

<sup>1)</sup> Sensor readout, different from pixel format

<sup>2)</sup> Depends on the used interface



## Sensor Information

|            |                              |
|------------|------------------------------|
| Model Name | Sony IMX426                  |
| Type       | 1/1.7" progressive scan CMOS |
| Shutter    | Global Shutter               |
| Resolution | 800 x 620 pixels             |
| Scan Area  | 7.2 mm x 5.58 mm             |
| Pixel Size | 9 µm x 9 µm                  |

## Data Quality

@ 20 °C, gain = 1, exposure time = 4 msec

|                           |                      |
|---------------------------|----------------------|
| Dark Noise ( $\sigma$ )   | 21.9 e- typical      |
| Saturation                | 94000 e- typical     |
| Dynamic Range             | 72 dB typical        |
| SNR                       | 49.5 dB typical      |
| Quantum efficiency $\eta$ | 73% @ 536 nm typical |

## Acquisition

|   |                 |            |   |
|---|-----------------|------------|---|
| Resolution  | 800 px x 620 px |            |   |
| Interface Frame Rate<br>(depends on used interface performance) | Format          | Resolution | max. Frame Rate<br>(@ Trigger Mode) <sup>2)</sup> |
|   | Full Frame      | 800 x 620  | 1609 fps  |
|   | Binning 2x2     | 400 x 310  | 1609 fps  |
|   | Binning 2x1     | 400 x 620  | 1609 fps  |
|   | Binning 1x2     | 800 x 310  | 1609 fps  |

|  |   |
|--|---|
| Acquisition Frame Rate <sup>1)</sup><br>(Burst Mode) | 1609 fps   $t_{\text{readout}} = 0.63$ msec (max. Res. Full Frame) @ 8 bit  |
|  | 1463 fps   $t_{\text{readout}} = 0.69$ msec (max. Res. Full Frame) @ 10 bit |
|  | 949 fps   $t_{\text{readout}} = 1.06$ msec (max. Res. Full Frame) @ 12 bit  |

Pixel Formats Mono8, Mono10, Mono12, Mono12p

Partial Scan True Partial Scan with increasing Frame Rate on Y direction, Region of Interest (ROI) arbitrary  
Width: minimum 64, increment 32  
Height: minimum 1, increment 1

Multi ROI Up to 8 non-overlapping regions

Ad. Acquisition Frame Rate Off or 0,01 ... 65535 Hz

Acquisition Mode Continuous, Single Frame and Multi Frame

Acquisition Status AcquisitionActive, AcquisitionTrigger Wait

Exposure Mode Timed

Readout Mode Overlapped, Sequential

## Image Pre-Processing

Analog Controls Exposure Time (1 µsec ... 60 sec | Step Size 1 µsec)  
Gain (0...48 dB), Offset (0 ... 255 LSB | 12 bit)

Auto Functions ExposureAuto and GainAuto with BrightnessAutoPriority based on BrightnessAuto ROI

Gamma Correction Gamma (0.1 ... 2 | available if LUT is enabled)

LUT Luminance (12 bit)

