# MV1-D1024E-3D02-160-G2

The CMOS camera MV1-D1024E-3D02-160-G2 was developed for laser triangulation of highly reflective materials

## Features

- Detection of a laser line with sub-pixel accuracy
- Photonfocus A1024B CMOS image sensor
- 1024 x 1024 pixel resolution
- Exceptional SNR up to 447: 1
- Dynamic range up to 120dB via LinLog®
- Up to 6750fps @ 1024x20 pixels
- Global shutter

- Monochrome
- Extended sensor and camera features
- Reduction of ROI in x- and y-direction increases frame rate
- A/B shaft encoder interface
- GigEVision interface
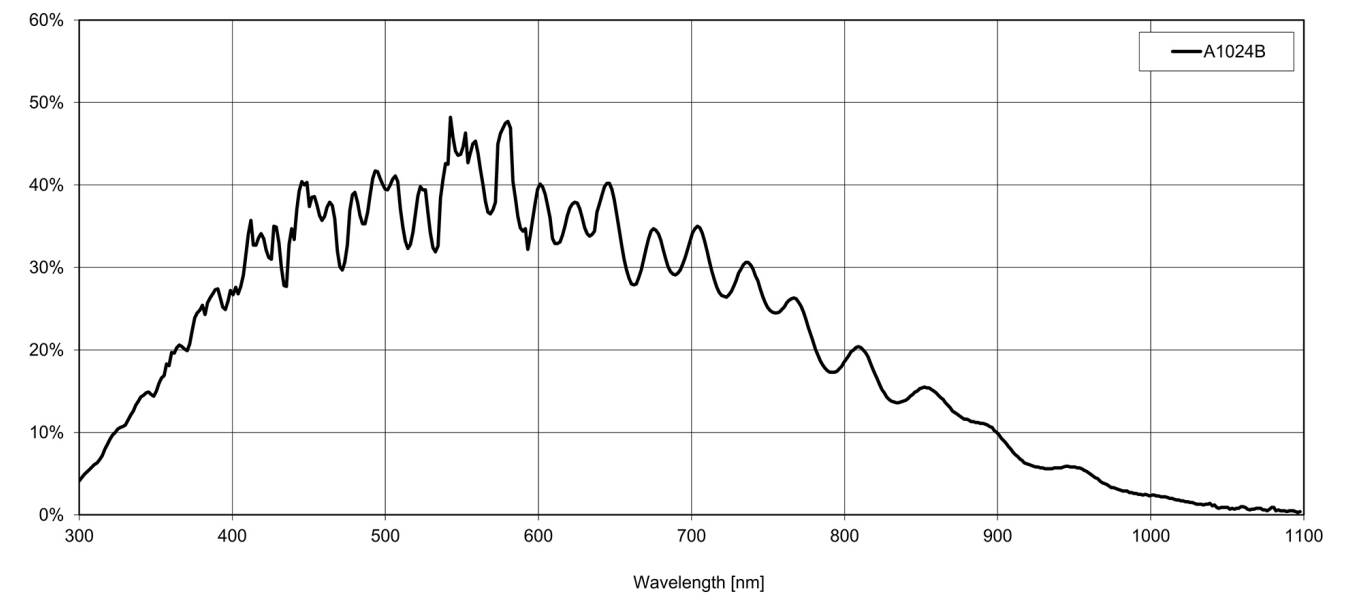- Free GUI available (PF 3D Suite)

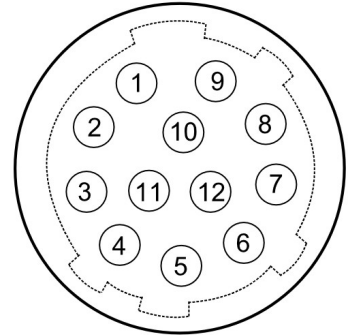## Quantum Efficiency Image Sensor



## Image Sensor Specifications

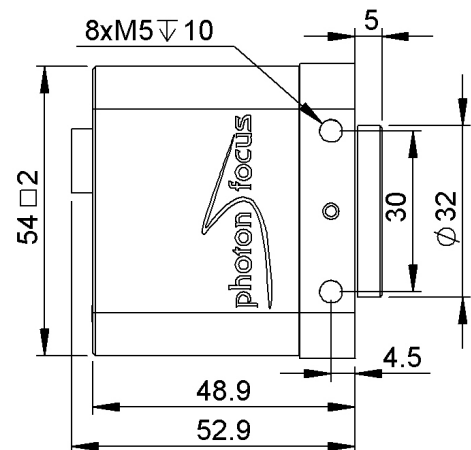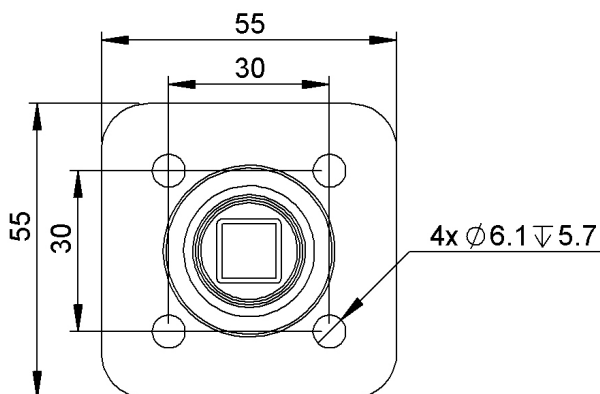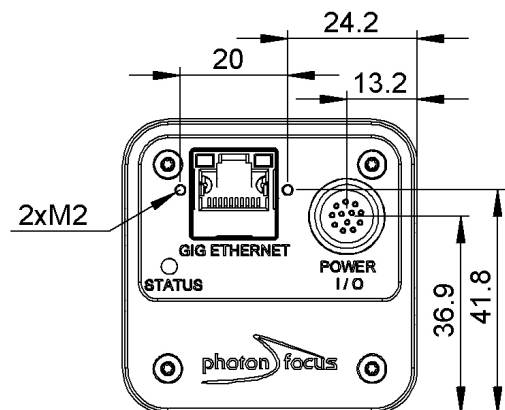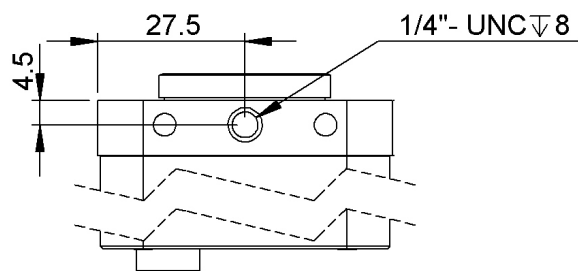| | |
|---|---|
| Manufacturer / Type | Photonfocus / A1024 |
| Technology | CMOS |
| Optical format | 1" |
| Optical diagonal | 15.42mm |
| Resolution | 1024 x 1024 |
| Pixel size | 10.6µm x 10.6µm |
| Active optical area | 10.9mm x 10.9mm |
| Dark current | 107'000e⁻/s |
| Read out noise | 220e⁻ |
| Full well capacity / SNR | 200ke⁻ / 447: 1 |
| Spectral range | Monochrome: < 400 to 900nm (to 10% of peak responsivity) |
| Responsivity | Monochrome: 120 x 10³ DN / (J/m²) @ 610nm / 8bit |
| Quantum Efficiency | Monochrome: > 45% |
| Optical fill factor | 35% |
| Dynamic range | 60dB in linear mode; 120dB with LinLog® |
| Characteristic curve | Linear, LinLog®, Skimming |
| Shutter mode | Global shutter |

# Camera Specifications

| | |
|---|---|
| Interface | GigE |
| Frame rate | 6750fps |
| Pixel clock | 80MHz |
| Camera taps | 2 |
| Greyscale resolution | 8Bit |
| Fixed pattern noise (FPN) | < 1DN RMS @ 8bit |
| Exposure time range | 10µs - 419ms |
| Analog gain | n/a |
| Digital gain | 0.1 to 15.99 (FineGain) |
| Trigger Modes | Free running (non triggered), external Trigger, SWTrigger, AB-Trigger |
| Features | Detection of a laser line (peak detector) with sub-pixel accuracy, Configurable region of interest (ROI), Dynamic range up to 120dB via LinLog®, Image correction, Ultra low trigger delay and low trigger jitter, Extended trigger input and strobe output functionality, Isolated inputs (2 single ended, 2 differential) and outputs (2 single ended), A/B shaft encoder interface (RS-422 (G2 models) or HTL (H2 models)), Free GUI available (PF 3D Suite) for an easy system set up and visualisation of 3D scans |
| Operation temperature / moisture | 0°C ... + 50°C / 20% ... 80% |
| Storage temperature / moisture | -25°C ... 60°C / 20% ... 95% |
| Power supply | +12VDC (-10%) ... +24VDC (+10%) |
| Power consumption | < 4.8W |
| Lens mount | C-Mount (CS-Mount optional) |
| I/O Inputs | 2x Opto-isolated<br>2x RS-422 or HTL Opto-isolated for AB-Trigger |
| I/O Outputs | 2x Opto-isolated |
| Dimensions | 55 x 55 x 49mm³ |
| Mass | 260g |
| Connector I/O (Power) | Hirose 12-pole (mating plug HR10A-10P-12S) |
| Connector Interface | RJ-45 |
| Conformity | CE / RoHS / WEEE |
| IP Code | IP40 |

