Basler Kit 001

Basler machine vision starter kit comprising:

- *a2A1920-160ucBAS - Colour camera*
- *C125-0818-5M-P f8mm - Lens*
- *Light Ring-70OD-White – Ring light*
- *Tripod Mount Ace2*
- *Camera tripod bracket with rotatable ball joint*
- *Camera Mount for Basler Standard Light Ring-70OD*
- *USB Cable - with screwlock*
- *M8, 5m, axial - Lighting Cable*

a2A1920-160ucBAS

The a2A1920-160ucBAS Basler ace 2 R camera is equipped with a Sony IMX392 sensor.

Specifications

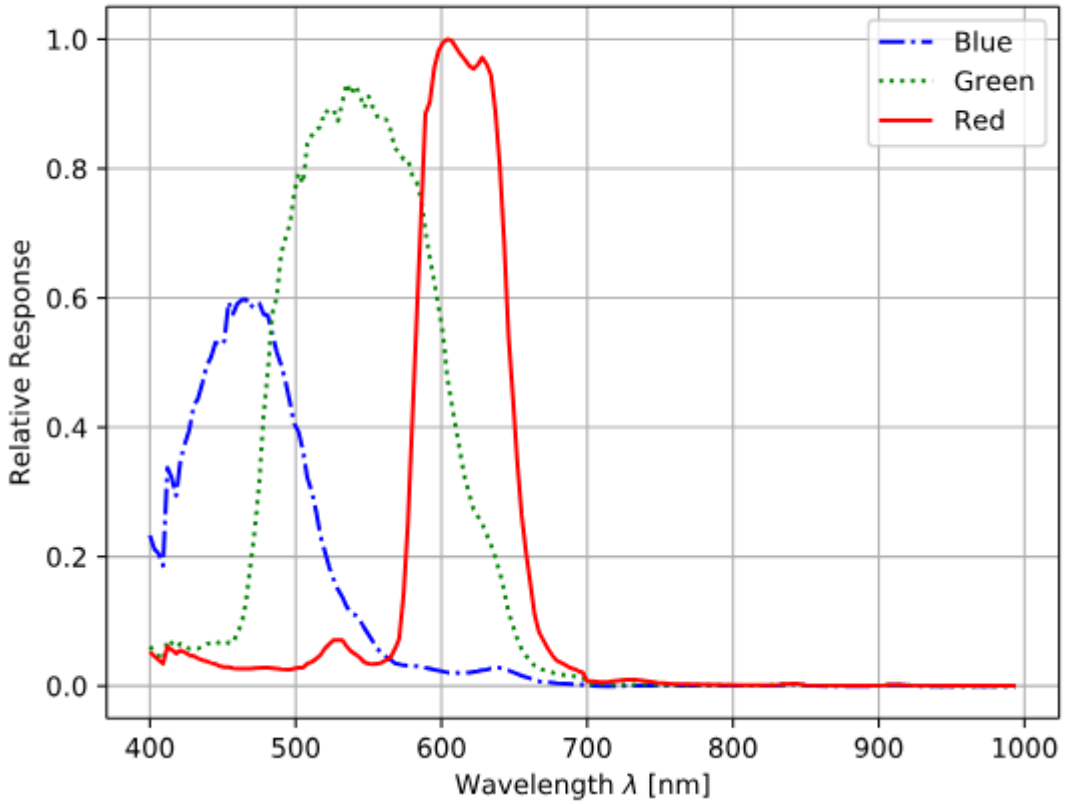
General Specifications

	a2A1920-160ucBAS
Resolution (H x V Pixels)	*1936 x 1216 (full resolution)* *1920 x 1200 (default resolution)*
Resolution	*2.3 MP*
Sensor Type	*Sony IMX392LQR-C* *Progressive scan CMOS* *Global shutter*
Sensor Format	*1/2.3"*
Effective Sensor Diagonal	*7.9 mm*
Pixel Size (H x V)	*3.45 x 3.45 µm*
Frame Rate (at Default Settings)	*164 fps*
Product Family	*ace 2 R*
Mono / Color	*Color*
Image Data Interface	*USB 3.0, nominal max. 5 Gbit/s (SuperSpeed)*
Pixel Formats	▪ *8 bits* ▪ *10 bits*

