THORLABS

OCT-AIR/IMMx Adjustable Ring/Immersion Z-Spacer

User Manual

Original User Manual – not translated

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Chapter 1 Warning Symbol Definitions

Below is a list of warning symbols you may encounter in this manual or on your device.

Symbol	Description
	Direct Current
	Alternating Current
	Both Direct and Alternating Current
	Earth Ground Terminal
	Protective Conductor Terminal
	Frame or Chassis Terminal
	Equipotentiality
	On (Supply)
	Off (Supply)
	In Position of a Bi-Stable Push Control
	Out Position of a Bi-Stable Push Control
	Caution: Risk of Electric Shock
	Caution: Hot Surface
	Caution: Risk of Danger
	Warning: Laser Radiation
	Caution: Spinning Blades May Cause Harm

Chapter 2 Safety

ATTENTION

Please read this operating manual carefully before operating the adjustable ring/immersion Z-spacer OCT-LKx. All statements regarding safety and technical specifications will only apply when the unit is operated correctly.

This equipment is intended for laboratory use only and is not certified for medical applications, including but not limited to life support situations.

Refer to this manual whenever the following symbols are encountered on the OCT system:

Attention symbol indicates that additional information is given in this manual.

2.1. Care and Maintenance

Handle the device with care during transportation and unpacking. Banging or dropping the system can damage the unit or lower system performance. Please contact Thorlabs Technical Support for more information.

- Do not use solvents on or near the equipment.
- Keep away from dust, dirt, and air-borne pollutants (including cigarette smoke). The system is not designed for outdoor use. Protect the equipment from rain, snow, and humidity.
- Do not expose to mechanical and thermal extremes. Protect the equipment from rapid variation in temperature.
- Handle the equipment with care. Do not use unnecessary force, as this may damage the device.

2.1.1. Optical Cleaning

Good performance and image quality of the OCT system relies on clean optical components.

2.1.2. Service

Only trained and approved Thorlabs personnel are allowed to service the system. Please contact Thorlabs technical support for more information.

2.1.3. Accessories and Customization

This adjustable ring/immersion Z-spacer OCT-LKx is a qualified accessory provided by Thorlabs. To achieve the listed specifications however this system should only be used with the delivered parts and assemblies. Any modification or maintenance by unqualified personnel will render the warranty null and void, leaving Thorlabs free of liability. Please contact Thorlabs technical support for questions on customization.

Chapter 3 Description

The adjustable Z-Spacer is an accessory for the OCT scanner that reduces motion artifacts during scanning by creating a defined contact surface for the sample. It is designed to be attached to the scan lens kits OCT-LKx.

The contact interface could adjusted along the Z-axis in relation to the OCT scanner to adjust the focal plane within the sample.

The focal spacer is available in two options:

- The ring-contact OCT-AIRx Z-spacer, provides a distance guide between the scanner and sample, only the Z-spacer edge is in direct contact with the sample.

