



MC12K series

Product presentation

www.opto-engineering.com

MC12K series



Summary

MC12K series

Introduction

Key advantages

Application examples

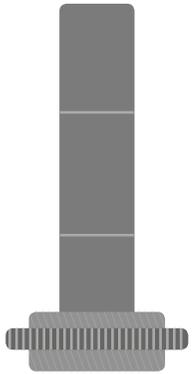
Pricing / Competitors



Introduction

What is a MACRO lens?

Many definitions

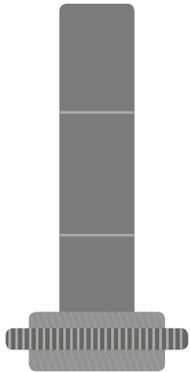


- Specifically designed for short working distances (optimized for “close-up” focusing)
- Optimized to work at magnifications near 1X (FOV \approx sensor size)
- Specifically designed for small fields of view

Introduction

What is a MACRO lens?

Many definitions



- Specifically designed for short working distances (optimized for “close-up” focusing)
- Optimized to work at magnifications near 1X (FOV \approx sensor size)
- Specifically designed for small fields of view

IT IS COMMON TO USE

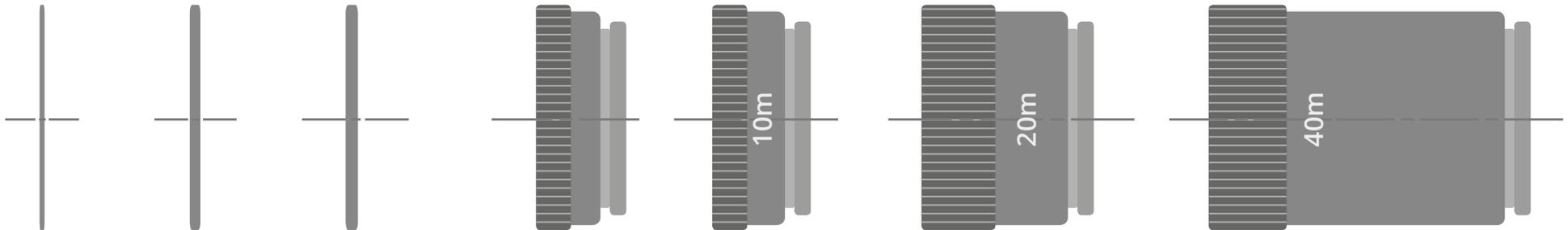
infinite conjugate lenses at short working distances (in «macro» configuration)
by adding **extension tubes/rings**