	a2A1920-160ucBAS
	▪ *12 bits*
Synchronization	*Via hardware trigger* *Via software trigger* *Via free run*
Exposure Time Control	*Via hardware trigger* *Programmable via the camera API*
Camera Power Requirements	*≈3.1 W (typical) @ 5 VDC*
I/O Lines	*1 opto-coupled input line* *2 general purpose I/O (GPIO) lines*
Lens Mount	*C-mount*
Size (L x W x H)	*36.3 x 29 x 29 mm (without lens mount or connectors)* *48.1 x 29 x 29 mm (with lens mount and connectors)*
Weight	*<85 g*
Conformity	*CE (includes RoHS), EAC, UKCA, UL Listed, FCC, KC, GenICam, USB3 Vision, IP30* *Certificates for your camera model* *For more information, see the Compliance section of the Basler website.*

	a2A1920-160ucBAS
Software	*Basler pylon Software Suite (version 6.0 or higher)* *Available for Windows, Linux x86, Linux ARM, macOS, and Android* *Available from www.baslerweb.com*

Spectral Response



The spectral response curve includes IR cut filter characteristics, but excludes lens characteristics and light source characteristics.

IR Cut Filter

Color cameras are equipped with an IR cut filter. The filter is mounted in a filter holder inside the lens mount.

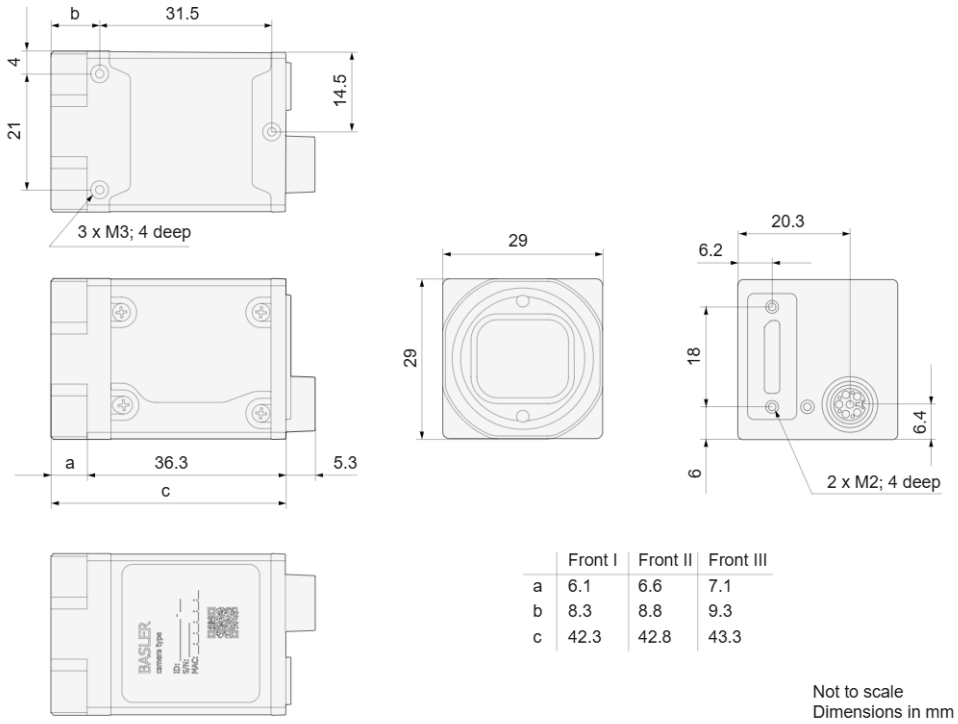
The IR cut filter has the following spectral characteristics:

Wavelength [nm]	*Transmittance*
450–610	T_{min} > 90 %

Wavelength [nm]	Transmittance
450–620	$T_{avg} > 93\ \%$
645 ± 10	$T = 50\ \%$
700–1070	$T_{max} < 4\ \%$
690–1070	$T_{avg} < 1\ \%$

The filter holder can be removed.

