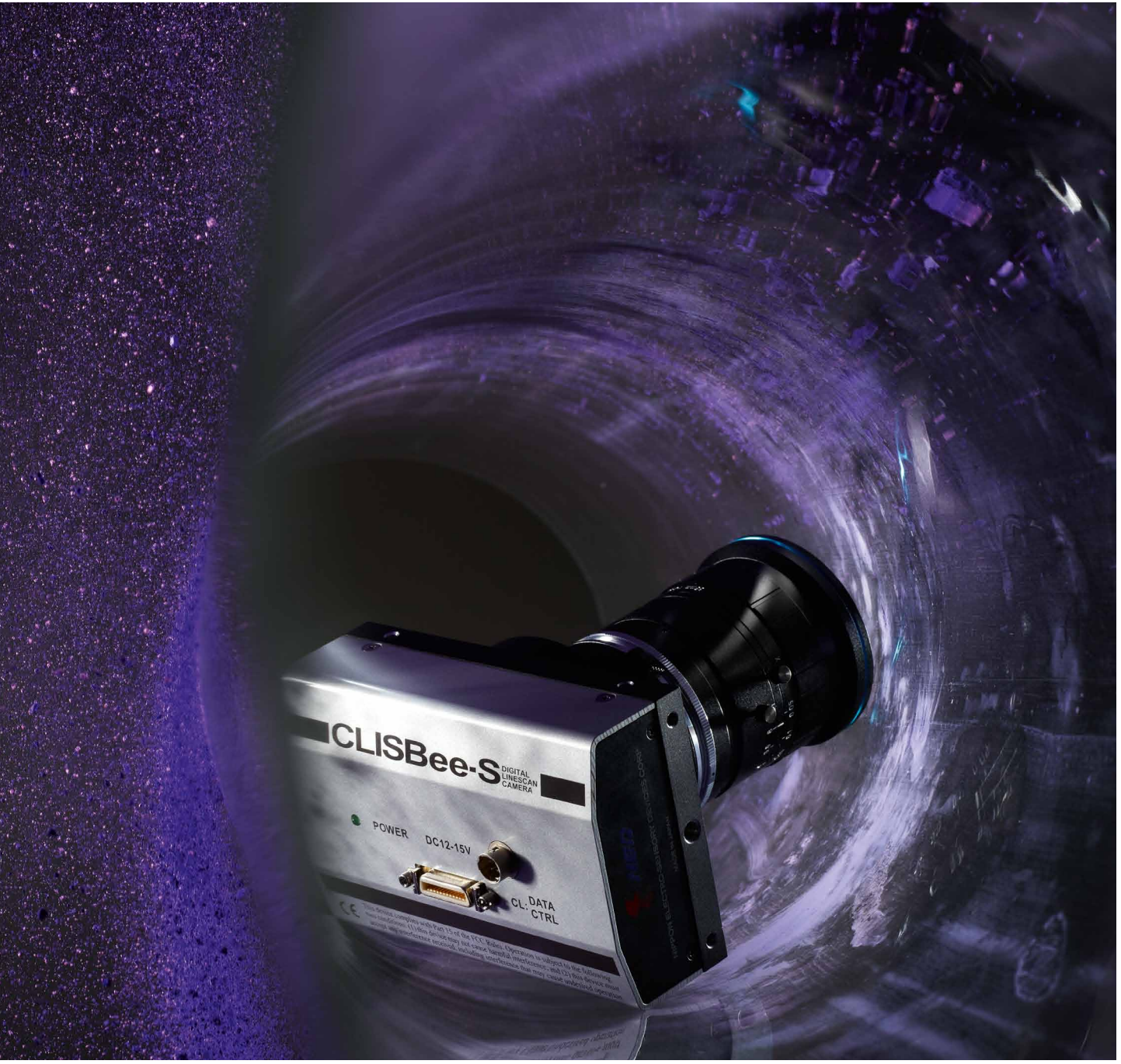

CLISBee-S

Fast running lines.

LINE SCAN CAMERAS – INDUSTRIAL INSPECTION TECHNOLOGY

NEW ELECTRONIC TECHNOLOGY

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CLISBee-S – FAST RUNNING LINES

NET & NED offer innovative line scan cameras.

NET & NED offer innovative line scan cameras.

