

Liquid Fixed Focal Length Lenses

New

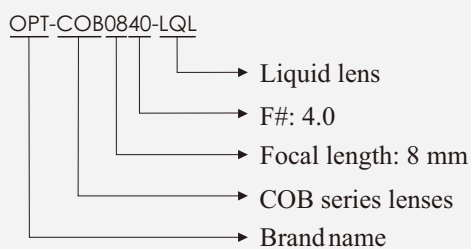


Product Features

- Faster focus**
 Can achieve dynamic autofocus, response time <4 ms, focus can be completed almost instantly.
- High resolution**
 The highest resolution is 145lp / mm, can match 3.45μm image size, maximum compatible with 2 / 3 " chip size camera^[1], focal length of 8 mm to 50 mm optional.
- Repeatability stability**
 The repeated adjustment of the liquid lens can be kept at + / -0.1 dpt.
- Phase adjustable up to 360°**
 The liquid lens digital I/O interface can rotate around the light by 360°, better accommodating applications with limited space.

[1] The sensor size of applicable cameras to OPT-COB0840-LQL and OPT-COB1240-LQL is up to 1/1.8".

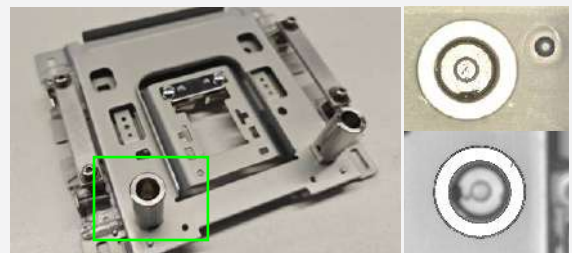
Selection Guide



Application Cases



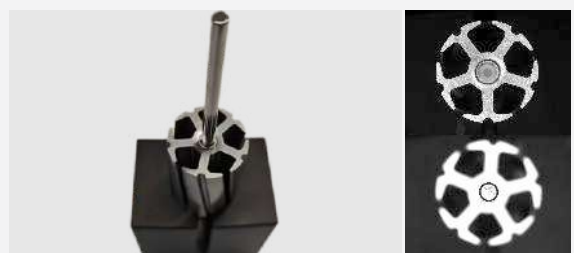
Recognition of labels on different heights of shipping boxes



