

Sensor Information

| | |
|------------|------------------------------|
| Model Name | Sony IMX265 Gen2 |
| Type | 1/1.8" progressive scan CMOS |
| Shutter | Global Shutter |
| Resolution | 2048 x 1536 pixels |
| Scan Area | 7.06 mm x 5.29 mm |
| Pixel Size | 3.45 μm x 3.45 μm |

Data Quality

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

| | |
|---------------------------|--|
| Dark Noise (σ) | 2 e- typical |
| Saturation | 9500 e- typical |
| Dynamic Range | 71 dB typical |
| SNR | 40 dB typical |
| Quantum efficiency η | 47% @ 465 nm, 47% @ 536 nm, 54% @ 631 nm typical |

Acquisition

| | | | |
|---|--|-------------|---|
| Resolution | 2048 px x 1536 px | | |
| Interface Frame Rate (depends on used interface performance) | Format | Resolution | max. Frame Rate (@ Trigger Mode) ²⁾ |
| | Full Frame | 2048 x 1536 | 39 fps |
| | Binning 2x2 | 1024 x 768 | 56 fps |
| | Binning 2x1 | 1024 x 1536 | 56 fps |
| | Binning 1x2 | 2048 x 768 | 56 fps |
| Acquisition Frame Rate ¹⁾ (Burst Mode) | 56 fps $t_{\text{readout}} = 17.9 \text{ msec}$ (max. Res. Full Frame) @ 12 bit | | |
| Pixel Formats | BayerRG8, BayerRG10, BayerRG12, BayerRG12p Mono8, Mono10, Mono12, Mono12p, RGB8, BGR8 | | |
| Partial Scan | True Partial Scan with increasing Frame Rate on Y direction, Region of Interest (ROI) arbitrary Width: minimum 16, increment 16 Height: minimum 2, increment 2 | | |
| Adjustable Acquisition Frame Rate | Off or 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 | | |

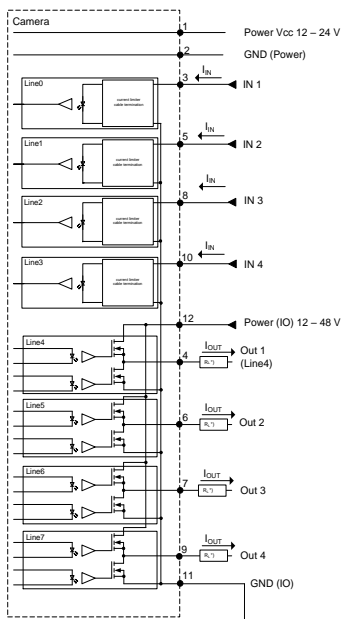
Image Pre-Processing

| | |
|-------------------|--|
| Analog Controls | Exposure Time (1 μsec ... 60 sec Step Size 1 μsec) Gain (0...48 dB), Offset (0 ... 255 LSB 12 bit) |
| Auto Function | ExposureAuto and GainAuto with BrightnessAutoPriority based on BrightnessAuto ROI BalanceWhiteAuto and ColorTransformationAuto based on BalanceWhiteAuto ROI |
| LUT | Luminance (12 bit) |
| Color Models | Mono, Raw Bayer, RGB and BGR |
| Color Processing | Integrated color processor for high quality color calculation |
| Color Adjustment | Manual White Balance Automatic White Balance (Once or Continuous) based on Region of Interest (ROI) |
| Color Enhancement | Color Transformation to sRGB color space by optimized Matrix for 3000 K, 5000 K, 6500 K and 9500 K Lightsource or User defined Matrix |
| Color Tolerance | - |

¹⁾ Sensor readout, different from pixel format

²⁾ depends on the used interface

Digital Input / Output: principle circuit diagram



Trigger Mode: Start up time and valid Trigger

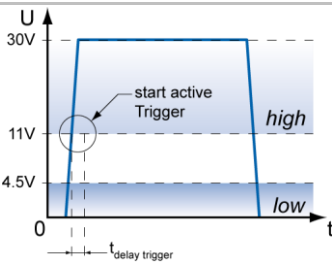


Image Pre-Processing

| | |
|------------------------------|--|
| Binning Horizontal | 1 or 2 |
| Binning Vertical | 1 or 2 |
| Image Flipping | Horizontal, vertical |
| Defect Pixel Correction | via Defect Pixel List with up to 512 Pixel Coordinates |
| Fix Pattern Noise Correction | - |