The CLISBee-S camera series is designed by Nippon Electro-Sensory Devices Corporation (NED), a manufacturer of high quality line scan cameras for industrial machine vision systems. CLISBee-S cameras achieve resolutions of up to 16384 pixel per row and a line scan rate of up to 125 kHz (at 2048 pixel per row). The cameras are available with CCD and CMOS linear image sensors delivering optimal results for monochrome and color line inspections. CLISBee-S applies the prism-based 3K-chip technology which enables customers to inspect also non-flat objects in regard of color without any optical alignment and synchronization topics. The cameras are offered with Camera Link, GigE Vision and CoaXPress interface. As a result CLISBee-S is suitable for virtually any line scan application, which depends on highest quality image data, involves remote distances over 100 m, or requires data transfer rates of up to 6.25 Gb/s. Due to the image sensors' high photosensitivity, an excellent signal-to-noise ratio, and camera functions that really improve the image result, like anti blooming and flatfield correction, CLISBee-S delivers optimal results to inspection systems.

	2K CAMERA						4K CAMERA					
	XCM2040SAT2	XCM2040SAT4	XCM2080SAT2	XCM2080SAT4	XCM2740MLCT3	SUCL2025T3	XCM4040SAT2	XCM4040SAT4	XCM4040DLMT4	XCM4085DLMT4	XCM3C4080T3	XCM4085TLCT8
Number of pixel	2048	2048	2048	2048	2730 x 3	2098 x 3	4096	4096	4096 x 2	4096 x 2	4096 x 3	4096 x 4
Sensor type	CMOS	CMOS	CMOS	CMOS	CMOS	3-Line CCD	CMOS	CMOS	CMOS	CMOS	3-CMOS	CMOS
Pixel size [µm]	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	7.00 x 7.00	14.00 x 14.00	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	10.00 x 10.00
Sensor length [mm]	28.7	28.7	28.7	28.7	57.3	29.4	28.7	28.7	29.0	29.0	28.7	41.0
Minimum sensitivity [V/lux-sec]	50	50	50	50	12	25	70	70	125	125	40	100
Line scan rate [kHz]	34	62	68	125	14	11	19	33	19 / 36	39 / 77	19	40
Data rate [MHz]	80	160	160	320	120	25	80	160	80 / 160	170 / 340	240	8 x 85
Output [MHz]	2 x 40	4 x 40	2 x 80	4 x 80	3 x 40	25	2 x 40	4 x 40	2 / 4 x 40	2 / 4 x 85	3 x 80	8 x 85
Video out	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link
Camera Link	base	medium	base	medium	base	base / medium	base	medium	base / medium	base / medium	base / medium	base/medium/full
Camera Link ports	1	2	1	2	1	2	1	2	2	2	2	2
Flat field correction	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Exposure control	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Test pattern output	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Scan direction change	yes	yes	yes	yes	-	yes	yes	yes	yes	yes	yes	yes
Analog gain	x1~x11.2	x1~x11.2	x1~x11.2	x1~x11.2	x1~x11.2	0-22 dB	x1~x11.2	x1~x11.2	x1~x17.8	x1~x17.8	x1~x11.2	x1~x5.5
Digital gain	x1~x2	x1~x2	x1~x2	x1~x2	x1~x2	-	x1~x2	x1~x2	x1~x2	x1~x2	x1~x2	x1~x2
Offset (8 Bit)	-15DN / +15DN	-15DN / +15DN	-15DN / +15DN	-15DN / +15DN	-15DN / +15DN	0 / +15DN	-15DN / +15DN	-15DN / +15DN	-127DN / 127DN	-127DN / 127DN	-15DN / +15DN	-40DN / +40DN
Offset (10 Bit)	-60DN / +60DN	-60DN / +60DN	-60DN / +60DN	-60DN / +60DN	-	0 DN / +63DN	-60DN / +60DN	-60DN / +60DN	-	-	-60DN / +60DN	-160DN / +160DN
Lens	Nikon F / C-mount	Nikon F / C-mount	Nikon F / C-mount	Nikon F / C-mount	M72 x 0.75	Nikon F	Nikon F	Nikon F	Nikon F	Nikon F	Nikon F	Nikon F
Power consumption	12-15 VDC	12-15 VDC	12-15 VDC	12-15 VDC	12-15 VDC	12-15 VDC +/-5%	12-15 VDC	12-15 VDC	12-15 VDC +/-5%	12-15 VDC +/-5%	12-15 VDC +/-5%	12-15 VDC +/-5%
Connector	Hirose 4pin	Hirose 4pin	Hirose 4pin	Hirose 4pin	Hirose 4pin	Hirose 4pin	Hirose 4pin	Hirose 4pin	Hirose 6pin	Hirose 6pin	Hirose 6pin	Hirose 6pin
Dimensions W x H x D [mm]	60 x 100 x 73.5	60 x 100 x 73.5	60 x 100 x 73.5	60 x 100 x 73.5	80 x 120 x 65	64 x 70 x 116	80 x 120 x 80	80 x 120 x 80	60 x 100 x 35	60 x 100 x 35	100 x 100 x 123	62 x 100 x 72
Weight [g]	420	420	420	420	600	470	730	730	300	300	1110	400
Operating temperature	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 40 °C	0 - 50 °C
Conformity	CE/FCC/RoHs						CE/FCC/RoHs					

