TLP-1-2.0-110

The TLP-1-2.0-110 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 TLP-1-2.0-110 is available with Optotune's EL-12-30-TC-VIS-16D.

Lens module specifications

	EL-12-30-TC-VIS-16D						
Magnification	2.110	2.061	2.013				X
Working distance[1]	99	108	117				mm
HFOV	6.1	6.2	6.4				mm
VFOV	4.6	4.7	4.8				mm
Focal power	3	0	-3				Dpt
Magnification change		0.261					%/mm
Focus sensitivity		3.00					mm/dpt
F/# (fixed)			13.5				
Maximum sensor format			1"				inch
Maximum image circle (Φ)			16				mm
Pixel size (recommended)			2.4				µm
Resolution test with USAF target			57				lp/mm
Optical distortion			<0.010				%
Telecentricity			<0.1				°
Wavelength range			400-700				nm
Mount			C-mount				
Filter thread			M31.5x0.5				
Dimension (Φ x L)			47 x 133.2				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		
Focal power range (@25°C)	-6 to +10		dpt
Settling time with / without signal conditioning	10 / 20		ms
Temperature sensor and EEPROM	Yes		
Control current (typical)	-250 to +250		mA
Max. control current	-300 to +300		mA
Motor coil resistance @ 30°C	15		Ω
Absolute maximum voltage (coil)	6		V
Absolute maximum voltage (temp. sensor)	4.3		V

Embedded controller specifications[2]

[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.

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

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

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
TLP-1-2.0-110-12	EL-12-30-TC-VIS-16D	Hirose (male)	ICC-1C, ICC-4C-500 (not included)	USB, Ethernet, Analog 0-10 V
TLP-1-2.0-110-12EC1	EL-12-30-TC-VIS-16D	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

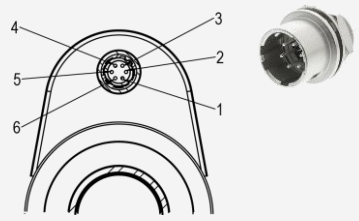

Table 1: Pinout of the TLP-1-2.0-110 with male Hirose connector (for external controller).

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

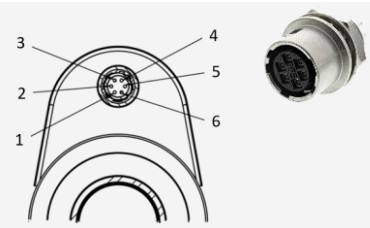

Table 2: Pinout of the TLP-1-2.0-110 with female Hirose connector ("EC1" version with ECC-1C integrated).

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

Mechanical layout

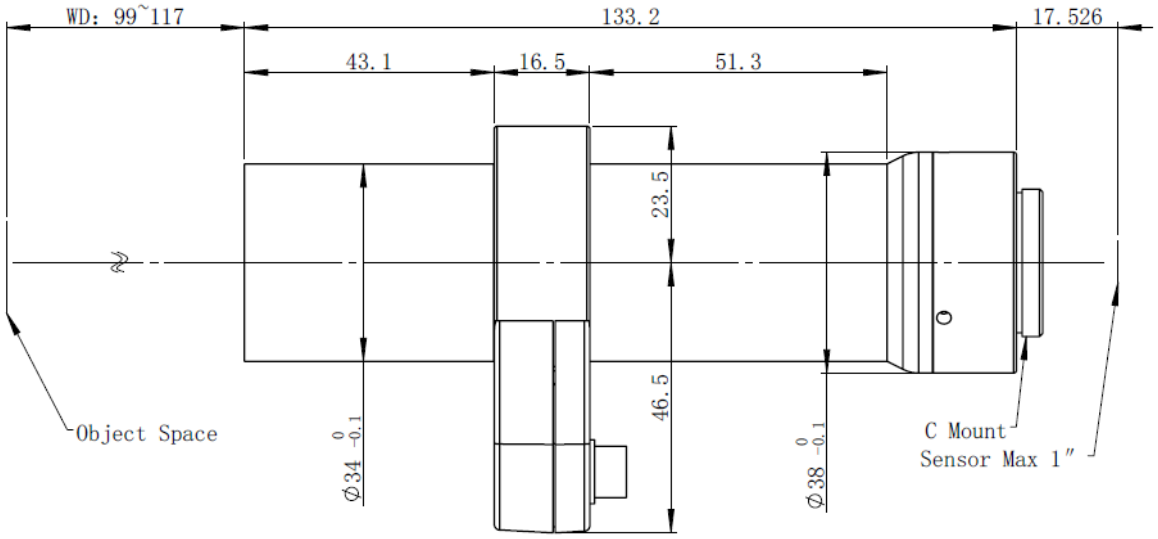

Figure 1: Mechanical drawing of the TLP-1-2.0-110 (unit: mm).

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