Process Synchronization

| | |
|----------------------|---|
| Trigger Mode | Off (Free Running), On (Trigger) |
| Trigger Overlap Type | Readout |
| Trigger Sources | Hardware (Line0, 1, 2, 3), Software, Action CMD (Action 1), All or Off fixed Trigger Delay out of t _{readout} : ¹⁾ 66,7 µsec @ 12 bit max. Trigger Delay during t _{readout} : ¹⁾ 73,1 µsec @ 12 bit |
| Trigger Delay | 0 ... 2 sec, Tracking and buffering of up to 256 triggers |
| External Flash Sync | via Exposure Active t _{delay flash} ≤ 3 µsec, t _{duration} = t _{exposure} |
| Encoder Function | yes, via Counter and Trigger Source |
| PTP Function | - |

Digital I/Os

| | |
|---------------------|---|
| Lines | Input: Line 0 .. 3, Output: Line 4 .. 7, GPIO: no |
| 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 PWM Mode: Off, One Pulse, FixedFrequency PWM feature: PWMDuration, PWMDutyCycle Configuration Mode for lightning protection: MaxPWMDuration, MaxPWMDutyCycle |
| Line Debouncer | Low and high signal separately selectable Debouncing Time 0 ... 5 msec, Step Size: 1 µsec |

Memory

| | |
|---------------------|--|
| Image Buffer | 72 MB 8 Images (Trigger Mode) / 1 Image (Free Running Mode) |
| Non-volatile Memory | 128 kb |

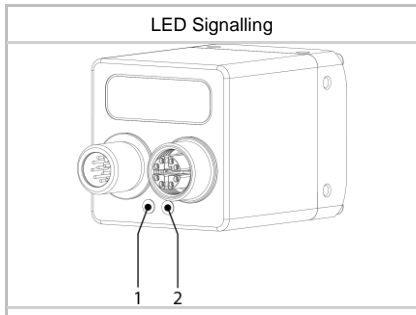
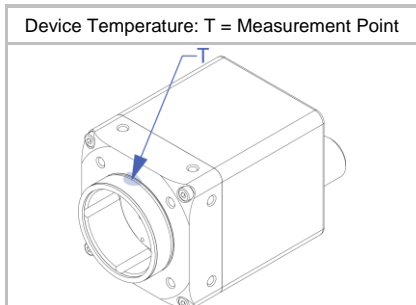
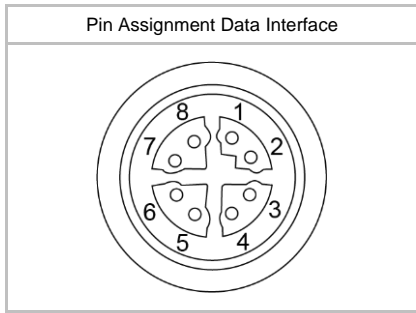
Network Interface Data

| | |
|---------------------------|--|
| Interface | Gigabit Ethernet 1000BASE-T 1000 Mbits/sec Fast Ethernet 100 BASE-T 100 Mbits/sec |
| Ethernet IP Configuration | Persistent IP, DHCP, LLA |
| Packet Size | 576 ... 9000 Byte, Jumbo Frames supported |

GigE Vision® Features

| | |
|---|---|
| Events Transmission via Asynchronous Message Channel | DeviceTemperatureStatusChanged, EventLost, ExposureEnd, ExposureStart, FrameEnd, FrameStart, FrameTransferSkipped, GigEVisionError, GigEVisionHeartbeatTimeOut, PrimaryApplicationSwitch, Line0..7 FallingEdge, Line0..7 RisingEdge, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped |
| Action CMD | yes, Action 1 for Trigger |
| Frame Counter | up to 2 ³² |
| Payload Size | 0 ... 9437408 Byte |
| Timestamp | 64 bit, resolution in nsec, increment = 8 |
| Packet Delay | 0 .. 2 ³² - 1 nsec |
| Packet Resend | Resend Buffer: 72 MB (8 Images) |
| GigE Vision | v2.0 (v1.2 backward compatible) |

¹⁾ Sensor readout, different from pixel format



Interfaces and Connectors

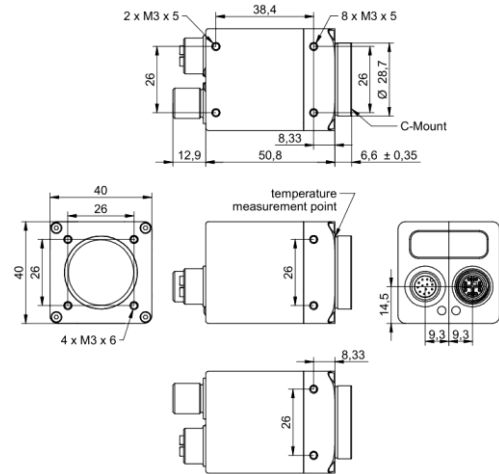
| | | | |
|--------------------------|------------------|--|------------------|
| Data and Power Interface | Gigabit Ethernet | Transfer Rate | 1000 Mbits/sec |
| | Fast Ethernet | Transfer Rate | 100 Mbits/sec |
| | Connector: | M12 / 8-pol x-coded (SACC-CI-M12FS-8CON-L180-10G) | |
| | Assignment: | 1 - MX1+ | 2 - MX1- |
| | | 3 - MX2+ | 4 - MX2- |
| | | 5 - MX4+ | 6 - MX4- |
| | | 7 - MX3- | 8 - MX3+ |
| Process Interface | Connector: | M12/12-pin a-coded (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 - IN3 (Line2) |
| | | 9 - OUT4 (Line7) | 10 - IN4 (Line3) |
| | | 11 - GND (IO) | 12 - Power (IO) |