Introduction

EXTENSION RINGS

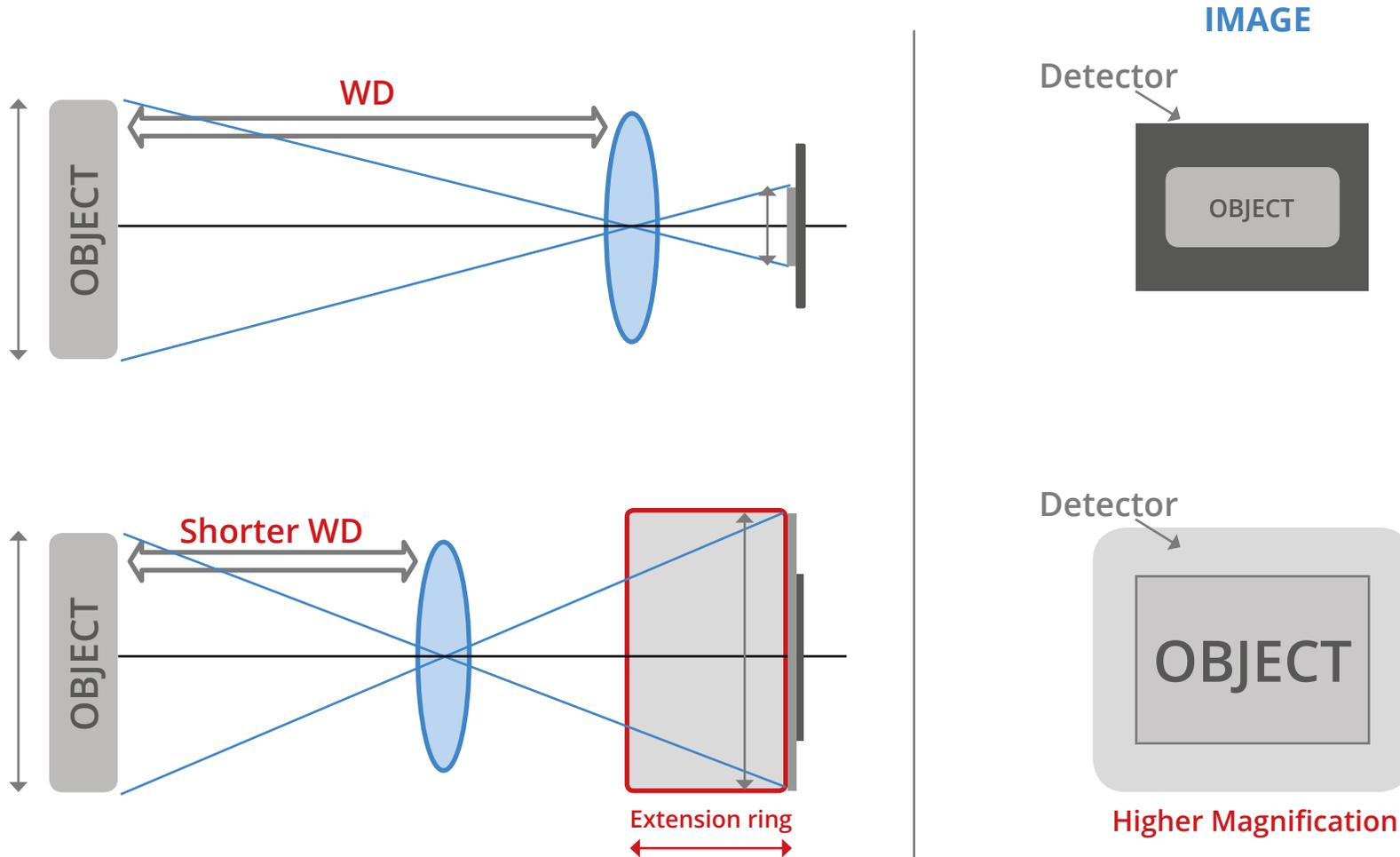


- Tubes are positioned between lens and camera when there is need to **focus in shorter Working Distance** than the lens minimum object distance (MOD)
- FOV will be also smaller consequently



Introduction

EXTENSION RINGS EFFECT



Introduction

EXTENSION RINGS EFFECT



Manufacturers give lens performance when deployed in their optimal condition

EXTENSION RINGS cause the lens to **focus more closely than it was designed** resulting in:

LOWER IMAGE QUALITY

than with a dedicated macro lens

HIGH IMAGE DISTORTION

RESOLUTION LOSS (especially at the edges of the FOV)

DECREASE IN DEPTH OF FIELD

CHROMATIC EFFECT

LOSS OF LIGHT



NOT SUITABLE FOR CRITICAL APPLICATIONS

**NOT COMPATIBLE WITH ACCURATE
MEASUREMENT REQUIREMENTS**

MC12K series



MACRO by design



**UNIQUE OPTICAL PERFORMANCES
for
CRITICAL APPLICATIONS**

Key advantages

WIDE RANGE of magnifications



Wide span of possible applications

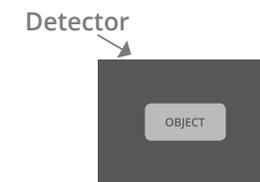
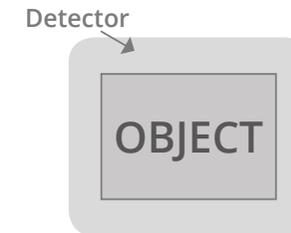
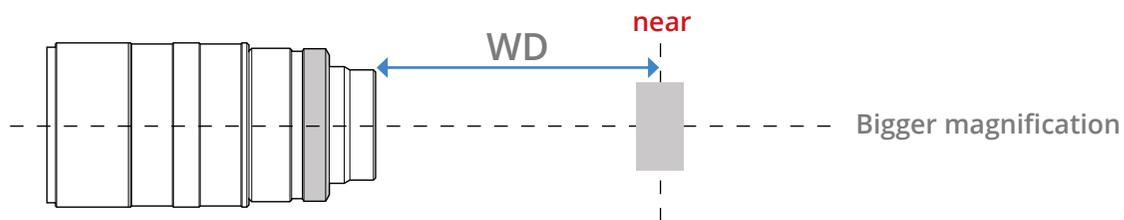
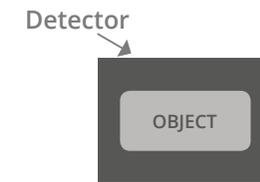