Mechanical Specifications



	Front I	Front II	Front III
a	6.1	6.6	7.1
b	8.3	8.8	9.3
c	42.3	42.8	43.3

Not to scale
Dimensions in mm

Camera Dimensions and Mounting Points

Housing temperature during operation	*-10–60 °C (14–140 °F)*
Humidity during operation	*20–80 %, relative, non-condensing*
Storage temperature	*-20–80 °C (-4–176 °F)*
Storage humidity	*20–80 %, relative, non-condensing*
Housing temperature according to UL 62368-1	*max. 70 °C (158 °F)*
Ambient temperature according to UL 62368-1	*max. 30 °C (86 °F)*

Electrical Requirements

NOTICE – Incorrect voltage can damage the camera.

Camera Power

You must supply camera power that complies with the Universal Serial Bus 3.0 specification.

The camera's nominal operating voltage is 5 VDC, effective on the camera's connector.

Opto-Coupled I/O Input Line

Voltage	*Description*
30 VDC	*Absolute maximum. This voltage must never be exceeded. Doing so may damage the camera and voids the warranty.*
0–24 VDC	*Safe operating range.*

Voltage	Description
0–1.4 VDC	*Indicates a logical 0 (with inverter disabled).*
>1.4–2.2 VDC	*Region where the logic level transition occurs; the logical state is not defined in this region.*
>2.2 VDC	*Indicates a logical 1 (with inverter disabled).*

- ***Input current (high-level):*** *<15 mA internally limited*
- ***Input current (high-level):*** *>5 mA required to drive the opto-coupler*

General Purpose I/O Lines

NOTICE: Applying incorrect electrical signals to the camera's GPIO line can severely damage the camera.

Operation as Input

Voltage	Description
30 VDC	*Absolute maximum. This voltage must never be exceeded. Doing so may damage the camera and voids the warranty.*
0–24 VDC	*Safe operating range. The minimum external pull-up voltage is 3.3 VDC.*
0–0.8 VDC	*Indicates a logical 0 (with inverter disabled).*
>0.8–2.0 VDC	*Region where the logic level transition occurs; the logical state is not defined in this region.*
>2.0 VDC	*Indicates a logical 1 (with inverter disabled).*

- ***Input current (high-level):*** *<100 µA*
- ***Input current (low-level):*** *<5 mA sink current from the GPIO input line without exceeding 0.8 VDC.*

Operation as Output

Voltage	*Description*
30 VDC	*Absolute maximum. This voltage must never be exceeded. Doing so may damage the camera and voids the warranty.*
3.3–24 VDC	*Safe operating range.*
<3.3 VDC	*Unreliable GPIO output.*

- ***Internal pull-up resistor:*** *≈650 Ω, with open collector. Many applications will have to provide an additional pull-up resistor.*
- ***Residual voltage ("on" state):*** *≈0.4 VDC at 50 mA and 25 °C (77 °F) housing temperature. Actual residual voltage depends on operating temperature, load current, and production spread of electronic components.*
- ***Leakage current:*** *<60 µA. Actual leakage depends on operating temperature and production spread of electronic components.*
- ***Maximum load current:*** *50 mA*
- ***Minimum load current:*** *Not specified. Consider the following:*
    - *Leakage current will have a stronger effect when load currents are low.*
    - *Propagation delay of the output increases as load currents decrease.*
    - *Higher-impedance circuits tend to be more susceptible to EMI.*
    - *Higher currents cause higher voltage drops in long cables.*

C125-0818-5M-P f8mm – Lens

General Specifications

	C125-0818-5M-P
Order Number	*2000034832*
Focal Length f'	*8.11 mm ± 5 %*
Aperture Range	*F1.8–F22*
Image Circle	*7.3 mm (1/2.5" format)*
Focus Range	*0.1 m to infinity*
Optimum Working Distance	*0.5 m*
Optimum Magnification	*0.016*
Relative Illumination at Full Aperture	*At least 55*
Resolution (25 % MTF, Center, Full Aperture)	*Designed for 230 LP/mm*
Resolution at 5.8 mm Image Diagonal (80 % of a Basler acA2500-14gm/c camera or a Basler acA2500-14um/c camera)	*At least 50 % of resolution in image center*

