DTLP-23-036-115

The DTLP-23-036-115 bi-telecentric lens was engineered to integrate Optotune's electrically tunable lenses directly into the optical path. This optimized design preserves telecentricity, minimizes magnification change, and ensures excellent optical performance. The DTLP-23-036-115 is available with two different liquid lens models.

- EL-12-30-TC-VIS-16D: Faster and more economical
- EL-16-40-TC-VIS-5D: Higher repeatability and very good line of sight stability with pixel shift well below 1px

Lens module specifications

	EL-12-30-TC-VIS-16D			EL-16-40-TC-VIS-5D			
Magnification	0.363	0.359	0.357	0.369	0.361	0.361	X
Working distance[1]	104	115	121	107	124	124	mm
HFOV	24.3	24.5	24.7	23.8	24.4	24.4	mm
VFOV	18.2	18.4	18.5	17.9	18.3	18.3	mm
Focal power	2.5	0	-1.5	3	0	0	Dpt
Magnification change		0.096			0.133		%/mm
Focus sensitivity		4.25			5.67		mm/dpt
F/# (fixed)	4.5						
Maximum sensor format	2/3"						inch
Maximum image circle (Φ)	11						mm
Pixel size (recommended)	2.4						µm
Resolution test with USAF target	159						lp/mm
Optical distortion	<0.002						%
Telecentricity	<0.1						°
Wavelength range	400-700						nm
Mount	C-mount						
Filter thread	M49.5x0.5						
Dimension (Φ x L)	53.4 x 128.2						mm
Operating temperature	-20 to +65						°C
Storage temperature	-40 to +85						°C
Lifecycles (10-90% sinusoidal)	>1'000'000'000						cycles

Focus tunable lens specifications

	EL-12-30-TC-VIS-16D	EL-16-40-TC-VIS-5D	
Focal power range (@25°C)	-6 to +10	-2 to +3	dpt
Settling time with / without signal conditioning	10 / 20	12.5 / 25	ms
Temperature sensor and EEPROM	Yes		
Control current (typical)	-250 to +250		mA
Max. control current	-300 to +300	-500 to 500	mA
Motor coil resistance @ 30°C	15	12	Ω
Absolute maximum voltage (coil)	6	10	V
Absolute maximum voltage (temp. sensor)	4.3	4.3	V

[1] Recommended working distance range based on performance tests. Note that both liquid lenses provide a larger focal power range and with that significantly larger working distance ranges are possible, but resolution might drop beyond the recommended range.

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Embedded controller specifications[2]

Supply voltage range	5 and 9-24 (tolerance ± 5%)	VDC
Maximum power consumption (5V / 9-24V)	1.5 / 2.5	W
Analog voltage inputs level	0-10	V
Digital signal logic level	3.3	V

Overview of available standard products

Standard Product	Liquid lens integrated	Connector	Controller	Typical interface
DTLP-23-036-115-12EC1	EL-12-30-TC-VIS-16D	Hirose (female)	ECC-1C (embedded)	I2C, UART, Analog 0-10 V UART to USB cable available.
DTLP-23-036-115-16	EL-16-40-TC-VIS-5D	Hirose (male)	ICC-1C, ICC-4C-500 (not included)	USB, Ethernet, Analog 0-10 V
DTLP-23-036-115-16EC1	EL-16-40-TC-VIS-5D	Hirose (female)	ECC-1C (embedded)	I2C, UART, Analog 0-10 V UART to USB cable available.

Control

The focus tunable lens is controlled with electrical current and must be operated by a suitable lens controller. The following controllers are fully compatible:

- Optotune embedded controller ECC-1C (included in -EC1 configuration, compatible with selected cameras)
- Optotune industrial controller ICC-1C
- Optotune industrial controller ICC-4C-500

Further information about Optotune's controllers is available at www.optotune.com/controllers.

Electrical layout

Hirose connector (HR10G-7R-6PB)	Function	Sensor pins
Pin 1	Control current +	-
Pin 2	Control current -	-
Pin 3	Ground	1-4
Pin 4	Vcc (3.0-3.7V)	8
Pin 5	I^2C SCL	6
Pin 6	I^2C SDA	5

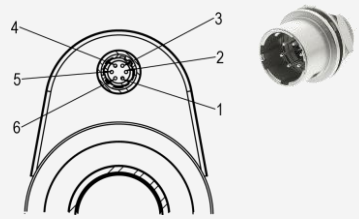

Table 1: Pinout of the DTLP-23-036-115 with male Hirose connector (for external controller).

