optotune
shaping the future of optics

FOV Expansion Development kit

Optotune's FOV Expansion Development kit combines our fast-steering mirror MR-15-30 with the liquid lens EL-16-40 in an implementation that enables high-resolution imaging over a wide field of view (FOV). The Development kit features two imaging systems: a wide-angle objective for overview and a narrow-angle objective (50 mm or 75 mm) for high resolution in the area of interest. The mirror allows to steer the FOV while the lens enables fast focusing. The Development kit is accompanied by software to demonstrate its suitability for surveillance and inspection applications (inspection, face recognition, autofocus, area of interest selection).

Advantages

- Wide FOV
- High resolution
- Autofocus

Applications

- Machine vision/inspection
- Face recognition
- Area of interest selection

Mechanical specifications

Outer dimensions w/o drivers & cabling (WxDxH)	115 x 84 x 200	mm
Weight w/o drivers & cabling	650	g
Mounting	M4 post / M6 through holes	
Camera cable length	3	m
Lens cable length	1	m
Mirror cable length	1	m

Optical specifications

Resolution	6 (50 mm lens) 4 (75 mm lens)	mdeg
Focal length of wide-angle lens	4	mm
f/# of wide-angle lens	f/2.0	
Wide-angle FOV (H x V)	67 x 84	°
Focal length of narrow-angle lens	50 or 75	mm
f/# of narrow-angle lens	f/2.8 (50mm) f/2.8 (75mm)	
Narrow-angle FOV (H x V)	8.2 x 6.1 (50 mm lens) 5.5 x 4.1 (75 mm lens)	°
Focal tuning range	250 - infinity	mm
Camera	Daheng MER2-302-56U3C	
Sensor	Sony IMX265 CMOS 1/1.8"	
Camera resolution	2048 x 1536	pxl
Pixel size	3.45 x 3.45	µm
Sensor size	7.18 x 5.32	mm
Shutter type	global	

Optotune Switzerland AG | Bernstrasse 388 | CH-8953 Dietikon | Switzerland
Phone +41 58 856 3000 | www.optotune.com | sales@optotune.com

Electrical specifications

Total power consumption (typ.)	10	W
Required current on USB (powered USB hub not included)	1.5 (at 5 V)	A
Camera interface	USB 3.0	
Mirror controller (MR-E-3) interface	USB-C/USB 3.0	
Lens controller interface (ECC-1C with USB to UART connector)	Hirose/USB 2.0	

Overview of available standard products

Standard Product	Objective	
FOV Expansion Development kit (50 mm)	50 mm	
FOV Expansion Development kit (75 mm)	75 mm	

Figure 1 schematically illustrates how the mirror allows for high-resolution imaging over a large area. The narrow FOV, given by the fixed focal length lens (50 mm or 75 mm) and camera, can be steered across the full angular range of the mirror while maintaining the resolution.

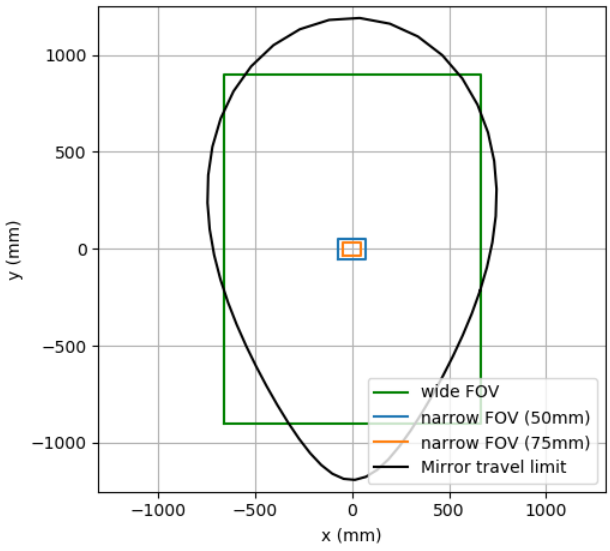

Figure 1: Comparison between the achievable FOVs achievable at a 1 m distant plane. The narrow FOV can be steered around within the mirror travel limits.

Optotune Switzerland AG | Bernstrasse 388 | CH-8953 Dietikon | Switzerland
Phone +41 58 856 3000 | www.optotune.com | sales@optotune.com

Hardware components

- 1x Fast steering mirror, MR-E-3 head unit (DVIS) – containing the MR-15-30 (datasheet)
- 1x Mirror controller, MR-E-3 base unit (datasheet)
- 1x Focus tunable lens, EL-16-40-TC-VIS-5D[1] (datasheet) with embedded controller ECC-1C (datasheet)
- 2x Industrial camera, Daheng MER2-302-56U3C[2]
- 1x Wide-angle objective, 4 mm
- 1x Narrow-angle objective, 50 mm or 75 mm
- 1x USB to UART cable, Hirose connector, 1 m long
- 2x USB3 cable, 3 m long (USB-hub not included, 1.5 A needed)
- 1x Black anodized aluminium mounting set (allows shifts along the optical axis)
- 1x Aluminium case for transport of the complete kit

The combination of the EL-16-40 with a fixed focal length objective can also be replaced by one of our lens modules (ELMs) for an optimized geometry. For more information, please contact sales@optotune.com.

