

## DTLP-1-0166-258

The DTLP-1-0166-258 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-1-0166-258 is available with Optotune’s EL-16-40-TC-VIS-5D.

### Lens module specifications

#### EL-16-40-TC-VIS-5D

Magnification	0.168	0.165		X
Working distance <sup>1</sup>	218	293		mm
HFOV	76.4	77.5		mm
VFOV	57.3	58.1		mm
Focal power	2	0		Dpt
Magnification change	0.019			%/mm
Focus sensitivity	37.50			mm/dpt
F/# (fixed)			6.8	
Maximum sensor format			1"	inch
Maximum image circle (Φ)			16	mm
Pixel size (recommended)			2.4	µm
Resolution test with USAF target			121	lp/mm
Optical distortion			<0.040	%
Telecentricity			<0.1	°
Wavelength range			400-700	nm
Mount			C-mount	
Filter thread			M114.5x0.5	
Dimension (Φ x L)			122 x 253.1	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-16-40-TC-VIS-5D

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

### Embedded controller specifications<sup>2</sup>

<sup>1</sup> 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.

<sup>2</sup> Applies to the -EC1 version of the ELM. For more information, please refer to the [ECC-1C datasheet](#).

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

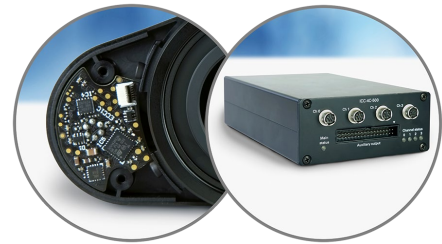
## Overview of available standard products

Standard Product	Liquid lens integrated	Connector	Controller	Typical interface
DTLP-1-0166-258-16	EL-16-40-TC-VIS-5D	Hirose (male)	ICC-1C, ICC-4C-500 (not included)	USB, Ethernet, Analog 0-10 V
DTLP-1-0166-258-16EC1	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](http://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 <sup>2</sup> C SCL	6
Pin 6	I <sup>2</sup> C SDA	5

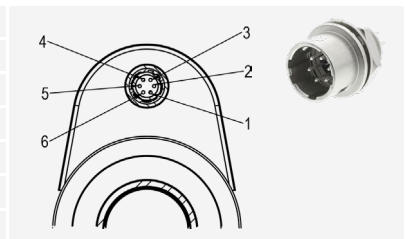


Table 1: Pinout of the DTLP-1-0166-258 with male Hirose connector (for external controller).

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

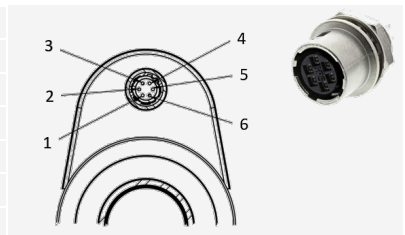


Table 2: Pinout of the DTLP-1-0166-258 with female Hirose connector ("EC1" version with ECC-1C integrated).

## Mechanical layout

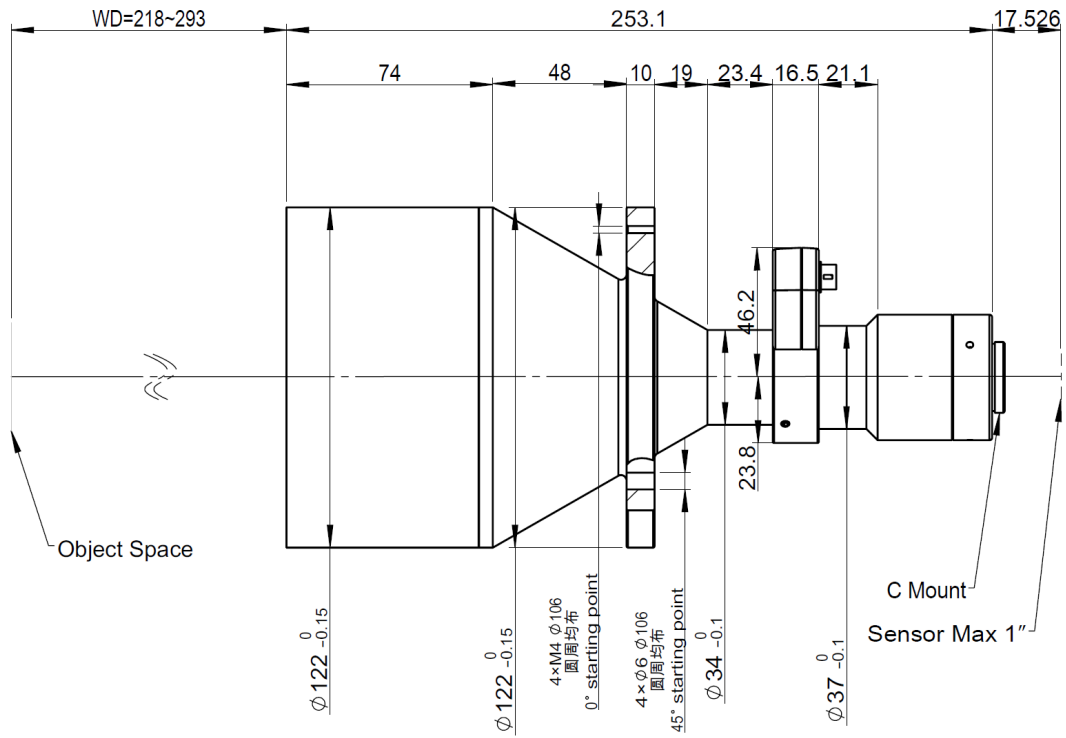


Figure 1: Mechanical drawing of the DTLP-1-0166-258 (unit: mm).