Color Models Mono

Color Processing -

Color Enhancement -

Color Tolerance -

Binning Horizontal: 1 or 2, Vertical: 1 or 2

Image Flipping Horizontal, vertical

Defect Pixel Correction via Defect Pixel List with up to 512 Pixel Coordinates

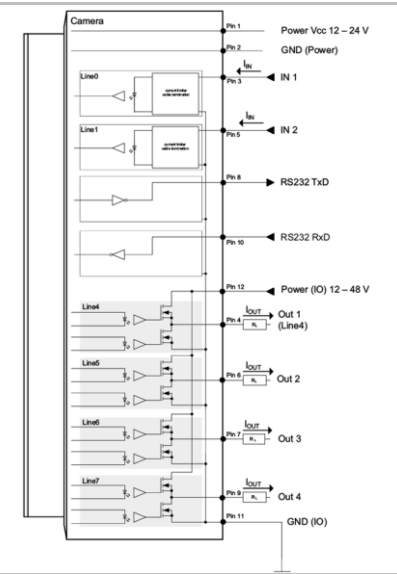
Shading Correction -

Sharpening -

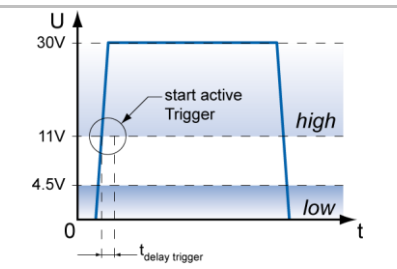
HDR -

Image Compression Baseline JPEG (ISO/IEC 10918-1)

Digital Input / Output: principle circuit diagram



Trigger Mode: Start up time and valid Trigger



## Process Synchronization

|  |   |
|--|---|
| Trigger Mode                           | Off (Free Running), On (Trigger)  |
| Trigger Overlap Type                   | Readout   |
| Trigger Sources                        | Hardware (Line0,1), Software, All, ActionCMD (Action 1) or Off<br>fixed Trigger Delay out of t <sub>readout</sub> : <sup>1)</sup><br>29 µsec @ 8 bit<br>30 µsec @ 10 bit<br>35 µsec @ 12 bit<br>max. Trigger Delay during t <sub>readout</sub> : <sup>1)</sup><br>29 µsec @ 8 bit<br>30 µsec @ 10 bit<br>35 µsec @ 12 bit |
| Trigger Delay                          | 0 ... 2 sec, Tracking and buffering of up to 256 triggers   |
| External Flash Sync                    | via Exposure Delay Active<br>t <sub>delay flash</sub> ≤ 1 µsec, t <sub>duration</sub> = t <sub>exposure</sub>   |
| Encoder Function                       | yes, via Counter and Trigger Source   |
| Precision Time Protocol (PTP) Function | IEEE1588-2008 clock synchronization, default profile 1.0, master and slave mode   |

## Digital I/Os

|                     |  |
|---------------------|--|
| Lines               | Input: Line 0 .. 1, Output: Line 4 .. 7, GPIO: no, RS232: Line 2 .. 3 (reserved for future use)  |
| Output Sources      | Off, ExposureActive, Timer1, ReadoutActive, UserOutput 1-3 and TriggerReady  |
| Output Line Mode    | yes, Tri-State, PushPull, OpenDrain, OpenSource  |
| Output PWM function | yes, Line 4 .. 7<br>PWM Mode: Off, One Pulse, FixedFrequency<br>PWM feature: PWMDuration, PWMDutyCycle<br>Configuration Mode for lightning protection: MaxPWMDuration, MaxPWMDutyCycle |
| Line Debouncer      | Low and high signal separately selectable<br>Debouncing Time 0 ... 5 msec, Step Size: 1 µsec   |

## Memory

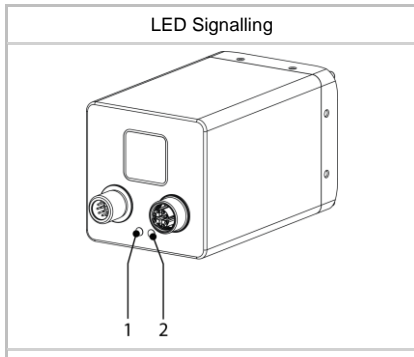
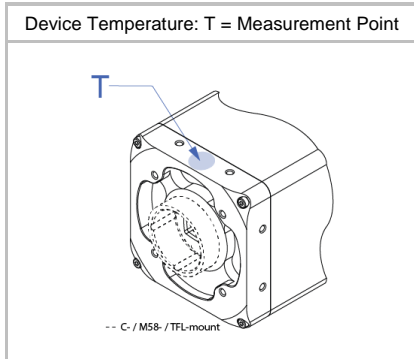
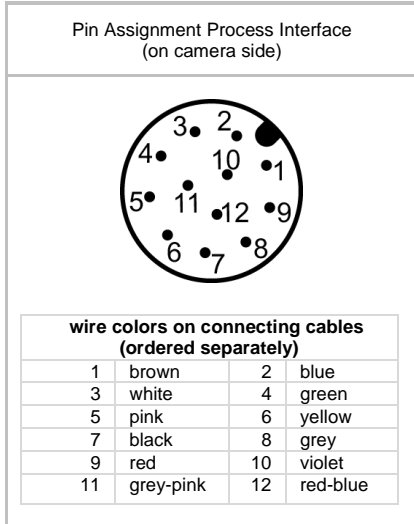
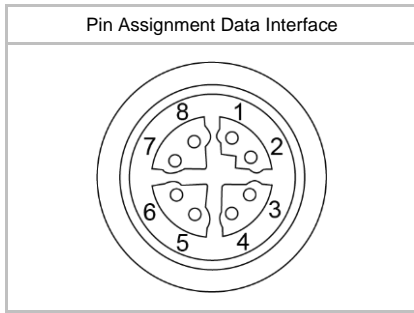
|                     |   |
|---------------------|---|
| Image Buffer        | 1024 MB<br>2096 Images (Trigger Mode) / 1 Image (Free Running Mode) |
| Non-volatile Memory | 128 kb  |