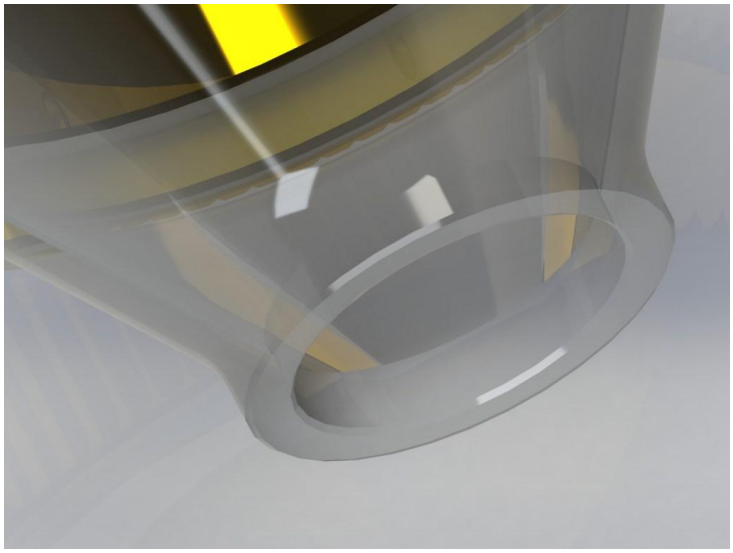


Figure 1 Ring Contact OCT-AIRx Z-Spacer

- The immersion OCT-IMMx Z-spacer for when a sample is immersed in fluid. The contact glass comes in contact with the immersion fluid or sample within the scanning area and is tilted to avoid direct reflection

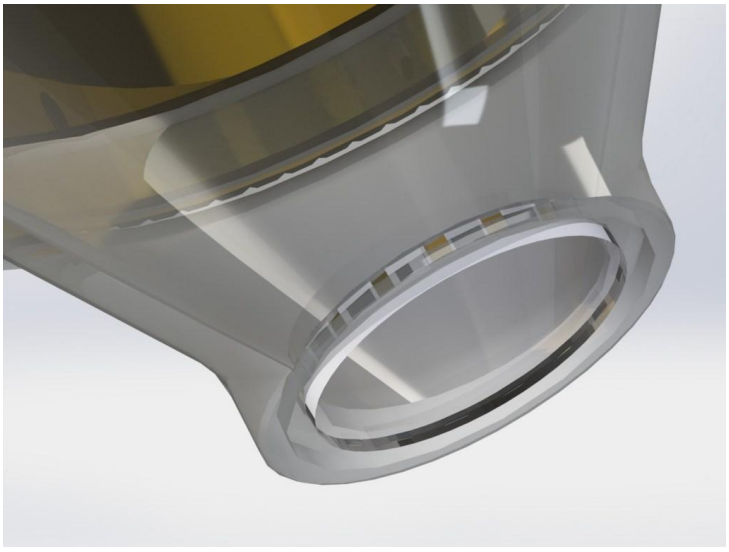


Figure 2 Immersion OCT-IMMx Z-Spacer

3.1. Focus

The z-position of the sample in relation to the imaging focal plane can be adjusted by rotating the front end of the focal spacer using the internal thread with 0.5 mm pitch. The possible height adjustment range depends on the type of the focal spacer.