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THE RIGHT APPROACH FOR EVERY INSPECTION SYSTEM

Line scan cameras allow high-speed 100% inspection of wide fields of view at comparably low setup costs. As there is no line scan camera being a perfect fit for every inspection system, NET offers cameras with different features that meet most different demands.

MONOCHROME LINES

· Single line is usually referred to as standard line scan type. This sensor type is considered when low to medium sensor sensitivity is required for customers' applications. If this applies - even for high line rates and small pixel sizes - then a simple optical setup will do, and the overall system costs are very low.

· Dual/multi line sensors have a multiple sensitivity of a single line sensor and also dispose of exposure control. This allows to address inspection tasks with more detailed images.

· Time Delay Integration (TDI) comes typically with CCD image sensors because no extra read noise is introduced to the image. Although TDI employs the same principle as dual line, it offers superior sensitivity due to the inclusion of actually several hundreds lines. Certainly, the exact optical configuration requires special expertise.

COLOR LINES

· Monoline color stands for single-line sensors with a color filter in an R-G-B-R-G-B sequence. Customers profit from a low cost solution with no color lag and an easy optical setup.

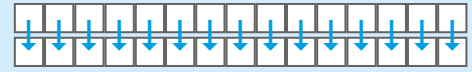
· Dual line with Bayern Pattern adds a second line of green pixels for improved color information as one pixel consists of either blue and green or red and green values, and a third interpolated color.

· 3-line color sensors distribute each color (red, green, blue) on a single pixel line for a better color reproduction.

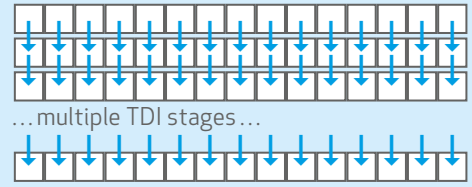
· In the case of 3-CCD or 3-CMOS color sensors the light is split into red, green and blue by using a prism. Then a separate sensor is applied for each color reproduction. This method leads to best color results currently available. Non-flat objects or a diagonal camera angle are no issue for this kind of line scan cameras.

SINGLE LINE

DUAL LINE



TIME DELAY INTERGRATION (TDI)

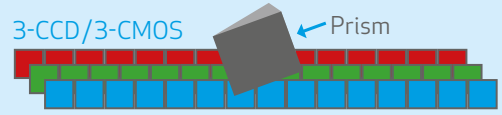


MONOLINE COLOR

DUAL LINE WITH BAYERN PATTERN

3-LINE-COLOR

3-CCD/3-CMOS



Note: Each square illustrates one pixel.

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TECHNICAL DATA – CAMERA LINK CAMERAS

