

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

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



### Sensor Information

Model Name	Sony IMX273
Type	1/2.9" progressive scan CMOS
Shutter	Global Shutter
Resolution	1440 x 1080 pixels
Scan Area	4.96 mm x 3.72 mm
Pixel Size	3.45 μm x 3.45 μm

### Data Quality

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

Dark Noise ( $\sigma$ )	2 e- typical
Saturation	9500 e- typical
Dynamic Range	71 dB typical
SNR	40 dB typical
Quantum efficiency $\eta$	47 % @ 465 nm, 58 % @ 536 nm, 53 % @ 631 nm typical

### Acquisition

Resolution	1440 px x 1080 px		
Interface Frame Rate (depends on used interface performance)	Format	Resolution	max. Frame Rate (@ Trigger Mode) <sup>2)</sup>
	Full Frame	1440 x 1080	79 fps
	Binning 2x2	720 x 540	120 fps
	Binning 2x1	720 x 1080	120 fps
	Binning 1x2	1440 x 540	120 fps
Acquisition Frame Rate <sup>1)</sup> (Burst Mode)	121 fps   $t_{readout} = 8.26$ msec (max. Res. Full Frame) @ 10 bit		
	111 fps   $t_{readout} = 9.01$ 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

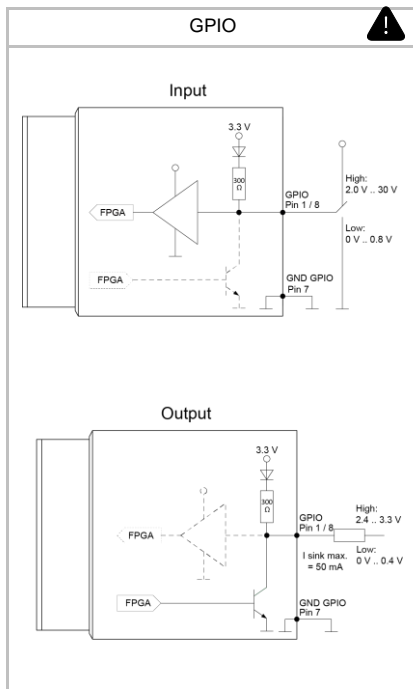
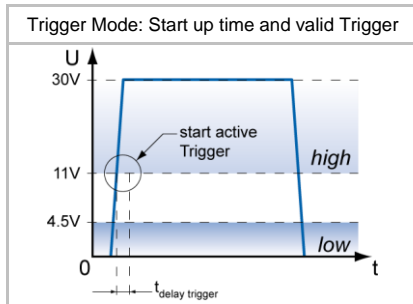
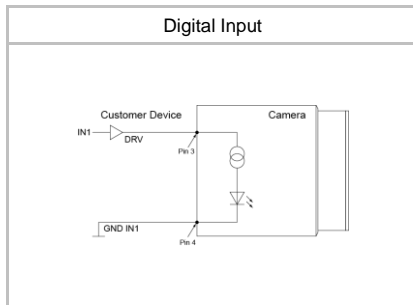
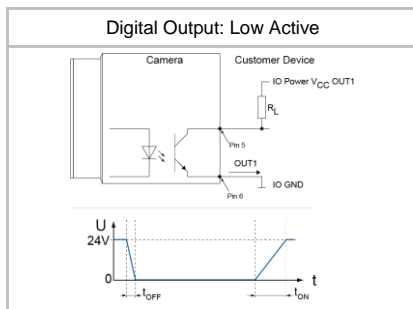
**Acquisition Status**  
 AcquisitionActive, AcquisitionTrigger Wait

**Exposure Mode**  
 Timed

**Readout Mode**  
 Overlapped, Sequential

### Image Pre-Processing

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



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## 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), Software, Counter 1, 2 End, Action CMD (Action 1), All or Off fixed Trigger Delay out of t <sub>readout</sub> : <sup>1)</sup> 54,9 μsec @ 10 bit 56,8 μsec @ 12 bit max. Trigger Delay during t <sub>readout</sub> : <sup>1)</sup> 57,3 μsec @ 10 bit 60 μsec @ 12 bit
Trigger Delay	0 ... 2 sec, Tracking and buffering of up to 256 triggers
External Flash Sync	via Exposure Active t <sub>delay flash</sub> ≤ 3 μsec, t <sub>duration</sub> = t <sub>exposure</sub>
Encoder Function	yes, via Counter and Trigger Source
PTP Function	-

## Digital I/Os

Lines	Input: Line 0, Output: Line3, GPIO: Line 1, Line 2
Output Sources	Off, ExposureActive, Timer1, ReadoutActive, UserOutput 1-3 and TriggerReady
Line Debouncer	Low and high signal separately selectable Debouncing Time 0 ... 5 msec, Step Size: 1 μsec

