Baumer
Passion for Sensors

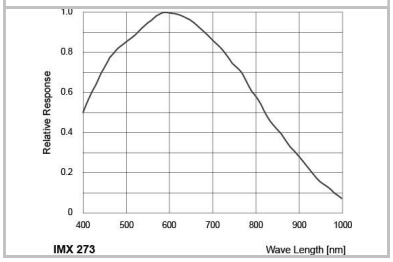
Technical Data
VCXG-15M.I.K34

Digital Monochrome Matrix Camera, GigE
Article No. 11194700
Firmware Revision 2.1

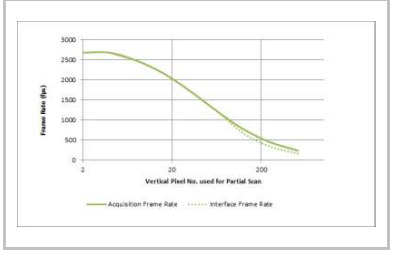




Sensor Graph: Relative Response



Frame Rates / Partial Scan
(Measured at Mono8/BayerRG8-Format)



Sensor Information

Model Name	Sony IMX273
Type	1/2.9″ progressive scan CMOS
Shutter	Global Shutter
Resolution	1440 × 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 (σ)	2 e- typical
Saturation	9500 e- typical
Dynamic Range	71 dB typical
SNR	40 dB typical
Quantum efficiency η	67,3% @ 536 nm typical

Acquisition

Resolution	1440 px x 1080 px		
Interface Frame Rate (depends on used interface performance)	Format	Resolution	max. Frame Rate (@ Trigger Mode) [2]
	Full Frame	1440 x 1080	79 fps
	Binning 2x2	720 x 540	289 fps
	Binning 2x1	720 x 1080	120 fps
	Binning 1x2	1440 x 540	120 fps
Acquisition Frame Rate [1] (Burst Mode)	121 fps | $t_{readout}$ = 8.23 msec (max. Res. Full Frame) @ 10 bit 111 fps | $t_{readout}$ = 8.98 msec (max. Res. Full Frame) @ 12 bit 441 fps | $t_{readout}$ = 2.27 msec (max. Res. Binning 2x2) @ 10 bit 323 fps | $t_{readout}$ = 3.1 msec (max. Res. Binning 2x2) @ 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 32, increment 32 Heigth: minimum 4, increment 4		
Adjustable Acquisition Frame Rate	Off or Off or 0.01 … 2958 Hz		
Acquisition Mode	Continuous, Single Frame and Multi Frame		
Acquisition Status	AcquisitionActive, AcquisitionTrigger Wait		
Exposure Mode	Timed		
Readout Mode	Overlapped, Sequential		

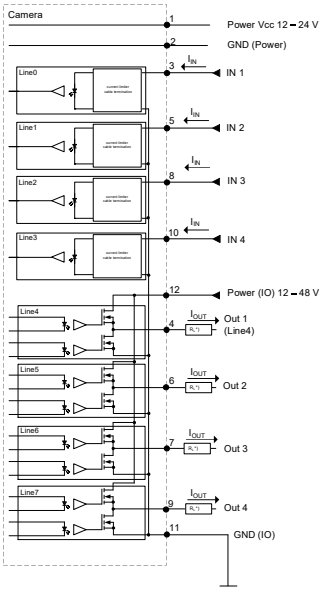
Image Pre-Processing

Analog Controls	Exposure Time (1 µsec … 60 sec | Step Size 1 µsec) Gain (0…48 dB), Offset (0 ... 255 LSB | 12 bit)
Gamma Correction	Gamma (0.1 … 2 | available if LUT is enabled)
LUT	Luminance (12 bit)
Color Models	Mono
Color Processing	-
Color Adjustment	-
Color Enhancement	-
Color Tolerance	-
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	-

