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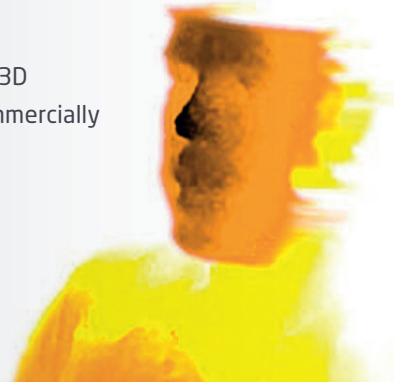
E-series cameras are possible to configure by choosing different Field of view and illumination. This allows you to tailor a camera that best suits your applications with regards to measurement range, target and environmental conditions. *See picture 1 on page 4.*

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:

4W – For near field applications

16W – Flexible choice for most applications

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

Technical information ›

PARAMETERS						COMMENTS

Sensor

		COMMENTS
Type of sensor	CCD	
Maximum frame rate	52 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-interferring
Number of dead pixels on sensor	<=20	
Dead pixel cluster (2 or more direct neighbours)	No	

Illumination

	4W	16 W	48 W	COMMENTS
Illumination (power out)	4 W	16 W	48 W	
Wave length	850 nm			
Modulation freqency	15 Mhz			Value is approx.

Optics

	E70	E40	COMMENTS
Field of view (h) x (v)	70° x 53°	45° x 34°	For examples see table below
Measurement range	0,1 - 10 m		Radial distance. Camera type, setting and reflectivity dependent.

Field of view

Z-distance from camera [m]	E70 (70° x 53°) x [m]	E70 (70° x 53°) y [m]	E40 (45° x 34°) x [m]	E40 (45° x 34°) y [m]	COMMENTS
	x [m]	y [m]	x [m]	y [m]	x=horizontal, y= vertical
0,5	0,7	0,5	0,4	0,3	
1	1,4	1,0	0,8	0,6	Values are approximate
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*

Absolute accuracy

	E40 4W	E70 4W	E40 16W	E70 16W	E40 48W	E70 48W	COMMENTS
0,15–0,3m		+/- 10 mm					Reflectivity of target 70% Shorter range possible on lower reflectivity targets
0,3–0,5 m	+/- 10 mm	+/- 10 mm		+/- 10 mm			
0,5–1 m	+/- 10 mm	+/- 10 mm	+/- 10 mm	+/- 10 mm			*Measured in Z-direction, for 11x11 central pixels, over 20 frames. Ambient illumination 0%, Ambient temperature 20 degrees. Measured on single flat target
1–2 m	+/- 20 mm	+/- 20 mm	+/- 10 mm	+/- 10 mm	+/- 30 mm	+/- 30 mm	
2–3 m	+/- 30 mm	+/- 30 mm	+/- 20 mm	+/- 20 mm	+/- 30 mm	+/- 30 mm	
3–5 m	+/- 30 mm		+/- 30 mm	+/- 30 mm	+/- 30 mm	+/- 30 mm	
5–7,5 m			+/- 30 mm	+/- 30 mm	+/- 30 mm	+/- 30 mm	

Repeatability (1σ)

	E40 4W	E70 4W	E40 16W	E70 16W	E40 48W	E70 48W	COMMENTS
0,15–0,3 m		5 mm					Reflectivity of target 70% Shorter range possible on lower reflectivity targets
0,3–0,5 m	5 mm	5 mm		5 mm			
0,5–1 m	5 mm	5 mm	5 mm	5 mm		5 mm	
1–2 m	10 mm	10 mm	5 mm	5 mm	5 mm	5 mm	
2–3 m	10 mm	20 mm	5 mm	10 mm	5 mm	5 mm	
3–5 m	20 mm		10 mm	10 mm	5 mm	10 mm	
5–7,5 m			10 mm	30 mm	10 mm	10 mm	

		COMMENTS
Relative accuracy	+/- 10 mm	Measured at 2 m for 48W camera models and E40 16W, at 0,4m for 4W camera models and E70 16W. Reflectivities 30% and 90%

Drift with temperature (T)

		COMMENTS
20°C ≤ T ≤ 30°C	≤ 0.5 mm/°C (max)	
10°C ≤ T ≤ 50°C	≤ 1.5 mm/°C (max)	
External light disturbance	Up to 100 kLux	Electronic suppression of background illumination