Optical Data

| | |
|----------------|---------------|
| Lens Mount | C-Mount |
| Optical Filter | IR cut filter |

Mechanical Data

| | |
|------------------|--|
| Housing | aluminum, hard anodized |
| Protection Class | IP40 (with mounted lens and GigE cable) IP54 (with mounted lens and GigE cable) IP65/67 (with mounted tube and cable) IP69k (with stainless steel housing system) |
| Weight | 137 g |
| Dimensions | |



Environmental Data

| | |
|----------------------------|--|
| Storage Temperature | -10 °C ... +70 °C |
| Operating Temperature | 0 °C ... +65 °C @ T = Measurement Point or) 0 °C ... +70 °C @ internal Temperature Sensor Ambient temperature above 45 °C requires heat dissipation measures. |
| Int. Temperature Sensor | yes, accuracy: ±2 °C (typ) -40 °C ... 0 °C ±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 55°C @ Measurement Point or 59°C @ internal temperature sensor

LED Signalling

| | | | |
|-----|-------|---------------|-----------|
| LED | LED 1 | Yellow static | Error |
| | | Yellow flash | TX active |
| | LED 2 | Green static | Link ON |
| | | Green flash | RX active |

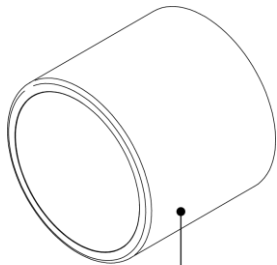
Optional accessories for IP65/67 protection (ordered separately)



tube adapter

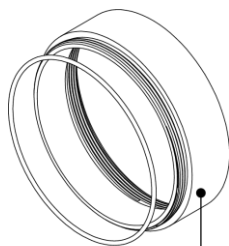
including seals and screws

| Article Number | Diameter | Length |
|----------------|-----------|---------|
| 11185373 | Ø 49,5 mm | 5,25 mm |
| 11185377 | Ø 65 mm | 5,25 mm |



tube

| Article Number | Diameter | Cover Glass | Length |
|----------------|-----------|---------------------------------|--------|
| 11185370 | Ø 49,5 mm | Acryl | 44 mm |
| 11185374 | Ø 65 mm | | 58 mm |
| 11195425 | Ø 49,5 mm | Tempered laminated safety glass | 44 mm |
| 11195426 | Ø 65 mm | | 58 mm |



distance ring

including seal

| Article Number | Diameter | Length |
|----------------|-----------|--------|
| 11185372 | Ø 49,5 mm | 6 mm |
| 11185371 | Ø 49,5 mm | 12 mm |
| 11211571 | Ø 49,5 mm | 36 mm |
| 11185376 | Ø 65 mm | 6 mm |
| 11185375 | Ø 65 mm | 12 mm |
| 11198906 | Ø 65 mm | 36 mm |

Electrical Data

| | |
|---------------------|--|
| Power Supply (ext.) | VCC: 12 ... 24 V DC ± 20% I: 101 ... 203 mA |
| Power over Ethernet | Class 1 device VCC: 36 ... 57 V DC I: 66 mA @ 48 VDC |
| Power Consumption | approx. 2.4 W @ 12VDC and 39 fps approx. 3.1 W @ 48 VDC (PoE) and 39 fps (Factory Setting "Default") |
| Digital Input | Isolated, short circuit protection $U_{IN(low)}$: 0.0 ... 4.5 VDC $U_{IN(high)}$: 11.0 ... 30.0 VDC I_{IN} : 3.0 ... 10.0 mA min. Impulse Length: 2.0 µsec |
| Digital Output | Isolated, short circuit protected U_{EXT} : 12 ... 48 V DC [Power (IO)] (See documentation for guidelines when using >30V.) I_{OUT} : Continuously: max. 1.5 A PWM t_{ON} max 1s / Duration max 40%: max. 2.5 A (Max. current can be used with one output or as a sum of all outputs used.) t_{ON} = < 0.2 µsec t_{OFF} = < 0.2 µsec max. Frequency: 500 kHz |
| GPIO | no |