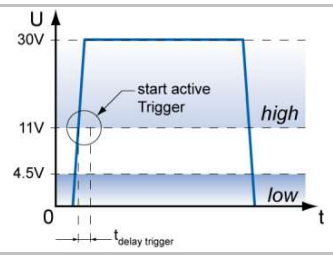
[1] Sensor readout, different from pixel format

[2] depends on the used interface

;Digital Input / Output: principle circuit diagram



Trigger Mode: Start up time and valid Trigger



Process Synchronization

Trigger Mode	Off (Free Running), On (Trigger)
Trigger Overlap Type	Readout
Trigger Sources	Hardware (Line0,1,2,3), Software, All, ActionCMD (Action 1) or Off fixed Trigger Delay out of $t_{readout}$: [1] 54.9 µsec @ 10 bit 56.8 µsec @ 12 bit max. Trigger Delay during $t_{readout}$: [1] 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 $t_{delay\ flash} \leq 1$ µsec, $t_{duration} = t_{exposure}$

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

Network Interface Data

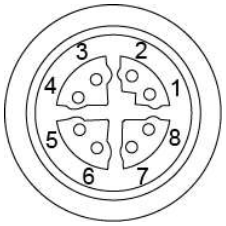
Interface	Gigabit Ethernet 1000BASE-T 1000 Mbits/sec Fast Ethernet 100 BASE-T 100 Mbits/sec
Ethernet IP Configuration	Persistent IP, DHCP, LLA
Packet Size	576 … 9000 Byte, Jumbo Frames supported

GigE Vision® Features

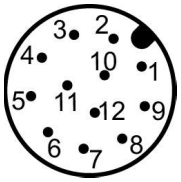
Events Transmission via Asynchronous Message Channel	DeviceTemperatureStatusChanged, EventLost, ExposureEnd, ExposureStart, FrameEnd, FrameStart, FrameTranferSkipped, Error, GigEVisionHeartbeatTimeOut, Line0..3 FallingEdge, Line0..3 RisingEdge, PrimaryApplicationSwitch, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped
Action CMD	yes, Action 1 for Trigger
Frame Counter	up to 2^{32}
Payload Size	0 … 3110600 Byte
Timestamp	64 bit, resolution in nsec, increment = 8
Packet Delay	0 .. 2^{32}– 1 nsec
Packet Resend	Resend Buffer: 24 MB (8 Images)
GigE Vision	v2.0 (v1.2 backward compatible)

[1] Sensor readout, different from pixel format

Pin Assignment Data Interface

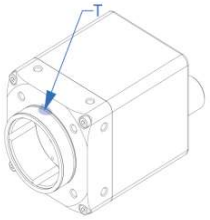


Pin Assignment Process Interface
(on camera side)

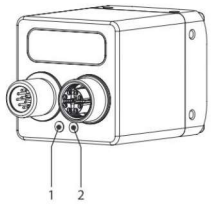


wire colors on connecting cables (ordered separately)			
1	brown	2	blue
3	white	4	green
5	pink	6	yellow
7	black	8	grey
9	red	10	violet
11	grey-pink	12	red-blue

Device Temperature: T = Measurement Point



LED Signalling



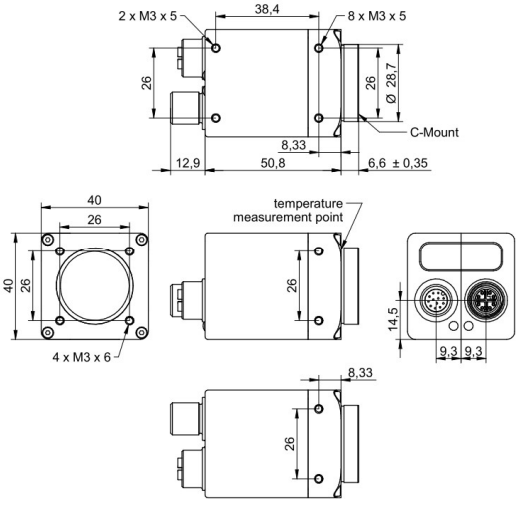
Interfaces and Connectors

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	-

Mechanical Data

Housing	alumium, hard anodized, IP40 (with mounted lens and GigE cable) IP65/67 (with mounted tube and cable)
Dimensions	
Weight	137 g

