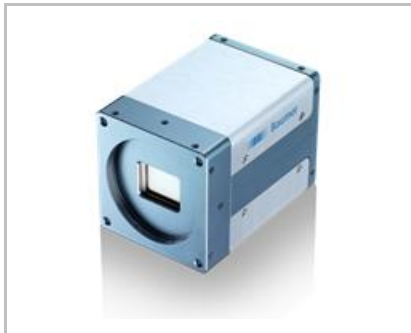
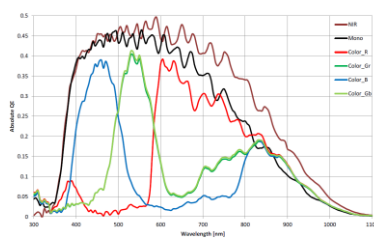


VQXT-120M.HS

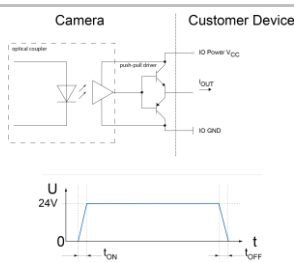
Technical Data

 Art. No.
11185752


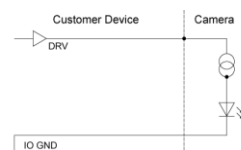
Sensor Graph: Relative Response



Digital Output: Active push-pull



Digital Input



Digital Monochrome Matrix Camera, 10 GigE Firmware Revision 2.0.0

Sensor Information

Model Name	CMOSIS CMV12000
Type	APS-C progressive scan CMOS
Shutter	global
Resolution	4096 x 3068 pixels
Scan Area	22.528x16.874 mm
Pixel Size	5.5 μm x 5.5 μm

Data Quality

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

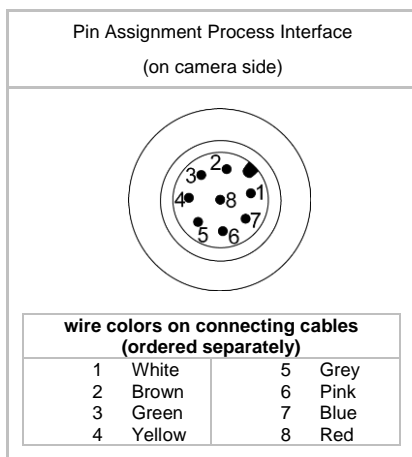
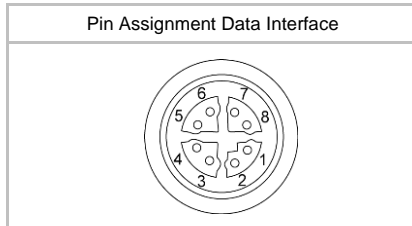
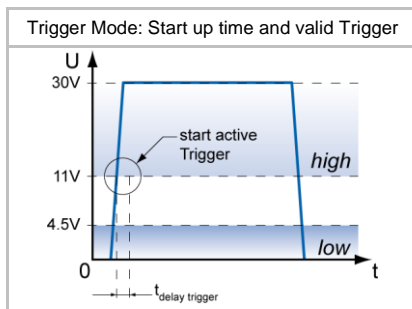
Dark Noise (σ)	14,5 e- typical
Saturation	7000 e- typical
Dynamic Range	52 dB typical
SNR	38,5 dB typical
Quantum efficiency η	38 % @ 536 nm typical