Part number	Focusing	Mag.	Detector type				Optical specifications						Dimensions			
			Line - 12K 12k x 5.2 μm 62.4 (mm)	Line - 12K 12k x 5 μm 61.44 (mm)	Line - 16K 16k x 3.5 μm 57.34 (mm)	35 mm w x h 36 x 24 (mm x mm)	WD (mm)	F/N	Distortion typical (max) (%)	Field depth (mm)	CTF 50 lp/mm (%)	Image side N.A.	Object side N.A.	Mount (6)	Length (mm) (5)	Diam. (mm)
MC12K 200X	near	2.017	30.7	30.5	28.7	17.8 x 11.9	93.6	18	< 0.01 (0.02)	0.15	> 30	0.028	0.056	M72 x 0.75 FD 6.56	281.8	76
	nominal	2.000	31.2	30.7	28.7	18.0 x 12.0	94.0									
	far	1.983	31.3	31.0	29.2	18.2 x 12.1	94.4									
MC12K 150X	near	1.517	40.9	40.5	38.2	23.7 x 15.8	109.3	15	< 0.01 (0.02)	0.2	> 40	0.033	0.05	M72 x 0.75 FD 6.56	242.5	76
	nominal	1.500	41.6	41.0	38.2	24.0 x 16.0	110.0									
	far	1.484	41.8	41.4	39.0	24.3 x 16.2	110.7									
MC12K 100X	near	1.018	61.0	60.4	56.9	35.4 x 23.6	134.0	12	< 0.01 (0.02)	0.3	> 50	0.042	0.042	M72 x 0.75 FD 6.56	195.0	76
	nominal	1.000	62.4	61.4	57.3	36.0 x 24.0	135.5									
	far	0.984	63.1	62.5	58.9	36.6 x 24.4	137.0									
MC12K 067X	near	0.684	90.7	89.9	84.7	52.7 x 35.1	179.7	10	< 0.01 (0.02)	0.6	> 60	0.050	0.033	M72 x 0.75 FD 6.56	169.6	76
	nominal	0.667	93.6	92.2	86.0	54.0 x 36.0	183.0									
	far	0.667	93.0	92.2	86.8	55.4 x 36.9	186.4									
MC12K 050X	near	0.517	119.9	118.8	111.9	69.6 x 46.4	217.1	9	< 0.01 (0.02)	0.9	> 50	0.056	0.028	M72 x 0.75 FD 6.56	153.3	76
	nominal	0.500	124.8	122.9	114.7	72.0 x 48.0	223.0									
	far	0.483	128.3	127.1	119.7	74.5 x 49.6	229.1									
MC12K 025X	near	0.266	233.2	231.1	217.6	135.3 x 90.2	393.6	8	< 0.05 (0.1)	3.2	> 50	0.063	0.016	M72 x 0.75 FD 6.56	138.9	76
	nominal	0.250	249.6	245.8	229.4	144.0 x 96.0	415.5									
	far	0.234	265.6	263.2	247.9	154.2 x 102.8	393.6									
MC12K 012X	near	0.142	438.3	434.4	409.1	254.4 x 189.6	678.5	7	< 0.05 (0.1)	11	> 50	0.071	0.009	M72 x 0.75 FD 6.56	125.3	76
	nominal	0.125	498.8	491.1	458.4	287 x 192	762.0									
	far	0.108	572.6	567.5	534.5	332.5 x 221.7	873.2									
MC12K 008X	near	0.100	619.1	613.5	577.7	359.2 x 239.5	924.1	7	< 0.05 (0.1)	15	> 50	0.071	0.006	M72 x 0.75 FD 6.56	121.0	76
	nominal	0.083	747.9	736.4	687.3	432 x 288	1102.5									
	far	0.067	832.0	823.6	869.9	541.1 x 360.7	1370.9									

0.08X Macro lenses for 12k and 16kpx linescan cameras

How to use

Part number	Focusing	Mag.	Detector type				Optical specifications						Dimensions			
			Line - 12K 12k x 5.2 μm 62.4 (mm)	Line - 12K 12k x 5 μm 61.44 (mm)	Line - 16K 16k x 3.5 μm 57.34 (mm)	35 mm w x h 36 x 24 (mm x mm)	WD (mm)	F/N	Distortion typical (max) (%)	Field depth (mm)	CTF 50 lp/mm (%)	Image side N.A.	Object side N.A.	Mount	Length (mm)	Diam. (mm)
			(1) Object field of view (mm x mm)				(2)	(3)	(4)				(6)	(5)		
MC12K 200X	near	2.017	30.7	30.5	28.7	17.8 x 11.9	93.6	18	< 0.01 (0.02)	0.15	> 30	0.028	0.056	M72 x 0.75 FD 6.56	281.8	76
	nominal	2.000	31.2	30.7	28.7	18.0 x 12.0	94.0									
	far	1.983	31.3	31.0	29.2	18.2 x 12.1	94.4									



Key advantages

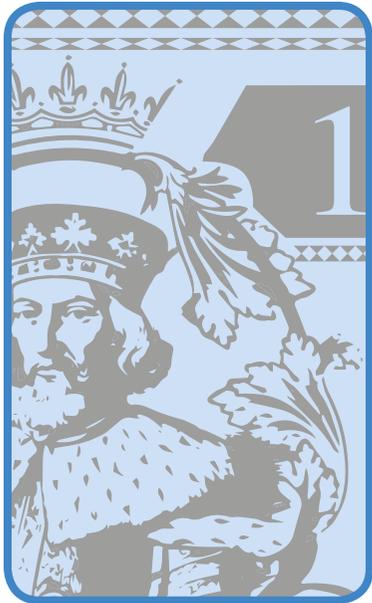
MACRO DESIGN



UNMATCHED resolution
for CRITICAL applications

MC12K

Conventional lens



macro design



with
extension tubes

Consistently deliver superior image quality
than standard fixed focal length camera lenses
used with extension tubes