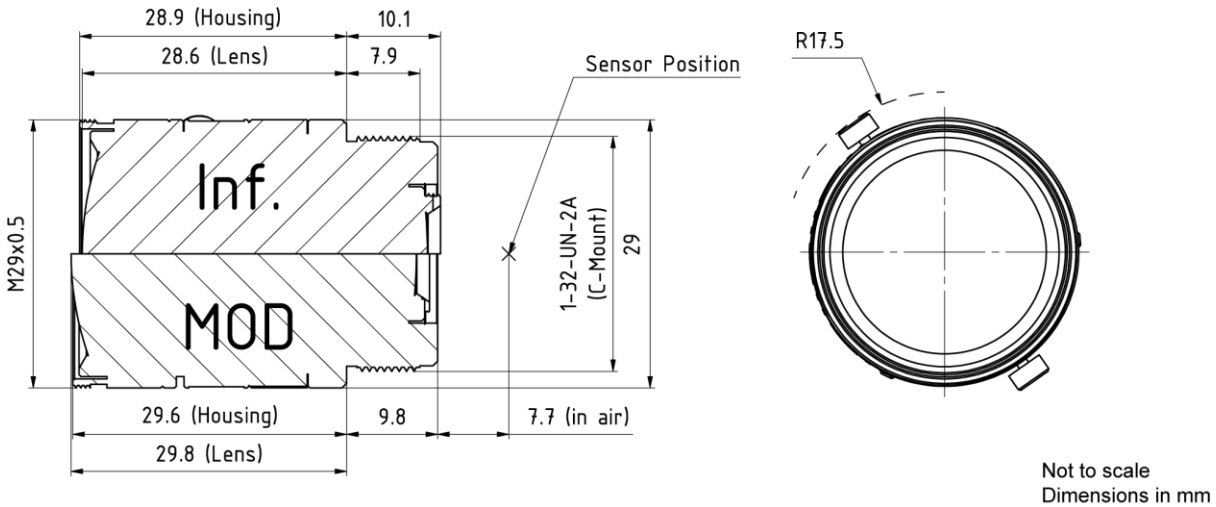
	C125-0818-5M-P
Optical Distortion	*Typical -5 % (barrel distortion)*
Angle of View, 1/2.5" Format (using a Basler acA2500-14gm/c camera or a Basler acA2500-14um/c camera)	*Horizontal: 38.7° (@ MOD) to 39.6°* *Vertical: 29.3° (@ MOD) to 29.9°*
Angle of View, 1/3" Format (using a Basler acA1300-30gm/c camera or a Basler acA1300-30um/c camera)	*Horizontal: 33.2° (@ MOD) to 33.9°* *Vertical: 24.9° (@ MOD) to 25.4°*
Wavelength Range	*Visible (400–700 nm,)*
Pupil Magnification, $ß'_P$	*3.00*
Chief Ray Angle, CRA	*8°*
Front Focal Length, s_F	*14.65 mm*
Back Focal Length, s'_F	*9.00 mm*
Principal Point Separation, HH'	*15.44 mm*
Entrance Pupil Position, s_{EP}	*17.36 mm*

	C125-0818-5M-P
Exit Pupil Position, s'_{AP}	*-15.31 mm*
Overall Optical Length, d	*37.31 mm*

Mechanical Specifications

	C125-0818-5M-P
Flange Back	*17.526 mm +0/-0.2 mm*
Mount	*C-mount*
Weight	*Approx. 65 g*
Focus/Iris Operation	*Manual* *Operating angle: 288°*

Lens Dimensions



Not to scale
Dimensions in mm

Light Ring-70OD-White – Ring light

asler Ring Lights are commonly placed around the camera and can be used in various applications for bright field lighting.

Key Features

- *Internal LED controller with 2 operating modes*
- *Compatible with Basler SLP Strobe Controller*
- *Preconfigured hardware components*
- *Various sizes and LED colors*

General Specifications

	Basler Light Ring-70OD-Red	Basler Light Ring-70OD-White	Basler Light Ring-70OD-Blue	Basler Light Ring-70OD-Infrared
Order Number	*2200000838*	*2200000734*	*2200000807*	*2200000869*
LED Color	*Red*	*White*	*Blue*	*Infrared*
Luminous Area	*53–72 mm*	*53–72 mm*	*53–72 mm*	*53–72 mm*
Recommended Light Working Distance	*75–200 mm*	*75–200 mm*	*75–200 mm*	*75–200 mm*
	Basler Light Ring-70OD-x			
Conformity	*CE (includes RoHS), FCC, IP54, UKCA* *For more information, see the Compliance section of the Basler website.*			

LED Specifications

	Ring Light Series 70OD-x
Luminous Power of White LEDs (lumen)	*920*
Radiant Power of Red LEDs (mW)	*2700*

