

Datasheet

ELIIXA+ 8k/4k CL Cmos Multi-Line Color Camera

Features

- Cmos Colour Sensor :
 - 8192 RGB Pixels, 5 x 5µm (Full Definition)
 - 4096 RGB Pixels 10x10µm (True Colour)
- Interface : CameraLink® (Base/Medium/Full/Deca)
- Line Rate :
 - Up to 50 000 l/s In 8k Full Definition Mode
 - Up to 66 000 l/s in 4k True Colour Mode
- Bit Depth : 24bits (RGB 8bits)
- Scan Direction
- Flat Field Correction
- Low Power Consumption : < 10W
- Compliant with Standard Lenses of the Market



Description

e2v's next generation of line scan cameras are setting new, high standards for line rate and image quality. Thanks to e2v's recently developed multi-line CMOS technology, the camera provides high line rates and combines high response with an extremely low noise level; this delivers high signal to noise ratio even when short integration times are required or when illumination is limited.

The 5µm pixel size is arranged in four active lines and dual line filter configuration allowing the camera to be operated in several modes:

True colour mode with 10µm RGB pixels to provide equivalent colour fidelity to 10µm pixel tri-linear solutions with advanced immunity to web variation or full definition mode with 8,192 RGB 5µm pixel resolution.

Application

- Printing Inspection
- High Resolution Document Scanning
- Printed Circuit Board Inspection
- Flat Panel Display Inspection
- High Quality Raw material Surface Inspection
- High Quality Food and Pharmaceutical Inspection



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Standard Conformity

The ELIIXA+ cameras have been tested using the following equipment:

- A shielded power supply cable
- A Camera Link data transfer cable ref. MVC-1-1-5-2M from CEI (Component Express, Inc.)

e2v recommends using the same configuration to ensure the compliance with the following standards.

CE Conformity

The ELIIXA+ cameras comply with the requirements of the EMC (European) directive 89/336/CEE (EN 50081-2, EN 61000-6-2).

FCC Conformity

The ELIIXA+ cameras further comply with Part 15 of the FCC rules, which states that: Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Key Specifications

Characteristics	Value	Unit
Sensor Characteristics		
Resolution	8192 or 4096	RGB Pixels
Pixel Size (square)	5 or 10	µm
Max Line Rate 4096 RGB Pixels True Color Mode 8192 RGB Pixels Full Definition Modes	66 50	kHz kHz
Radiometric Performances (at Maximum Pixel rate and Minimum Camera Gain)		
Bit Depth	3 x 8	Bits
Responsivity (peak) Red at 610nm Green at 530nm Blue at 450nm	5.9 5.6 3.9	LSB 8bits/(nJ/cm2)
Response non linearity (between 5 – 95% saturation)	<1	%
Maximum PRNU	3	%
Dynamic Range	65	dB
Functionalities (Programmable via Control Interface)		
Sensor Modes	True Color : 4096 RGB Pixels of 10x10µm Full Definition Enhanced: 8192 RGB Pixels of 5x5µm Full Definition Single : 8192 RGB Pixels of 5x5µm	
Gain (Analog : In the ADC converter)	Up to 12	dB
Offset	-255 to +255	LSB 8bits
Trigger Mode	Timed (Free run) and triggered (Ext Trig, Ext ITC) modes	
Mechanical and Electrical Interface		
Power Supply	Single 12 to 24	V _{DC}
Power Consumption	<10	W
Lens Mount	F, T2, M42	-
Sensor Alignment	±100	µm
Sensor Flatness	35	µm
General Features		
Operating Temperature	0 to 55 Front Face	°C
Storage Temperature	-40 to 70	°C
Regulatory	CE, FCC and RoHs Compliant	-