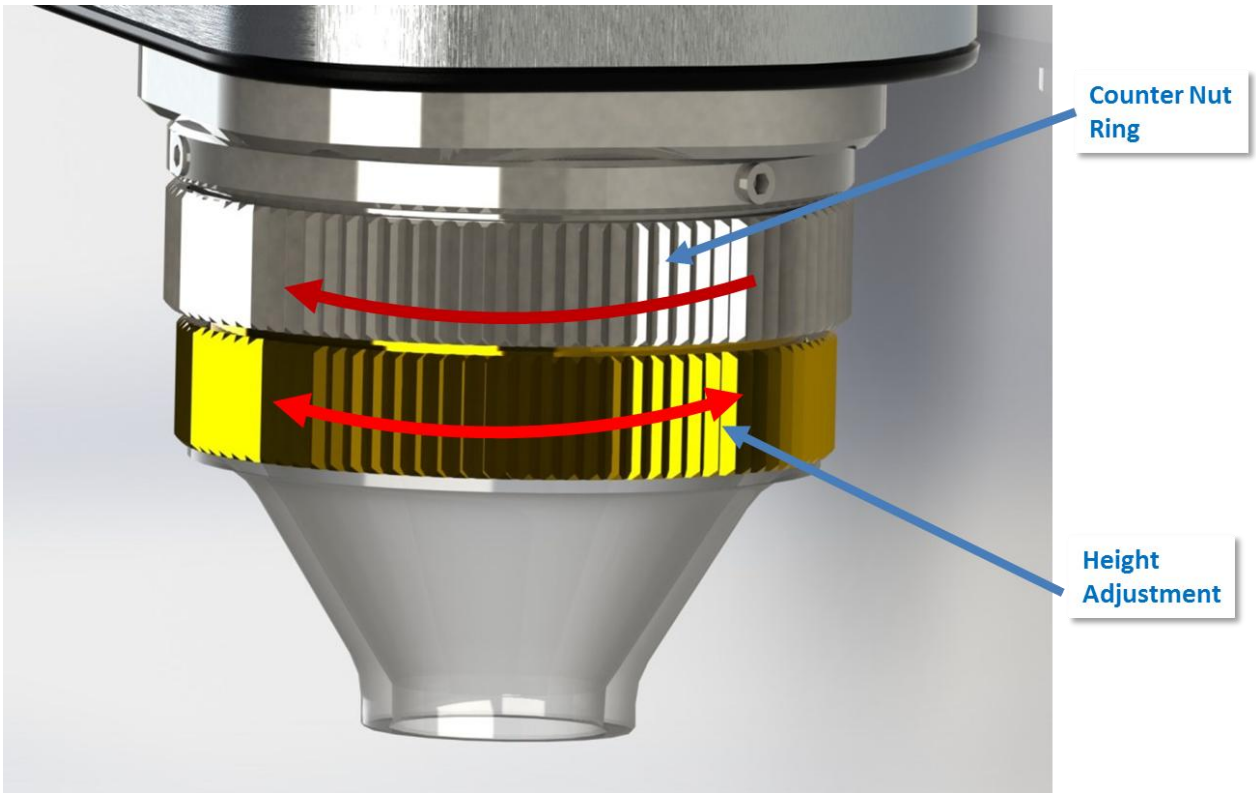


Figure 3 Z-Position Adjustment

- First loose the counter nut ring by turning it counter clockwise as shown in the image above
- Adjust the height adjustment ring
    - Rotate clockwise to lift the sample in relation to the focal plane
    - Rotate counter clockwise to lower the sample in relation to the focal plane
- Tighten the counter nut ring by turning it clockwise

ATTENTION
Please do not disassemble the focal spacer, the internal thread is sensitive to mechanical stress and dirt.

3.2. Orientation

Adjustments to the height adjustment ring cause the orientation of the focal spacer to become undefined. The orientation of the focal spacer can be adjusted by rotating the whole focal spacer. Loosen the set screws using a 1.5 mm hex key driver till the focal spacer could be rotated and setting it into the intended orientation.