Conformity

| | |
|----------------------------|--|
| Conformity | CE, RoHS, REACH, KC, EAC |
| KC Registration No. / Date | R-R-BkR-VCXG-51MI / 24.12.2020 |
| MTBF | 44 years @ T = 45 °C / 29 years @ T = 60 °C T = Measurement Point |

GenICam™ Features

| | |
|----------------------|--|
| Short Exposure Range | yes, ShortExposureTimeEnable Short Exposure Range 1 µsec ... 60 sec Default Exposure Range 15 µsec ... 60 sec |
| Timer | Timer Selector: Timer 1 TimerTriggerSource: Line0, SoftwareTrigger, ExposureStart, ExposureEnd, FrameTransferSkipped, TriggerSkipped, Off TimerDelay: 0 µsec ... 2 sec, Step Size: 1 µsec TimerDuration: 4 µsec ... 2 sec, Step Size: 1 µsec |
| Counter | Counter Selector: Counter 1, Counter 2 CounterValue: 0 ... 65535 Counter Event Source: Counter1End or Counter2End, ExposureActive, FrameTransferSkipped, FrameTrigger, TriggerSkipped, Line0..3 and Off Counter Reset Source: Counter1End, Counter2End, Line0..3 and Off |
| Sequencer | Sequencer Characteristics: up to 128 sets, up to 4 possible paths for triggered set transitions, 6 trigger sources: Counter1End, Counter2End, ExposureActive, Line0..3, ReadoutActive, Timer1End Sequencer Parameters for Exposure, Gain, Trigger, ROI and Output: ExposureTime, CounterDuration, CounterEventActivation, CounterEventSource, CounterResetSource, ExposureMode, ExposureTime, Gain, Height, OffsetX, OffsetY, TriggerMode, UserOutputValue, UserOutputValueAll, Width |

GeniCam™ Features

| | |
|------------------------------|--|
| User Sets | Factory Settings: UserSet0 (read only) Freely Programmable: UserSet1, UserSet2, UserSet3 Parameters: any user definable Parameter |
| Acquisition Abort | Delay up to 17.9 msec |
| Chunk Data | yes, Chunk Selector: Binning, BlackLevel, CounterValue, DeviceTemperature, ExposureTime, FrameID, Gain, Height, Image, ImageControl, LineStatusAll, OffsetX, OffsetY, PixelFormat, SequencerSetActive, Timestamp, Width |
| Device Temperature | InHouse Event generation for Normal to High, High to Exceeded and Exceeded to Normal 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 |

Factory Settings after Start-Up

| | |
|--------------------------------|--|
| Trigger Mode | Off (Free Running) |
| Analog Controls | Exposure Time: 4 msec, Gain: 0 dB, Offset: 0 |
| Pixel Format | BayerRG8 |
| Partial Scan | Off |
| Acquisition Frame Rate | Off |
| Timer/Counter/Sequencer | Off |
| Defect Pixel Correction | ON |
| Fixed Pattern Noise Correction | - |
| Digital Input | Line0 .. 3, invert = false, line format = Tri State |
| Digital Output | Line4 .. 7, invert = false, line source = Off, line format = Open Source |
| GPIO 1/2 | no |
| TriggerSource | All |

Partial Scan @ FullFrame, min Exposure, Mono8 (monochrome camera) or BayerRG8 (color camera)

| | Resolution | max. fps acquisition | max. fps interface ²⁾ |
|----------|-------------|----------------------|----------------------------------|
| Full HD | 1920 x 1080 | 78 | 59 |
| SXGA | 1280 x 1024 | 83 | 83 |
| HD720 | 1280 x 720 | 116 | 116 |
| XGA | 1024 x 768 | 109 | 109 |
| SVGA | 800 x 600 | 137 | 137 |
| VGA | 640 x 480 | 169 | 169 |
| CIF | 352 x 288 | 267 | 267 |
| QVGA | 320 x 240 | 312 | 312 |
| QCIF | 176 x 144 | 472 | 472 |
| LineScan | 2048 x 1024 | 83 | 58 |
| | 2048 x 512 | 159 | 117 |
| | 2048 x 256 | 295 | 235 |
| | 2048 x 128 | 516 | 470 |
| | 2048 x 64 | 824 | 824 |
| | 2048 x 32 | 1173 | 1173 |
| | 2048 x 16 | 1488 | 1488 |
| | 2048 x 8 | 1719 | 1719 |
| | 2048 x 4 | 1864 | 1864 |
| | 2048 x 2 | 1945 | 1945 |
| | 2048 x 1 | - | - |

²⁾ depends on the used interface