Camera Description

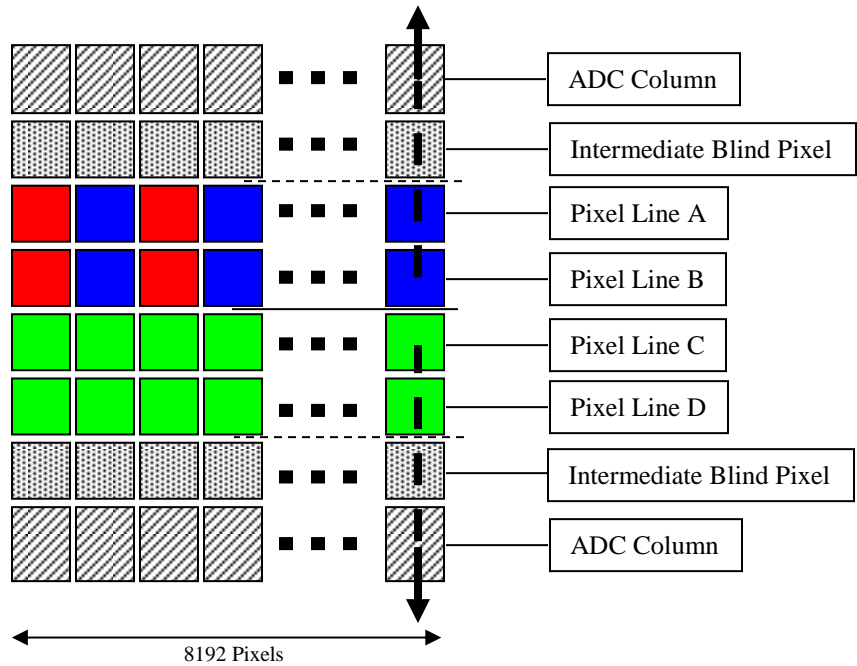
Image Sensor

The Eliixa+ Colour 8k sensor is composed of two pairs of sensitive lines.

The Colour version has been completed with RGB colour Filter and disposed as detailed beside.

Each pair of lines use the same Analog to Digital Column converter (ADC Column). An appropriate (embedded) Time delay in the exposure between each line this allows to combine two successive exposures in order to double the sensitivity of a single line.

This Time Delay Exposure is used only in the Full Definition Enhanced mode (See Below).

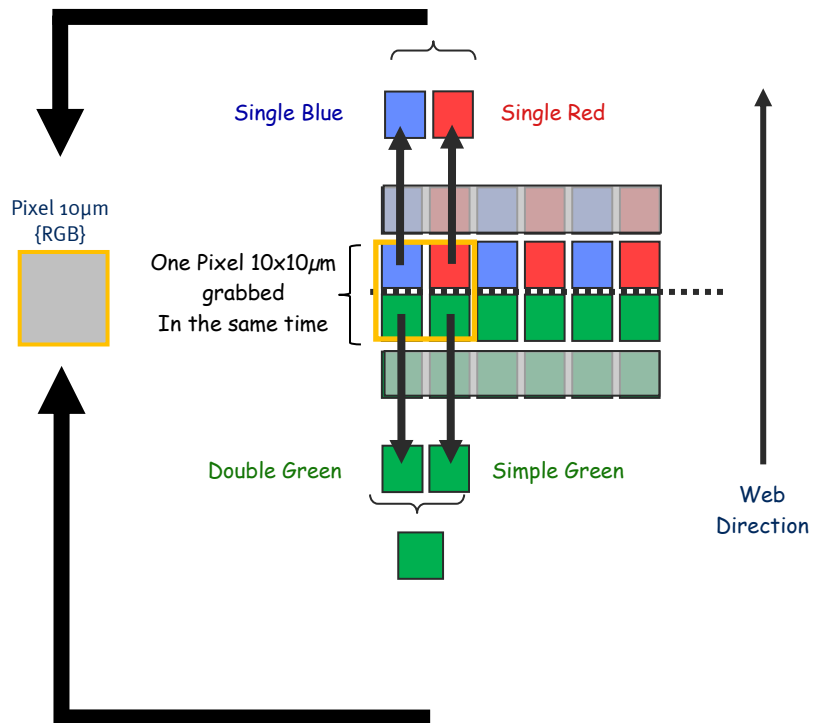


Colour modes

True Colour Single Mode (TCS)

10µm pixels (R,G,B)
 Twice less pixels than B/W
 Requires x3/2 the data flow of B&W