## Connectors

| Pin | I/O Type | Name | Description |
|-----|----------|------|-------------|
| 1 | PWR | CAMERA_GND | Camera GND 0V |
| 2 | PWR | CAMERA_PWR | Camera Power 12V... 24V |
| 3 | O | ISO_OUT0 | Default Strobe out, internally Pulled up to ISO_PWR with 4k7 Resistor |
| 4 | I | ISO_INC0_N | INC0 differential input (G2: RS-422, H2: HTL), negative polarity |
| 5 | I | ISO_INC0_P | INC0 differential input (G2: RS-422, H2: HTL), positive polarity |
| 6 | PWR | ISO_PWR | Power supply 5V… 24V for output signals |
| 7 | I | ISO_IN0 | IN0 input signal |
| 8 | O | ISO_OUT1 (MISC) | Q1 output from PLC, no Pull up to ISO_PWR; can be used as additional output (by adding Pull up) or as controllable switch (max. 100mA, no capacitive or inductive load) |
| 9 | I | ISO_IN1(Trigger IN) | Default Trigger IN |
| 10 | I | ISO_INC1_N | INC1 differential input (G2: RS-422, H2: HTL), negative polarity |
| 11 | I | ISO_INC1_P | INC1 differential input (G2: RS-422, H2: HTL), positive polarity |
| 12 | PWR | ISO_GND | I/O GND 0V |

## Dimensions

## Explanation

| | |
|---|---|
| DN | DigitalNumber (equals to LSB) |
| e$^-$ | Electrons |

## Order Information

| | |
|---|---|
| MV1-D1024E-3D02-160-G2-8 | RS-422 Encoder Interface |

## Compatibility

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# MV1-D1280-L01-3D05-1280-G2

The 3D CMOS camera MV1-D1280-L01-3D05-1280-G2 was developed for laser triangulation systems with high triangulation rates

## Features

- Detection of one laser line (COG)
- LUXIMA LUX1310 CMOS image sensor
- 1280 x 1024 pixel resolution
- Up to 43700fps @ 1280x16 pixels
- Global shutter

- Extended sensor and camera features
- A/B shaft encoder interface
- GigEVision interface
- Free GUI available (PF 3D Suite)

## Quantum Efficiency Image Sensor



## Image Sensor Specifications
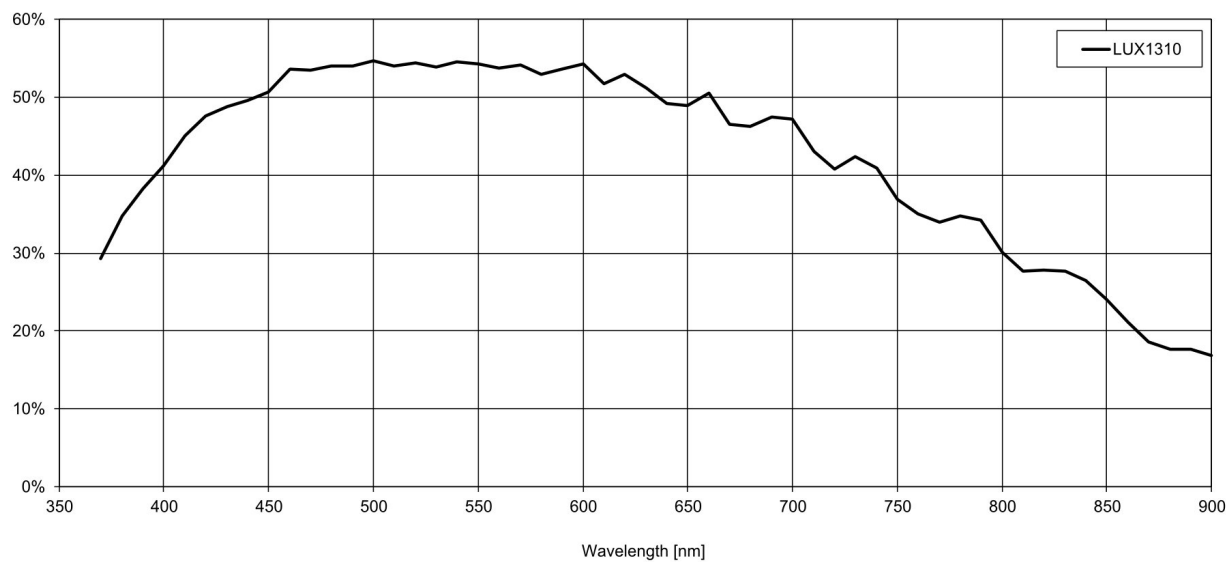
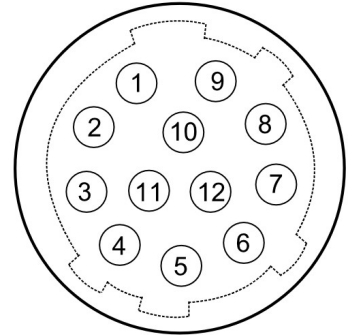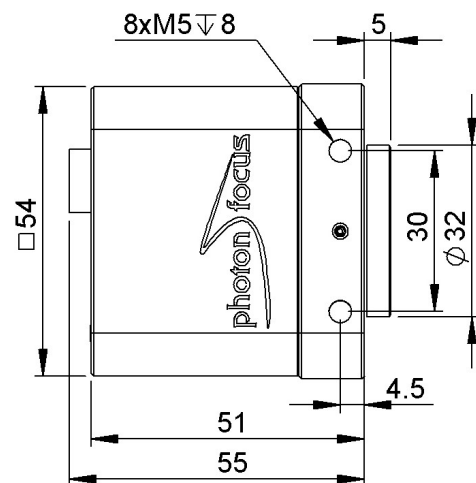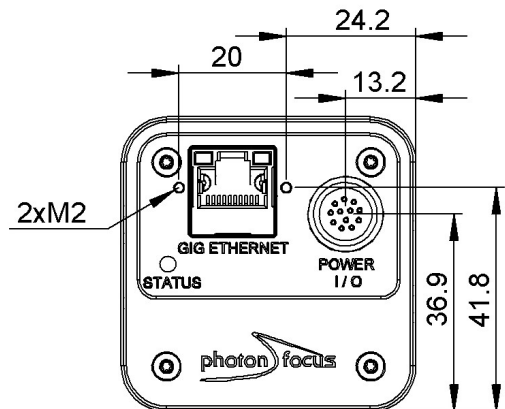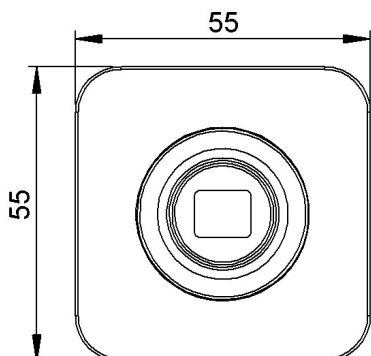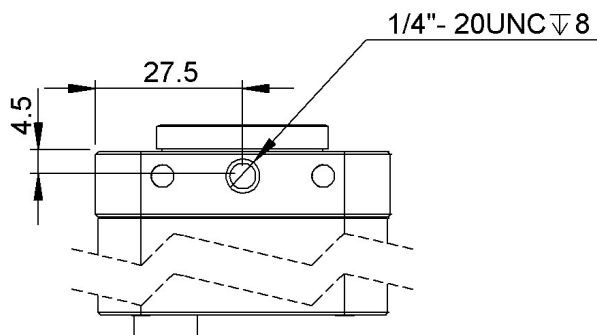| | |
|---|---|
| Manufacturer / Type | LUXIMA / LUX1310 |
| Technology | CMOS |
| Optical format | 2/3" |
| Optical diagonal | 10.82mm |
| Resolution | 1280 x 1024 |
| Pixel size | 6.6µm x 6.6µm |
| Active optical area | 8.45mm x 6.76mm |
| Dark current | 41100e⁻/s |
| Read out noise | 25e⁻ |
| Full well capacity / SNR | 17ke⁻ / 130: 1 |
| Spectral range | Monochrome: < 350 to 950nm (to 10% of peak responsivity) |
| Responsivity | Monochrome: 994 x 10³ DN / (J/m²) @ 560nm / 8bit |
| Quantum Efficiency | Monochrome: > 54% |
| Optical fill factor | 45 % (without micro lenses) |
| Dynamic range | 57dB |
| Characteristic curve | Linear |
| Shutter mode | Global shutter |