## Network Interface Data

|                           |  |
|---------------------------|--|
| Interface                 | 10 Gigabit Ethernet 10GBASE-T 10.000 Mbits/sec<br>5 Gigabit Ethernet 5GBASE-T 5.000 Mbits/sec<br>2.5 Gigabit Ethernet 2.5GBASE-T 2.500 Mbits/sec<br>Gigabit Ethernet 1000BASE-T 1.000 Mbits/sec<br>Fast Ethernet 100BASE-T 100 Mbits/sec |
| Ethernet IP Configuration | Persistent IP, DHCP, LLA   |
| Packet Size               | 576 ... 9000 Byte, Jumbo Frames supported  |

## GigE Vision® Features

|   |   |
|---|---|
| Events<br>Transmission via Asynchronous Message Channel | DeviceTemperatureStatusChanged, EventLost, ExposureEnd, ExposureStart, FrameEnd, FrameStart, FrameTransferSkipped, Error, GigEVisionHeartbeatTimeout, Line0..3 FallingEdge, Line0..3 RisingEdge, PrimaryApplicationSwitch, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped |
| Action CMD  | yes, Action 1 for Trigger   |
| Frame Counter   | up to 2 <sup>32</sup>   |
| Payload Size  | 0 ... 992624 Byte   |
| Timestamp   | 64 bit, resolution in nsec, increment = 8   |
| Packet Delay  | 0 .. 2 <sup>32</sup> - 1 nsec   |
| Packet Resend   |   |
| GigE Vision   | v2.0  |



## Interfaces and Connectors

|  |  |  |                           |
|--|--|--|---------------------------|
| Data and Power Interface                           | 10 Gigabit Ethernet                                  | Transfer Rate                                    | 10.000 Mbits/sec          |
|  | 5 Gigabit Ethernet                                   | Transfer Rate                                    | 5.000 Mbits/sec           |
| 2.5 Gigabit Ethernet                               | Transfer Rate  | 2.500 Mbits/sec                                  |                           |
|  | Gigabit Ethernet                                     | Transfer Rate                                    | 1.000 Mbits/sec           |
| Fast Ethernet                                      | Transfer Rate  | 100 Mbits/sec                                    |                           |
| Connector:   | M12 / 8-pol x-coded<br>(SACC-CI-M12FS-8CON-L180-10G) |  |                           |
| Assignment:  | 1 - MX1+   | 2 - MX1-   |                           |
|  | 3 - MX2+   | 4 - MX2-   |                           |
|  | 5 - MX4+   | 6 - MX4-   |                           |
|  | 7 - MX3-   | 8 - MX3+   |                           |
| Process Interface                                  | Connector:   | M12/12-pin a-coded<br>(SACC-CI-M12MS-12CON-L180) |                           |
|  | Assignment:  | 1 - Power Vcc                                    | 2 - GND (Power)           |
|  |  | 3 - IN1 (Line0)                                  | 4 - OUT1 (Line4)          |
|  |  | 5 - IN2 (Line1)                                  | 6 - OUT2 (Line5)          |
|  |  | 7 - OUT3 (Line6)                                 | 8 - RS232 TxD<br>(Line2)  |
|  |  | 9 - OUT4 (Line7)                                 | 10 - RS232 RxD<br>(Line3) |
|  |  | 11 - GND (IO)                                    | 12 - Power (IO)           |
| Lens Control Interface<br>(located within support) | Connector:   | 6 pin<br>(JST BM06B-SRSS-TB)                     |                           |
|  | Assignment:  | 1 - Power (lens)                                 | 2 - GND (lens)            |
|  |  | 2 - UART RxD                                     | 4 - UART TxD              |
|  |  | 5 - NC   | 6 - NC                    |

