

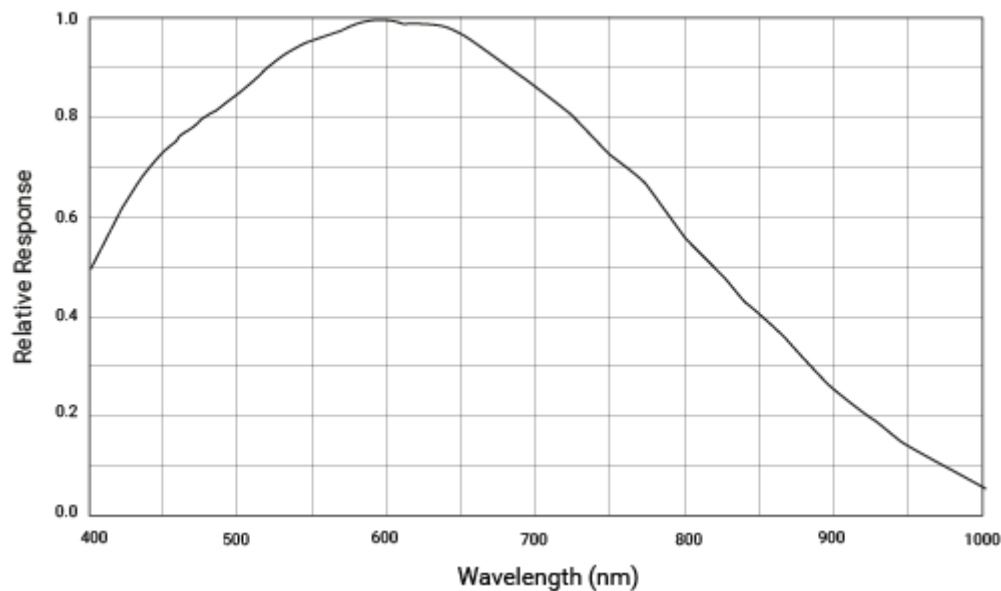
# Specifications

## General Specifications

| Specification                       | acA2040-55um   |
|-------------------------------------|--|
| Resolution<br>(H x V Pixels)        | 2064 x 1544 (full resolution)<br>2048 x 1536 (default resolution)<br>You can change the resolution by changing the <a href="#">Image ROI</a> . |
| Sensor Type                         | Sony IMX265LLR-C<br>Progressive scan CMOS<br>Global shutter  |
| Optical Size                        | 1/1.8"   |
| Effective Sensor Diagonal           | 8.9 mm   |
| Pixel Size (H x V)                  | 3.45 $\mu\text{m}$ x 3.45 $\mu\text{m}$  |
| Frame Rate<br>(at Default Settings) | 55 fps   |
| Product Line                        | <a href="#">ace U</a>  |
| Mono / Color                        | Mono   |
| Image Data Interface                | USB 3.0, nominal max. 5 Gbit/s (SuperSpeed)  |
| Pixel Formats                       | See <a href="#">Pixel Format</a> .   |
| Synchronization                     | Via hardware trigger<br>Via software trigger<br>Via free run   |
| Exposure Time Control               | Via hardware trigger<br>Programmable via the camera API  |
| Camera Power Requirements           | Nominal 5 VDC supplied via the camera's USB 3.0 port<br><br>$\approx 2.5$ W (typical) @ 5 VDC  |
|                                     |  |

