2y mm	NA'	R'0 lp/mm	M	2y mm	NA'	R'0 lp/mm	M	2y mm	NA'	R'0 lp/mm
2x/0.08	24.8	125.0	±42.7	293	2	12.5	0.04	147	3.5	12.5	0.023	85	4.5	12.5	0.018	65
5x/0.20	13.0	50.0	±6.8	733	5	5.0	0.04	147	8.7	5.0	0.023	85	11.25	5.0	0.018	65
8x/0.32	23.0	31.3	±2.7	1172	8	3.1	0.04	147	13.8	3.1	0.023	85	18.0	3.1	0.018	65

NA Numerical aperture in the object space = n · sin (σ)
WD Working distance
f'_{obj} Focal length of the objective
f'_{tub} Focal length of the tube lens

δ_{obj} Depth of field at 546 nm $\delta_{obj} = \pm n \cdot \lambda/(2 \cdot NA^2)$
R'_0 Cut off frequency in image space at 546 nm
R_0 Cut off frequency in object space at 546 nm $R_0 = (2 \cdot NA) / \lambda$
2y' Image field size (maximum detector diagonal)
2y Object field size
M Magnification of the overall system

MachVis Software

LINOS MachVis software is designed to help you find the right lens for your machine vision application. Starting with four simple parameters:

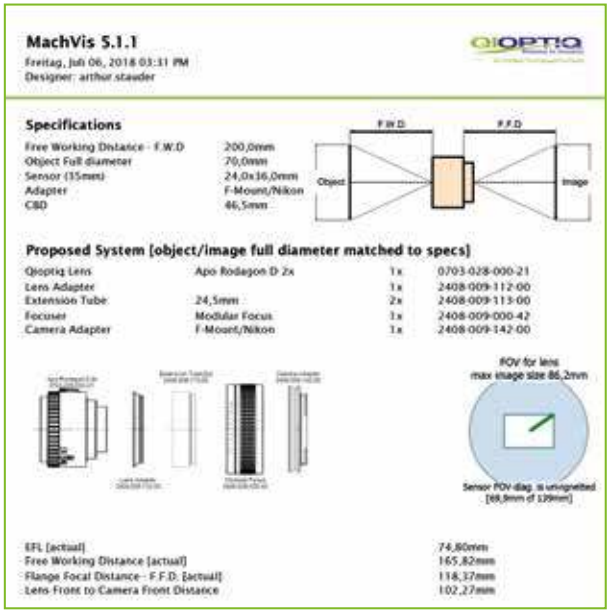
- Object size
- Working distance
- Sensor size
- Camera mount

MachVis calculates the necessary optical parameters and then, from the extensive lens catalogue, selects all suitable lenses that meet your specifications.

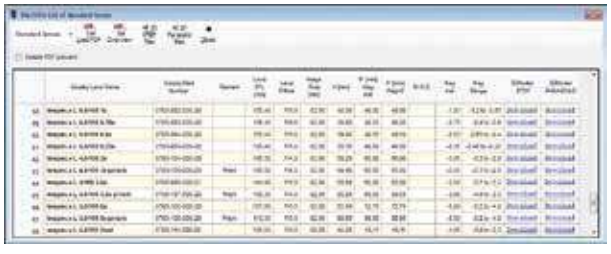
If mechanical accessories (e.g. focussing unit extension tubes etc.) are needed, MachVis will create a printable, itemized list of the required parts. MachVis also generates a schematic drawing of the lens and accessories in the order of assembly.

Specifications, along with your own project notes, may be saved for later recall. Datasheets (PDF) for each lens may be viewed for a more detailed analysis.

To facilitate the mechanical design of your system as much as possible, MachVis offers the direct download of 3-D data in step or parasolid fomat of all lenses and accessories.



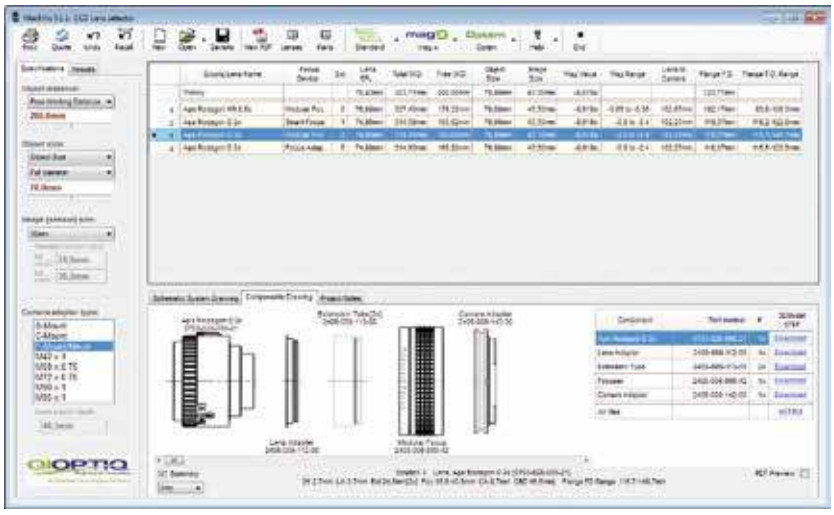
Printout of the selected system



Lens overview dialog

MachVis Workflow

From the choice of lens...



to 3D modelling...

to the final system:

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