Key advantages

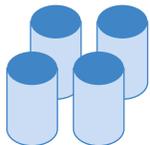
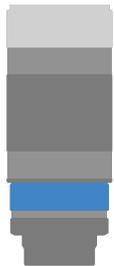


**INCREDIBLY
LOW DISTORTION**

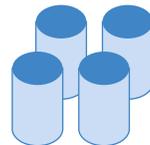
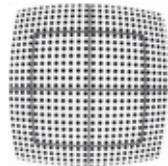


Ideal for
flat **MEASUREMENT** applications

MC12K



Conventional lens

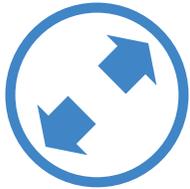


Optical specifications

WD	f/#	Distortion typical (max)	Field depth	CTF	Image	Object
(mm)	(2)	(%) (3)	50 lp/mm (4)	(%)	side N.A.	side N.A.
93.6	18	< 0.01 (0.02)	0.15	> 30	0.028	0.056
94.0						
94.4						
109.3	15	< 0.01 (0.02)	0.2	> 40	0.033	0.05
110.0						
110.7						
134.0	12	< 0.01 (0.02)	0.3	> 50	0.042	0.042
135.5						
137.0						
179.7	10	< 0.01 (0.02)	0.6	> 60	0.050	0.033
183.0						
186.4						
217.1	9	< 0.01 (0.02)	0.9	> 50	0.056	0.028
223.0						
229.1						
393.6	8	< 0.05 (0.1)	3.2	> 50	0.063	0.016
415.5						
393.6						
678.5	7	< 0.05 (0.1)	11	> 50	0.071	0.009
762.0						
873.2						
924.1	7	< 0.05 (0.1)	15	> 50	0.071	0.006
1102.5						
1370.9						

DOWN TO 0.01%

Key advantages



WIDE IMAGE CIRCLE



Optimized for

- High-resolution linescan cameras
- Down to 5 μm pixel size

SENSOR SIZE

2048 px x 10 μm

2048 px x 14 μm

4096 px x 7 μm

4096 px x 10 μm

7450 px x 4.7 μm

6144 px x 7 μm

8192 px x 7 μm

12288 px x 5 μm

UP TO 62.4 mm

12288 px x 7 μm

20.48 mm

28.6 mm

28.6 mm

35 mm

41 mm

43 mm

57.3 mm

62 mm

86 mm

MC12K



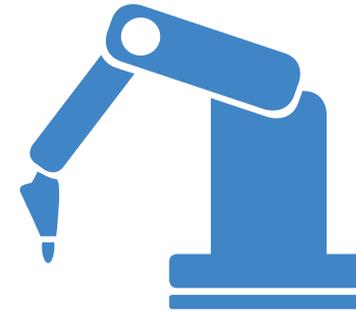
Compatible with most common linescan cameras

Key advantages



**INDUSTRIAL DESIGN
FOR FACTORY AUTOMATION**

NO VARIABLE IRIS



**EASY integration
in machine vision systems**



**DEDICATED
CLAMPING MECHANICS**

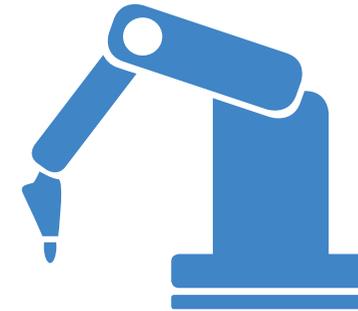


Key advantages



**INDUSTRIAL DESIGN
FOR FACTORY AUTOMATION**

NO VARIABLE IRIS



**EASY integration
in machine vision systems**



**DEDICATED
CLAMPING MECHANICS**

Part number	Compatible products	Mechanical specifications				
		Compatible teleplates (CMPT)	Length (mm)	Width (mm)	Height (mm)	Optical axis height (mm)
MC12K						
CMHO MC12K 025	MC12K 008-025	-	140	111	132.5	80
CMHO MC12K 067	MC12K 050-067	-	140	111	132.5	80
CMHO MC12K 200	MC12K 100-200	-	140	111	132.5	80