## Camera Specifications

| | |
|---|---|
| Interface | GigE |
| Frame rate | 43700fps |
| Pixel clock | 80MHz |
| Camera taps | 1 |
| Greyscale resolution | 8Bit |
| Fixed pattern noise (FPN) | < 1DN RMS @ 8Bit |
| Exposure time range | 10µs - 419ms |
| Analog gain | no |
| Digital gain | 0.1 to 15.99 (FineGain) |
| Trigger Modes | Free running (non triggered), external Trigger, SWTrigger, AB-Trigger |
| Features | Detection of one laser line (COG), Linear Mode / multiple slope (High Dynamic Range), Configurable region of interest (ROI), Temperature monitoring of camera, Ultra low trigger delay and low trigger jitter, Extended trigger input and strobe output functionality, Isolated inputs (2 single ended, 2 differential) and outputs (2 single ended), A/B shaft encoder interface (RS-422 (G2 models) or HTL (H2 models)), Free GUI available (PF 3D Suite) for an easy system set up and visualisation of 3D scans |
| Operation temperature / moisture | 0°C ... + 40°C / 20% ... 80% |
| Storage temperature / moisture | -25°C ... 60°C / 20% ... 95% |
| Power supply | +12VDC (-10%) ... +24VDC (+10%) |
| Power consumption | < 8.7W |
| Lens mount | C-Mount (CS-Mount optional) |
| I/O Inputs | 2x Opto-isolated<br>2x RS-422 or HTL Opto-isolated for AB-Trigger |
| I/O Outputs | 2x Opto-isolated |
| Dimensions | 55 x 55 x 51mm³ |
| Mass | 258g |
| Connector I/O (Power) | Hirose 12-pole (mating plug HR10A-10P-12S) |
| Connector Interface | RJ-45 |
| Conformity | CE / RoHS / WEEE |
| IP Code | IP40 |

## Connectors

| Pin | I/O Type | Name | Description |
|-----|----------|------|-------------|
| 1 | PWR | CAMERA_GND | Camera GND 0V |
| 2 | PWR | CAMERA_PWR | Camera Power 12V... 24V |
| 3 | O | ISO_OUT0 | Default Strobe out, internally Pulled up to ISO_PWR with 4k7 Resistor |
| 4 | I | ISO_INC0_N | INC0 differential input (G2: RS-422, H2: HTL), negative polarity |
| 5 | I | ISO_INC0_P | INC0 differential input (G2: RS-422, H2: HTL), positive polarity |
| 6 | PWR | ISO_PWR | Power supply 5V… 24V for output signals |
| 7 | I | ISO_IN0 | IN0 input signal |
| 8 | O | ISO_OUT1 (MISC) | Q1 output from PLC, no Pull up to ISO_PWR; can be used as additional output (by adding Pull up) or as controllable switch (max. 100mA, no capacitive or inductive load) |
| 9 | I | ISO_IN1(Trigger IN) | Default Trigger IN |
| 10 | I | ISO_INC1_N | INC1 differential input (G2: RS-422, H2: HTL), negative polarity |
| 11 | I | ISO_INC1_P | INC1 differential input (G2: RS-422, H2: HTL), positive polarity |
| 12 | PWR | ISO_GND | I/O GND 0V |



## Dimensions

## Explanation

| | |
|---|---|
| DN | DigitalNumber (equals to LSB) |
| e⁻ | Electrons |

## Order Information

| | |
|---|---|
| MV1-D1280-L01-3D05-1280-G2-8 | RS-422 Encoder Interface |
| MV1-D1280-L01-3D05-1280-H2-8 | HTL Encoder Interface |

## Compatibility



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# MV1-D1312-3D02-160-G2

The CMOS camera MV1-D1312-3D02-160-G2 was developed for laser triangulation of highly reflective materials

## Features

- Detection of a laser line with sub-pixel accuracy
- Photonfocus A1312 CMOS image sensor
- 1312 x 1082 pixel resolution
- Very good NIR spectral response
- Exceptional SNR up to 300: 1
- Dynamic range up to 120dB via LinLog®

- Up to 3000fps @ 1312x20 pixels
- Global shutter
- Extended sensor and camera features
- Reduction of ROI in x- and y-direction increases frame rate
- A/B shaft encoder interface
- GigEVision interface

## Quantum Efficiency Image Sensor



## Image Sensor Specifications
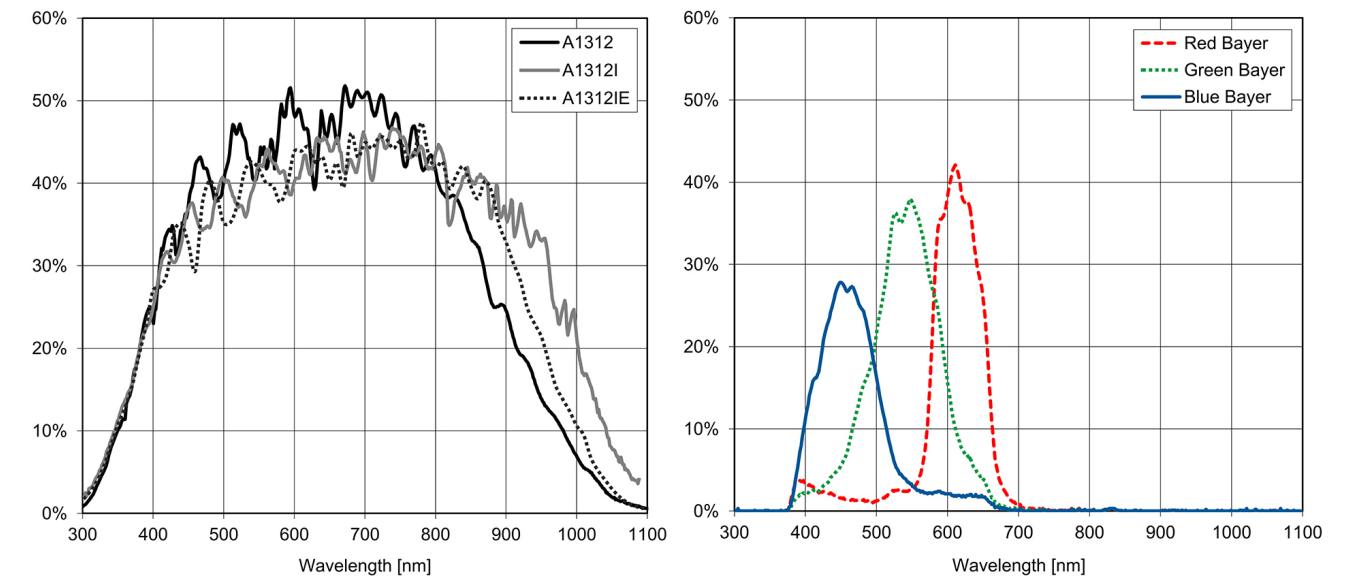
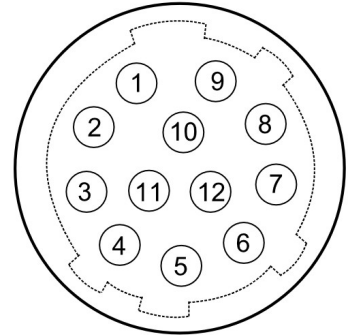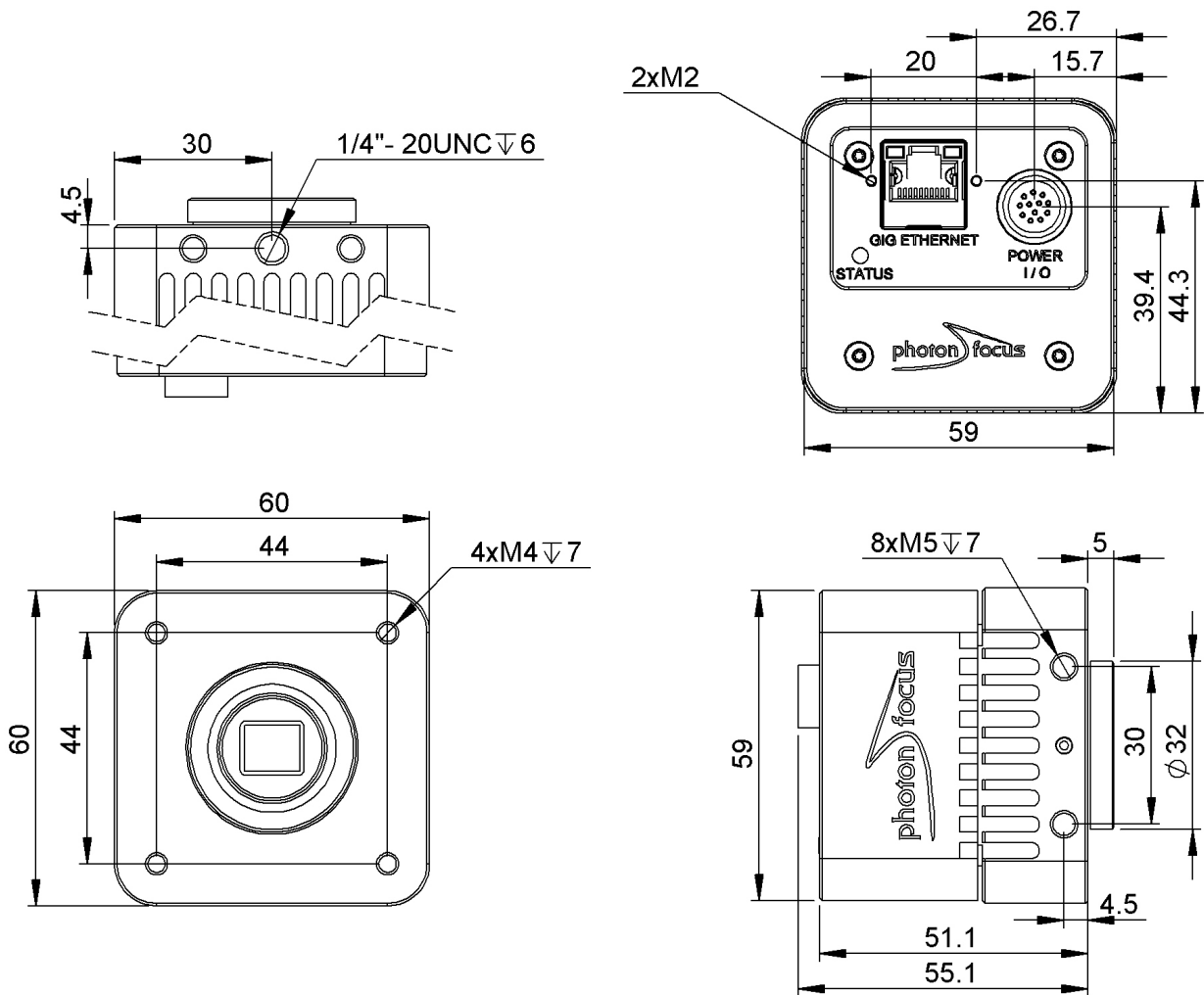| | | |
|---|---|---|
| Manufacturer / Type | Photonfocus / A1312 | |
| Technology | CMOS | |
| Optical format | 1" | |
| Optical diagonal | 13.6mm | |
| Resolution | 1312 x 1082 | |
| Pixel size | 8µm x 8µm | |
| Active optical area | 10.48mm x 8.64mm | |
| Dark current | 4000e$^-$/s | |
| Read out noise | 110e$^-$ | |
| Full well capacity / SNR | 90ke$^-$ / 300: 1 | |
| Spectral range | Monochrome: | < 350 to 980nm (to 10% of peak responsivity) |
| Responsivity | Monochrome: | 295 x 10$^3$ DN / (J/m$^2$) @ 670nm / 8bit |
| Quantum Efficiency | Monochrome: | > 50% |
| | NIR: | > 60% |
| | NIR Enhanced: | > 50% |
| | Color: | > 40% |
| Optical fill factor | > 60% | |
| Dynamic range | 60dB in linear mode; 120dB with LinLog® | |
| Characteristic curve | Linear, LinLog® | |
| Shutter mode | Global shutter | |