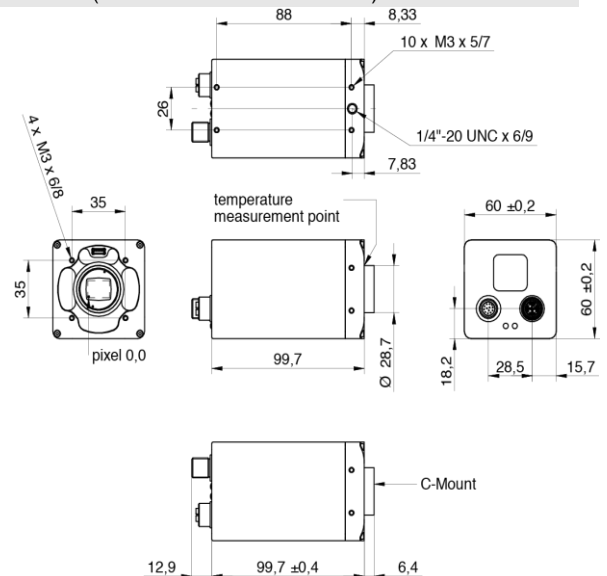
## Optical Data

|                |         |
|----------------|---------|
| Lens Mount     | C-Mount |
| Optical Filter | -       |

## Mechanical Data

|         |   |
|---------|---|
| Housing | aluminum, hard anodized,<br>IP40 (with mounted lens and 10 GigE cable)<br>IP65/67 (with mounted tube and cable) |
|---------|---|

### Dimensions



|        |       |
|--------|-------|
| Weight | 485 g |
|--------|-------|

## Environmental Data

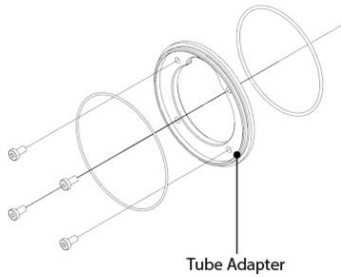
|                             |   |
|-----------------------------|---|
| Storage Temperature         | -10 °C ... + 70 °C  |
| Operating Temperature<br>*) | 0 °C ... +62 °C @ T = Measurement Point or<br>+10 °C ... +70 °C @ internal Temperature Sensor<br>Ambient temperature above 30 °C requires heat<br>dissipation measures. |
| Int. Temperature<br>Sensor  | yes, accuracy:<br>±2 °C (typ) -40 °C ... 0°C<br>±1 °C (typ) 0 °C ... +85 °C   |
| Humidity                    | 10 % ... 90 % non-condensing  |

\*) the maximum temperature for Sony sensor characteristics (sensor performance) are guaranteed up to 50°C @ Measurement Point or 58°C @ internal temperature sensor

## LED Signaling

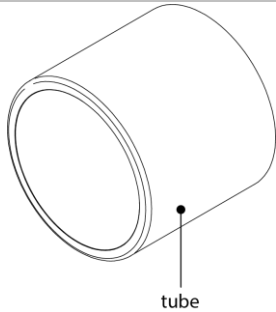
|     |              |           |
|-----|--------------|-----------|
| LED | Green flash  | RX active |
|     | Green        | Link ON   |
|     | Yellow       | Error     |
|     | Yellow flash | TX active |