Metal circular hole outline positioning and bottom defect detection

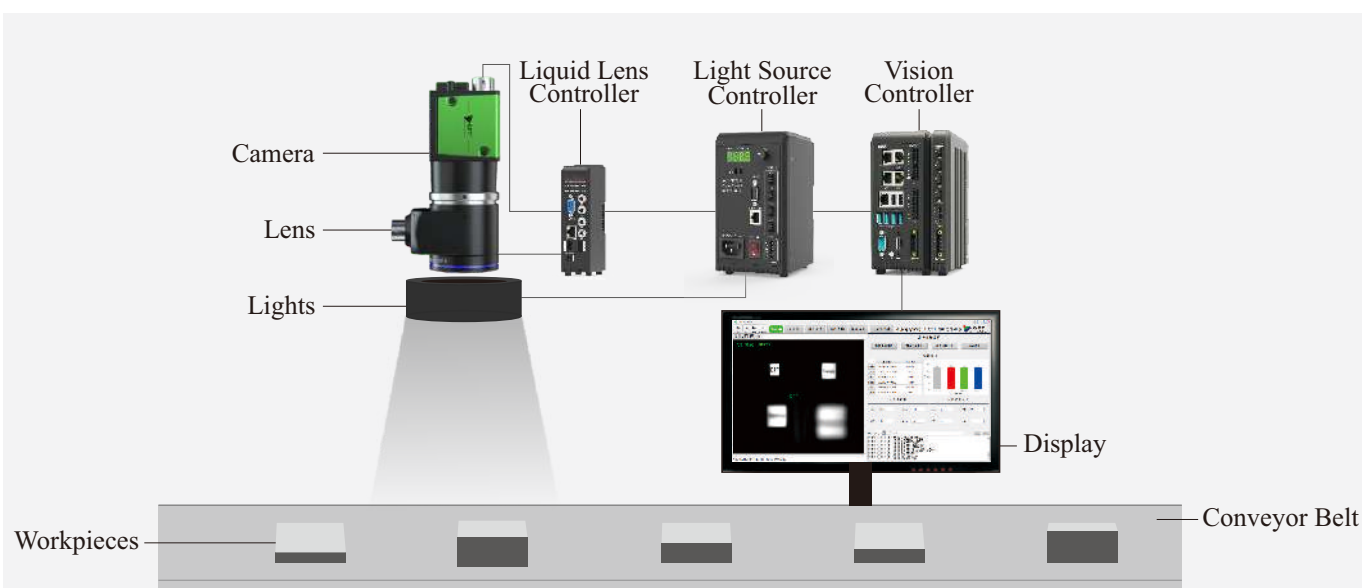


Ice cream cone exterior inspection-liquid lens testing



Bearing outer contour positioning and shaft axial runout detection

System Configuration

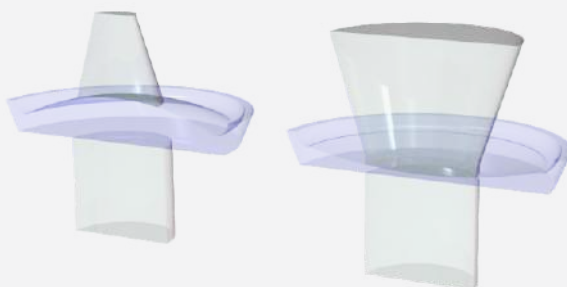


Technology Introduction

OPT liquid fixed focal length lenses employ high-precision optical design and integrated liquid lens technology, providing rapid electronic focusing, superior image performance, and a quick autofocus solution. When combined with the OPT-LLC0524E-4 liquid lens controller and Smart3 software, the liquid lens can deliver the active autofocus control required for implementing autofocus solutions. Additionally, the digital I/O interface of the liquid lens can rotate 360° to prevent interference with the imaging system's structure.

The liquid lens is composed of a container filled with optical fluid, sealed with a flexible polymer membrane. Electromagnetic pressure within the container drives the lens to deform. By applying current through the coil, the lens's radius can be adjusted within a certain range (from concave to flat to convex), thereby altering the lens's optical focal length and consequently adjusting the focusing working distance of the lens.

The OPT liquid lens offers millisecond-level response speeds, enabling rapid autofocus, addressing challenges caused by varying working distances, and reducing the time required for lens movement and adjustments. It is compatible with cameras featuring a pixel size of 3.45 micrometers, allowing for quick and precise capture of high-definition images and providing a solid foundation for efficient image processing. It finds applications in fields such as 3C electronics, new energy, keyboard electronics, electronic components, packaging printing, food, pharmaceuticals, logistics, and automation equipment, among others.



Model Table

No.	Model	Focal length (mm)	Aperture	Sensor Ø(mm)	Pixel Size (μm)	TV Distortion	WD (mm)	Chief Ray Angle	Back Focal Length (mm)	I/O Number	Focal Power Range (20C°(dpt))	Wavefront Error ^m	FOV Angle (H×V×D)		
1	OPT-COB0840-LQL	8	F4.0	9(1/1.8")	3.45	<0.45% at WD 300	100~∞	<5°	12.60	6-pin Hirose connector	-13~+13	<0.2λ/0.2λ	58.72°	48.46°	37.30°
2	OPT-COB1240-LQL	12	F4.0	9(1/1.8")	3.45	<0.13% at WD 300	100~∞	<5°	13.23	6-pin Hirose connector	-13~+13	<0.2λ/0.2λ	41.11°	33.40°	25.36°