PARAMETERS	VALUE		COMMENTS
Processor, Memory and OS			
CPU for customerapplication 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 and Open Source OpenNI driver		
PC API	FZ-API for C, C++, OpenNI 2.2, PCL		wFotonic SDK available
Camera Internal API	FZ-API, OpenNI 2.2		Fotonic SDK available
Cross Compiler and Debugger	GCC and GDB for ARM Cortex		
Resolution of raw data output			
Distance data	16 bit / pixel		
Housing	**E40/70 4W/16W**	**E40/70 48W**	
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 4W/16W**	**E40/70 48W**	
Ingress protection	IP 65, IP67		
Operating temperature	-20 - +50 deg C		Non condensing
Storage temperature	-20 - +70 deg C		
Cooling	Passive		Camera always to be connected to a heat sink
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 4W/16W**	**E40/70 48W**	
Data interface	Gigabit Ethernet		
Signal socket	8-position M12 SPEEDCON SOCKET, A-code		IEC 61076-2-101
Power socket	4-position M12 SPEEDCON, A-code	8-position M12 SPEEDCON SOCKET, A-code	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 4W/16W**	**E40/70 48W**	
Power supply	24 V DC +/-10% 60-90 W	24 V DC +/- 10% 240W	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).
Total power consumption	Typical 10 W max 20 W	Typical 50 W max 100 W	Mean effect
Certification	**E40/70 4W/16W**	**E40/70 48W**	
Conformity	CE, FCC, RoHS		FCC Part 15, Subpart B (47CFR15.109). Class A
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.
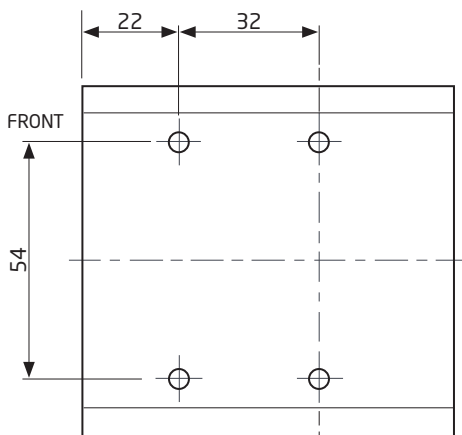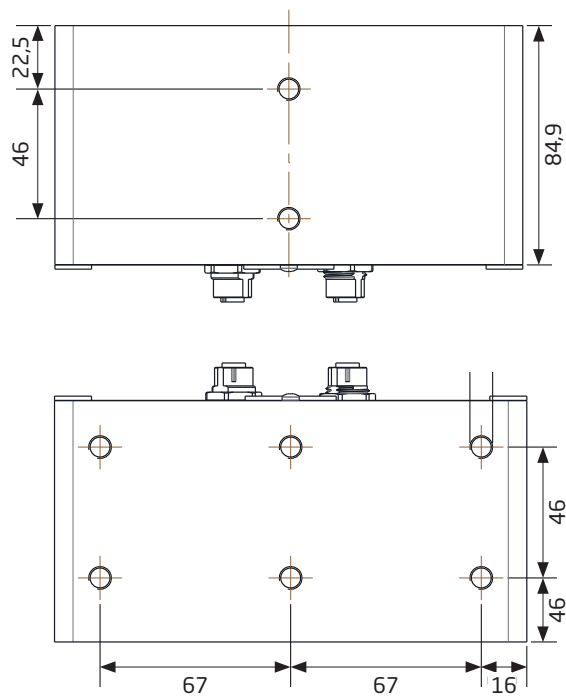2) E70 16 W with HD configuration
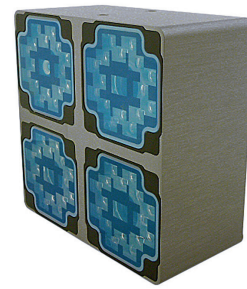
1
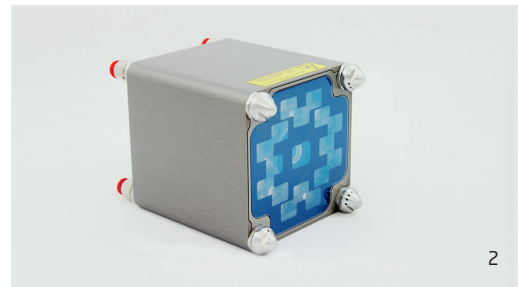
2

Mounting Tread Position E70/40 16W

22   32

FRONT

54

Mounting Tread Position E70/40 48W

22,5

46

84,9

46

46

67   67   16

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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