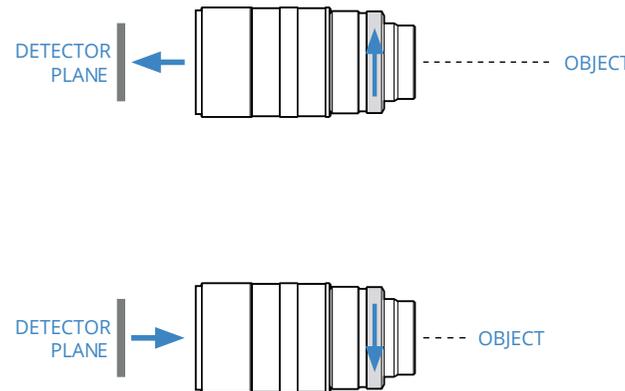
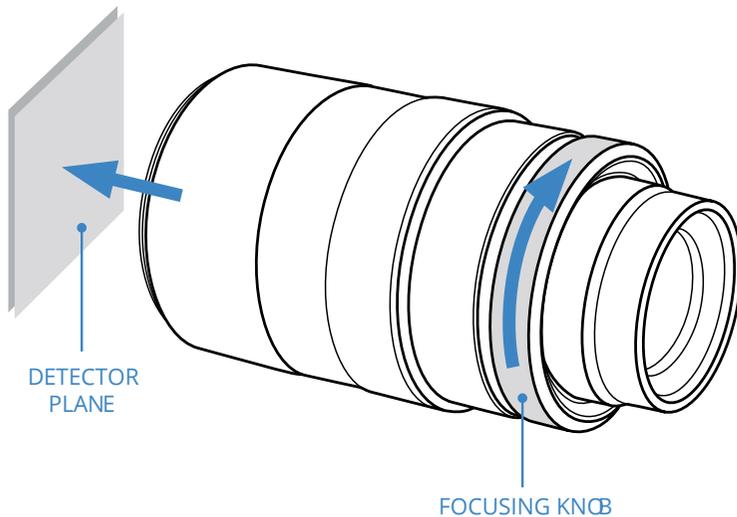
Key advantages



PRECISE manual FOCUSING MECHANISM



ACCURATELY achieve the best possible IMAGE SHARPNESS



Key advantages



COLOR CORRECTION
In the VIS spectrum



Distinguish **FINE** tonal gradations

Ideal for demanding applications
where **COLOR CONSISTENCY** is required

MC12K



Color corrected

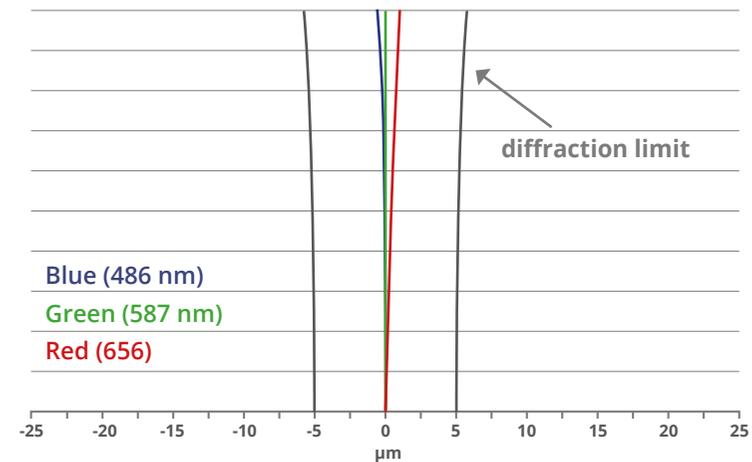
Conventional lens



Chromatic aberration



Lateral Color for MC12K008



LATERAL COLOR is within the diffraction limit*

* Nominal values

Key advantages



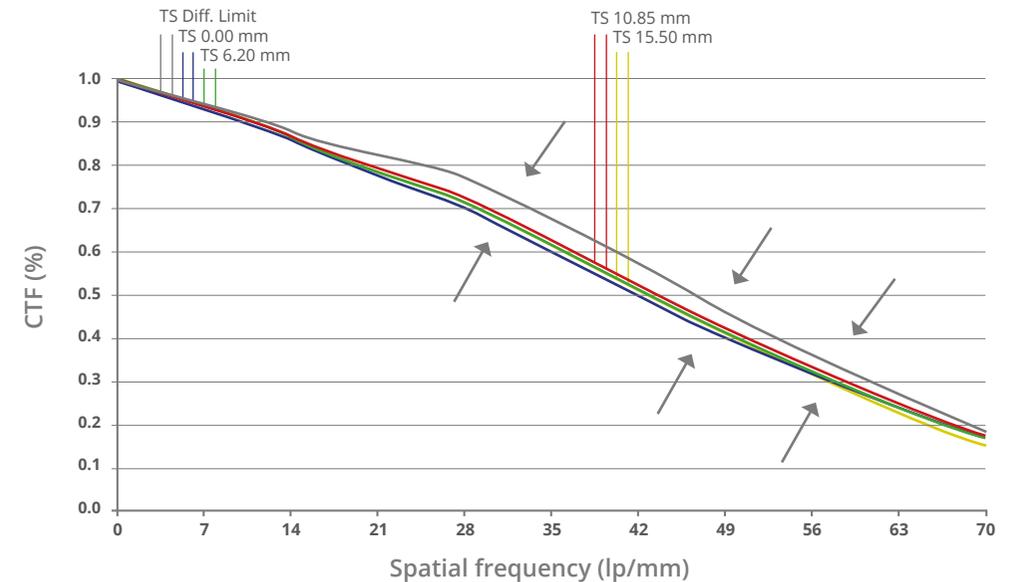
**HOMOGENEOUS
IMAGING QUALITY**



Perfect for applications where
MAXIMUM image resolution is required

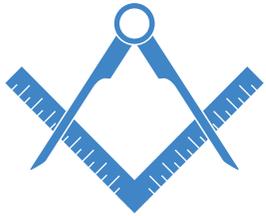
**Same performances
at the center and at the edges
of the FOV***