Hirose connector (HR10G-7R-6SB)	Function	Value
Pin 1	GPIO Trigger	-
Pin 2	Analog In	0-10V
Pin 3	UART Tx / I^2C SCL	TTL
Pin 4	UART Rx / I^2C SDA	TTL
Pin 5	GND	-
Pin 6	Vcc	5-24V

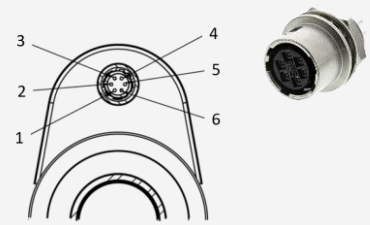

Table 2: Pinout of the DTLP-23-036-115 with female Hirose connector ("EC1" version with ECC-1C integrated).

[2] Applies to the -EC1 version of the ELM. For more information, please refer to the ECC-1C datasheet.

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Mechanical layout

While the mechanical dimensions are the same for both liquid lens options, the working distance range and corresponding magnifications varies slightly according to the table on page 1.

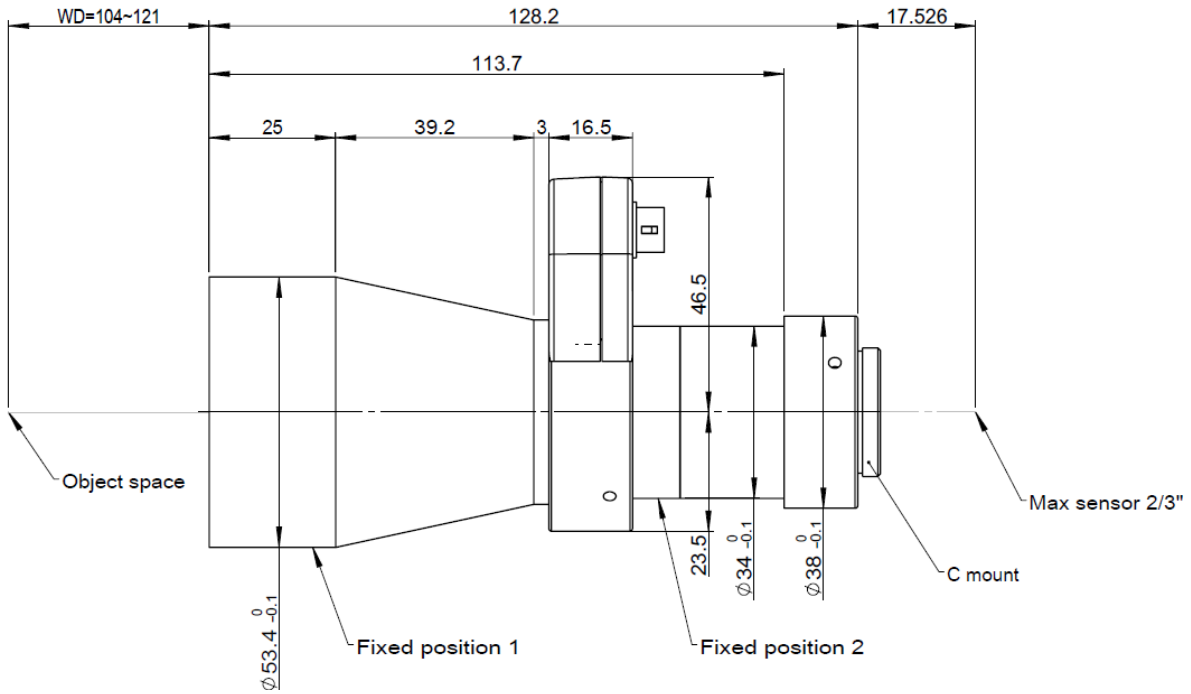

Figure 1: Mechanical drawing of the DTLP-23-036-115 (unit: mm).

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