

FOTONIC E-SERIES

SMART 3D-CAMERAS

Meeting our strategy of building the best 3D smart cameras based on commercially available sensors, the Fotonic E-SERIES is characterized by high reliability in performance and a robust design.

One of the greatest benefits with the E-series is that we deliver a camera with very low motion artifacts, and high frame rate. This enables effective tracking of moving objects.

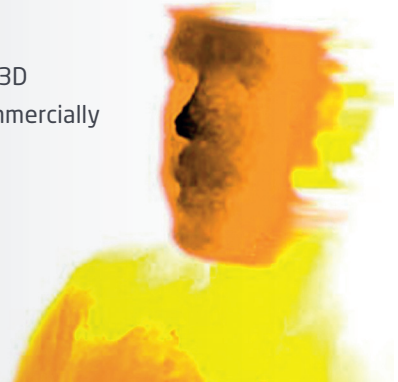
The E-series cameras perform in sunlight. Our 48 LED version has of course, due to its high power illumination, the best performance outdoors in sunlight. All cameras are IP65 and IP67, and the window of Gorilla glass is interchangeable.

The multi shutter setting available doubles the already high dynamic range, with this setting you can measure accurately from short to long distance within one frame. The powerful ARM processor from Texas Instrument together with the Linux OS, enable you to easily run your software on board. This makes the E-Series a natural choice for anyone looking for a truly smart camera.



"Our aim is to build the best 3D smart cameras based on commercially available sensors."

Gösta Forsén, Fotonic



E-series cameras are possible to configure by choosing different Field of view and illumination. This allows you to tailor a camera that best suits your applications with regards to measurement range, target and environmental conditions. *See picture 1 on page 4.*

You can also add our HD enclosure for extremely harsh environments. The HD enclosure adds 4 nozzels which can be used for continuous cleaning of the camera window with water/air.

See picture 2 on page 4.

OPTIONS

Field of view:

E70 - 70° x 53°

E40 - 45° x 34°

Illumination:

4 W - For near field applications

16 W - Flexible choice for most applications

48 W - Powerful illumination for accurate measurement on long range or in outdoor environments.

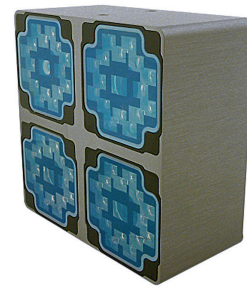
Technical information >

PARAMETERS	VALUE					COMMENTS	
Sensor							
Type of sensor	CCD						
Maximum frame rate	58 fps					Camera setting dependent (full frames)	
Total capture time	Approx. 7 ms					Depending on shutter time	
Pixel array size	160 (h) x 120 (v)						
Multi camera option	Yes, by factory configuration					Up to 4 cameras non-interfering	
Number of dead pixels on sensor	<=20						
Dead pixel cluster (2 or more direct neighbours)	No						
External light disturbance	Up to 100 kLux					Electronic suppression of background illumination	
Illumination							
	4 W	16 W		48 W			
Illumination (power out)	4 W	16 W	48 W				
Wave length	850 nm					Value is approx.	
Modulation frequency	15 Mhz						
Optics							
	E70			E40			
Field of view (h) x (v)	70° x 53°		45° x 34°		For examples see table below		
Measurement range	0,15 - 10 m					Radial distance. Camera type, setting and reflectivity dependent.	
Field of view							
	E70 (70° x 53°)			E40 (45° x 34°)			
Z-distance from camera [m]	x [m]	y [m]	x [m]	y [m]	x=horizontal, y= vertical		
0,5	0,7	0,5	0,4	0,3	Values are approximate		
1	1,4	1,0	0,8	0,6			
2	2,8	2,0	1,7	1,2			
3	4,2	3,0	2,5	1,8			
5	7,0	5,0	4,1	3,1			
7,5	10,5	7,5	6,2	4,6			
Accuracy*							
	E70 4 W	E70 16 W	E70 48 W	E40 4 W	E40 16 W	E40 48 W	
Absolute accuracy							
0,15-0,3m	+/- 10 mm					Reflectivity of target 55%, ambient temperature 20 degrees	
0,3-0,5 m	+/- 10 mm	+/- 10 mm		+/- 10 mm			
0,5-1 m	+/- 10 mm	+/- 10 mm	+/- 30 mm	+/- 10 mm	+/- 10 mm		
1-2 m	+/- 20 mm	+/- 10 mm	+/- 30 mm	+/- 20 mm	+/- 10 mm +/- 30 mm		
2-3 m	+/- 30 mm	+/- 20 mm	+/- 30 mm	+/- 30 mm	+/- 20 mm +/- 30 mm		
3-5 m		+/- 30 mm	+/- 30 mm	+/- 30 mm	+/- 30 mm +/- 30 mm		
5-7 m		+/- 30 mm	+/- 30 mm		+/- 30 mm +/- 30 mm		
Repeatability (1σ)							
0,15-0,3 m	7 mm					Reflectivity of target 55%, ambient temperature 20 degrees	
0,3-0,5 m	7 mm	7 mm		7 mm			
0,5-1 m	7 mm	7 mm	4 mm	7 mm	7 mm		
1-2 m	10 mm	7 mm	4 mm	10 mm	7 mm 4 mm		
2-3 m	30 mm	10 mm	4 mm	10 mm	7 mm 4 mm		
3-5 m		20 mm	7 mm	20 mm	10 mm 4 mm		
5-7 m		30 mm	7 mm		20 mm 7 mm		
Relative accuracy	+/- 10 mm					Measured at 2 m for 48 W camera models and E40 16 W, at 0,4 m for 4 W camera models and E70 16 W. Reflectivities 30% and 90%	
Drift with temperature (T)							
20°C ≤ T ≤ 30°C	≤ 0.5 mm/°C (max)						
10°C ≤ T ≤ 50°C	≤ 1.5 mm/°C (max)						