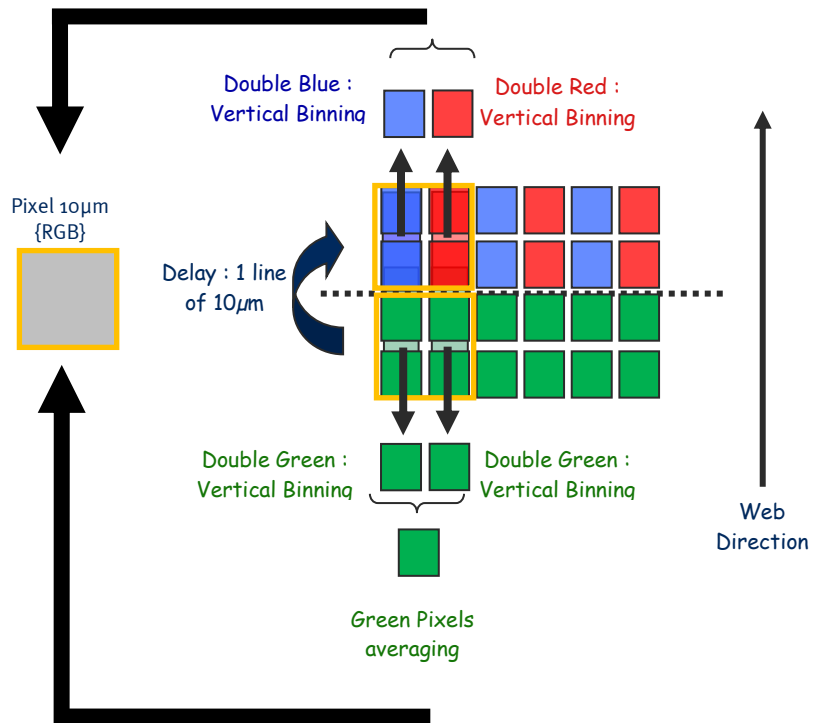
- Sensitivity Half of the TCE mode: Equivalent to 6 x Pixels of 5µm (with their respective colour filters).
- “Full Exposure control” not needed in TC as the TDI is not active (only binning). The Exposure time can be control as for a single line mode.
- **Not sensitive to the Scanning direction and the variation of the aspect ratio of the image.**



True Colour Mode Enhanced (TCE)

10µm pixels (R,G,B)
 Twice less pixels than B/W
 Requires x3/2 the data flow of B&W

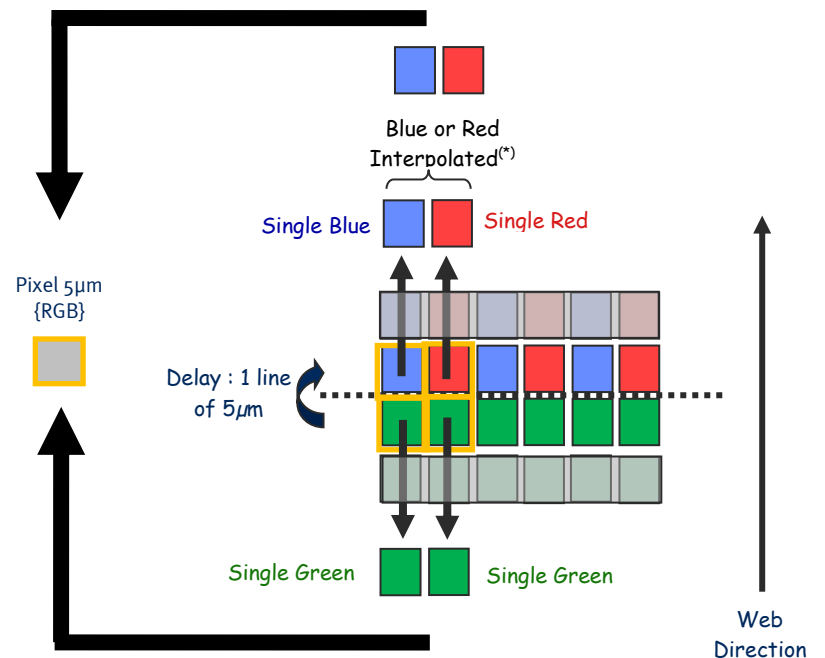
- High Sensitivity True Color mode: Equivalent to 6 x Pixels of 5µm (with their respective colour filters).
- “Full Exposure control” not needed in TC as the TDI is not active (only binning). The Exposure time can be control as for a single line mode.