# Camera Specifications

| | |
|---|---|
| Interface | GigE |
| Frame rate | 3000fps |
| Pixel clock | 80MHz |
| Camera taps | 2 |
| Greyscale resolution | 8Bit |
| Fixed pattern noise (FPN) | < 1DN RMS @ 8bit |
| Exposure time range | 10µs - 419ms |
| Analog gain | n/a |
| Digital gain | 0.1 to 15.99 (FineGain) |
| Trigger Modes | Free running (non triggered), external Trigger, SWTrigger, AB-Trigger |
| Features | Detection of a laser line (peak detector) with sub-pixel accuracy, Configurable region of interest (ROI), Dynamic range up to 120dB via LinLog®, Image correction, Ultra low trigger delay and low trigger jitter, Extended trigger input and strobe output functionality, Isolated inputs (2 single ended, 2 differential) and outputs (2 single ended), A/B shaft encoder interface (RS-422 (G2 models) or HTL (H2 models)), Free GUI available (PF 3D Suite) for an easy system set up and visualisation of 3D scans |
| Operation temperature / moisture | 0°C ... + 50°C / 20% ... 80% |
| Storage temperature / moisture | -25°C ... 60°C / 20% ... 95% |
| Power supply | +12VDC (-10%) ... +24VDC (+10%) |
| Power consumption | < 5.0W |
| Lens mount | C-Mount (CS-Mount optional) |
| I/O Inputs | 2x Opto-isolated<br>2x RS-422 or HTL Opto-isolated for AB-Trigger |
| I/O Outputs | 2x Opto-isolated |
| Dimensions | 60 x 60 x 51mm³ |
| Mass | 310g |
| Connector I/O (Power) | Hirose 12-pole (mating plug HR10A-10P-12S) |
| Connector Interface | RJ-45 |
| Conformity | CE / RoHS / WEEE |
| IP Code | IP40 |

## Connectors

| Pin | I/O Type | Name | Description |
|---|---|---|---|
| 1 | PWR | CAMERA_GND | Camera GND 0V |
| 2 | PWR | CAMERA_PWR | Camera Power 12V... 24V |
| 3 | O | ISO_OUT0 | Default Strobe out, internally Pulled up to ISO_PWR with 4k7 Resistor |
| 4 | I | ISO_INC0_N | INC0 differential input (G2: RS-422, H2: HTL), negative polarity |
| 5 | I | ISO_INC0_P | INC0 differential input (G2: RS-422, H2: HTL), positive polarity |
| 6 | PWR | ISO_PWR | Power supply 5V… 24V for output signals |
| 7 | I | ISO_IN0 | IN0 input signal |
| 8 | O | ISO_OUT1 (MISC) | Q1 output from PLC, no Pull up to ISO_PWR; can be used as additional output (by adding Pull up) or as controllable switch (max. 100mA, no capacitive or inductive load) |
| 9 | I | ISO_IN1(Trigger IN) | Default Trigger IN |
| 10 | I | ISO_INC1_N | INC1 differential input (G2: RS-422, H2: HTL), negative polarity |
| 11 | I | ISO_INC1_P | INC1 differential input (G2: RS-422, H2: HTL), positive polarity |
| 12 | PWR | ISO_GND | I/O GND 0V |

## Dimensions

## Explanation

| DN | DigitalNumber (equals to LSB) |
|---|---|
| e⁻ | Electrons |

## Order Information

| MV1-D1312-3D02-160-G2-8 | BW model |
|---|---|

## Compatibility

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# MV1-D2048-3D04-760-G2

The 3D CMOS camera MV1-D2048-3D04-760-G2 was developed for Laser triangulation systems with high triangulation rates

## Features

- Detection of up to 2 laser lines (peak detector)
- 2D single line for 2D surface inspection and image overlay
- CMOSIS CMV2000 CMOS image sensor
- 2048 x 2048 pixel resolution
- Up to 7740fps @ 2048x23 pixels

- Global shutter
- Extended sensor and camera features
- A/B shaft encoder interface
- GigEVision interface
- Free GUI available (PF 3D Suite)

