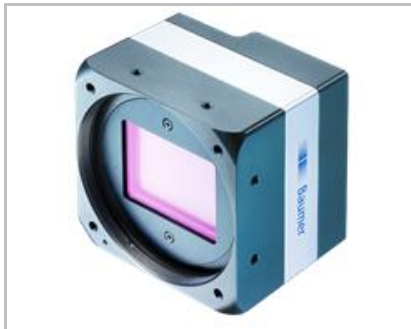


# LXG-120M.3D

## Technical Data

 Art. No.  
11174308


### Digital Monochrome Matrix Camera, Gigabit Ethernet, 3D Laser Triangulation Processing (R1.1)

#### Sensor Information

Model Name	CMOSIS CMV-12000
Type	APS-C progressive scan CMOS
Shutter	Global
Native Resolution	4096 x 3072 pixels
Scan Area	22.528 mm x 16.896 mm
Pixel Size	5.5 µm x 5.5 µm

#### Data Quality

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

Readout Noise ( $\sigma$ )	0.4 LSB @ 8 bit (typical)
Dynamic Range	54 dB (typical)

#### Acquisition Formats

Image Formats	Format	Resolution	Sensor/GigE	$t_{\text{readout}}$
	Full Frame	4096 x 3072	60/9 fps	16,6 msec
Pixel Formats	Mono10 (Sensor), Mono8 / Mono10Packed (GigE)			
Partial Scan	True Partial Scan, Region of Interest (ROI) arbitrary			

#### Image Pre-Processing

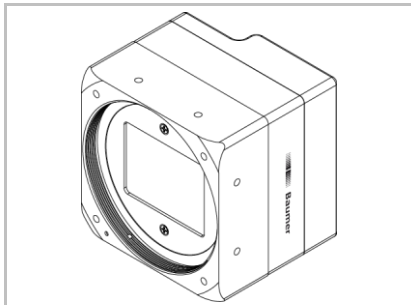
Analog Controls	Exposure Time (17 µsec ... 1 sec   Step Size 1 µsec) Gain (0 ... 12 dB), Offset (0 ... 63 LSB   10 bit)
Gamma Correction	NA
LUT	NA
Color Models	Mono
Color Tolerance	Only on Color Cameras
Color Processing	NA
Color Adjustment	NA
Binning	NA
Decimation	NA
Image Flipping	Horizontal
Defect Pixel Correction	via Defect Pixel List with up to 1000 Pixel Coordinates, 10 Lines, 10 Columns

#### Process Synchronization

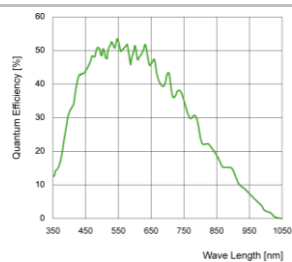
Modes	Free Running, Trigger
Free Running	Continuous or Adjustable Acquisition Frame Rate (0.01 ... 13157 Hz)
Trigger Sources	line0, Software, ActionCommand, Timer1Start, eVAOutput1, All (except Timer1Start/eVAOutput1) or Off
Trigger Delay	0 ... 2 sec, Tracking and buffering of up to 256 triggers
Sequencer Characteristics	up to 128 sets of parameters, up to 65536 loop passes, up to 65536 repetitions of sets of parameters, up to 65536 images per trigger event
Sequencer Parameters	Exposure Time, Gain Factor, ROI Offset x, ROI offset y
External Flash Sync	via Exposure Active $t_{\text{delay flash}} \leq 3 \mu\text{sec}$ , $t_{\text{duration}} = t_{\text{exposure}} + 18 \mu\text{sec}$

#### Digital I/Os

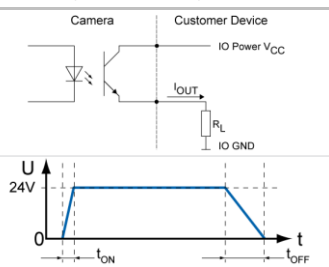
Lines	Input: Line 0, Output: Line1, Line 2, Line 3
Circuit Times	Output: $t_{\text{ON}} = \text{typ. } 2 \mu\text{sec}$ $t_{\text{OFF}} = \text{typ. } 30 \mu\text{sec}$
Output Sources	Off, ExposureActive, ReadoutActive, FrameActive, TriggerReady, TriggerOverlapped, TriggerSkipped, Line 0, UserOutput{1,2,3}, Timer{1,2,3}Active, eVAOutput{1,2,3}
Line Debouncer	Low and high signal separately selectable Debouncing Time 0 ... 5 msec, Step Size: 1 µsec