Full Definition Single Mode (FD Single)

5µm pixels (R,G,B)
 Same definition than B&W
 Requires x3 the data flow of the B&W

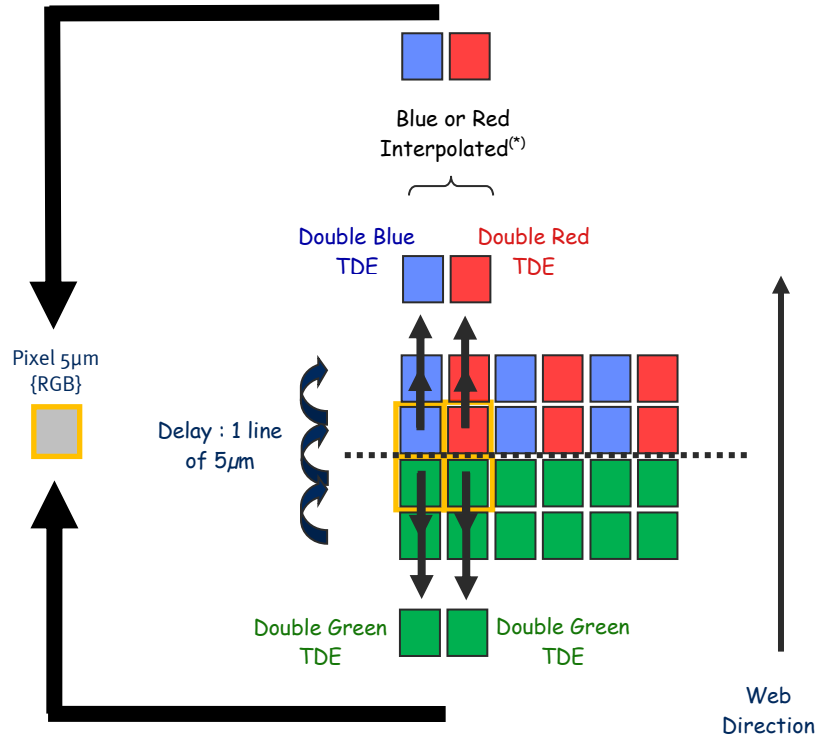
- Sensitivity is half of the TC mode available : Equivalent to 3 x Pixels of 5µm (with their respective colour filters).
- “Full Exposure control” not needed in this mode as the Time Delay Exposure is not active. The Exposure time can be control as for a single line mode.



Full Definition Enhanced Mode (FD Enhanced)

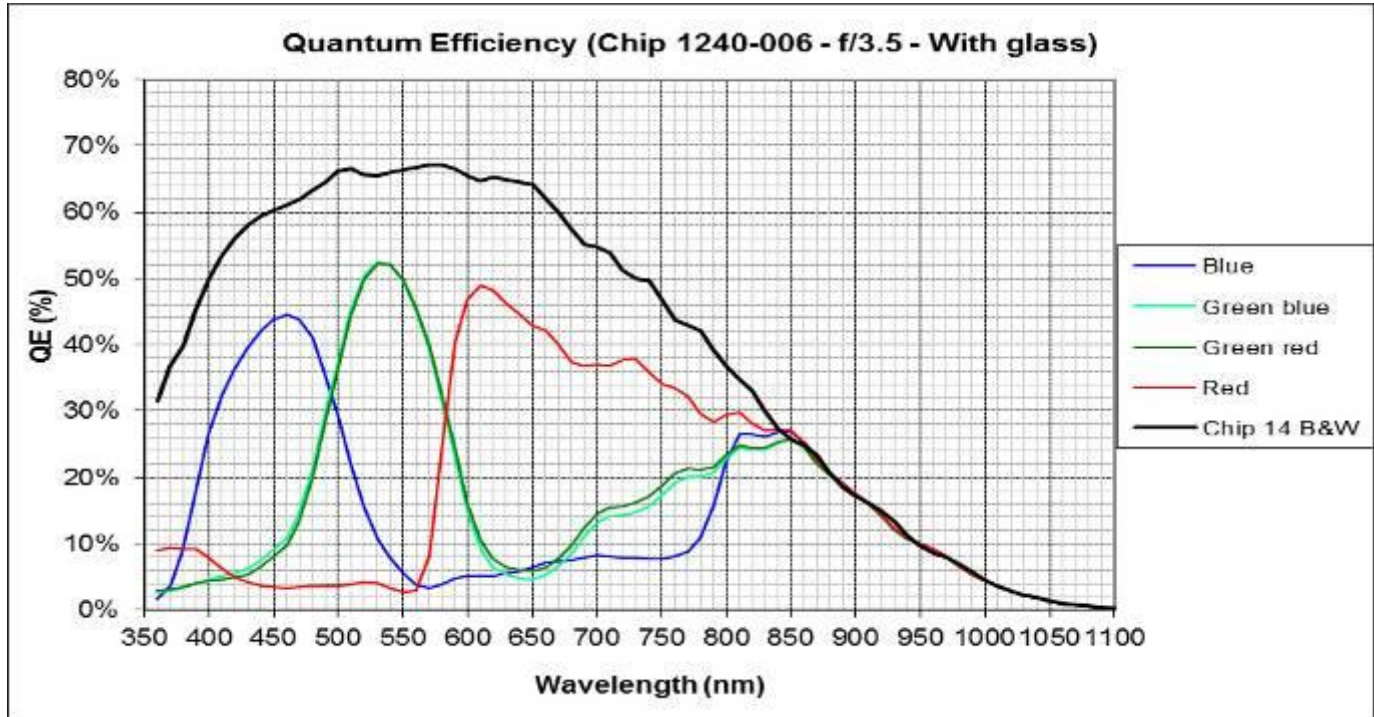
5µm pixels (R,G,B)
 Same definition than B&W
 Requires x3 the data flow of the B&W