## Memory

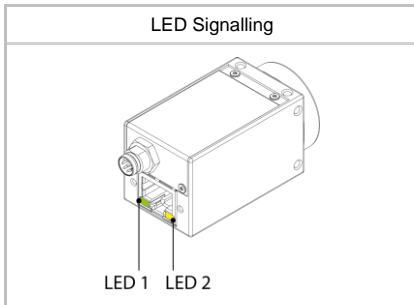
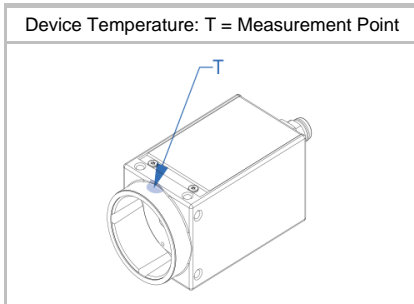
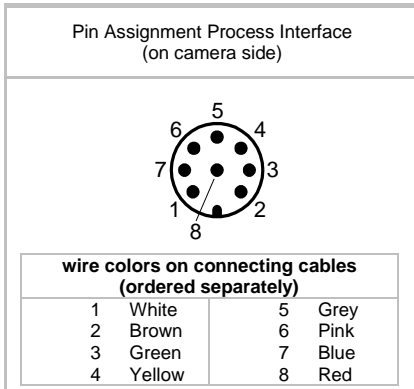
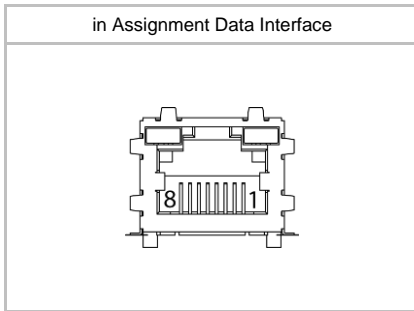
Image Buffer	36 MB 8 Images (Trigger Mode) / 1 Image (Free Running Mode)
Non-volatile Memory	128 kb

## 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	DeviceTemperatureStatusChanged, EventLost, ExposureEnd, ExposureStart, FrameEnd, FrameStart, FrameTransferSkipped, GigEVisionError, GigEVisionHeartbeatTimeOut, PrimaryApplicationSwitch, Line0..2 FallingEdge, Line0..2 RisingEdge, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped
Transmission via Asynchronous Message Channel	
Action CMD	yes, Action 1 for Trigger
Frame Counter	up to 2 <sup>32</sup>
Payload Size	0 ... 4665824 Byte
Timestamp	64 bit, resolution in nsec, increment = 8
Packet Delay	0 .. 2 <sup>32</sup> - 1 nsec
Packet Resend	Resend Buffer: 36 MB (8 Images)
GigE Vision	v2.0 (v1.2 backward compatible)



## Interfaces and Connectors

Data and Power Interface	Gigabit Ethernet	Transfer Rate	1000 Mbits/sec
	Fast Ethernet	Transfer Rate	100 Mbits/sec
	Connector:	8P8C Modular Jack (RJ45), screw lock type	
Process Interface	Connector:	M8/8-pin (SACC-DSI-M8MS-8CON-M8-L180)	
	Assignment:	1 - MX1+ 3 - MX2+ 5 - MX3- 7 - MX4+	2 - MX1- 4 - MX3+ 6 - MX2- 8 - MX4-
	Assignment:	1 - GPIO (Line2) 3 - IN1 (Line0) 5 - Power VCC OUT 7 - GND (Power, GPIO)	2 - Power Vcc 4 - GND IN1 6 - OUT1 (Line3) 8 - GPIO (Line1)

Caution



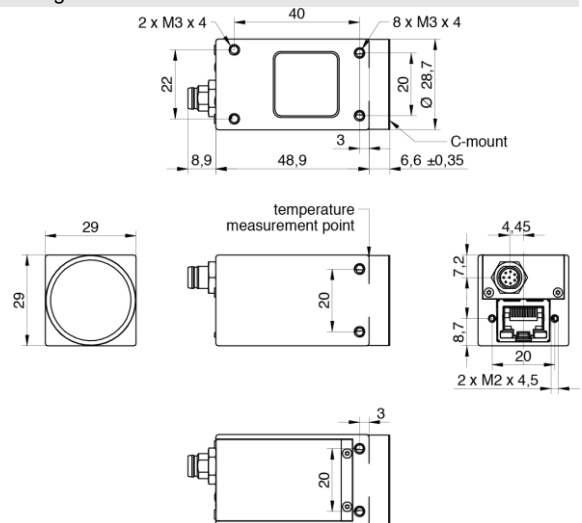
\* Note GPIOs: Ground loops are to be avoided and can lead to destruction of the device.