2K CAMERA

4K 3-CHIP CAMERA

4K AND 6K CAMERA

8K AND 16K CAMERA

	6K CAMERA				8K CAMERA					16K CAMERA
	XCM6040SAT2	XCM6040SAT4	XCM6060SAT4	XCM3C6080T3	XCM8040SAT2	XCM8040SAT4	XCM8060SAT4	XCM8040SAT8	XCM8085DLMT8	XCM16K80SAT8
Number of pixel	6144	6144	6144	6000 x 3	8192	8192	8192	8192	8192 x 2	16384
Sensor type	CMOS	CMOS	CMOS	3-CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS
Pixel size [µm]	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	3.50 x 3.50
Sensor length [mm]	43.0	43.0	43.0	42.0	57.4	57.4	57.4	57.4	57.0	57.3
Minimum sensitivity [V/lux-sec]	70	70	70	20	70	70	70	70	100	45.2
Line scan rate [kHz]	12	25	33	12	9	19	28	33	21 / 41 / 77	36
Data rate [MHz]	80	160	240	3 x 80	80	160	240	320	170 / 340 / 680	640
Output [MHz]	2 x 40	4 x 40	4 x 60	3 x 80	2 x 40	4 x 40	4 x 60	8 x 40	2 / 4 / 8 x 85	8 x 80
Video out	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link	Camera Link
Camera Link	base	medium	medium	base / medium	base	medium	medium	full	base / medium / full	full
Camera Link ports	1	2	2	2	1	2	2	2	2	2
Flat field correction	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Exposure control	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Test pattern output	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Scan direction change	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Analog gain	x1~x11.2	x1~x1.,2	x1~x11.2	x1 ~ x8	x1~x11.2	x1~x11.2	x1~x11.2	x1~x11.2	x1 ~ x17.8	x1~x17.8
Digital gain	x1~x2	x1~x2	x1~x2	x1 ~ x2	x1~x2	x1~x2	x1~x2	x1~x2	x1 ~ x2	x1~x2
Offset (8 Bit)	-15DN / +15DN	-15DN / +15DN	-15DN / +15DN	-40DN / 40 DN	-15DN / +15DN	-15DN / +15DN	-15DN / +15DN	-15DN / +15DN	-127DN / 127DN	-127DN / +127DN
Offset (10 Bit)	-60DN / +60DN	-60DN / +60DN	-60DN / +60DN	-160DN / 160 DN	-60DN / +60DN	-60DN / +60DN	-60DN / +60DN	-60DN / +60DN	-	-
Lens	Nikon F	Nikon F	Nikon F	Nikon F	M72 x 0.75	M72 x 0.75	M72 x 0.75	M72 x 0.75	M72 x 0.75	M72 x 0.75
Power consumption	12-15 VDC	12-15 VDC	12-15 VDC	12-15 VDC +/-5%	12-15 VDC	12-15 VDC	12-15 VDC	12-15 VDC	12-15 VDC +/-5%	12-15 VDC +/-5%
Connector	Hirose 4pin	Hirose 4pin	Hirose 4pin	Hirose 6pin	Hirose 4pin	Hirose 4pin	Hirose 4pin	Hirose 4pin	Hirose 6pin	Hirose 6pin
Dimensions W x H x D [mm]	80 x 120 x 80	80 x 120 x 80	80 x 120 x 80	100 x 100 x 123	80 x 120 x 65	80 x 120 x 65	80 x 120 x 65	80 x 120 x 65	80 x 110 x 62	80 x 130 x 67.2
Weight [g]	730	730	730	1.100	600	600	600	600	600	680
Operating temperature	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 45 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C
Conformity	CE / FCC / RoHs				CE / FCC / RoHs					CE / FCC / RoHs

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TECHNICAL DATA – GigE VISION CAMERAS / CoaXPRESS CAMERAS

GigE Vision interface for data transfer of up to 1 Gb/s over 100 m in networks.

2K CCD CAMERA

2K 3-LINE CMOS CAMERA

CoaXPress interface allows image transfer over 100 m and speeds of up to 6.25 Gb/s