- Sensitivity is the same as the TC mode available : Equivalent to 6 x Pixels of 5µm (with their respective colour filters).
- “Full Exposure control” is used in this mode as the Time Delay Exposure is active.

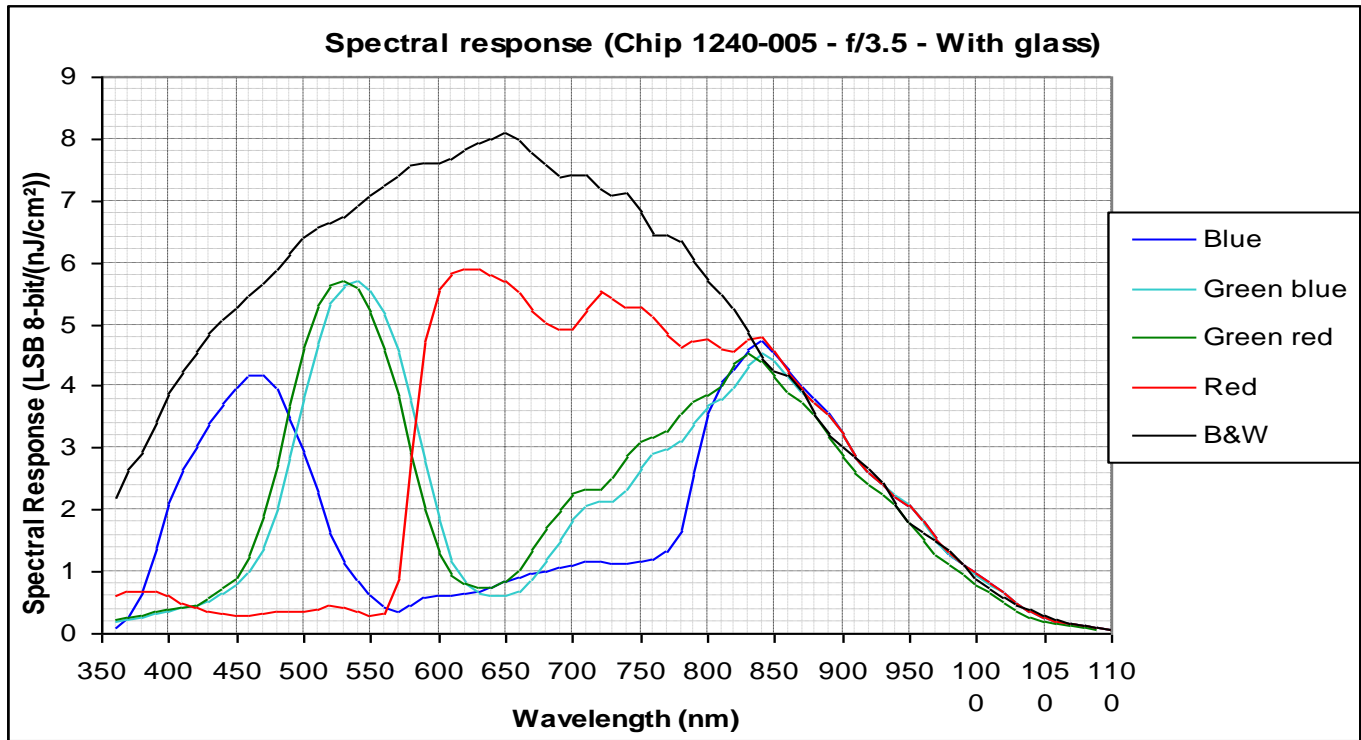