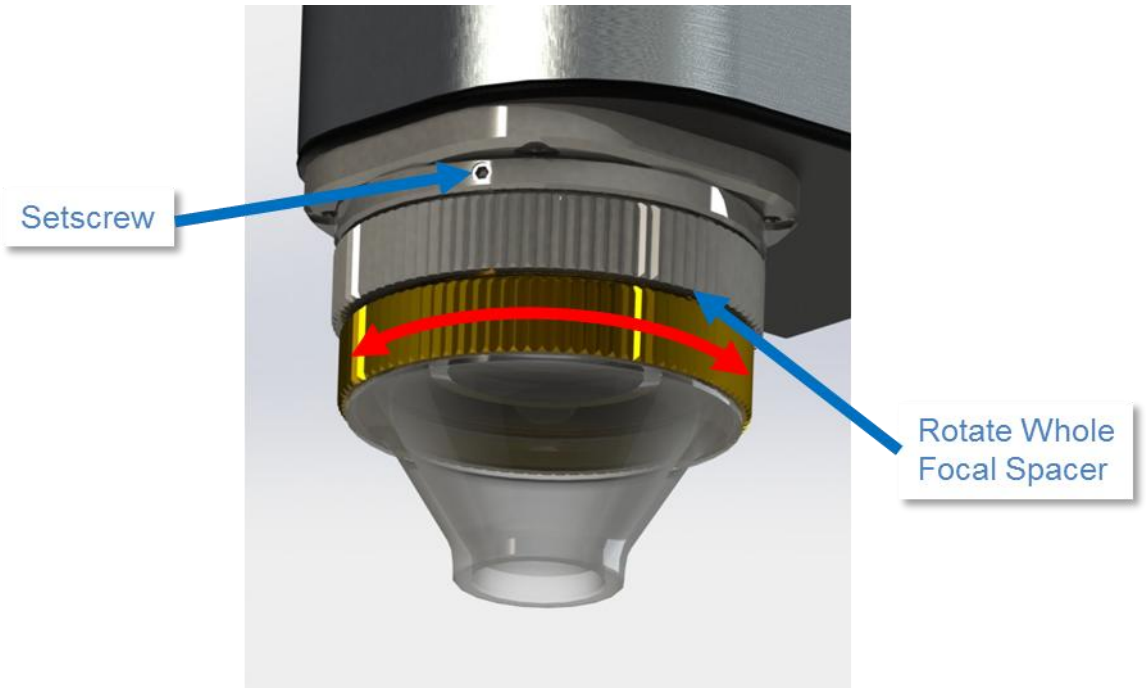


Figure 4 Rotation Adjustment

ATTENTION
Take care that the screws are not loosen too much, the focal spacer might fall if the screws leave the dove tail overlap

Chapter 4 Setup

The installation of the focal spacer requires a 1.5 mm hexagonal screw driver (metric 1.5 mm hex key) which is included.

The three M3 setscrews at the base of the focal spacer should be loosened so that the focal spacer can be inserted into the circular dove tail on the scanner.