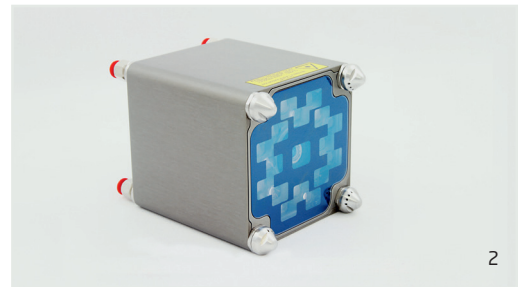
*Measured in Z-direction, for 11x11 central pixels, over 20 frames. Ambient illumination 0%, measured on single flat target.

PARAMETERS	VALUE		COMMENTS
Processor, Memory and OS			
CPU for customer application SW	1.5GHz Dual-core ARM Cortex-A9		Texas Instruments OMAP 4460
Free Processor power capacity	~70%		
Memory	512 MB 400MHz LPDDR2		
Free RAM storage	>=300 MB		
Free Flash storage	>=1500 MB		
OS	Linux		BusyBox Embedded Linux
Software			
Drivers	Linux, Windows XP, 7, 8		Fotonic SDK available
PC API	FZ-API for C, C++, PCL		
Camera Internal API	FZ-API		
Cross Compiler and Debugger	GCC and GDB for ARM Cortex		
Data output			
Distance data resolution	16 bit / pixel		
Signal amplitude resolution	10 bit/ pixel		
Housing			
	E40/70 4 W/16 W		E40/70 48 W
Size [height x width x length]	80x80x86.3	166x166x86.3	
Weight	800 g	4150 g	
Material	Aluminum		
- Surface Material	Hard Anodized Aluminum 40 µm		
- Window material	Gorilla glass		
	Interchangeable front glass		
Environmental			
	E40/70 4 W/16 W		E40/70 48 W
Ingress protection	IP 65, IP67		Non condensing
Operating temperature	-20 - +50 deg C		
Storage temperature	-20 - +70 deg C		
Cooling	Passive		
Shock and vibration	IEC60068-2-64: 10 - 30 Hz: 0,05 g2/Hz, 30 - 500 Hz: -3dB/Octave, RMS:2,3g, 90min, dir: x,y,z IEC68-2-27 Ea: Half sine, 500m/s2, 6ms, 3x6 schocks, dir: x,y,z	IEC60068-2-6 Fc: 10-55-10Hz (1oct/min), 0,35mm, 30min, dir: x,y,z IEC68-2-29 Eb: 10g, 16 ms, -500 +500 , dir : x,y,z IEC68-2-27 Ea: Half sine, 500m/s2, 6ms, 3x6 schocks, dir: x,y,z	
Interfaces			
	E40/70 4 W/16 W		E40/70 48 W
Data interface	Gigabit Ethernet		
Signal socket	8-position M12 SPEEDCON SOCKET, A-code		
Power socket	4-position M12 SPEEDCON, A-code	4-position M12 PlugLink T-code Power	
	IEC 61076-2-101		
Mounting thread	4 x M5 Max 6mm tread depth	8 x M8	
	See drawings of mounting thread position on page 4		
Power supply			
	E40/70 4 W/16 W		E40/70 48 W
Power supply	24 V DC +/-10% 60-90 W	24 V DC +/- 10% 240 W	
	Power supply 230V~/ 24Vd.c. must conform to SS-EN 60 950-1, defined as a SELV (§2.2) and Limited Power Source (§2.5). In case of using camera in outdoor applications, the supply must also conform to SS-EN 60 950-22, (§6.1).		
Power consumption	Mean 10 W, max 20 W	Mean 50 W, max 100 W	
Certification			
	E40/70 4 W/16 W		E40/70 48 W
Conformity	CE, FCC, RoHS		
LVD	EN 60950-1:2006-05-29 + A1/A2/A11/AC1, EN 60950-22:2006-06-19 + C1/A11/A11C1		
EMC	Emission: EN 61000-6-4:2007 +A1:2011 Immunity: EN 61000-6-2:2005	Emission: EN 61000-6-3:2007 +A1:2011 Immunity: EN 61000-6-2:2005	
Eye safety	EN 62471-1:2008		