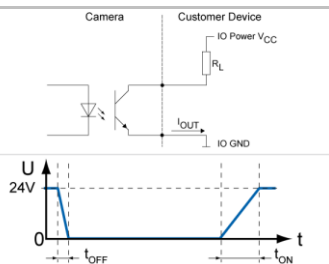
Sensor Graph: Relative Response

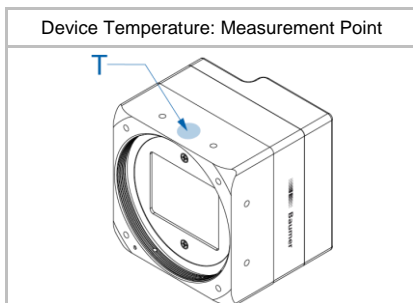
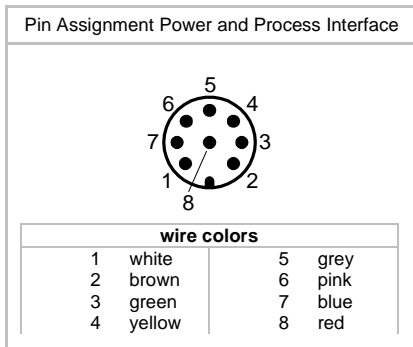
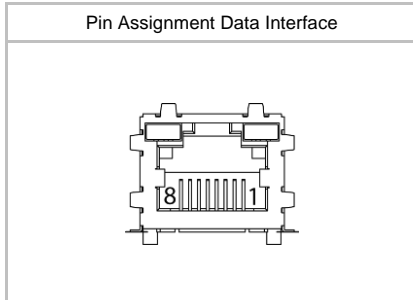
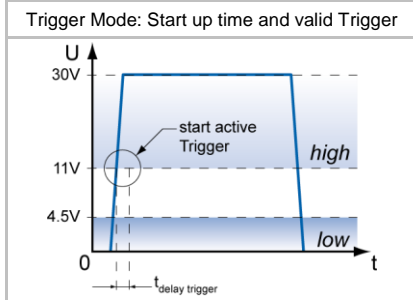
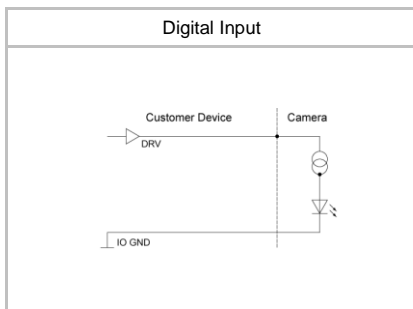