	Ring Light Series 70OD-x
Radiant Power of IR LEDs (mW)	*1300*

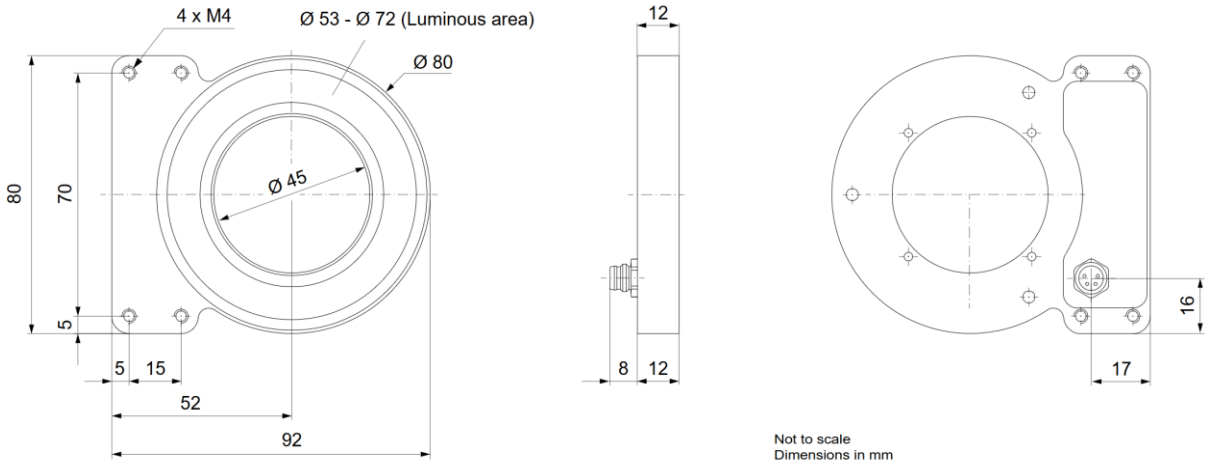
Electrical Specifications

	Ring Light Series 70OD-x
Required Power for Voltage Control Mode	*24 VDC ± 10 %, 6 W*
Required Current for Current Control Mode	*Red, White, and Blue: 300 mA Infrared: 450 mA*
Recommended max. LED Current for Strobe Mode (50 % Duty Cycle, 100 ms Pulses)	*Red, White, and Blue: 600 mA Infrared: Must never be used.*
Recommended max. LED Current for Strobe Mode (25 % Duty Cycle, 20 ms Pulses)	*Red, White, and Blue: 900 mA Infrared: Must never be used.*
Recommended max. LED Current for Strobe Mode (10 % Duty Cycle, 5 ms Pulses)	*Red, White, and Blue: 1200 mA Infrared: 900 mA*
Infrared only: Recommended max. LED Current for Strobe Mode (1 % Duty Cycle, 100 µs Pulses)	*1350 mA*
Recommended min. Flash Time in Strobe Mode	*100 µs*

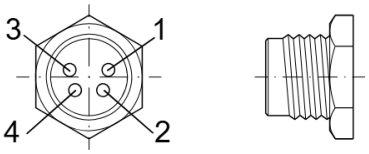
Mechanical Specifications

	Ring Light Series 70OD-x
Dimensions (H x W x D)	*80 x 92 x 12 mm*
Weight	*120 g*
Material	*Black anodized aluminium housing with PMMA light cover*
Connector	*M8 socket, 4-pin male connector*