Acquisition

Resolution	4096 x 3068 pixel		
Acquisition Frame Rate (Burst Mode)	335 fps $t_{\text{readout}} = 2,979$ msec (max. Resolution) @ 8 bit		
Interface Frame Rate (depends on used 10 GigE interface performance)	Format	Resolution	max. Frame Rate (@ Trigger Mode)
	Full Frame	4096 x 3068	92 fps
	Binning 2x2	2048 x 1534	NA
	Binning 2x1	2048 x 3068	NA
	Binning 1x2	4096 x 1534	NA
Pixel Formats	Mono8		
Partial Scan	True Partial Scan with increasing Frame Rate on Y direction, Region of Interest (ROI) arbitrary Width: minimum 64, increment 32 Height: minimum 4, increment 4		
Adjustable Acquisition Frame Rate	Off or 0.01 ... 24870 Hz		
Acquisition Mode	Continuous		
Acquisition Status	AcquisitionActive, AcquisitionTrigger Wait		
Exposure Mode	Timed		
Readout Mode	Overlapped, Sequential		

Image Pre-Processing

Analog Controls	Exposure Time (16 μsec ... 1 sec Step Size 1 μsec) Gain (0...12 dB), Offset (0 ... 31 LSB 8 bit)
Gamma Correction	-
LUT	-
Color Models	Mono
Color Processing	-
Color Adjustment	-
Color Enhancement	-
Color Tolerance	-
Binning Horizontal	-
Binning Vertical	-
Image Flipping	Horizontal, vertical
Defect Pixel Correction	via Defect Pixel List with up to 1000 Pixel Coordinates
Fixed Pattern Noise Correction	Yes



Process Synchronization

Trigger Mode	Off (Free Running), On (Trigger)
Trigger Overlap Type	Readout
Trigger Sources	Line0, Software, Off
	Trigger Delay out of treadout: 0,2 µsec @ 8 bit
	max. Trigger Delay during treadout: 1,94 µsec @ 8 bit
Trigger Delay	0 ... 2 sec, Tracking and buffering of up to 256 triggers
External Flash Sync	via Exposure Active
	$t_{\text{delay flash}} \leq 3 \mu\text{sec}$, $t_{\text{duration}} = t_{\text{exposure}}$

Digital I/Os

Lines	Input: Line0, Line1, Output: Line2, Line3
Output Sources	Off, ExposureActive, ReadoutActive, Line 0, Line 1, UserOutput1, UserOutput2, UserOutput3, Timer1Active, Timer2Active, Timer3Active
Line Debouncer	Low and high signal separately selectable
	Debouncing Time 0 ... 5 msec, Step Size: 1 µsec

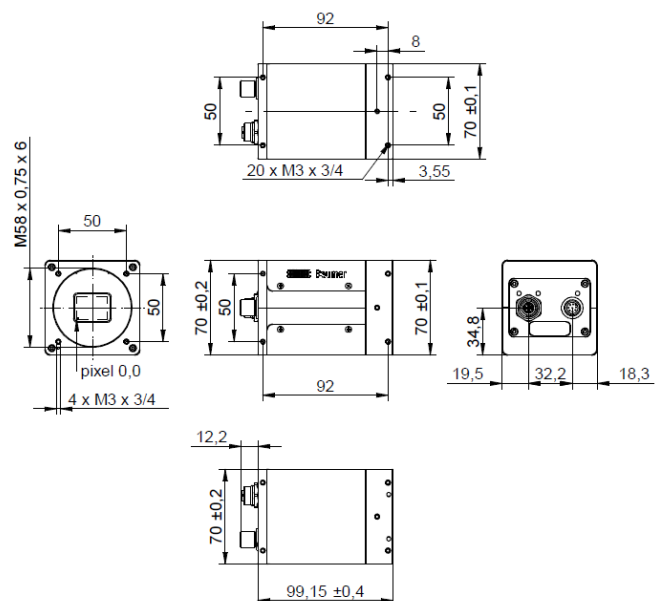
Interfaces and Connectors

Data and Power Interface	10 Gbit Ethernet	Transfer Rate 10000 Mbits/sec
	Gigabit Ethernet	Transfer Rate 1000 Mbits/sec
	Connector:	M12/X-coded (SACC-CI-M12FS-8CON-L180-10G)
	Pin Assignment:	1 – MX1+ 5 – MX4+ 2 – MX1- 6 – MX4- 3 – MX2+ 7 – MX3- 4 – MX2- 8 – MX3+
Process Interface	Connector:	M12/12-pin (SACC-CI-M12MS-8CON-SH TOR 32)
	Assignment:	1 – IN2 (Line1) 5 – Power VCC I/O 2 – Power Vcc 6 – OUT1 (Line2) 3 – IN1 (Line0) 7 – GND (Power) 4 – GND I/O 8 – OUT2 (Line3)