Digital Output: High Active



Digital Output: Low Active

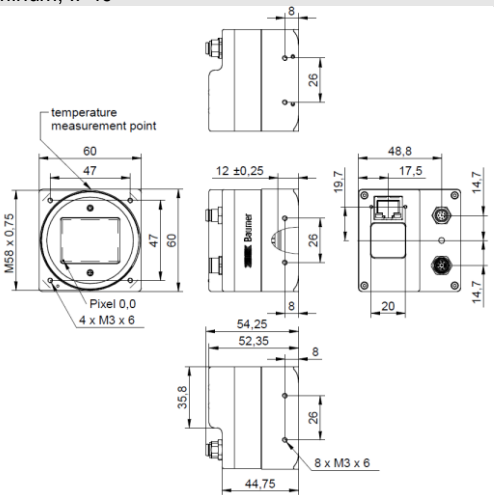




### Interfaces and Connectors

Data Interface (lower GigE port not used)	Gigabit Ethernet	Transfer Rate	1000 Mbits/sec
	Fast Ethernet	Transfer Rate	100 Mbits/sec
	Connector:	8P8C Modular Jack (RJ45), screw lock	
	Pin Assignment:	1 – MX1+	5 – MX3-
		2 – MX1-	6 – MX2-
		3 – MX2+	7 – MX4+
		4 – MX3+	8 – MX4-
Power and Process Interface #1 (top)	Connector:	SACC-DSI-M8MS-8CON-M8-L180 SH	
	Assignment:	1 – OUT3 (line3)	5 – IO Power VCC
		2 – Power VCC	6 – OUT1 (line1)
		3 – IN1 (line0)	7 – GND
		4 – IO GND	8 – OUT2 (line2)
Power and Process Interface #2 (bottom)	Connector:	SACC-DSI-M8FS-8CON-M10-L180 SH	
	Assignment:	1 – IN2_RS485+ (line4)	
		2 – IN2_RS485- (line4)	
		3 – IN3_RS485+ (line5)	
		4 – IN3_RS485- (line5)	
		5 – OUT4_RS485+ (line6)	
		6 – OUT4_RS485- (line6)	
		7 – External Power GND	
		8 – External Power 5 V/200 mA	

### Mechanical Data

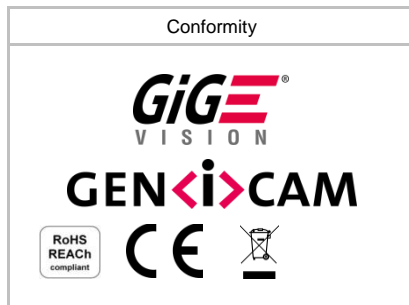
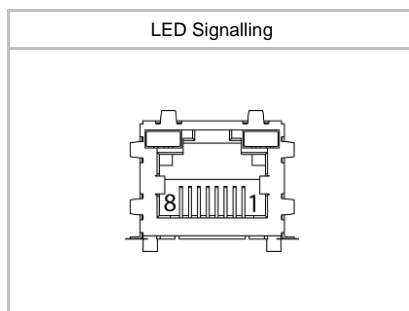
Housing	Aluminum, IP40
Dimensions	
Weight	290 g

### Optical Data

Lens Mount	M58-Mount, via optional adapters F-/M42-/C-Mount
Optical Filter	None

### Electrical Data

Power Supply (ext.)	VCC: 12 ... 24 V DC ± 20%
	I: 305 ... 604 mA
Power over Ethernet	Class 0 device
	VCC: 36 ... 57 V DC
	I: 174 mA @ 48 VDC
Power Consumption	approx. 7,3 W @ 24 VDC and 60 fps
	approx. 8,4 W @ 48 VDC (PoE) and 60 fps
Digital Input	U <sub>IN(low)</sub> : 0.0 ... 4.5 VDC
	U <sub>IN(high)</sub> : 11.0 ... 30.0 VDC
	I <sub>IN</sub> : 6.0 ... 10 mA
	min. Impulse Length: 2.0 µsec
	Trigger Delay out of treadout: 4.0 µsec
	max. Trigger Delay during treadout: 30.0 µsec
Digital Output	U <sub>EXT</sub> : 5 ... 30 V DC
	I <sub>OUT</sub> : max. 50 mA



## LED Signalling

Camera LED	Green on	Power on, link good
	Green blinking	Power on, no link
	Red on	Error
	Red blinking	Warning
	Yellow	Readout active
RJ45 LEDs	Green on	Link on
	Green blinking	Link activity
	Amber on	GigE speed
	Amber blinking	100 Mb speed

## Environmental Data

Storage Temperature	-10 °C ... +70 °C
Operating Temperature	+5 °C ... +50 °C @ T= Measurement Point Ambient temperature above 50 °C requires cooling
Int. Temperature Sensor	0 °C ... +85 °C accuracy: ±1 K
Humidity	10 % ... 90 % non-condensing
Conformity	RoHS, REACH, CE

## Network Interface Data

Network Interface	Gigabit Ethernet	1000BASE-T	1000 Mbits/sec
	Fast Ethernet	100 BASE-T	100 Mbits/sec
Link Aggregation	According to 802.3ad, static configuration		
Ethernet IP Configuration	Persistent IP, DHCP, LLA		
Packet Size	576 .. 9000 Byte, Jumbo frames supported		