Response & QE curves

Quantum Efficiency



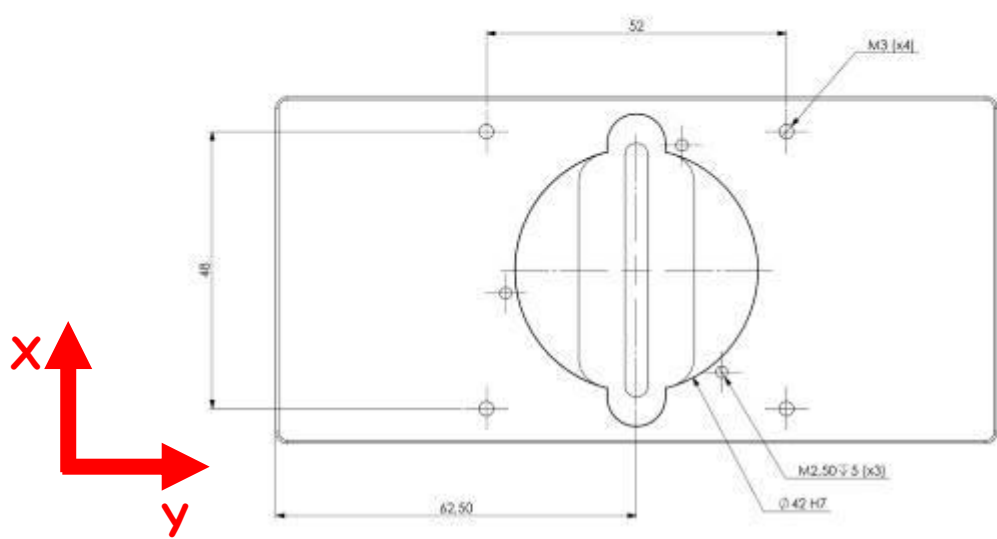
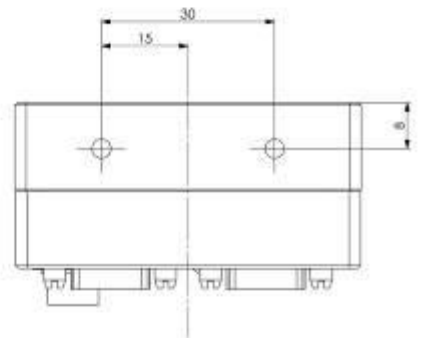
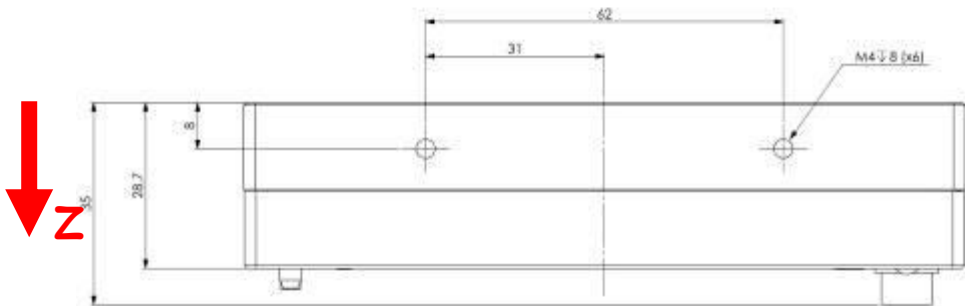
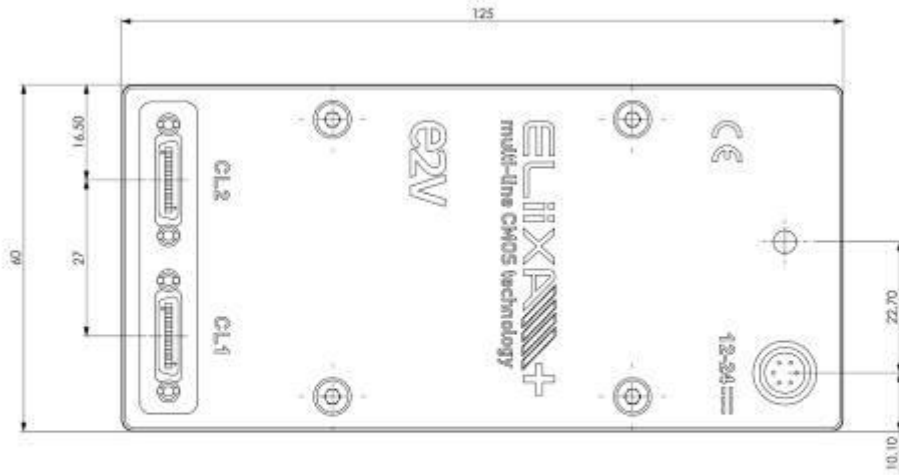
Spectral Response