Mechanical Data

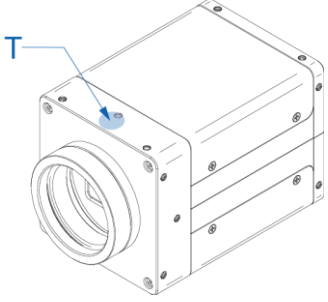
Housing	Aluminum, with Heli-Coil screw thread inserts, IP40 (with mounted lens and GigE cable)
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Dimensions

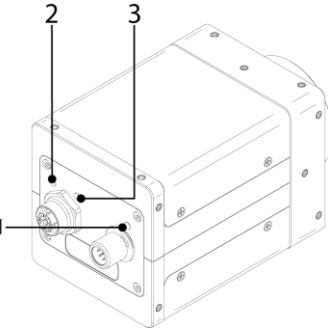


Weight	640 g
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Device Temperature: T = Measurement Point



LED Signalling



Conformity






Optical Data

Lens Mount	M58-Mount, via optional adapters F-/M42-/C-Mount
Optical Filter	-

Electrical Data

Power Supply (ext.)	VCC: 12 ... 24 V DC \pm 20% I: 833 ... 1667 mA
Power over Ethernet	NA
Power Consumption	approx. 17.5 W @ 24VDC and 335 fps approx. 14.6 W @ 24VDC and 92 fps approx. 13.5 W @ 24VDC and 40 fps (factory settings)
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 μ sec
Digital Output	Active push-pull U_{EXT} : 5 ... 30 V DC I_{OUT} : max. 20 mA t_{ON} = typ. 1 μ sec t_{OFF} = typ. 1 μ sec

LED Signalling

10 GigE LED (1)	Off	1 GigE
	Green	10 GigE
	Green blinking	10 GigE, Energy Efficient Ethernet
10 GigE LED (2)	Off	10 GigE
	Yellow	1 GigE
	Yellow blinking	1 GigE, Energy Efficient Ethernet
Camera LED (3)	Off	Power off
	Green	Power on
	Red blinking	Firmware update in progress
	Yellow	Readout active

Environmental Data

Storage Temperature	-10 °C ... +70 °C
Operating Temperature	+5 °C ... +65 °C @ T = Measurement Point or +5 °C ... +75 °C @ internal Temperature Sensor Ambient temperature above 30 °C requires heat dissipation measures.
Int. Temperature Sensor	0 °C ... +85 °C accuracy: \pm 1 K
Humidity	10 % ... 90 % non-condensing

Network Interface Data

Interface	10 Gigabit Ethernet 10GBASE-T 10000 Mbits/sec Gigabit Ethernet 1000 BASE-T 1000 Mbits/sec
Ethernet IP Configuration	Persistent IP, DHCP, LLA
Packet Size	576 ... 16110 Byte, Jumbo Frames supported
Image Buffer	8160 MB Full frame: 680 Images ROI: 8160 MB / (ROI size + 256 Bytes header)

GigE Vision® Features

Events Transmission via Asynchronous Message Channel	GigEVisionHeartbeatTimeOut, EventLost, Line0RisingEdge, Line0FallingEdge, Line1RisingEdge, Line1FallingEdge, Line2RisingEdge, Line2FallingEdge, Line3RisingEdge, Line3FallingEdge, ExposureStart, ExposureEnd, FrameStart, FrameEnd, TriggerReady, TriggerOverlapped, TriggerSkipped, PrimaryApplicationSwitch
Action CMD	-
Frame Counter	up to $2^{64} - 1$
Payload Size	0 ... 12566736 Byte
Timestamp	64 bit, resolution in nsec, increment = 8
Packet Delay	0 .. $2^{32} - 1$ nsec
Packet Resend	
GigE Vision	v2.0