16K CMOS CAMERA

	2K CAMERA					4K CAMERA	6K CAMERA	8K CAMERA		16K CAMERA
	SU2025GIG	XCM20125GIG	SUCL2025	XCM20160CXP	XCM20160T2CXP	XCM40160CXP	XCM60160CXP	XCM80160CXP	XCM80160T2CXP	XCM16K04GT4CXP
Number of pixel	2048	2048	2098 x 3	2048	2048	4096	6144	8192	8192	16384
Sensor type	CCD	CMOS	3-Line CCD	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS
Pixel size [µm]	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	7.00 x 7.00	3.50 x 3.50
Sensor length [mm]	28.6	28.7	29.4	28.7	28.7	28.7	43.0	57.3	57.3	57.3
Minimum sensitivity [V/lux-sec]	90	50	25	50	50	70	70	70	70	45
Line scan rate [kHz]	11	53	11	63	125	34	25	19	34	69
Data rate [MHz]	25	125	25	160	320	160	160	160	320	1280
Video out	GigE Vision 8/10/12 bit	GigE Vision 8/10 bit	GigE Vision 8/10 bit	CoaXPress 2 x 1	CoaXPress 2 x 2	CoaXPress 2 x 1	CoaXPress 2 x 1	CoaXPress 2 x 1	CoaXPress 2 x 2	CoaXPress 6 x 4
Flat field correction	-	yes	yes	yes	yes	yes	yes	yes	yes	yes
Exposure control	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Test pattern output	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Scan direction change	-	yes	yes	yes	yes	yes	yes	yes	yes	yes
Analog gain	-3dB to 9 dB	x1~x20	0 - 22 dB	x1~x11.2	x1~x11.2	x1~x11.2	x1~x11.2	x1~x11.2	x1~x11.2	x1~x11.2
Digital gain	0 - 21.5 dB	x1~x2	-	x1~x2	x1~x2	x1~x2	x1~x2	x1~x2	x1~x2	x1~x2
Offset (8 Bit)	0DN / +15DN	-15DN / +15DN	0DN / +15DN	-15DN / +15DN	-15DN / +15DN	-15DN / +15DN	-15DN / +15DN	-15DN / +15DN	-15DN / +15DN	-127DN / +127DN
Offset (10 Bit)	0DN / +60DN	-60DN / +60DN	0DN / +63DN	-60DN / +60DN	-60DN / +60DN	-60DN / +60DN	-60DN / +60DN	-60DN / +60DN	-60DN / +60DN	-127DN / +127DN
Lens	Nikon F	Nikon F	Nikon F	Nikon F	Nikon F	Nikon F	Nikon F	M72 x 0.75	M72 x 0.75	M72 x 0.75
Power consumption	12-15 VDC +/-5%	12-15 VDC +/-5%	12-15 VDC +/-5%	12-15 VDC +/-5%	12-15 VDC +/-5%	12-15 VDC +/-5%	12-15 VDC +/-5%	12-15 VDC +/-5%	12-15 VDC +/-5%	12-15 VDC +/-5%
Connector	Hirose 6pin	Hirose 6pin	Hirose 4pin	Hirose 6pin	Hirose 6pin	Hirose 6pin	Hirose 6pin	Hirose 6pin	Hirose 6pin	Hirose 6pin
Dimensions W x H x D [mm]	64 x 70 x 118	64 x 100 x 81.4	64 x 70 x 116	60 x 120 x 91	60 x 120 x 91	80 x 120 x 91	80 x 120 x 91	80 x 120 x 77	80 x 120 x 77	80 x 130 x 51.1
Weight [g]	450	445	470	435	435	730	730	600	600	780
Operating temperature	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 40 °C
Conformity	CE/FCC/RoHs					CE/FCC/RoHs	CE/FCC/RoHs	CE/FCC/RoHs		CE/FCC/RoHs

NED – experts for CMOS & CCD high-speed cameras

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APPLICATION & ACCESSORIES

Ask us for matching lenses & illumination!

APPLICATION EXAMPLES

CLISBee-S line scan cameras have been developed for use in many different image processing tasks in various industries. They can be used in inspection systems for paper machines, film extruders, coating and paint finishing machines or even in the production of non-woven fabrics. High-resolution systems can be applied for 100% print defect detection in the printing of labels not only in pharmaceutical printing, but also in the production of bond paper.

web inspection

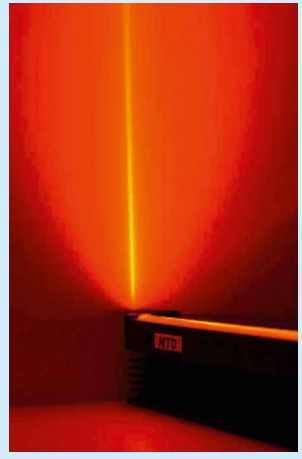
Typical applications are web inspection, paper inspection, film and foil inspection, textile / non-woven or pre bag inspection, coating process, solar and glass inspection, print inspection.

KEY FEATURES

- Up to 125 kHz line scan rate
- Sensor range 2048 pixel up to 16384 pixel
- Latest CMOS and CCD linear image sensor featuring high sensitivity, low noise and an excellent S/N ratio
- Onboard A/D converter
- Flat field correction
- Test pattern output
- Scan direction change
- Exposure control
- Selectable region of interest

LENSES AND LIGHT

NET provides the line scan illumination technology most suited to your application ranging from a low-budget version of the aperture tube – complete with line scan aperture and lens mount and a fully usable line illumination – to high-tech LED light sensors with the most up-to-date onboard technology. Special line scan lenses for high resolution, high contrast and low distortion are available with C-mount, F-mount, or M72-mount.



line illumination

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Technical changes, errors and omissions excepted. 10/2015

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