**Optional accessories for IP65/67 protection (ordered separately)**

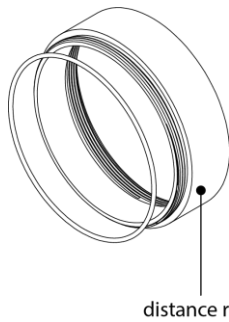


including seals and screws

| Article Number | Diameter | Length |
|----------------|----------|--------|
| 11193125       | Ø 65 mm  | 2 mm   |
| 11704315       | Ø 92 mm  | -4 mm  |



| Article Number | Diameter | Cover Glass                     | Length |
|----------------|----------|---------------------------------|--------|
| 11185374       | Ø 65 mm  | Acryl                           | 58 mm  |
| 11195426       | Ø 65 mm  | Tempered laminated safety glass | 58 mm  |
| 11704312       | Ø 92 mm  | Acryl                           | 70 mm  |



including seal

| Article Number | Diameter | Length |
|----------------|----------|--------|
| 11185376       | Ø 65 mm  | 6 mm   |
| 11185375       | Ø 65 mm  | 12 mm  |
| 11198906       | Ø 65 mm  | 36 mm  |
| 11704395       | Ø 92 mm  | 6 mm   |
| 11704397       | Ø 92 mm  | 12 mm  |
| 11704394       | Ø 92 mm  | 36 mm  |

**Electrical Data**

|                                    |   |
|------------------------------------|---|
| Power Supply (ext.)                | VCC: 24 V DC ± 20%<br>I: 470 mA   |
| Power over Ethernet                | NA  |
| Power Consumption                  | approx. 11.3 W @ 24VDC and 1609 fps<br>(Factory Setting "Default")  |
| Digital Input                      | Isolated, short circuit protection<br>U <sub>IN(low)</sub> : 0.0 ... 4.5 VDC<br>U <sub>IN(high)</sub> : 11.0 ... 30.0 VDC<br>I <sub>IN</sub> : 3.0 ... 10.0 mA<br>min. Impulse Length: 2.0 µsec   |
| Digital Output                     | Isolated, short circuit protected<br>U <sub>EXT</sub> : 12 ... 48 V DC [Power (IO)]<br>I <sub>OUT</sub> : Continuously: max. 1.5 A<br>PWM t <sub>ON</sub> max 1s /<br>Duration max 40%: max. 2.5 A<br>(Max. current for each output itself or sum of all outputs)<br><br>t <sub>ON</sub> = < 0.2 µsec                      t <sub>OFF</sub> = < 0.2 µsec<br>max. Frequency: 500 kHz |
| GPIO                               | NA  |
| RS232<br>(reserved for future use) | RS232 compatible, not optically isolated<br>Baud Rate: up to 115200, data bits: 8, stop bits: 1,<br>Parity: none, flow control: none  |
| Liquid lens control                | Support for Corning (Varioptic) Caspian C-39N0 series<br>(C-C-39N0-160-R33, C-C-39N0-250-R33, up to 2/3")<br>VCC: 5 V DC ± 20% , I: 100 mA, UART 3.3 V  |

**Conformity**

|                            |  |
|----------------------------|--|
| Conformity                 | CE, RoHS, REACH, EAC, UL recognized, KC                              |
| KC Registration No. / Date | R-R-BkR-VLXT-71MI / 2021-03-18                                       |
| MTBF                       | 26 years @ T = 45 °C / 17 years @ T = 60 °C<br>T = Measurement Point |