CTF for MC12K200



* CTF variation < 20% at 70 lp/mm

Key advantages

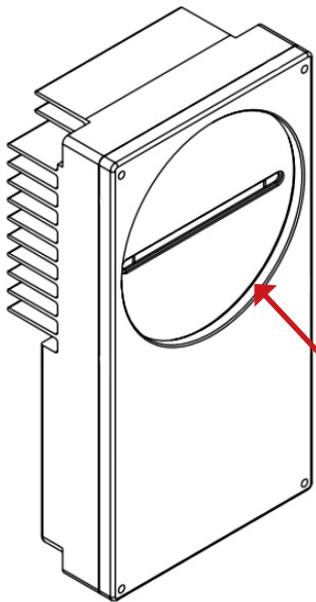


**OPTIONAL CUSTOM MOUNT
FOR ANY CAMERA***

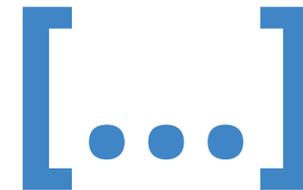
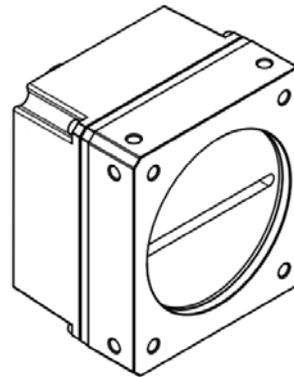


**WIDE compatibility
with most common
linescan cameras**

AT NO ADDITIONAL COST



**Standard mount
M72X0.75**



* Upon verification of camera-lens compatibility

Key advantages



- Macro design
- Incredibly low distortion
- Designed for high-resolution linescan cameras
- Industrial design for factory automation
- Manual focusing mechanism
- Color correction
- Homogeneous imaging quality
- Optional custom mount for any camera

Applications

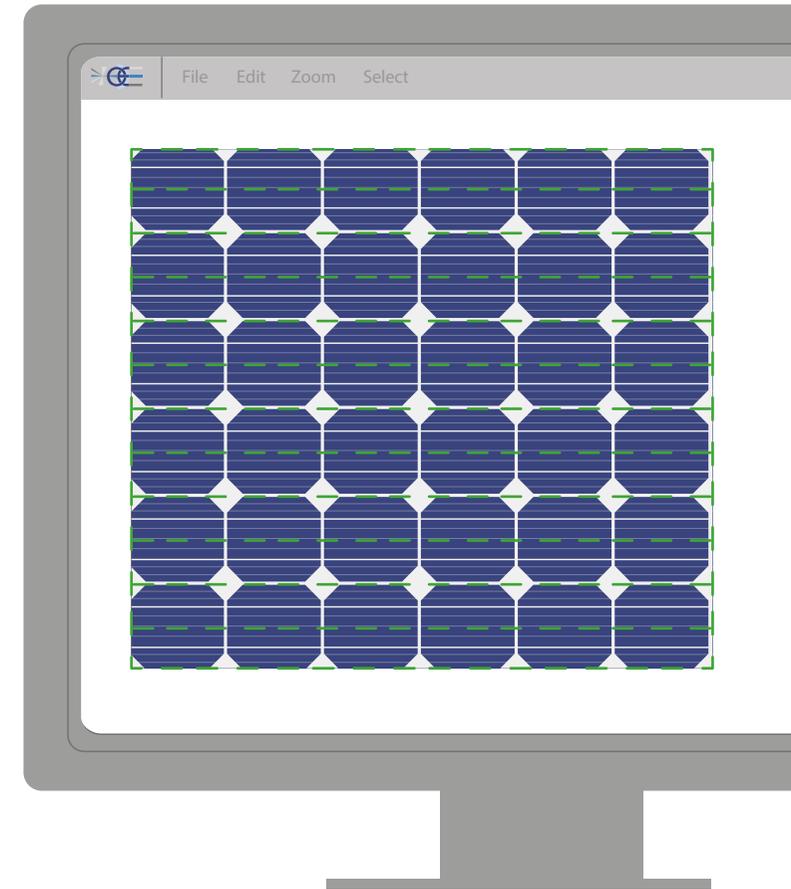
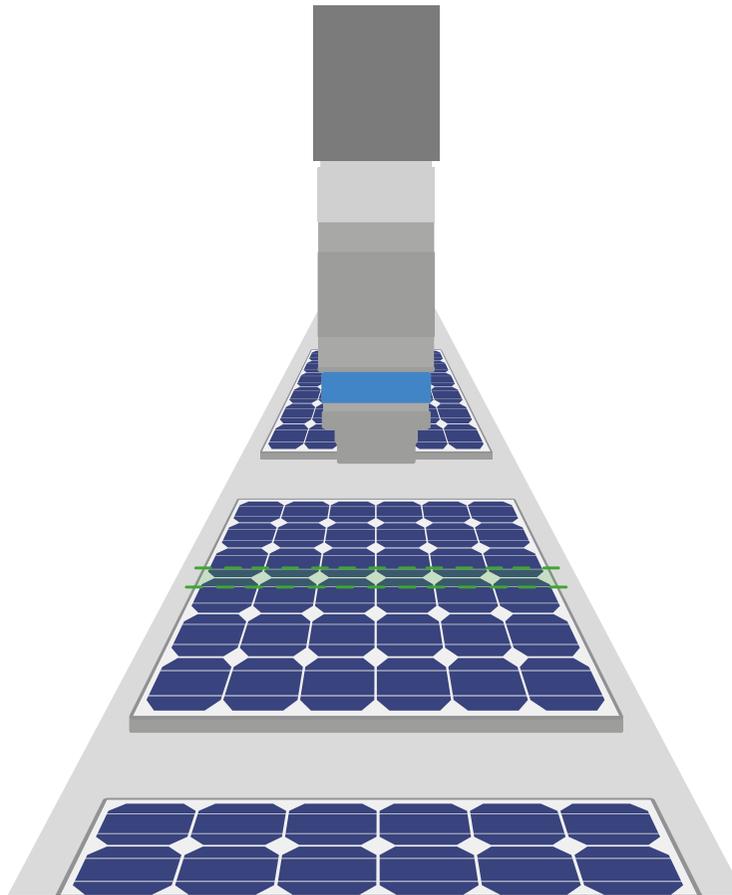
LINE SCAN APPLICATIONS