GenICam™ Features

Timer	Timer Selector: Timer 1, Timer 2, Timer 3 TimerTriggerSource: Off, Line0, Software, TriggerSkipped, ExposureStart, ExposureEnd TimerDelay: 0 µsec ... 2 sec, Step Size: 1 µsec TimerDuration: 10 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: CounterDuration, CounterEventActivation, CounterEventSource, CounterResetActivation, CounterResetSource, ExposureMode, ExposureTime, Gain, Height, OffsetX, OffsetY, TriggerMode, UserOutputValue, UserOutputValueAll, Width
User Sets	Factory Settings: UserSet0 (read only) Freely Programmable: UserSet1, UserSet2, UserSet3 Parameters: any user definable Parameter
Acquisition Abort	Delay up to 66.6 msec
Chunk Data	yes, Chunk Selector: BlackLevel, DeviceTemperature, ExposureTime, FrameID, Gain, Height, Image, ImageControl, LineStatusAll, OffsetX, OffsetY, PixelFormat, Timestamp, TriggerID, 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
SFNC Version	v2.3

Transfer Control Features

Mode	UserControlled with TransferStart and TransferStop
Streams	5 (preview, memory parts 1..4)
Preview	Live preview during acquisition to memory buffer with configurable ratio of acquired/transferred images for every memory part

Vendor Specific Features

Memory Management	8 GByte physical memory, up to 4 memory parts, switchable via Line 1 Dynamic buffer allocation based on selected ROI Live and buffered mode (cyclic)
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Factory Settings after Start-Up

Trigger Mode	Off (Free Running)
Analog Controls	Exposure Time: 4 msec, Gain: 0 dB, Offset: 0
Pixel Format	Mono8
Image Format	4096 x 3068
Acquisition Frame Rate	40 fps
Memory Management	Off
Transfer Control	On (stream 0/preview)
Timer/Counter/Sequencer	Off
Defect Pixel Correction	ON
Fixed Pattern Noise Correction	ON
Digital Input	Line0/1, invert = false
Digital Output	Line2/3, invert = false, line source = Off
GPIO 1/2	NA
TriggerSource	Line0

ROI Frame Rate Examples @ min. exposure, Mono8

	Resolution	max. buffered frames time [s]	max. fps acquisition	max. fps interface ²⁾
UHD (4K)	3840 x 2160	1031 2,18	473	140
Full HD	1920 x 1080	4125 4,43	932	540
SXGA	1280 x 1024	4351 4,44	980	580
XGA	1024 x 768	10876 8,42	1292	1290
SVGA	800 x 600	17816 10,92	1631	1630
VGA	640 x 480	27829 13,85	2009	2009
CIF	352 x 288	84189 26,33	3197	3196
	4096 x 3068	680 2,03	335	92
	4096 x 2048	1019 2,04	499	137
	2048 x 2048	2039 4,09	499	270
	4096 x 1024	2039 2,08	980	270
	1024 x 1024	8158 8,32	980	980
	4096 x 1000	2088 2,08	1003	275
	4096 x 512	4079 2,15	1894	540
	512 x 512	32608 17,22	1894	1894
	4096 x 500	4177 2,16	1935	570
	4096 x 256	8158 2,31	3536	1080
	256 x 256	130051 36,78	3536	3536
	4096 x 128	16312 2,61	6259	2160
	4096 x 64	32608 3,19	10230	4320
	4096 x 32	65152 4,41	14760	8200
	4096 x 16	130051 6,73	19323	15500
	4096 x 8	259095 11,59	22346	22000
	4096 x 4	514205 20,95	24539	24500

²⁾ depends on the PC performance