This Response is for a single 5x5µm pixel of each color (True Color Single or Full Definition Single modes).

Camera Interface

Mechanical Drawings



Sensor Positioning

Sensor alignment		
X	9,5 ±0,1	mm
Y	62,5 ±0,1	mm
Z	-10,3 ±0,1	mm
Planarity	35	µm
Rotation (X,Y plan)	±0,1	°
Tilt (versus lens mounting plane)	50	µm

Input/Output Connectors and LED



Status LED Behaviour

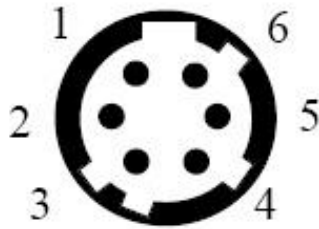
After less than 2 seconds of power establishment, the LED first lights up in ORANGE. Then after a Maximum of 40 seconds, the LED must turn in a following colour :

Colour and state	Meaning
Green and continuous	OK
Green and blinking slowly	Waiting for Ext Trig (Trig1 and/or Trig2)
Red and continuous	Camera out of order : Internal firmware error

Power Connector

Camera connector type: Hirose HR10A-7R-6PB (male)

Cable connector type: Hirose HR10A-7P-6S (female)



Camera side description

Signal	Pin	Signal	Pin
PWR	1	GND	4
PWR	2	GND	5
PWR	3	GND	6

Power supply from 12 to 24v
 Power 10W max with an typical inrush current
 peak of **1A** during power up

CameraLink Output Configuration

CameraLink Mode	Camera / Mode	Speed
Base Color 3x8bits 85MHz	ELIIXA 8K / 8K Full Def. Colour	10KHz
	ELIIXA 8K / 4K True Colour	20KHz
Medium Color 2x3x8bits 85MHz	ELIIXA 8K / 8K Full Def. Colour	20KHz
	ELIIXA 8K / 4K True Colour	40KHz
Full (Mono*) 8x8bits 85MHz	ELIIXA 8K / 8K Full Def. Raw Colour	40KHz
	ELIIXA 8K / 4K True Colour	53KHz
Deca (Mono*) 10x8bits 85MHz	ELIIXA 8K / 8K Full Def. Raw Colour	50KHz
	ELIIXA 8K / 4K True Colour	66KHz

(*) : **Full Def. Raw Mode** : 8K Green pixels and 8K (Red + Blue) pixels : Then 16K pixels info/Line
True Color : 4K Green + 4K Blue + 4K Red pixels : Then 12K pixels info/Line

Camera Models

Camera Part Number	Details
EV71YC4CCL8005-BA0	8k/4k RGB Pixels CameraLink®