## GigE Vision® Features (in compliance with GigE Vision® 1.2)

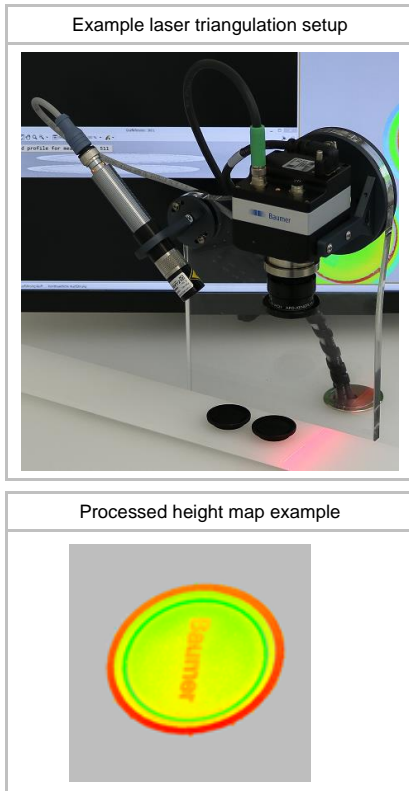
Events Transmission via Asynchronous Message Channel	GigEVisionError, HeartbeatTimeOut, EventLost, EventDiscarded, Line{0,1,2,3}RisingEdge, Line{0,1,2,3}FallingEdge, Action1, ExposureStart, ExposureEnd, FrameStart, FrameEnd, TriggerReady, TriggerOverlapped, TriggerSkipped, Timer{1,2,3}End
Frame Counter	up to 2 <sup>32</sup>
Lost Frame Counter	up to 2 <sup>24</sup> - 1, counts discarded images when FIFO is full
Payload Size	4 ... 58.720.468 Byte
Transmission Delay	0 .. 2 <sup>32</sup> -1 Ticks (1 Tick = 8 nsec)
Timestamp	64 bit
Packet Delay	0 .. 2 <sup>32</sup> -1 Ticks (1 Tick = 8 nsec)
Packet Resend	Resend Buffer: 240 MB (4 Images)

## GenICam™ Features (in compliance with SFNC 2.1.0)

Timer	Timer Selector: Timer 1 ... 3 TimerTriggerSource: Off, Line0, Software, Action1, TriggerSkipped ExposureStart, ExposureEnd, FrameStart, FrameEnd, TimerDelay: 0 µsec ... 2 sec, Step Size: 1 µsec TimerDuration: 10 µsec ... 2 sec, Step Size: 1 µsec
User Sets	Factory Settings: Default (read only) Freely Programmable: UserSet1, UserSet2, UserSet3 Parameters: any user definable Parameter
Acquisition Abort	Delay up to 69 msec

## Vendor Specific Features

DSNU / PRNU (FPN)	Based on offset / gain per column
Correction	
High Dynamic Range (HDR)	Piecewise linear response, up to 90 dB
Burst Mode	NA
eVA Applet Enable	On / Off
eVA A. Overlapped Images	Number of images than can be processed in parallel in eVA
Temperature measurement	Internal sensor temperature range: 0 °C .. +85 °C, accuracy: ±1,0 °C



### 3D Laser Triangulation Processing R1.1

Algorithm	Center of Gravity (COG) for high speed and robust laser line detection	
Profile Speed	4096 x 3072	60 fps
	4096 x 2048	90 fps
	4096 x 1024	179 fps
	4096 x 768	238 fps
	4096 x 512	354 fps
	4096 x 256	692 fps
	4096 x 128	1326 fps
	4096 x 64	2441 fps
Data Format	4096 x 32	
	4215 fps	
Data Format	16 bit profile height information per column with 12 row bits and 4 subpixel bits (4096x1 @ 16 bit). 8 bit 2D image per column (4096x1 @ 8 bit). 8 bit laser line width per column (4096x1 @ 8 bit). Transmitted as 8 bit data with 4096x4 @ 8 bit per profile.	
Profile Aggregation	Up to 64 profiles are combined in a frame for transmission. This reduces the frame rate and CPU load on PC and makes transmission more robust.	
Encoder Support	Evaluation of A/B lanes of RS422 based encoders.	
Meta Data Information	To simplify process monitoring and control. Includes frame counter, time stamp and encoder status embedded in the image.	
Laser Line Test Pattern	To simplify evaluation and test automation.	

### Factory Settings after Start-Up

Operation Mode	Free running, overlapped mode
Analog Controls	Exposure Time: 4 msec, Gain: 0 dB, Offset: 0
Pixel Format	Mono8
Partial Scan	Off
Acquisition Frame Rate	Off
Timer	Off
Transmission Delay	Off
Defect Pixel Correction	On
FPN Correction	On
eVA Applet Enable	Off
Digital Input	Line0, invert = false, trigger source = All
Digital Output	Line1/2/3, invert = false, line source = Off