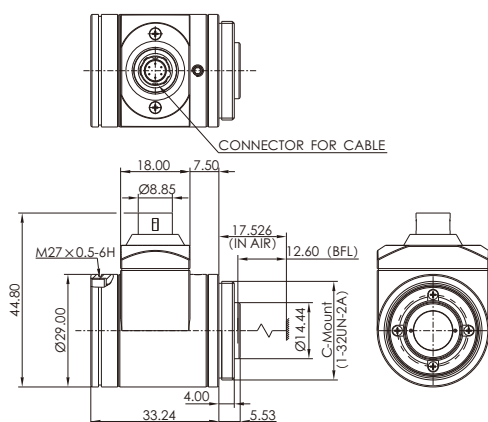
Model Table

No.	Model	Focal length (mm)	Aperture	Sensor Ø (mm)	Pixel Size (µm)	TV Distortion	WD (mm)	Chief Ray Angle	Back Focal Length (mm)	I/O Number	Focal Power Range (20°C°(dpt))	Wavefront Error ^[1]	FOV Angle (H×V×D)°
3	OPT-COB1656-LQL	16	F5.6	11(2/3")	3.45	<0.35% at WD 300	100~∞	<5°	14.89	6-pin Hirose connector	-13~+13	<0.2λ/0.2λ	37.94° 30.75° 23.31°
4	OPT-COB2556-LQL	25	F5.6	11(2/3")	3.45	<0.5% at WD 300	150~∞	<5°	14.58	6-pin Hirose connector	-13~+13	<0.2λ/0.2λ	24.81° 19.96° 15.04°
5	OPT-COB3564-LQL	35	F6.4	11(2/3")	3.45	<0.4% at WD 450	150~∞	<5°	15.54	6-pin Hirose connector	-13~+13	<0.2λ/0.2λ	17.86° 14.33° 10.77°
6	OPT-COB5080-LQL	50	F8.0	11(2/3")	3.45	<0.2% at WD 400	150~∞	<5°	18.69	6-pin Hirose connector	-13~+13	<0.2λ/0.2λ	12.55° 10.06° 7.55°
7	OPT-S0856-LQL	8	F5.6	9.4(1/1.7")	/	<2.56%	300 mm	<7.5°	5.24	FPC(2-pin) connector	-13~+13	<0.2λ/0.2λ	49.64° 37.94° 60.07°
8	OPT-S1256-LQL	12	F5.6	9.4(1/1.7")	/	<2.1%	150~∞	<5.5°	7.89	FPC(2-pin) connector	-13~+13	<0.2λ/0.2λ	34.38° 26.00° 42.39°
9	OPT-S1656-LQL	16	F5.6	9.4(1/1.7")	/	<1.7%	150~∞	<5.5°	8.77	FPC(2-pin) connector	-13~+13	<0.2λ/0.2λ	25.54° 19.06° 31.78°
10	OPT-S2556-LQL	25	F5.6	9.4(1/1.7")	/	<0.8%	150~∞	<5.5°	6.61	FPC(2-pin) connector	-13~+13	<0.2λ/0.2λ	16.30° 12.13° 20.35°

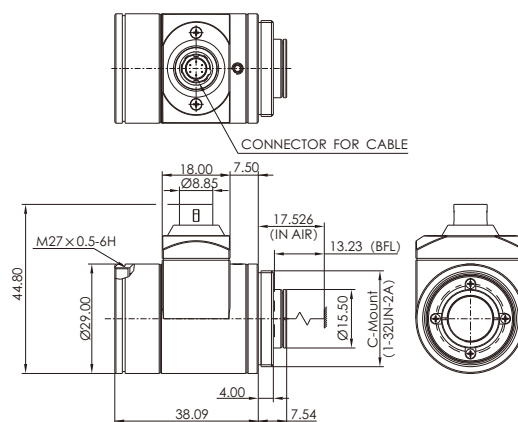
[1] The wavefront error is the mean variance in the vertical / horizontal optical axis direction at the 525 nm wavelength (RMS)λ.