- 1) E70 48 W camera has 48 W optical power, for best performance on long distance and outdoor applications.
- 2) E70 16 W with HD configuration

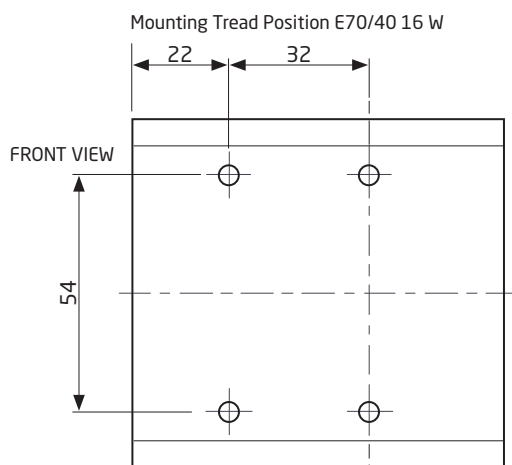


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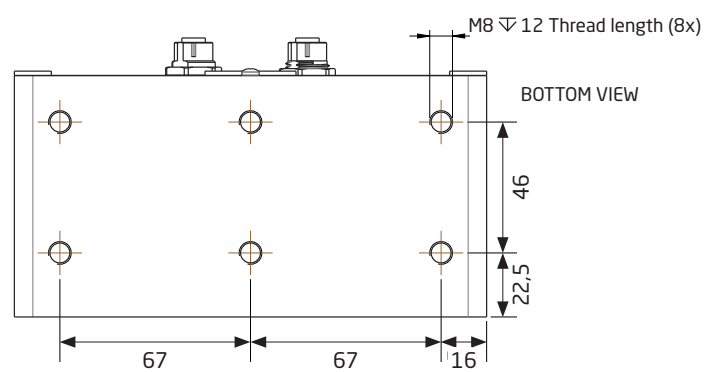
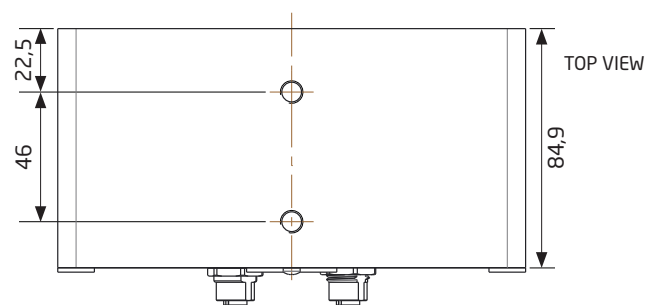


2

All dimensions are in mm



Mounting Tread Position E70/40 48 W



Fotonic is a Swedish company manufacturing cameras for 3D imaging. Our products combine robustness and high performance in order to meet the highest standards of the industry.

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