## Quantum Efficiency Image Sensor



## Image Sensor Specifications
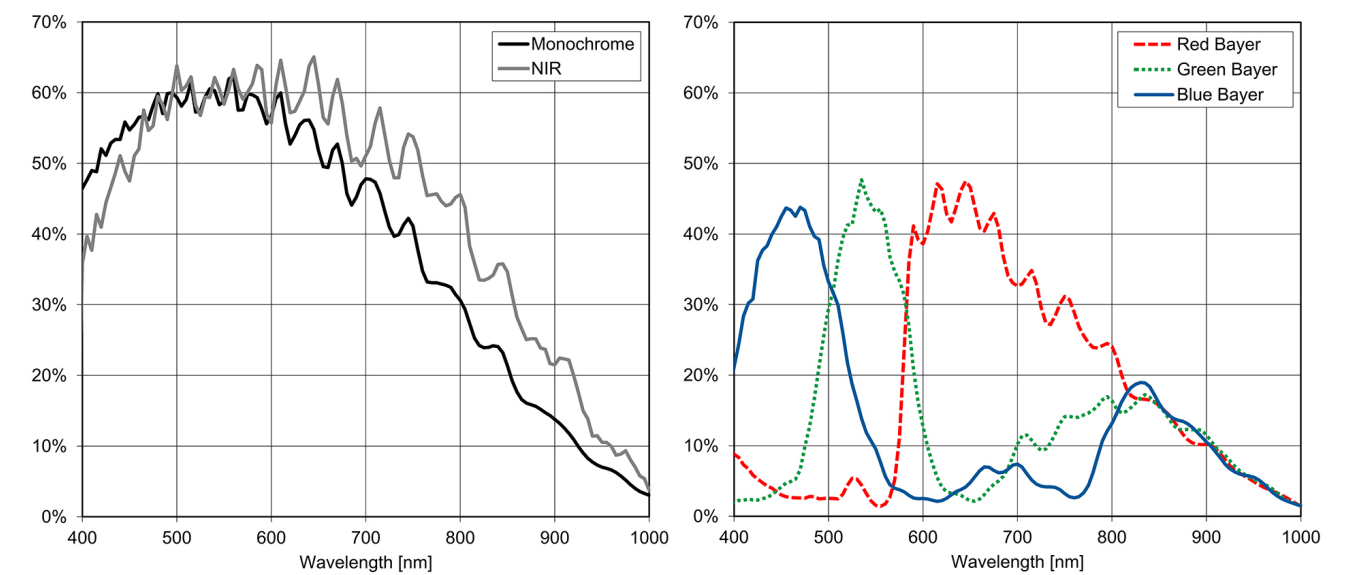
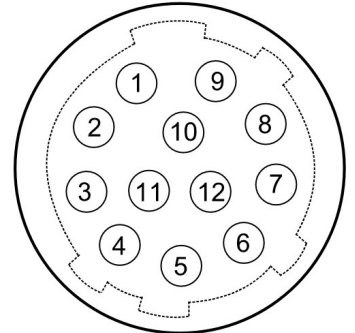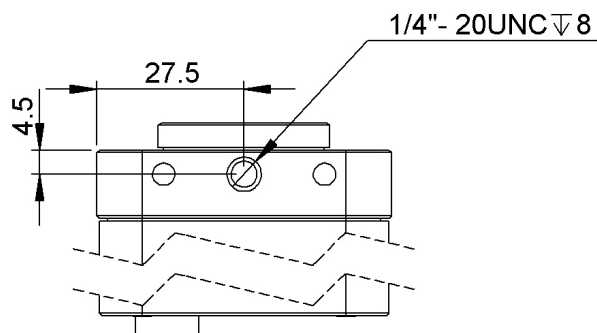| | | |
|---|---|---|
| Manufacturer / Type | CMOSIS / CMV4000 | |
| Technology | CMOS | |
| Optical format | 1" | |
| Optical diagonal | 12.76mm | |
| Resolution | 2048 x 2048 | |
| Pixel size | 5.5µm x 5.5µm | |
| Active optical area | 11.26mm x 11.26mm | |
| Dark current | 125e$^-$/s | |
| Read out noise | 13e$^-$ | |
| Full well capacity / SNR | 11ke$^-$ / 105: 1 | |
| Spectral range | Monochrome: | < 350 to 950nm (to 10% of peak responsivity) |
| Responsivity | Monochrome: | 1100 x 10$^3$ DN / (J/m$^2$) @ 520nm / 8bit |
| Quantum Efficiency | Monochrome: | > 60% |
| Optical fill factor | 42% without micro lenses | |
| Dynamic range | 60dB | |
| Characteristic curve | Linear, Piecewise linear | |
| Shutter mode | Global shutter | |

# Camera Specifications

| | |
|---|---|
| Interface | GigE |
| Frame rate | 7740fps |
| Pixel clock | 48MHz |
| Camera taps | 2 |
| Greyscale resolution | 8Bit |
| Fixed pattern noise (FPN) | < 1DN RMS @ 8Bit |
| Exposure time range | 24µs - 349ms |
| Analog gain | yes |
| Digital gain | 0.1 to 15.99 (FineGain) |
| Trigger Modes | Free running (non triggered), external Trigger, SWTrigger, AB-Trigger |
| Features | Detection of up to 2 laser lines (peak detector), 2D single line for 2D surface inspection and image overlay, Linear Mode / multiple slope (High Dynamic Range), Configurable region of interest (ROI), Temperature monitoring of camera, Ultra low trigger delay and low trigger jitter, Extended trigger input and strobe output functionality, Isolated inputs (2 single ended, 2 differential) and outputs (2 single ended), A/B shaft encoder interface (RS-422 (G2 models) or HTL (H2 models)), Free GUI available (PF 3D Suite) for an easy system set up and visualisation of 3D scans |
| Operation temperature / moisture | 0°C ... + 40°C / 20% ... 80% |
| Storage temperature / moisture | -25°C ... 60°C / 20% ... 95% |
| Power supply | +12VDC (-10%) ... +24VDC (+10%) |
| Power consumption | < 6W |
| Lens mount | C-Mount (CS-Mount optional) |
| I/O Inputs | 2x Opto-isolated<br>2x RS-422 or HTL Opto-isolated for AB-Trigger |
| I/O Outputs | 2x Opto-isolated |
| Dimensions | 55 x 55 x 52mm³ |
| Mass | 265g |
| Connector I/O (Power) | Hirose 12-pole (mating plug HR10A-10P-12S) |
| Connector Interface | RJ-45 |
| Conformity | CE / RoHS / WEEE |
| IP Code | IP40 |

## Connectors

| Pin | I/O Type | Name | Description |
|-----|----------|------|-------------|
| 1 | PWR | CAMERA_GND | Camera GND 0V |
| 2 | PWR | CAMERA_PWR | Camera Power 12V... 24V |
| 3 | O | ISO_OUT0 | Default Strobe out, internally Pulled up to ISO_PWR with 4k7 Resistor |
| 4 | I | ISO_INC0_N | INC0 differential input (G2: RS-422, H2: HTL), negative polarity |
| 5 | I | ISO_INC0_P | INC0 differential input (G2: RS-422, H2: HTL), positive polarity |
| 6 | PWR | ISO_PWR | Power supply 5V… 24V for output signals |
| 7 | I | ISO_IN0 | IN0 input signal |
| 8 | O | ISO_OUT1 (MISC) | Q1 output from PLC, no Pull up to ISO_PWR; can be used as additional output (by adding Pull up) or as controllable switch (max. 100mA, no capacitive or inductive load) |
| 9 | I | ISO_IN1(Trigger IN) | Default Trigger IN |
| 10 | I | ISO_INC1_N | INC1 differential input (G2: RS-422, H2: HTL), negative polarity |
| 11 | I | ISO_INC1_P | INC1 differential input (G2: RS-422, H2: HTL), positive polarity |
| 12 | PWR | ISO_GND | I/O GND 0V |

## Dimensions

## Explanation

| DN | DigitalNumber (equals to LSB) |
|---|---|
| e$^-$ | Electrons |

## Order Information

| MV1-D2048-3D04-760-G2-8 | RS-422 Encoder Interface |
|---|---|
| MV1-D2048-3D04-760-H2-8 | HTL Encoder Interface |

## Compatibility

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# MV1-D2048x1088-3D03-760-G2

The 3D CMOS camera MV1-D2048x1088-3D03-760-G2 was developed for Laser triangulation systems with high triangulation rates

## Features

- Detection of up to 2 laser lines (peak detector)
- 2D single line for 2D surface inspection and image overlay
- CMOSIS CMV2000 CMOS image sensor
- 2048 x 1088 pixel resolution
- Up to 10200fps @ 2048x23 pixels