Environmental Data

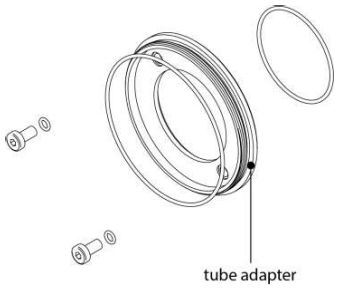
Storage Temperature	-10 °C … + 70 °C
Operating Temperature *)	0 °C … +65 °C @ T = Measurement Point or 0 °C … +70 °C @ internal Temperature Sensor Ambient temperature above 45 °C requires heat dissipation measures.
Int. Temperature Sensor	yes, accuracy: ±2 °C (typ) -40 °C … 0°C ±1 °C (typ) 0 °C ... +85 °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

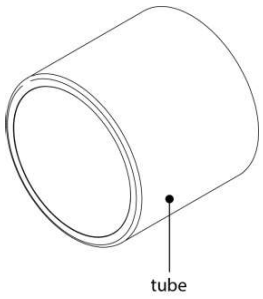
LED	Green flash	RX active
	Green	Link ON
	Yellow	Error
	Yellow flash	TX active

Optional accessories for IP65/67 protection (ordered separately)

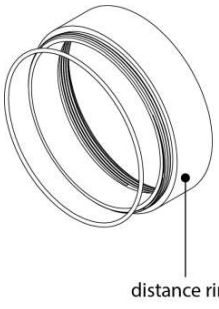


including seals and screws

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



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



including seal

Article Number	Diameter	Length
11185372	Ø 49,5 mm	6 mm
11185371	Ø 49,5 mm	12 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: 100 … 200 mA
Power over Ethernet	Class 1 device VCC: 36 … 57 V DC I: 63 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	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)] I_{OUT}: Continuously: max. 1.5 A PWM t_{ON} max 1s / Duration max 40%: max. 2.5 A (Max. current for each output itself or summery of all outputs) t_{ON} = < 0.2 µsec t_{OFF} = < 0.2 µsec max. Frequency: 500 kHz
GPIO	no

Conformity

Conformity	CE, RoHS, REACh
KC Registration No. / Date	- / -
MTBF	- / - 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 and Off Counter Reset Source: Counter1End, Counter2End, Line0 and Off
Sequencer	Sequencer Characteristics: up to 128 sets, up to 4 possible pathes for triggered set transitions, 6 trigger sources: Counter1End, Counter2End, ExposureActive, Line0, 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: Freely Programmable: Parameters:	UserSet0 (read only) UserSet1, UserSet2, UserSet3 any user definable Parameter
Acquisition Abort	Delay up to 9 msec	
Chunk Data	yes, Chunk Selector: Binning, Black Level, DeviceTemperature, ExposureTime, FrameID, Gain, Height, Image, ImageControl, LineStatusAll	
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	
SFNC Version	v2.3	

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 .. 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 or BayerRG8

Resolution		max. fps acquisition	max. fps interface [2)]
SXGA	1280 x 1024	127	94
XGA	1024 x 768	167	157
SVGA	800 x 600	211	210
VGA	640 x 480	259	259
CIF	352 x 288	407	407
QCIF	176 x 144	-	-
LineScan	1440 x 1024	127	83
	1440 x 512	244	167
	1440 x 256	450	335
	1440 x 128	781	670
	1440 x 64	1234	1234
	1440 x 32	1740	1740
	1440 x 16	2184	2184
	1440 x 8	2508	2507
	1440 x 4	2705	2705
	1440 x 2	2705	2705
	1440 x 1	-	-

[2)] depends on the used interface