

Small, robust and well-priced – ideal for camera phones and PDAs

New: liquid lenses

The technology of liquid lenses from VARIOPTIC represents a breakthrough for the design of lens systems with small apertures. Liquid lenses allow a variable focus without any moving components. Technology of liquid lenses perfectly suits applications in which small size, low price, low energy consumption and robustness are vital – for example in cameras for mobiles, in PDAs and video cameras. From now on LINOS offers liquid lenses from VARIOPTIC.

“Electro-wetting”

The liquid lenses developed by VARIOPTIC are based on the phenomenon of electro-wetting. A water drop lies on a metallic substrate, which is covered by a thin insulation layer. The voltage applied between substrate and water drop varies the contact angle between water drop and substrate. Liquid lenses from VARIOPTIC use two liquids, one of which is used as an insulator, while the other one is used as conducting layer. Varying the applied



From now LINOS offers liquid lenses from VARIOPTIC.

voltage leads to a change in bend of the border layer between both liquids. This causes a change in focal length of the lens. VARIOPTIC owns two fundamental, worldwide patents about this technology and is dedicating a large part of their development capacity to the improvement and expansion of these patents.

Characteristics of liquid lenses:

- Large range of focal length
- Robust – no moving components
- Short reaction time
- Very good optical quality
- Good transmission in the range of visible wavelengths
- Large range of operating temperature
- Very good stability of the optical axis
- Low power consumption
- Simple, cost-saving design

For future mobiles, PDAs, etc.

According to the technology used, VARIOPTIC’s optically controlled lenses are also called liquid lenses. Liquid lenses are well-suited for the next generation of mobile devices with camera function: mobiles, PDAs, digicams and many more. The VARIOPTIC-technology offers some key benefits for this type of devices:

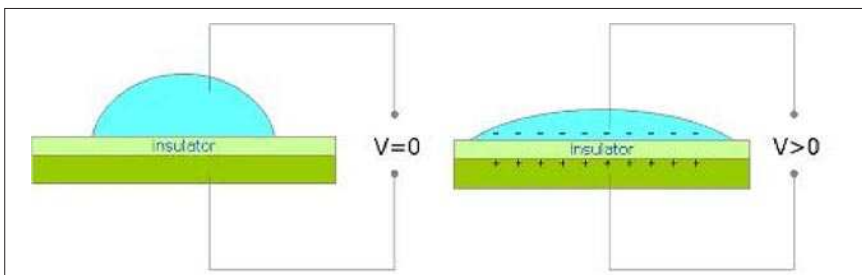
- Very small size: 8 mm in diameter, thickness of 2 mm,
- simple design,
- short reaction time <2/100 s and
- low power consumption

Medical technology

The big potential of VARIOPTIC with reference to miniaturisation creates many new opportunities in the area of imaging. So, liquid lenses are, for instance, suitable for installation inside endoscopes, confocal microscopes and for laser focusing. Ophthalmology will also benefit from this new technology of liquid lenses.

Biometry and identification

The short reaction time of 2/100 s is an essential benefit for recognising specific features: barcodes or biometric characteristics like iris or finger prints. ▶



Liquid lenses use the phenomenon of electro-wetting.

Automotive industry

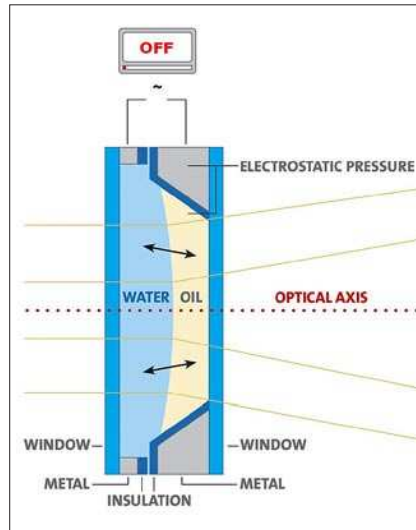
Autofocusing opportunities with liquid lenses offer new economic solutions for applications in telemetry or for monitoring systems.

Two lens types are available:
Arctic 320 and Arctic 416 SL:

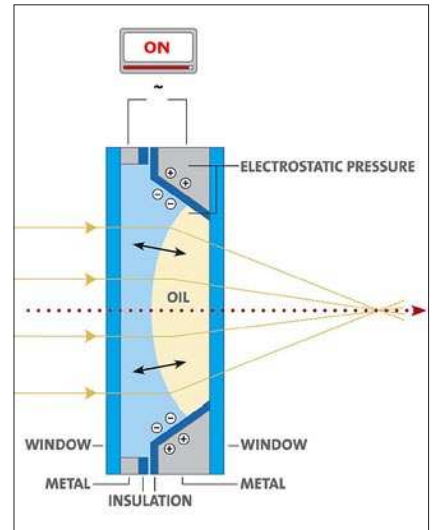
	Arctic 416 SL	Arctic 320
Aperture	2,3 mm	3 mm
Dimensions in mm	Ø 7,75 x 1,6	Ø 10,5 x 2,5
Range of focal length	60 mm until infinity	50 mm until infinity
Wave front deformation	< 0,5 µm	< 0,5 µm
Transmission (@ 587 nm)	> 90%	> 90%

“Developer kits”

Liquid lenses can be applied in a temperature range of between -20°C and +60°C. The electronic control module DrivIC 60 is a compact chip and available for integration in your own devices. LINOS offers “Lens Evaluation Kits” for testing. These kits consist of several lenses and of a lens bracket including voltage connections and voltage supply. The lens can be easily integrated in your systems by using this kit. The focal length of the lens varies if you manually change the voltage. Developer kits are also available for development of autofocus systems. These consist of lenses, bracket, voltage supply and electronic driver unit. This kit allows integration of both, the optics and the electronic driver unit in a customer-specific system.



The active principle of both liquids.



The AFL872 is an autofocus module consisting of an Arctic 320 liquid lens and of a Sunex DSL 872 fixed optical lens. This combination results in a complete autofocus module with an M8 x 0.35 thread connection. It is suitable for sensors with a size of up to 1/3” and 3 megapixels. This module offers a compact alternative to previous autofocus technologies and enables a rapid and cost-efficient access to the market because the development of customer-specific lens systems is not necessary. ◦



A compact alternative to previous autofocus technologies – the AFL 872 technologies.

Focusing on VARIOPTIC

VARIOPTIC is a leading enterprise in development and manufacturing of electronically controlled liquid optical lenses for the optical industry. VARIOPTIC is, for instance, the first enterprise which was granted international patents for a single-component focusing lens, which is based on non-mixable liquids. In order to retain and to further develop their technological head start, VARIOPTIC invests increasingly in research and development. VARIOPTIC has its headquarters in Lyon, in France, and was founded in 2002.