- Global shutter
- Extended sensor and camera features
- A/B shaft encoder interface
- GigEVision interface
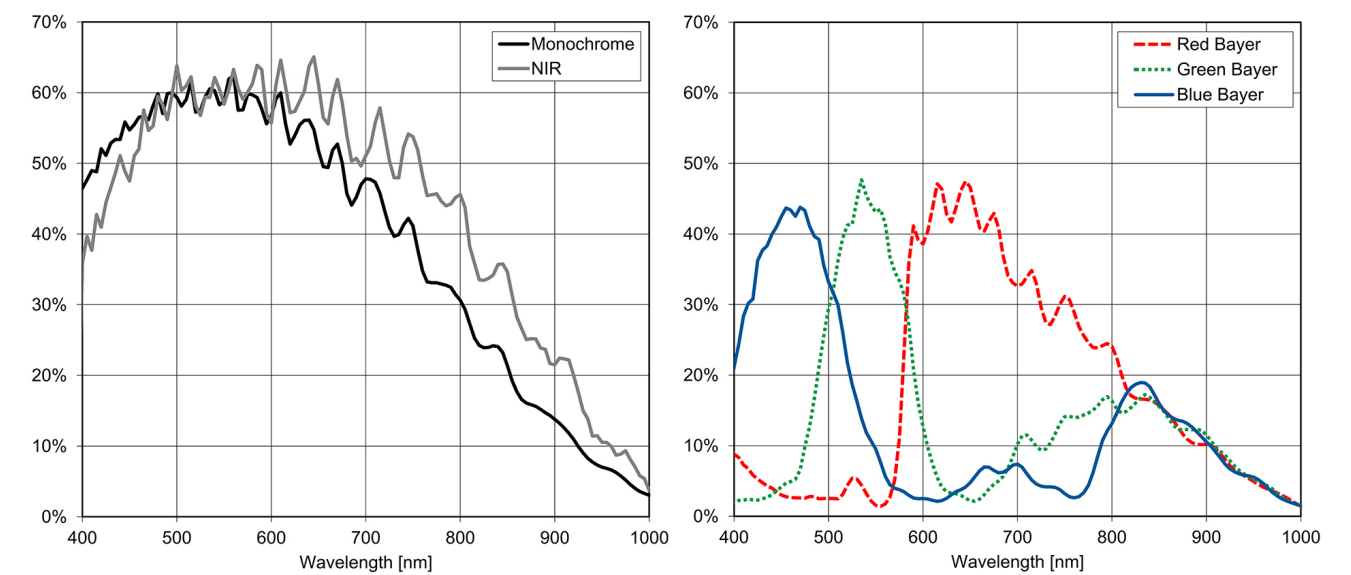- Free GUI available (PF 3D Suite)

## Quantum Efficiency Image Sensor



## Image Sensor Specifications

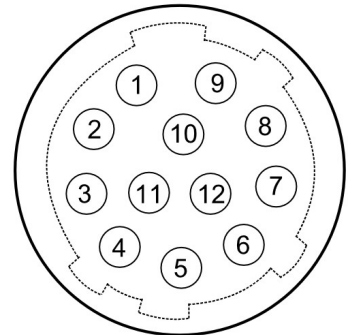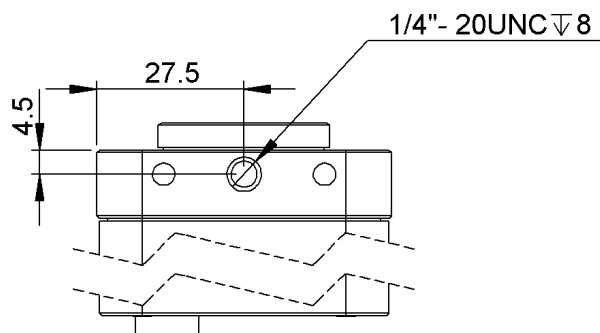| | | |
|---|---|---|
| Manufacturer / Type | CMOSIS / CMV2000 | |
| Technology | CMOS | |
| Optical format | 2/3" | |
| Optical diagonal | 12.76mm | |
| Resolution | 2048 x 1088 | |
| Pixel size | 5.5µm x 5.5µm | |
| Active optical area | 11.26mm x 5.98mm | |
| Dark current | 125e⁻/s | |
| Read out noise | 13e⁻ | |
| Full well capacity / SNR | 11ke⁻ / 105: 1 | |
| Spectral range | Monochrome: | < 350 to 950nm (to 10% of peak responsivity) |
| Responsivity | Monochrome: | 1100 x 10³ DN / (J/m²) @ 520nm / 8bit |
| Quantum Efficiency | Monochrome: | > 60% |
| Optical fill factor | 42% without micro lenses | |
| Dynamic range | 60dB | |
| Characteristic curve | Linear, Piecewise linear | |
| Shutter mode | Global shutter | |

# Camera Specifications

| | |
|---|---|
| Interface | GigE |
| Frame rate | 10200fps |
| Pixel clock | 48MHz |
| Camera taps | 2 |
| Greyscale resolution | 8Bit |
| Fixed pattern noise (FPN) | < 1DN RMS @ 8Bit |
| Exposure time range | 13µs - 349ms |
| Analog gain | yes |
| Digital gain | 0.1 to 15.99 (FineGain) |
| Trigger Modes | Free running (non triggered), external Trigger, SWTrigger, AB-Trigger |
| Features | Detection of up to 2 laser lines (peak detector), 2D single line for 2D surface inspection and image overlay, Linear Mode / multiple slope (High Dynamic Range), Configurable region of interest (ROI), Temperature monitoring of camera, Ultra low trigger delay and low trigger jitter, Extended trigger input and strobe output functionality, Isolated inputs (2 single ended, 2 differential) and outputs (2 single ended), A/B shaft encoder interface (RS-422 (G2 models) or HTL (H2 models)), Free GUI available (PF 3D Suite) for an easy system set up and visualisation of 3D scans |
| Operation temperature / moisture | 0°C ... + 40°C / 20% ... 80% |
| Storage temperature / moisture | -25°C ... 60°C / 20% ... 95% |
| Power supply | +12VDC (-10%) ... +24VDC (+10%) |
| Power consumption | < 6W |
| Lens mount | C-Mount (CS-Mount optional) |
| I/O Inputs | 2x Opto-isolated<br>2x RS-422 or HTL Opto-isolated for AB-Trigger |
| I/O Outputs | 2x Opto-isolated |
| Dimensions | 55 x 55 x 52mm³ |
| Mass | 265g |
| Connector I/O (Power) | Hirose 12-pole (mating plug HR10A-10P-12S) |
| Connector Interface | RJ-45 |
| Conformity | CE / RoHS / WEEE |
| IP Code | IP40 |

## Connectors

| Pin | I/O Type | Name | Description |
|-----|----------|------|-------------|
| 1 | PWR | CAMERA_GND | Camera GND 0V |
| 2 | PWR | CAMERA_PWR | Camera Power 12V... 24V |
| 3 | O | ISO_OUT0 | Default Strobe out, internally Pulled up to ISO_PWR with 4k7 Resistor |
| 4 | I | ISO_INC0_N | INC0 differential input (G2: RS-422, H2: HTL), negative polarity |
| 5 | I | ISO_INC0_P | INC0 differential input (G2: RS-422, H2: HTL), positive polarity |
| 6 | PWR | ISO_PWR | Power supply 5V… 24V for output signals |
| 7 | I | ISO_IN0 | IN0 input signal |
| 8 | O | ISO_OUT1 (MISC) | Q1 output from PLC, no Pull up to ISO_PWR; can be used as additional output (by adding Pull up) or as controllable switch (max. 100mA, no capacitive or inductive load) |
| 9 | I | ISO_IN1(Trigger IN) | Default Trigger IN |
| 10 | I | ISO_INC1_N | INC1 differential input (G2: RS-422, H2: HTL), negative polarity |
| 11 | I | ISO_INC1_P | INC1 differential input (G2: RS-422, H2: HTL), positive polarity |
| 12 | PWR | ISO_GND | I/O GND 0V |

## Dimensions

## Explanation

| | |
|---|---|
| DN | DigitalNumber (equals to LSB) |
| e⁻ | Electrons |

## Order Information

| | |
|---|---|
| MV1-D2048x1088-3D03-760-G2-8 | RS-422 Encoder Interface |
| MV1-D2048x1088-3D03-760-H2-8 | HTL Encoder Interface |
| MV1-D2048x1088-3D03-760-G2-8-S10 | RS-422, Scheimpflug Adapter |
| MV1-D2048x1088-3D03-760-H2-8-S10 | HTL, Scheimpflug Adapter |

## Compatibility

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# MV1-D2048x1088-3D03-760-G2-S10

The 3D CMOS camera MV1-D2048x1088-3D03-760-G2-S10 with Scheimpflug adapter was developed for Laser triangulation systems with high triangulation rates.