Ring Light Dimensions



Connector Pin Numbering



Info

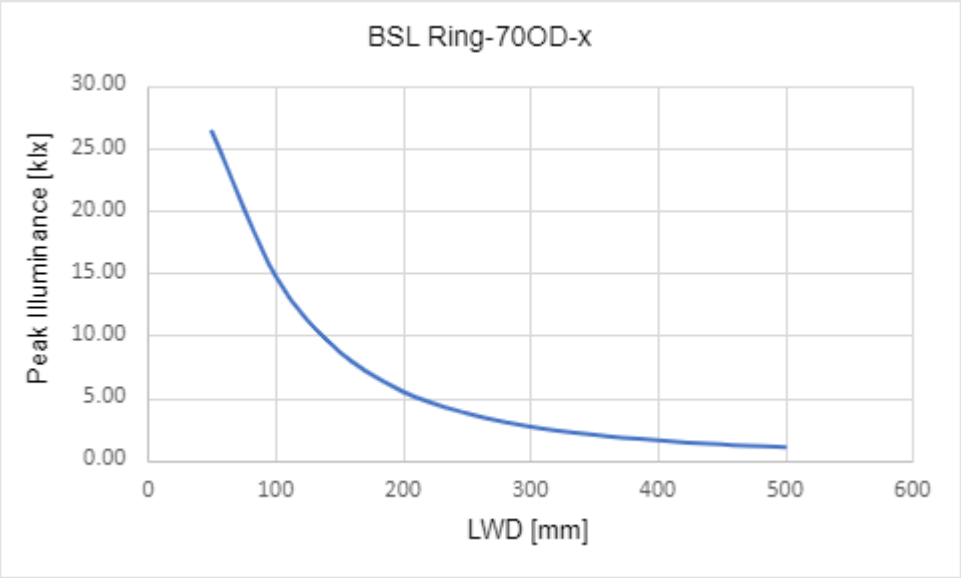
The pin assignment of the light's connector differs depending on whether you want to use the internal or an external controller. For more information, see the respective tables in the Installation chapter.

Environmental Requirements

Temperature During Operation	*10–30 °C (50–86 °F)*
Humidity During Operation	*30–70 %*

Performance Charts

Peak Illuminance versus Light Working Distance (LWD)

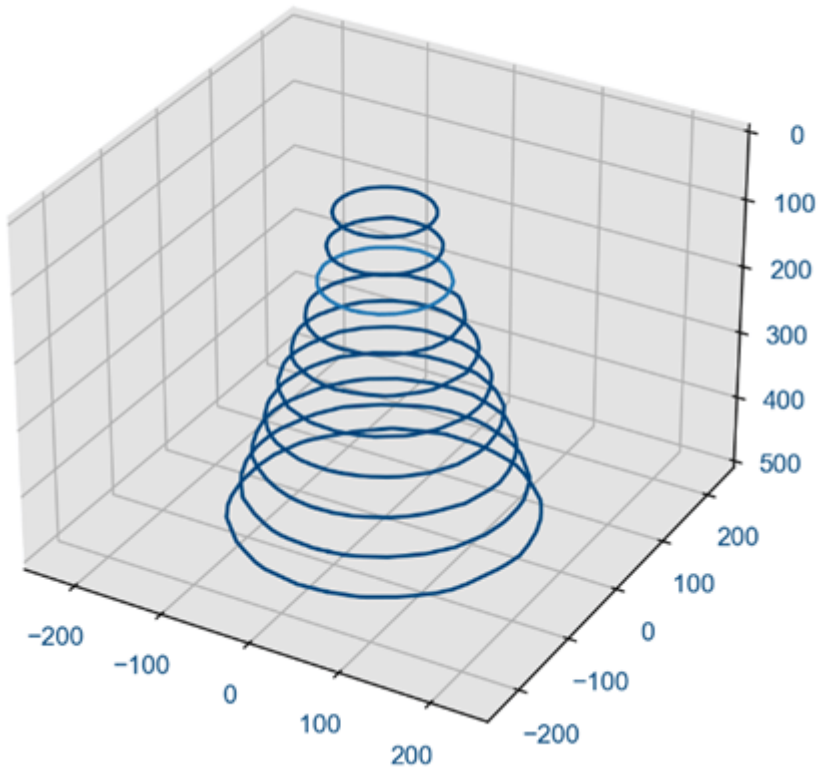


Info

Diagram is based on the following reference model: BL Ring-70OD-White.

Spectrum

Uniformity


0
100
200
300
400
500
200
100
0
−100
−200
−200
−100
0
100
200

Tripod Mount Ace2

Camera tripod bracket with rotatable ball joint

Camera Mount for Basler Standard Light Ring-70OD

USB Cable - with screwlock

Cable Length *3 m*

Connector Camera Side *USB 3.0 Micro B, locking screws*

Connector Host Side *USB 3.0 Type A*

Moving characteristic *static*

Interface *USB 3.0*

M8, 5m, axial - Lighting Cable

Cable Length *5 m*

Type *Lighting Cable*