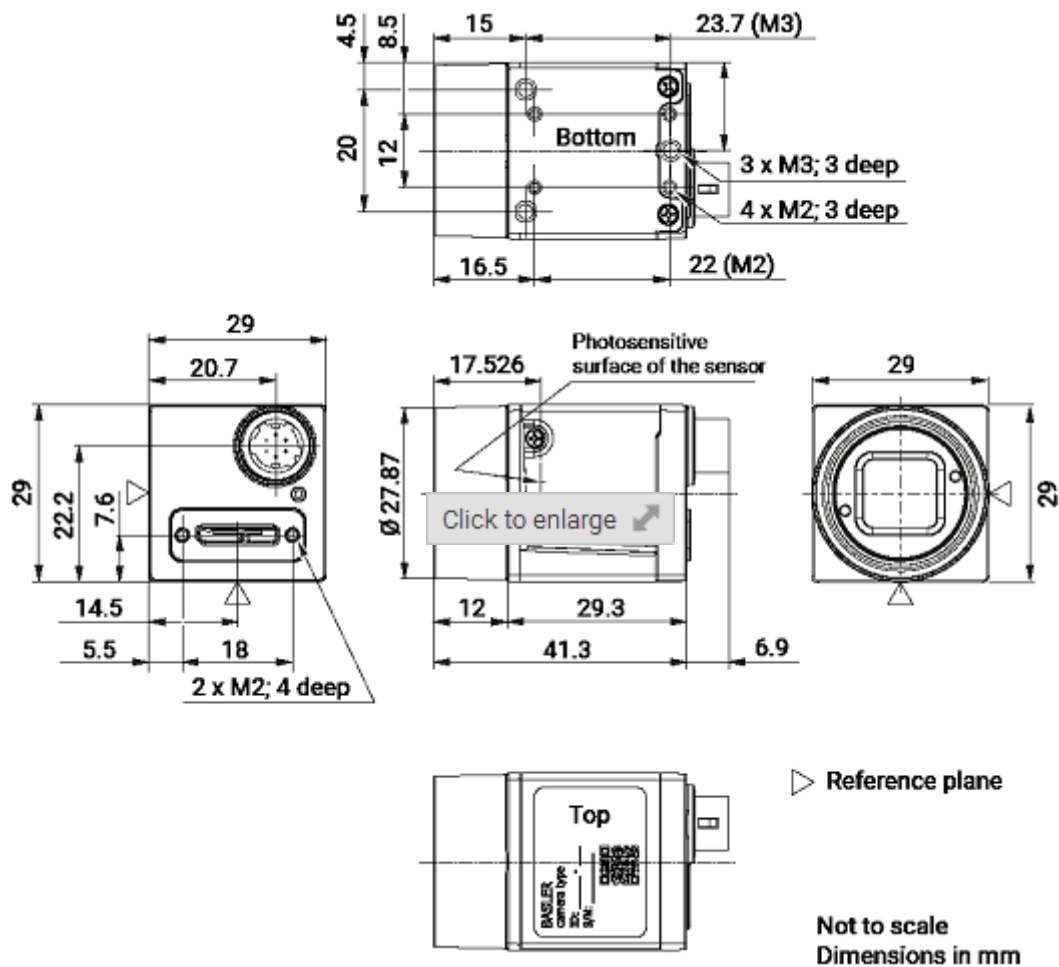
|                  |  |
|------------------|--|
| I/O Lines        | <ul style="list-style-type: none"> <li>1 <a href="#">opto-coupled input line</a></li> <li>1 <a href="#">opto-coupled output line</a></li> <li>2 <a href="#">general purpose I/O (GPIO) lines</a></li> </ul>                |
| Lens Mount       | C-mount  |
| Size (L x W x H) | <ul style="list-style-type: none"> <li>29.3 mm x 29 mm x 29 mm (without lens mount or connectors)</li> <li>48.2 mm x 29 mm x 29 mm (with lens mount and connectors)</li> </ul>   |
| Weight           | <80 g  |
| Conformity       | <p>CE (includes RoHS), UL Listed, FCC, GenICam 2.x (including PFNC 2.x and SFNC 2.x), IP30, USB3 Vision, REACH</p> <p>The EU Declaration of Conformity is available on the <a href="#">Basler website</a>.</p>             |
| Software         | <p><a href="#">Basler pylon Camera Software Suite</a> (version 4.0 or higher)</p> <p>Available for Windows, Linux x86, Linux ARM, and OS X</p>   |
| Accessories      | <ul style="list-style-type: none"> <li><a href="#">Cables for your camera model</a></li> <li><a href="#">Lenses for your camera model</a></li> <li><a href="#">Additional accessories for your camera model</a></li> </ul> |

## Spectral Response



## Mechanical Specifications

### Camera Dimensions and Mounting Points



## Maximum Allowed Lens Intrusion

→ See [Maximum Allowed Lens Intrusion](#).

## Mounting Instructions

→ See [Mounting Instructions](#).

## Stress Test Results

→ See [Stress Test Results](#).

## Requirements

### Environmental Requirements

#### Temperature and Humidity



|                                      |                                   |
|--------------------------------------|-----------------------------------|
| Housing temperature during operation | 0–50 °C (32–122 °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 60950-1  | max. 70 °C (158 °F)               |
| Ambient temperature according to UL 60950-1  | max. 30 °C (86 °F)                |
| UL 60950-1 test conditions: no lens attached to camera; no heat dissipation measures; ambient temperature kept at 30 °C (86 °F). |                                   |

## Heat Dissipation

→ See [Providing Heat Dissipation](#).

## Electrical Requirements

|  |   |
|--|---|
|  <b>DANGER</b>  |   |
| Electric Shock Hazard  | ▼ |
|  <b>WARNING</b> |   |
| Fire Hazard  | ▼ |
| <b>NOTICE</b>  |   |
| 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.   |
| 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 status is not defined in this region.             |
| >2.2 VDC     | Indicates a logical 1 (with inverter disabled).   |

- **Minimum current:** 5 mA
- **Current draw:** 5–15 mA

## Opto-Coupled I/O Output Line

| 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 I/O output.  |

- **Leakage current:** <60  $\mu$ A. 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.