**GenICam™ Features**

|                      |   |
|----------------------|---|
| Short Exposure Range | yes, ShortExposureTimeEnable<br>Short Exposure Range 1 µsec ... 60 sec<br>Default Exposure Range 7 µsec ... 60 sec  |
| Timer                | Timer Selector: Timer 1<br>TimerTriggerSource:<br>Line0, SoftwareTrigger, ExposureStart, ExposureEnd,<br>FrameTransferSkipped, TriggerSkipped, Action 1 and Off<br>TimerDelay: 0 µsec ... 2 sec, Step Size: 1 µsec<br>TimerDuration: 4 µsec ... 2 sec, Step Size: 1 µsec  |
| Counter              | Counter Selector: Counter 1, Counter 2<br>CounterValue: 0 ... 65535<br>Counter Event Source: Counter1End or Counter2End,<br>ExposureActive, FrameTransferSkipped, FrameTrigger,<br>TriggerSkipped and Off<br>Counter Reset Source: Counter1End, Counter2End, Line0<br>and Off   |
| Sequencer            | Sequencer Characteristics:<br>up to 128 sets,<br>up to 4 possible paths for triggered set transitions,<br>6 trigger sources: Counter1End, Counter2End,<br>ExposureActive, Line0, ReadoutActive, Timer1End<br>Sequencer Parameters for Exposure, Gain, Trigger, ROI<br>and Output:<br>ExposureTime, CounterDuration, CounterEventActivation,<br>CounterEventSource, CounterResetSource,<br>ExposureMode, ExposureTime, Gain, Height, OffsetX,<br>OffsetY, TriggerMode, UserOutputValue,<br>UserOutputValueAll, Width |

## GenICam™ Features

|                              |   |
|------------------------------|---|
| User Sets                    | Factory Settings: UserSet0 (read only)<br>Freely Programmable: UserSet1, UserSet2, UserSet3<br>Parameters: any user definable Parameter                           |
| Acquisition Abort            | Delay up to 1.1 msec  |
| Chunk Data                   | yes,<br>Chunk Selector: Binning, Black Level, DeviceTemperature, ExposureTime, FrameID, Gain, Height, Image, ImageControl, LineStatusAll                          |
| Device Temperature           | InHouse<br>Event generation for Normal to High, High to Exceeded and Exceeded to Normal<br>Exceeded (no image transfer) = max. internal temperature sensor + 1 °C |
| Device Link Throughput Limit | yes, up to max. Device Link Speed   |
| Custom Data                  | yes, 128 Byte   |
| SFNC Version                 | v2.4.0  |

## Factory Settings after Start-Up

|                                |  |
|--------------------------------|--|
| Trigger Mode                   | Off (Free Running)   |
| Analog Controls                | Exposure Time: 4 msec, Gain: 0 dB, Offset: 0                             |
| Pixel Format                   | Mono8  |
| Partial Scan                   | Off  |
| Acquisition Frame Rate         | Off  |
| Timer/Counter/Sequencer        | Off  |
| Defect Pixel Correction        | ON   |
| Fixed Pattern Noise Correction | -  |
| Digital Input                  | Line0 .. 1, invert = false, line format = Tri State                      |
| Digital Output                 | Line4 .. 7, invert = false, line source = Off, line format = Open Source |
| GPIO                           | NA   |
| TriggerSource                  | All  |

## ROI Frame Rates, min Exposure, 8 bit sensor readout, Mono8 or BayerRG8

|           | Resolution | max. fps acquisition | max. fps interface <sup>2)</sup> |
|-----------|------------|----------------------|----------------------------------|
| SVGA      | 800 x 600  | 1612                 | 1612                             |
| VGA       | 640 x 480  | 1929                 | 1929                             |
| CIF       | 352 x 288  | 2744                 | 2744                             |
| QCIF      | 176 x 144  | -                    | -                                |
| Full Line | 800 x 512  | 1836                 | 1836                             |
|           | 800 x 256  | 2946                 | 2943                             |
|           | 800 x 128  | 4230                 | 4230                             |
|           | 800 x 64   | 5394                 | 5391                             |
|           | 800 x 32   | 6235                 | 6234                             |
|           | 800 x 16   | 6783                 | 6775                             |
|           | 800 x 8    | 6785                 | 6781                             |
|           | 800 x 4    | 6785                 | 6782                             |
|           | 800 x 2    | 6784                 | 6772                             |
|           | 800 x 1    | -                    | -                                |

<sup>2)</sup> depends on the used interface speed