## Features

- Scheimpflug adapter to extend the optical depth of field
- Detection of up to 2 laser lines (peak detector)
- 2D single line for 2D surface inspection and image overlay
- CMOSIS CMV2000 CMOS image sensor
- 2048 x 1088 pixel resolution
- Up to 10200fps @ 2048x23 pixels

- Global shutter
- Extended sensor and camera features
- A/B shaft encoder interface
- GigEVision interface
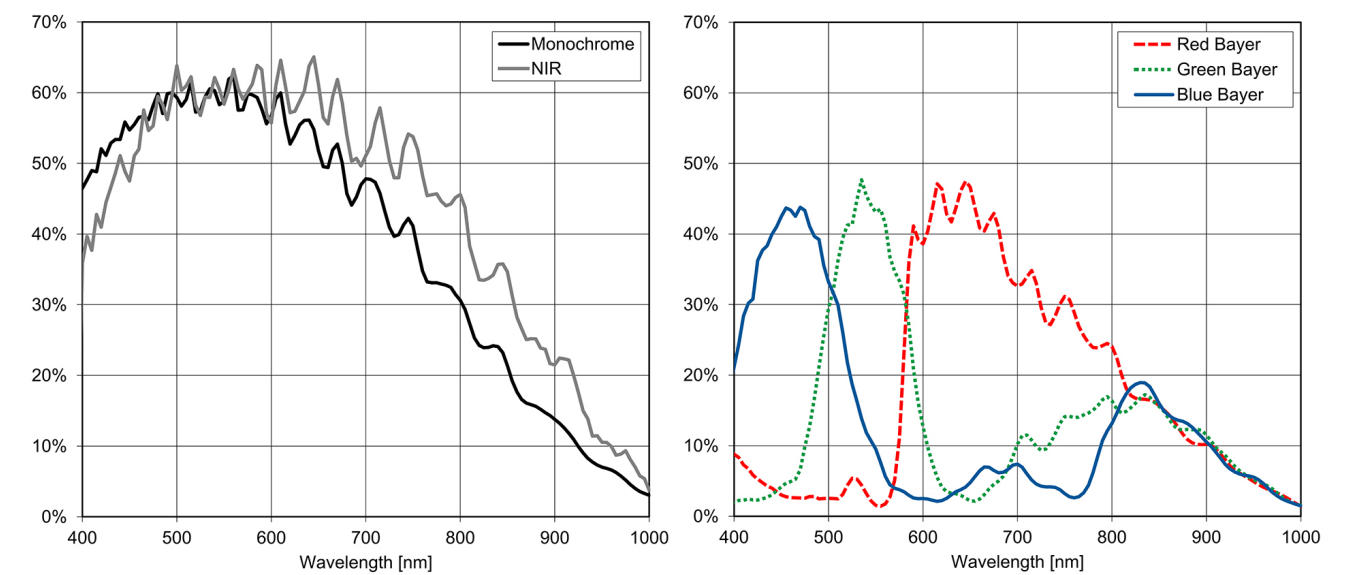- Free GUI available (PF 3D Suite)

## Quantum Efficiency Image Sensor



## Image Sensor Specifications

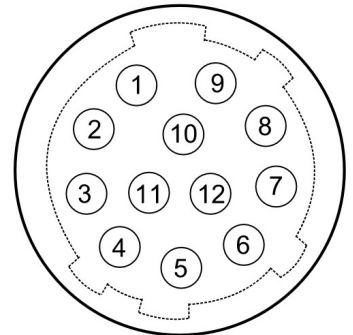| | | |
|---|---|---|
| Manufacturer / Type | CMOSIS / CMV2000 | |
| Technology | CMOS | |
| Optical format | 2/3" | |
| Optical diagonal | 12.76mm | |
| Resolution | 2048 x 1088 | |
| Pixel size | 5.5µm x 5.5µm | |
| Active optical area | 11.26mm x 5.98mm | |
| Dark current | 125e$^-$/s | |
| Read out noise | 13e$^-$ | |
| Full well capacity / SNR | 11ke$^-$ / 105: 1 | |
| Spectral range | Monochrome: | < 350 to 950nm (to 10% of peak responsivity) |
| Responsivity | Monochrome: | 1100 x 10³ DN / (J/m²) @ 520nm / 8bit |
| Quantum Efficiency | Monochrome: | > 60% |
| Optical fill factor | 42% without micro lenses | |
| Dynamic range | 60dB | |
| Characteristic curve | Linear, Piecewise linear | |
| Shutter mode | Global shutter | |

## Camera Specifications

| | |
|---|---|
| Interface | GigE |
| Frame rate | 10200fps |
| Pixel clock | 48MHz |
| Camera taps | 2 |
| Greyscale resolution | 8Bit |
| Fixed pattern noise (FPN) | < 1DN RMS @ 8Bit |
| Exposure time range | 13µs - 349ms |
| Analog gain | yes |
| Digital gain | 0.1 to 15.99 (FineGain) |
| Trigger Modes | Free running (non triggered), external Trigger, SWTrigger, AB-Trigger |
| Features | Scheimpflug adapter to extend the optical depth of field, Detection of up to 2 laser lines (peak detector), 2D single line for 2D surface inspection and image overlay, Linear Mode / multiple slope (High Dynamic Range), Configurable region of interest (ROI), Temperature monitoring of camera, Ultra low trigger delay and low trigger jitter, Extended trigger input and strobe output functionality, Isolated inputs (2 single ended, 2 differential) and outputs (2 single ended), A/B shaft encoder interface (RS-422 (G2 models) or HTL (H2 models)), Free GUI available (PF 3D Suite) for an easy system set up and visualisation of 3D scans |
| Operation temperature / moisture | 0°C ... + 40°C / 20% ... 80% |
| Storage temperature / moisture | -25°C ... 60°C / 20% ... 95% |
| Power supply | +12VDC (-10%) ... +24VDC (+10%) |
| Power consumption | < 6W |
| Lens mount | C-Mount (CS-Mount optional) |
| I/O Inputs | 2x Opto-isolated<br>2x RS-422 or HTL Opto-isolated for AB-Trigger |
| I/O Outputs | 2x Opto-isolated |
| Dimensions | 55 x 55 x 52mm³ |
| Mass | 265g |
| Connector I/O (Power) | Hirose 12-pole (mating plug HR10A-10P-12S) |
| Connector Interface | RJ-45 |
| Conformity | CE / RoHS / WEEE |
| IP Code | IP40 |

## Connectors

| Pin | I/O Type | Name | Description |
|-----|----------|------|-------------|
| 1 | PWR | CAMERA_GND | Camera GND 0V |
| 2 | PWR | CAMERA_PWR | Camera Power 12V... 24V |
| 3 | O | ISO_OUT0 | Default Strobe out, internally Pulled up to ISO_PWR with 4k7 Resistor |
| 4 | I | ISO_INC0_N | INC0 differential input (G2: RS-422, H2: HTL), negative polarity |
| 5 | I | ISO_INC0_P | INC0 differential input (G2: RS-422, H2: HTL), positive polarity |
| 6 | PWR | ISO_PWR | Power supply 5V... 24V for output signals |
| 7 | I | ISO_IN0 | IN0 input signal |
| 8 | O | ISO_OUT1 (MISC) | Q1 output from PLC, no Pull up to ISO_PWR; can be used as additional output (by adding Pull up) or as controllable switch (max. 100mA, no capacitive or inductive load) |
| 9 | I | ISO_IN1(Trigger IN) | Default Trigger IN |
| 10 | I | ISO_INC1_N | INC1 differential input (G2: RS-422, H2: HTL), negative polarity |
| 11 | I | ISO_INC1_P | INC1 differential input (G2: RS-422, H2: HTL), positive polarity |
| 12 | PWR | ISO_GND | I/O GND 0V |

## Dimensions

## Explanation

| | |
|---|---|
| DN | DigitalNumber (equals to LSB) |
| e$^-$ | Electrons |

## Order Information

| | |
|---|---|
| MV1-D2048x1088-3D03-760-G2-8-S10 | RS-422, Scheimpflug Adapter |
| MV1-D2048x1088-3D03-760-H2-8-S10 | HTL, Scheimpflug Adapter |

## Compatibility



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# MV-D1024E-3D01-160-CL

The CMOS camera MV-D1024E-3D01-160-CL was developed for laser triangulation of highly reflective materials

## Features

- Detection of a laser line with sub-pixel accuracy
- Photonfocus A1024B CMOS image sensor
- 1024 x 1024 pixel resolution
- Exceptional SNR up to 447: 1
- Dynamic range up to 120dB via LinLog®
- Up to 3100fps @ 24x1024 pixels