- High speed print inspection
- Identify and classify faults in web and surface inspection (glass, textiles, ..)
- Solar cell inspection
- Fpd inspection
- Pcb inspection
- Optical inspection of folding cartons (food, pharma,..)
- High speed sorting of tablets
- Checking registration marks
- Quality control
- Package identification / code reading
- Large mechanical components inspection

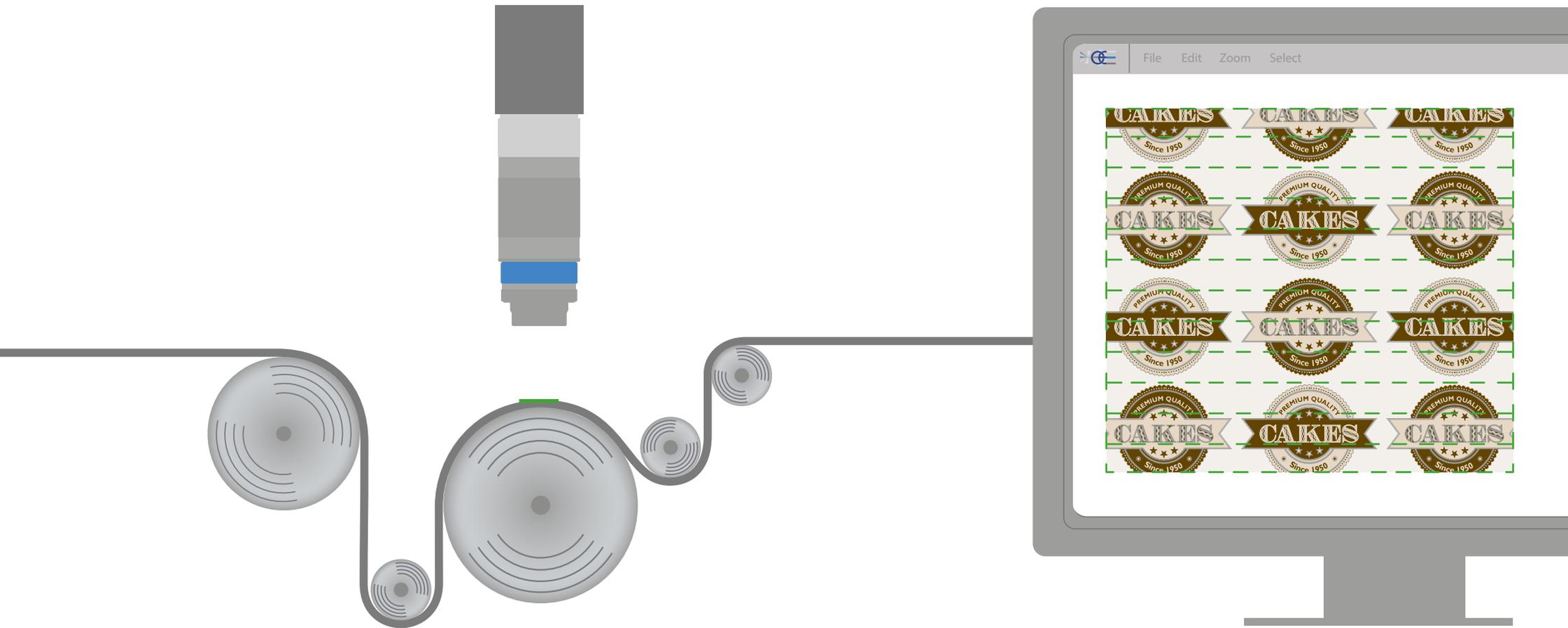
Applications

SOLAR CELL INSPECTION



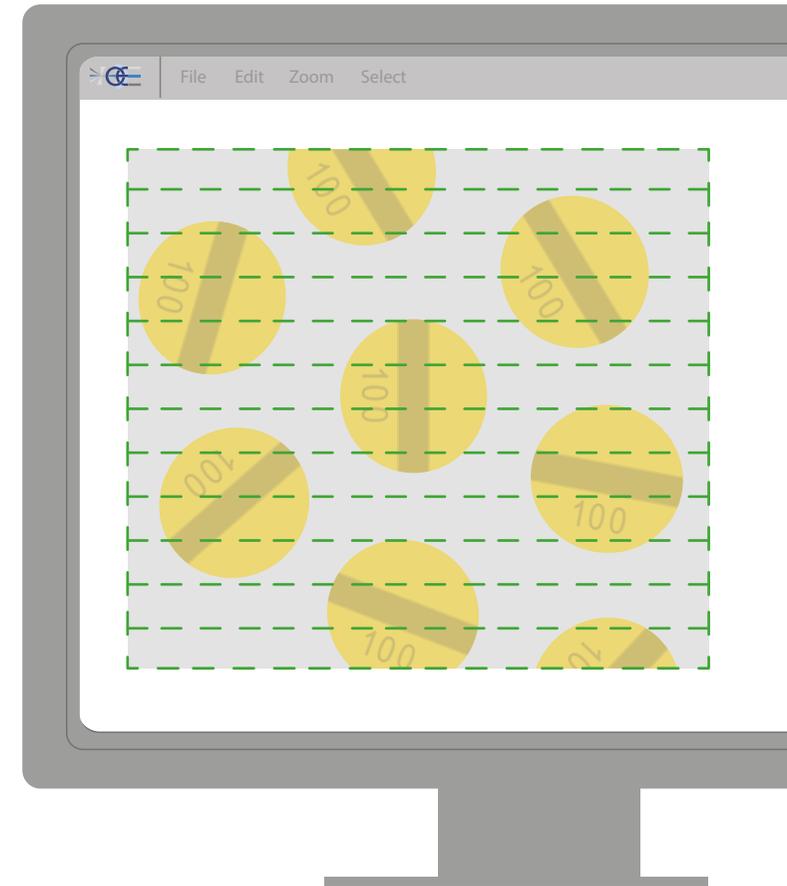
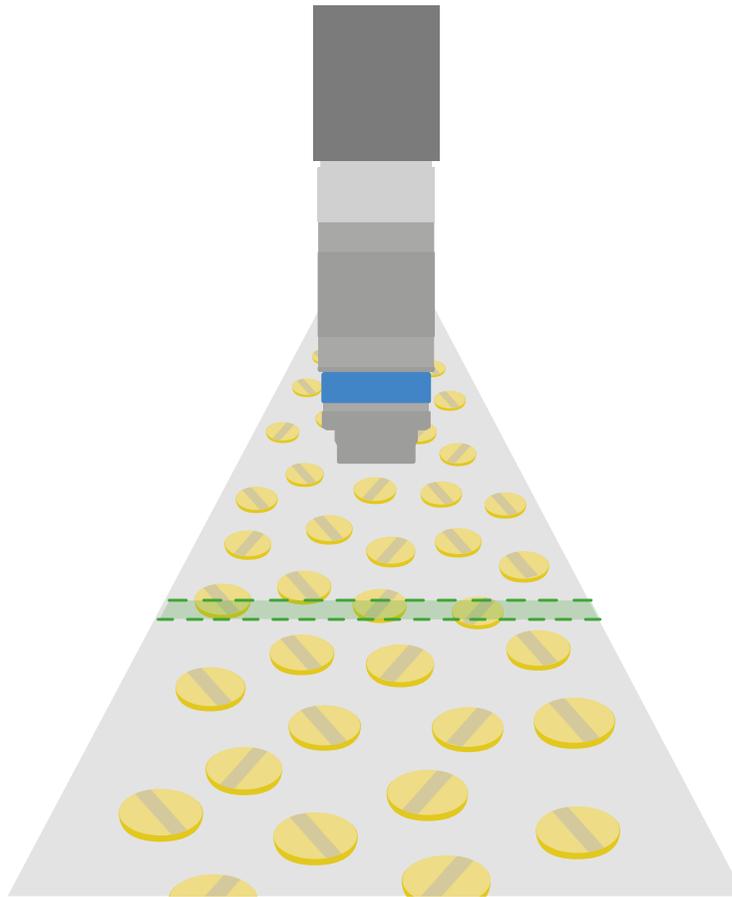
Applications

PRINT AND WEB INSPECTION



Applications

HIGH SPEED SORTING OF TABLETS





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