## Optical Data

Lens Mount	C-Mount
Optical Filter	IR cut filter

## Mechanical Data

Housing	Zinc die casting, nickel-chrome-plated
Protection Class	IP40 (with mounted lens and GigE cable)
Weight	120 g
Dimensions	



## Environmental Data


Storage Temperature	-10 °C ... + 70 °C
Operating Temperature	0 °C ... +65 °C @ T = Measurement Point or 0 °C ... +75 °C @ internal Temperature Sensor Ambient temperature above 34 °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

<sup>1)</sup> the maximum temperature for Sony sensor characteristics (sensor performance) are guaranteed up to 50 °C @ Measurement Point or 60 °C @ internal temperature sensor

## LED Signalling

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

## Electrical Data

Power Supply (ext.)	VCC: 12 ... 24 V DC $\pm$ 20% I: 100 ... 202 mA
Power over Ethernet	Class 1 device VCC: 36 ... 57 V DC I: 62 mA @ 48 VDC
Power Consumption	approx. 2.4 W @ 12VDC and 79 fps approx. 3.0 W @ 48 VDC (PoE) and 79 fps (Factory Setting "Default")
Digital Input	Optocoupler $U_{IN(low)}$ : 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 $\mu$ sec
Digital Output	Optocoupler $U_{EXT}$ : 5 ... 30 V DC $I_{OUT}$ : max. 50 mA $t_{ON}$ = typ. 3 $\mu$ sec $t_{OFF}$ = typ. 40 $\mu$ sec
GPIO	direct, without optocoupler
GPIO used as Input:	$U_{IN(low)}$ : 0.0 ... 0.8 VDC $U_{IN(high)}$ : 2.0 ... 30.0 VDC min. Impulse Length: 2.0 $\mu$ sec
GPIO used as Output:	$U_{Out(low)}$ : 0.0 ... 0.4 VDC ( $I_{sink\ max}$ : 50 mA) $U_{Out(high)}$ : 2.4 ... 3.3VDC ( $I_{max}$ : 1 mA)
Caution 	* The General Purpose I/Os (GPIOs) are not potential-free and do not have an overrun cut-off. Incorrect wiring (overvoltage, undervoltage or voltage reversal) can lead to defects in the electronic system. Ground loops are to be avoided and can lead to destruction of the device.

## Conformity

Conformity	CE, RoHS, REACH, EAC
KC Registration No. / Date	- / -
MTBF	57 years @ T = 45 °C / 37 years @ T = 60 °C T = Measurement Point

## GenICam™ Features

Short Exposure Range	yes, ShortExposureTimeEnable Short Exposure Range 1 $\mu$ sec ... 60 sec Default Exposure Range 15 $\mu$ sec ... 60 sec
Timer	Timer Selector: Timer 1 TimerTriggerSource: Line0, SoftwareTrigger, ExposureStart, ExposureEnd, FrameTransferSkipped, TriggerSkipped, Off TimerDelay: 0 $\mu$ sec ... 2 sec, Step Size: 1 $\mu$ sec TimerDuration: 4 $\mu$ sec ... 2 sec, Step Size: 1 $\mu$ sec
Counter	Counter Selector: Counter 1, Counter 2 CounterValue: 0 ... 65535 Counter Event Source: Counter1End or Counter2End, ExposureActive, FrameTransferSkipped, FrameTrigger, TriggerSkipped, Line0..2 and Off Counter Reset Source: Counter1End, Counter2End, Line0..2
Sequencer	Sequencer Characteristics: up to 128 sets, up to 4 possible pathes for triggered set transitions, 6 trigger sources: Counter1End, Counter2End, ExposureActive, Line0..2, 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 9.1 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

Ethernet IP Configuration	
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, invert = false
Digital Output	Line3, invert = false, line source = Off
GPIO 1/2	Line1, Line2, invert = false, LineMode = Input
TriggerSource	All

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

	Resolution	max. fps acquisition	max. fps interface <sup>2)</sup>
SXGA	1280 x 1024	127	94
HD720	1280 x 720	177	133
XGA	1024 x 768	167	156
SVGA	800 x 600	210	210
VGA	640 x 480	258	258
CIF	352 x 288	405	405
QVGA	320 x 240	472	472
QCIF	176 x 144	708	708
LineScan	1440 x 1024	127	83
	1440 x 512	243	167
	1440 x 256	447	334
	1440 x 128	772	668
	1440 x 64	1212	1212
	1440 x 32	1695	1695
	1440 x 16	2116	2116
	1440 x 8	2415	2415
	1440 x 4	2600	2600
	1440 x 2	2703	2703
	1440 x 1	-	-

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