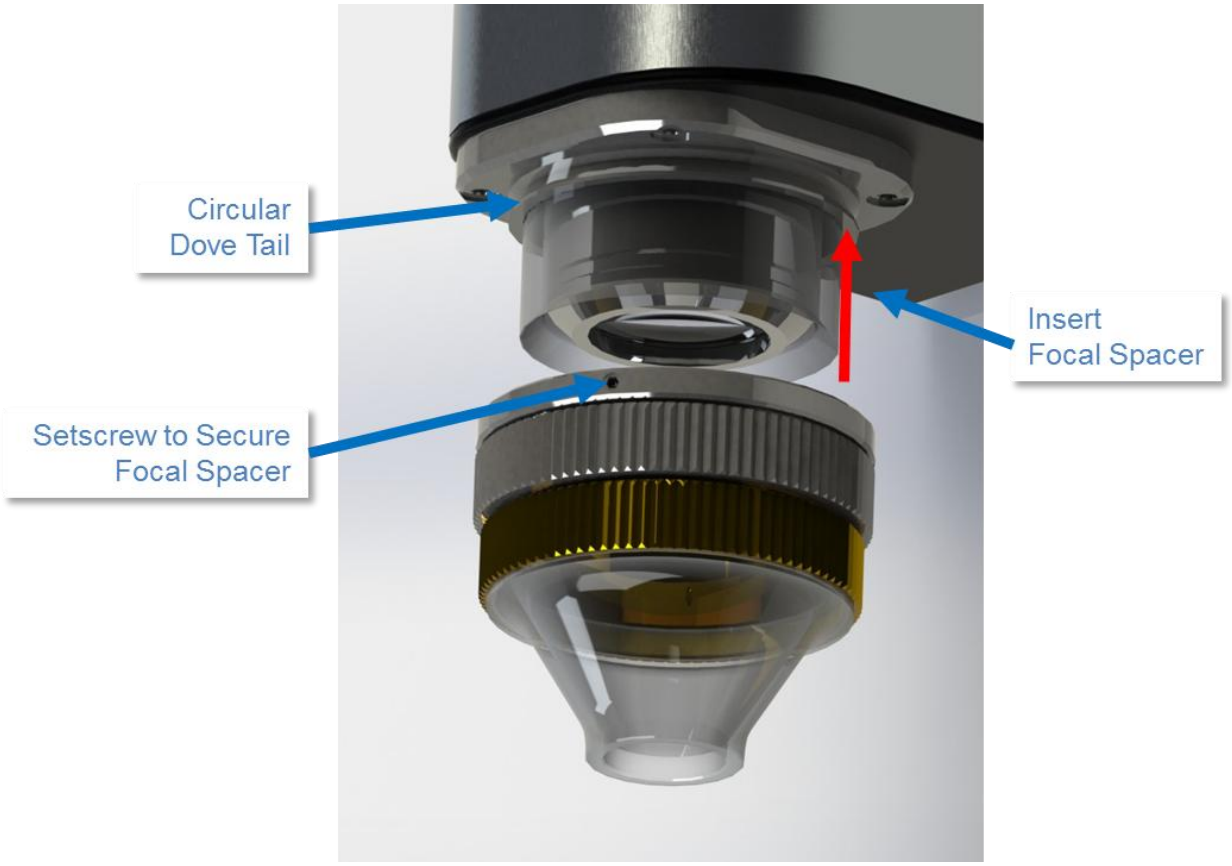


Figure 5 Installation of AdjustableRing/Immersion Z-Spacer

Tightening the three set screws secures the focal spacer in position.

Chapter 5 Supporting Information

When the sample is immersed by media with a refractive index bigger than one, the optical path of light through the system is impacted:

- The focal plane shifts due to the refraction of light in the media. This effect only affects the immersion focal spacer.
  For a sample in a depth t within a media, the preset focal depth in air should be t/n.

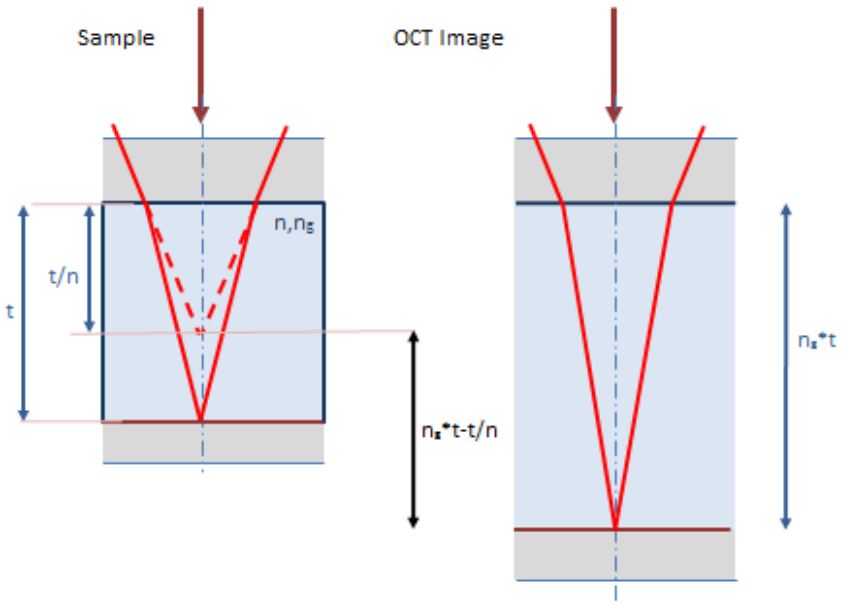


Figure 6 Focal Shift in a Medium

- The optical path length increases by a factor that depends on the refractive index n as well as the group refractive index n_g of the media.

  The enlargement could be calculated according to $n_g \cdot t - t/n = t \cdot (n_g - 1/n)$ This enlargement must be compensated by the reference arm length.

- For the immersion OCT-IMMx Z-spacer with a 2 mm Lithosil-Q window the calculation for 900 nm looks like this:

○ Thickness media	t	2 mm
○ Refractive index media	$n(900nm)$	1.452
○ Group refractive index media	$n_g(900nm)$	1.465

$$Shift_{reference} = t \cdot (n_g - 1/n) = 1.5507mm$$

Please note when installing the immersion OCT-IMMx Z-spacer, the reference arm of the scanner needs to be lengthened by 1.55 mm to compensate for the change in reference path length.