The complete setup is shown in Figure 2.

Figure 2: Hardware components included in the FOV Expansion Development kit.

[1] The 50 mm Development Kit comes with the EL-16-40-TC-VIS-5D-M27. The 75 mm Development kit comes with the EL-16-40-TC-VIS-5D-M30.5. The reason is a difference in filter threads on the 50 mm and 75 mm objectives.
[2] Other GenIcam-compliant cameras are supported both by software (Optotune Cockpit) and hardware (mounting holes).

Optotune Switzerland AG | Bernstrasse 388 | CH-8953 Dietikon | Switzerland
Phone +41 58 856 3000 | www.optotune.com | sales@optotune.com

Mechanical layout

Figure 3 shows the mechanical layout of the Development kit. The two cameras and the tunable lens and fast-steering mirror are shown without cables and drivers. The Development kit can be mounted either on an optical post (M4) or via two M6 clearance holes.

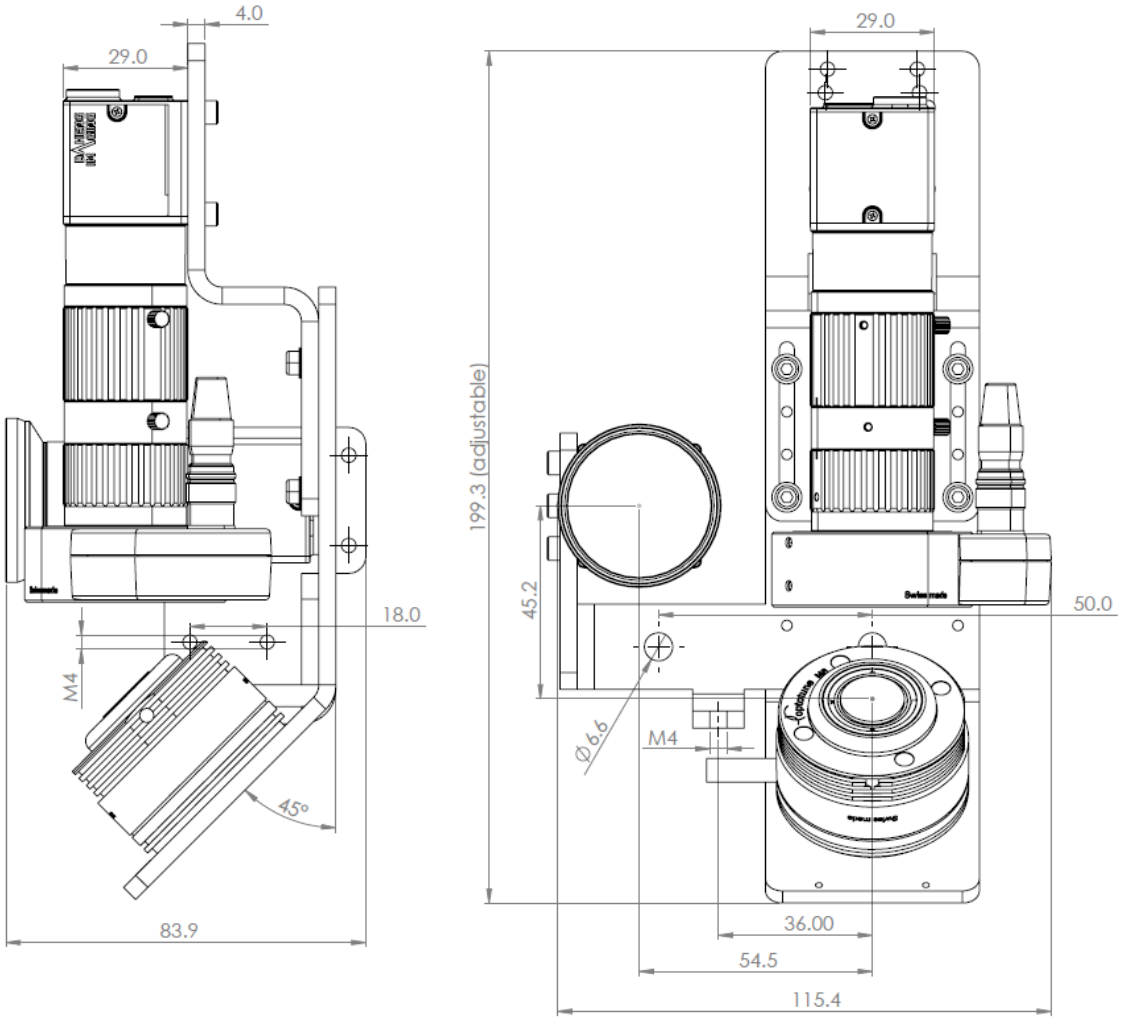

Figure 3: Mechanical drawing of the FOV Expansion Development Kit. The units are in mm.

For further information, please contact sales@optotune.com.

Optotune Switzerland AG | Bernstrasse 388 | CH-8953 Dietikon | Switzerland
Phone +41 58 856 3000 | www.optotune.com | sales@optotune.com