Dimensions (mm)

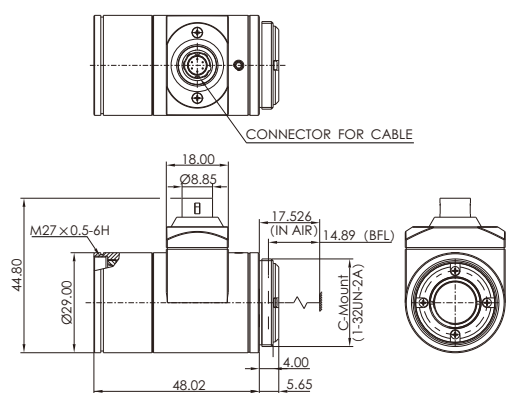
1.OPT-COB0840-LQL



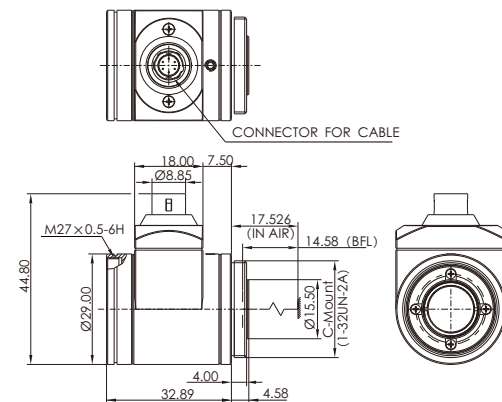
2.OPT-COB1240-LQL



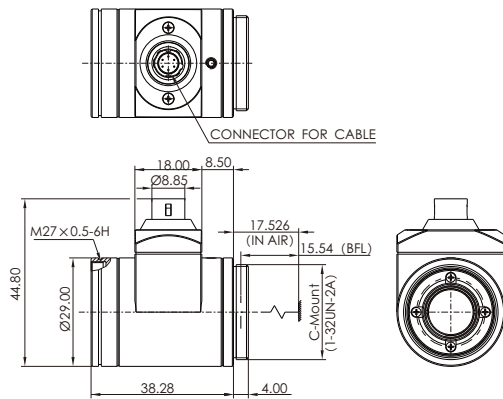
3.OPT-COB1656-LQL



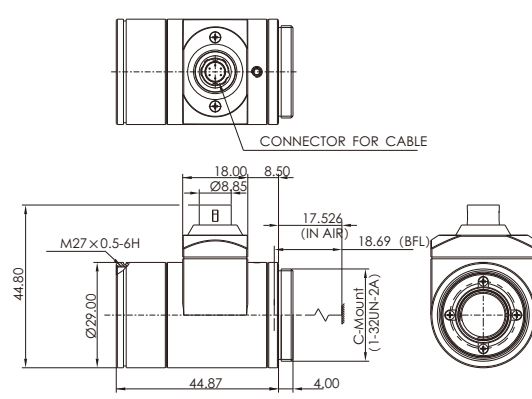
4.OPT-COB2556-LQL



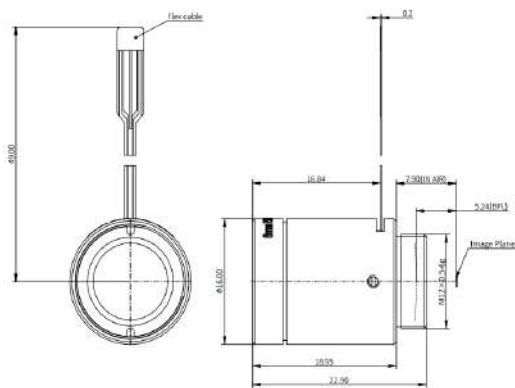
5.OPT-COB3564-LQL



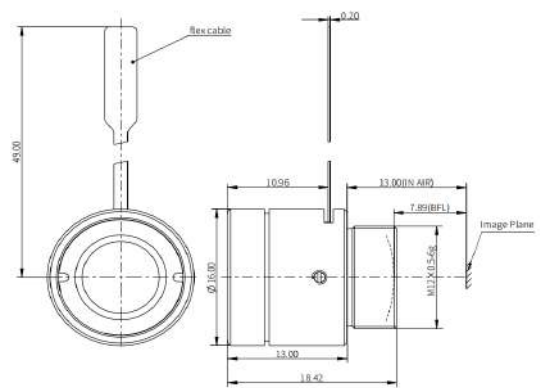
6.OPT-COB5080-LQL



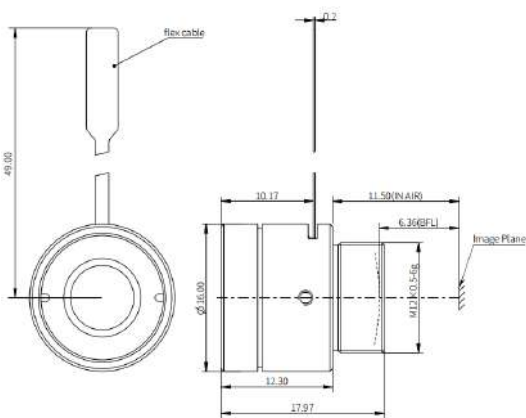
7.OPT-S0856-LQL



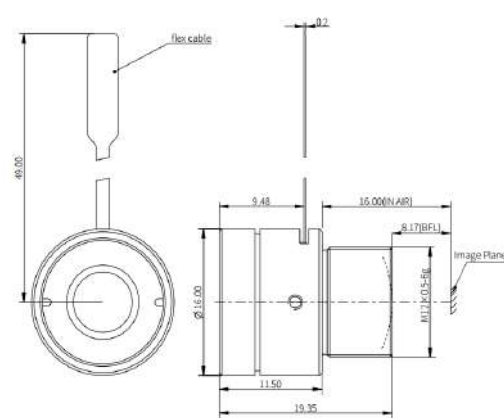
8. OPT-S1256-LQL



9.OPT-S1656-LQL



10. OPT-S2556-LQL



Liquid Lens Controller

OPT-LLC0524E-4, is a liquid lens controller used in OPT, liquid mirror head. It has the following functions: 8190 level focal length adjustment, multi-channel independent Control, programmable debugging, 100M Ethernet communication, RS232 communication.



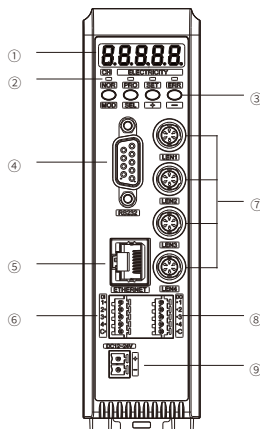
Selection Guide

OPT-LLC0524E-4

- Number of channels:4
- with network port
- Input voltage 24V
- Power 5W
- Controller type : Liquid state lens controller
- Brand name

Project	Parameters	Explanatio
Adjustable levels of current	8190 levels	Setting via keypad panel or Demo software
Liquid lens channels	4	
Communication method	RS232/Ethernet	
Lens interface	6-pin Hirose connector	
User Software Development Kit (SDK)	Applications written in C# and C++	
Supply voltage	DC24V±10%	
Power	<5W	
Operating environment temperature	-5℃~+50℃	
Humidity	20% to 85% (non-condensing)	
Dimensions(L×W×H)(mm)	95.5×40×145	Refer to dimension diagram
Weight(kg)	0.20	

Panel description



Panel description

No.	Name	Description	
1	5-Bit digital tube	From the left, the first dig it is the channel bit of the current operation, and the last four dig its are the values corresponding to the current operation.	
2	Pilot lamps	NOR Light	Normal debug
		PRO Light	Programmable debug
		SET Blink	Key setting
		ERR Light	An normal channel displayed in the current digital tube
3	Function-button	To configure the keys,the digital tube starts to blink, each press to shift, under the flashing state through the '+' , '-' keys to the corresponding bit.	
4	Serial port base	Communicate with the PC device by the RS232.	
5	100 Megabit network	Communication through the Ethernet and the PC devices.	
6	Control input	To be used	
7	Liquid lens interface	A total of 4 current output, each way independently controllable.	
8	Control output	To be used	
9	Power interface	Supply power to Controller.	

Dimensions (mm)

OPT-LLC0524E-4