- Global shutter
- Monochrome
- Extended sensor and camera features
- Reduction of ROI in x- and y-direction increases frame rate
- CameraLink® interface
- Free GUI available (PF 3D Suite)
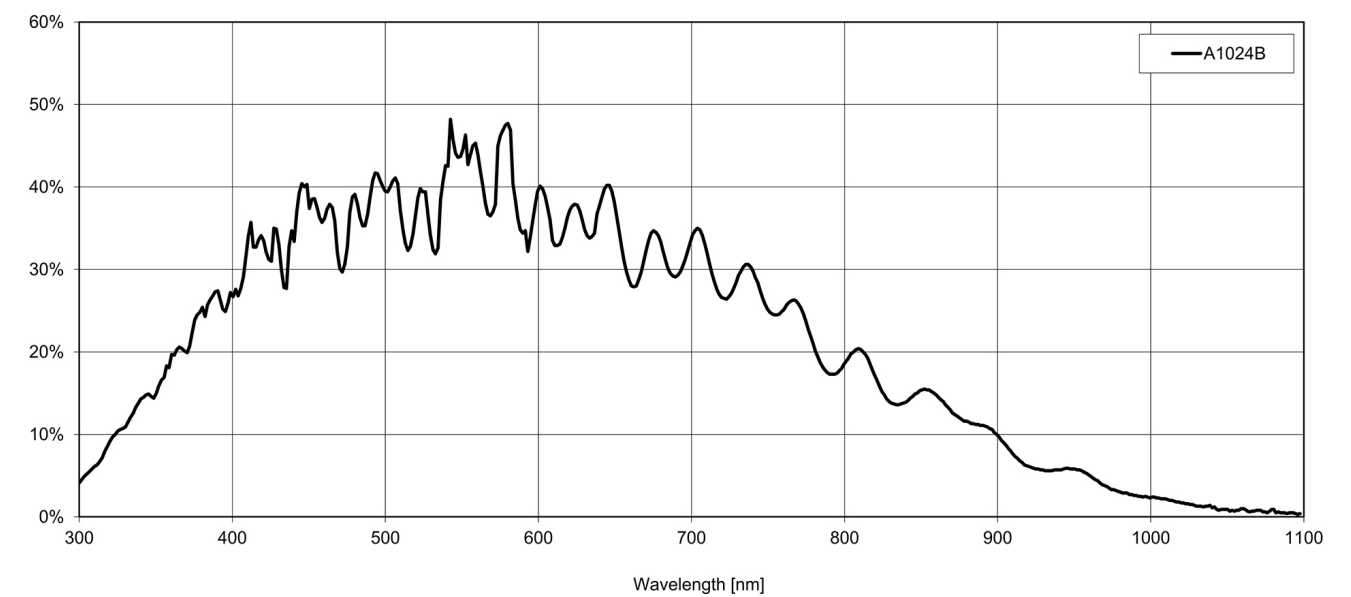
## Quantum Efficiency Image Sensor



## Image Sensor Specifications

| | |
|---|---|
| Manufacturer / Type | Photonfocus / A1024 |
| Technology | CMOS |
| Optical format | 1" |
| Optical diagonal | 15.42mm |
| Resolution | 1024 x 1024 |
| Pixel size | 10.6µm x 10.6µm |
| Active optical area | 10.9mm x 10.9mm |
| Dark current | 107'000e⁻/s |
| Read out noise | 220e⁻ |
| Full well capacity / SNR | 200ke⁻ / 447: 1 |
| Spectral range | Monochrome: < 400 to 900nm (to 10% of peak responsivity) |
| Responsivity | Monochrome: 120 x 10³ DN / (J/m²) @ 610nm / 8bit |
| Quantum Efficiency | Monochrome: > 45% |
| Optical fill factor | 35% |
| Dynamic range | 60dB in linear mode; 120dB with LinLog® |
| Characteristic curve | Linear, LinLog®, Skimming |
| Shutter mode | Global shutter |

# Camera Specifications

| | |
|---|---|
| Interface | Camera Link |
| Frame rate | 3100fps |
| Pixel clock | 80MHz |
| Camera taps | 2 |
| Greyscale resolution | 8Bit / 10Bit / 12Bit |
| Fixed pattern noise (FPN) | < 1DN RMS @ 8bit |
| Exposure time range | 10µs - 419ms |
| Analog gain | n/a |
| Digital gain | 0.1 to 15.99 (FineGain) |
| Trigger Modes | Free running (non triggered), external Trigger, SWTrigger |
| Features | Detection of a laser line (peak detector) with sub-pixel accuracy, Configurable region of interest (ROI), Dynamic range up to 120dB via LinLog®, Image correction, Constant frame rate independent of exposure time, Ultra low trigger delay and low trigger jitter, Extended trigger input and strobe output functionality, Camera informations readable over SDK, Free GUI available (PF 3D Suite) for an easy system set up and visualisation of 3D scans |
| Operation temperature / moisture | 0°C ... + 50°C / 20% ... 80% |
| Storage temperature / moisture | -25°C ... 60°C / 20% ... 95% |
| Power supply | +12VDC (-10%) ... +12VDC (+10%) |
| Power consumption | < 3.2W |
| Lens mount | C-Mount (CS-Mount optional) |
| I/O Inputs | 1x Opto-isolated |
| I/O Outputs | 1x Opto-isolated |
| Dimensions | 55 x 55 x 40mm³ |
| Mass | 210g |
| Connector I/O (Power) | Binder 7-pole (mating plug 99-0421-00-07) |
| Connector Interface | CameraLink Base (MDR) |
| Conformity | CE / RoHS / WEEE |
| IP Code | IP40 |

## Connectors

| Pin | I/O Type | Name | Description |
|-----|----------|------|-------------|
| 1 | PWR | CAMERA_PWR | Camera Power 12VDC |
| 2 | PWR | CAMERA_GND | Camera GND 0V |
| 3 | O | RESERVED | Do not connect |
| 4 | PWR | STROBE-VDD | +5 ... +15 VDC |
| 5 | O | STROBE | Strobe control (opto-isolated) |
| 6 | I | TRIGGER | External trigger (opto-isolated), +5 .. +15VDC |
| 7 | PWR | GROUND | Signal ground (for opto-isolated strobe signal) |
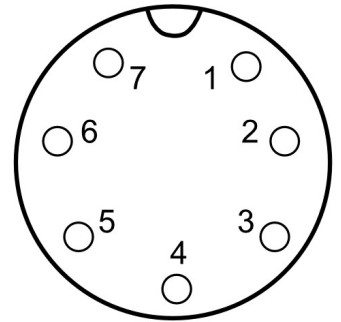
## Dimensions
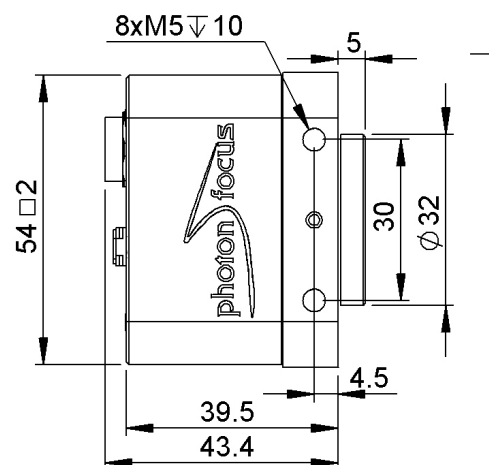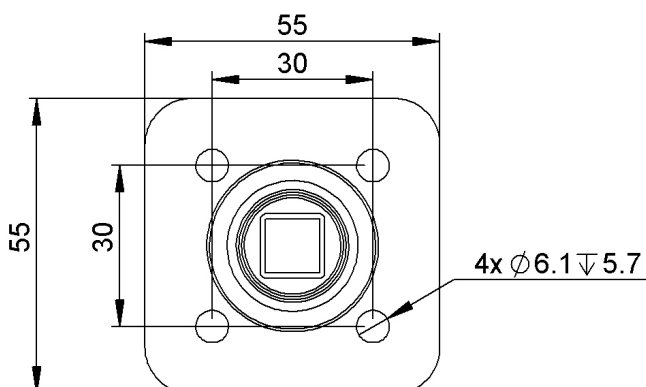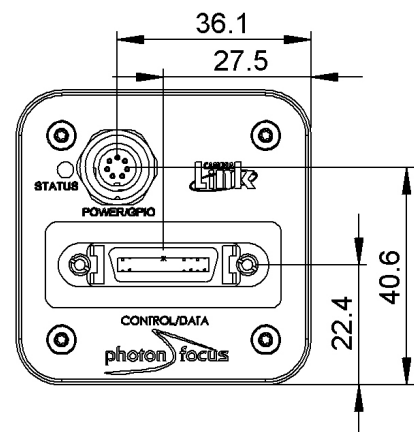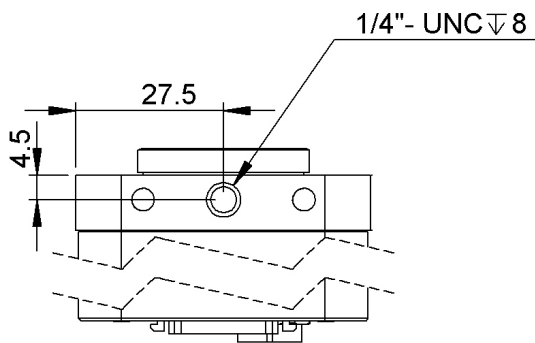
## Explanation

| DN | DigitalNumber (equals to LSB) |
|---|---|
| e$^-$ | Electrons |

## Order Information

| MV-D1024E-3D01-160-CL-12 | CameraLink Model |
|---|---|

## Compatibility



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