## 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. |
| 0–5 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 status is not defined in this region.             |
| >2.0 VDC     | Indicates a logical 1 (with inverter disabled).   |

- **Current draw (high-level):** <100  $\mu$ A
- **Sink current:** Your application must be able to accept 2 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:**  $\approx$ 2 k $\Omega$ , with open collector. Many applications will have to provide an additional pull-up resistor.
- **Residual voltage ("on" state):**  $\approx$ 0.4 V at 50 mA and 25  $^{\circ}$ C (77  $^{\circ}$ F) housing temperature. Actual residual voltage depends on operating temperature, load current, and production spread of electronic components.
- **Leakage current:** <60  $\mu$ A. Actual leakage depends on operating temperature and production spread of electronic components.
- **Maximum load current:** 50 mA
- **Minimum load current:** Not specified. However, 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.

## Circuit Diagrams

→ See [Circuit Diagrams for Basler ace Cameras](#).

## Cable Requirements

### USB 3.0 Cable

- Use a high-quality USB 3.0 cable with a Micro-B plug.
- To [avoid EMI](#), cables must be shielded, as specified in the USB 3.0 standard.
- Basler recommends using USB 3.0 cables from the [Basler Vision Components](#) range.

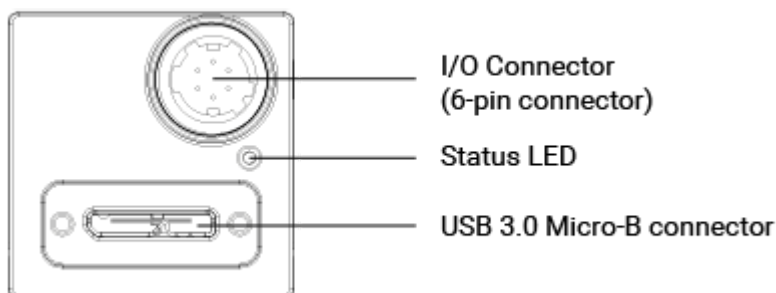
For more information about recommended USB 3.0 cables, see the [Recommended Accessories for Basler USB 3.0 Cameras](#) document.

### I/O Cable

- The I/O cable must be shielded.
- The I/O cable must have a cross-section at least 0.14 mm<sup>2</sup> (close to AWG26).
- Use twisted pair wire cables.
- Maximum recommended cable length: 10 m
- Camera-side connector: Hirose micro plug (part number HR10A-7P-6S) or equivalent
- Close proximity to strong magnetic fields should be avoided.
- Basler recommends using I/O cables from the [Basler Vision Components](#) range:
  - [GPIO cable, 10 m](#) (yellow cable): For use with the [GPIO lines](#) of your camera. To avoid interferences due to crosstalk, the opto-coupled I/O lines are not connected.
  - [Opto-I/O cable, 10 m](#) (blue cable): For use with the [opto-coupled I/O lines](#) of your camera. To avoid interferences due to crosstalk, the GPIO lines are not connected.
  - [Opto-GPIO Y-cable, 2 x 10 m](#) (yellow-blue cable): Allows you to use the [GPIO lines](#) and the [opto-coupled I/O lines](#) simultaneously without interferences due to crosstalk. There are two separate wires to split both I/O types.

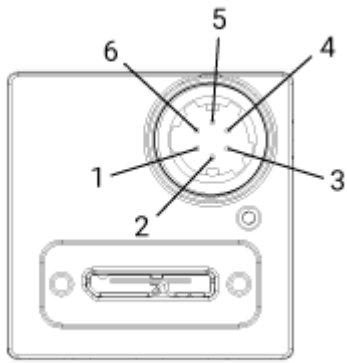
## Physical Interface

### Camera Connectors and Status LED



|                           |   |
|---------------------------|---|
| 6-pin connector           | Hirose micro receptacle (part number HR10A-7R-6PB)<br>Recommended mating connector: Hirose micro plug (part number HR10A-7P-6S) |
| USB 3.0 Micro-B connector | Standard USB 3.0 Micro-B connector with screw lock<br>Recommended mating connector: Standard connector with screws              |
| Status LED                | Indicates camera operation (LED lit = camera operating).  |

### Connector Pin Numbering and Assignments



| Pin | Line   | Function                                    |
|-----|--------|---|
| 1   | Line 3 | General purpose I/O (GPIO) line             |
| 2   | Line 1 | Opto-coupled I/O input line                 |
| 3   | Line 4 | General purpose I/O (GPIO) line             |
| 4   | Line 2 | Opto-coupled I/O output line                |
| 5   | -      | Ground for opto-coupled I/O lines           |
| 6   | -      | Ground for General Purpose I/O (GPIO) lines |

## Precautions

→ See [Safety Instructions for Basler ace Cameras](#).

## Installation

→ See [Camera Installation](#).

## Features

→ See the [camera features section](#).

Suggestions for improving the documentation? Send us your [feedback on this topic](#).

For technical questions, please contact your [local distributor](#) or use the [support form](#) on the Basler website.