Chapter 6 Specifications

Item #	OCT-AIR3	OCT-IMM3	OCT-IMM4
Open aperture	15 mm	14 mm	24 mm
Outer Diameter	50 mm		
Height focal plane	44.3 mm	44.6 mm	76.0 mm
Adjustment range	+3.5 mm / -1.0 mm	+3.4 mm / -1.1 mm	+1.0 mm / -17.0 mm

Chapter 7 Warranty

7.1. Imaging Systems

Thorlabs offers a one-year warranty on the OCT-AIR/IMMx Adjustable Ring/Immersion Z-Spacer.

7.2. Non-Warranty Repairs

Products returned for repair that are not covered under warranty will incur a standard repair charge in addition to all shipping expenses. This repair charge will be quoted to the customer before the work is performed.

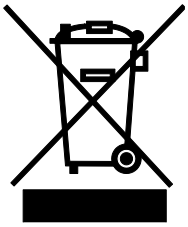
7.3. Warranty Exclusions

The stated warranty does not apply to products which are (a) specials, modifications, or customized items (including custom patch cables) meeting the specifications you provide; (b) ESD sensitive items whose static protection packaging has been opened; (c) items repaired, modified, or altered by any party other than Thorlabs; (d) items used in conjunction with equipment not provided by or acknowledged as compatible by Thorlabs; (e) subjected to unusual physical, thermal, or electrical stress; (f) damaged due to improper installation, misuse, abuse, or storage; (g) damaged due to accident or negligence in use, storage, transportation, or handling.

Chapter 8 Regulatory

As required by the WEEE (Waste Electrical and Electronic Equipment Directive) of the European Community and the corresponding national laws, Thorlabs offers all end users in the EC the possibility to return “end of life” units without incurring disposal charges.

- This offer is valid for Thorlabs electrical and electronic equipment:
- Sold after August 13, 2005
- Marked correspondingly with the crossed out “wheelie bin” logo (see right)
- Sold to a company or institute within the EC
- Currently owned by a company or institute within the EC
- Still complete, not disassembled and not contaminated



Wheelie Bin Logo

As the WEEE directive applies to self-contained operational electrical and electronic products, this end of life take back service does not refer to other Thorlabs products, such as:

- Pure OEM products, that means assemblies to be built into a unit by the user (e. g. OEM laser driver cards)
- Components
- Mechanics and optics
- Left over parts of units disassembled by the user (PCB’s, housings etc.).

If you wish to return a Thorlabs unit for waste recovery, please contact Thorlabs or your nearest dealer for further information.

8.1. Waste Treatment is Your Own Responsibility

If you do not return an “end of life” unit to Thorlabs, you must hand it to a company specialized in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site.

8.2. Ecological Background

It is well known that WEEE pollutes the environment by releasing toxic products during decomposition. The aim of the European RoHS directive is to reduce the content of toxic substances in electronic products in the future.

The intent of the WEEE directive is to enforce the recycling of WEEE. A controlled recycling of end of life products will thereby avoid negative impacts on the environment.

Chapter 9 Thorlabs Worldwide Contacts

For technical support or sales inquiries, please visit us at www.thorlabs.com/contact for our most up-to-date contact information.

USA, Canada, and South America
Thorlabs, Inc.
sales@thorlabs.com
techsupport@thorlabs.com

Europe
Thorlabs GmbH
europe@thorlabs.com

France
Thorlabs SAS
sales.fr@thorlabs.com

Japan
Thorlabs Japan, Inc.
sales@thorlabs.jp

UK and Ireland
Thorlabs Ltd.
sales.uk@thorlabs.com
techsupport.uk@thorlabs.com

Scandinavia
Thorlabs Sweden AB
scandinavia@thorlabs.com

Brazil
Thorlabs Vendas de Fotônicos Ltda.
brasil@thorlabs.com

China
Thorlabs China
chinasales@thorlabs.com

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www.thorlabs.com