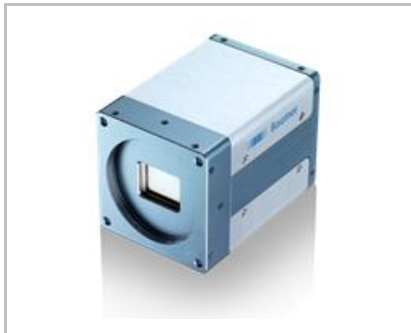
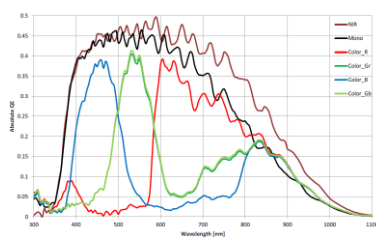


# VQXT-120C.HS

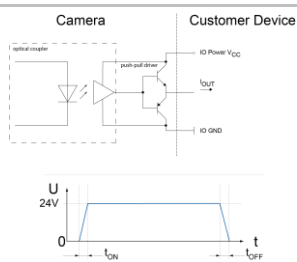
## Technical Data

 Art. No.  
11185753


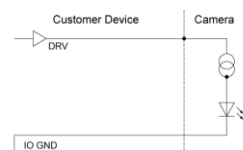
Sensor Graph: Relative Response



Digital Output: Active push-pull



Digital Input



### Digital Color 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 $\mu\text{m}$ x 5.5 $\mu\text{m}$

#### Data Quality

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

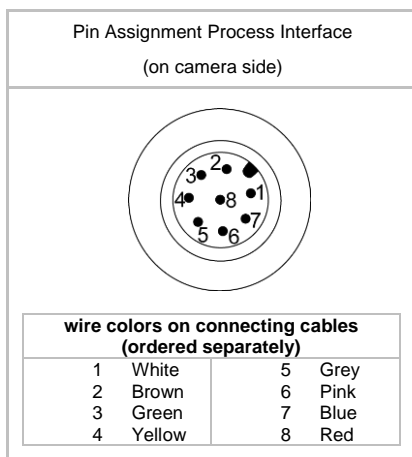
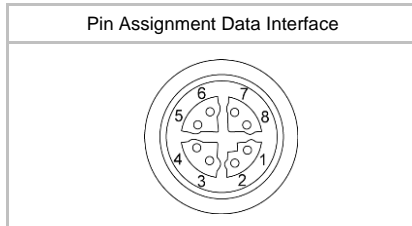
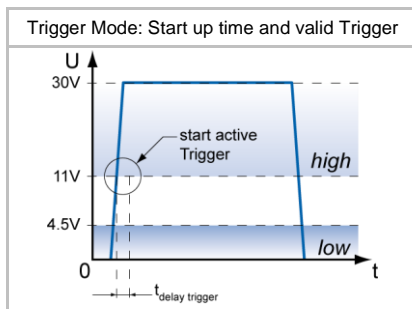
Dark Noise ( $\sigma$ )	16,5 e- typical
Saturation	7000 e- typical
Dynamic Range	52 dB typical
SNR	38,5 dB typical
Quantum efficiency $\eta$	33 % @ 536 nm typical

#### 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	BayerGB8		
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 $\mu\text{sec}$ ... 1 sec   Step Size 1 $\mu\text{sec}$ ) Gain (0...12 dB), Offset (0 ... 31 LSB   8 bit)
Gamma Correction	-
LUT	-
Color Models	No (Raw Bayer data only)
Color Processing	No (Raw Bayer data only)
Color Adjustment	White Balance (manual & one push)
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

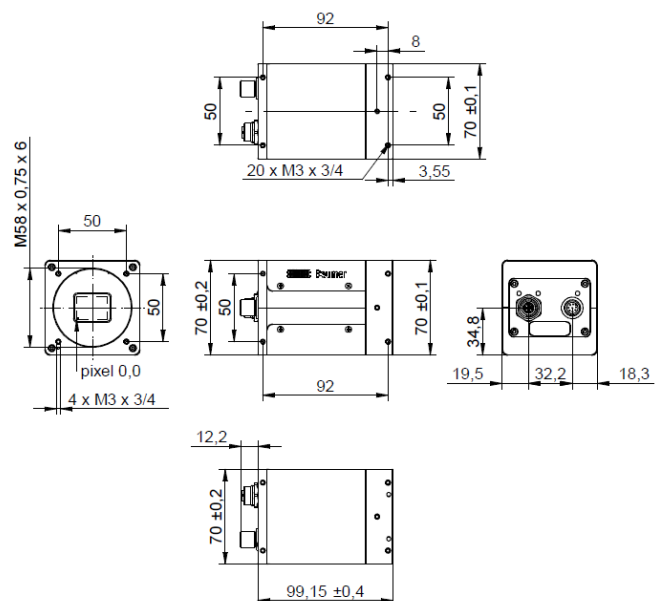
## Interfaces and Connectors

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)

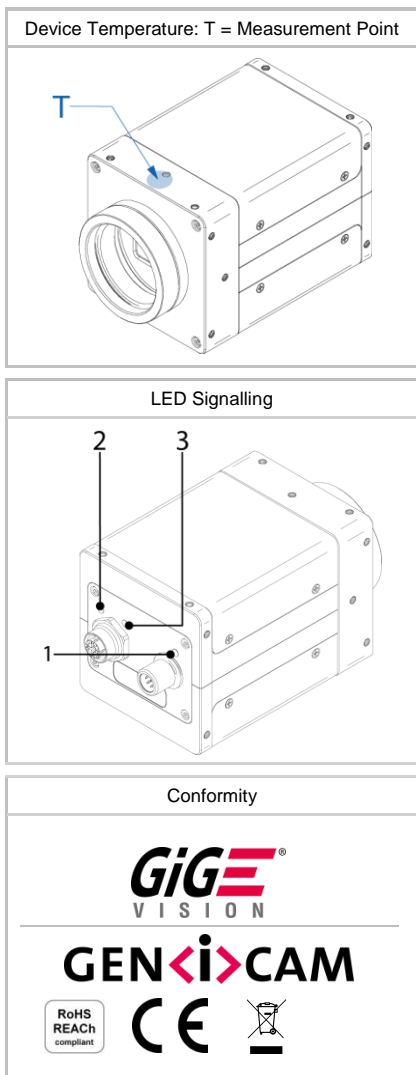
## Mechanical Data

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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### Optical Data

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

### 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 $\mu$ sec
Digital Output	Active push-pull $U_{EXT}$ : 5 ... 30 V DC $I_{OUT}$ : max. 20 mA $t_{ON}$ = typ. 1 $\mu$ sec $t_{OFF}$ = typ. 1 $\mu$ 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 $\mu$ sec ... 2 sec, Step Size: 1 $\mu$ sec TimerDuration: 10 $\mu$ 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 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	BayerGB8
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, BayerRG8**

	Resolution	max. buffered frames   time [s]	max. fps acquisition	max. fps interface <sup>2)</sup>
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

<sup>2)</sup> depends on the PC performance