



IO-K-2000 **Fiber Isolator**

User Guide



Table of Contents

Chapter 1	Safety.....	1
Chapter 2	Setup.....	2
	<i>2.1. Unpacking</i>	<i>2</i>
	<i>2.2. Installation Procedure</i>	<i>2</i>
Chapter 3	Description.....	3
	<i>3.1. Polarization Independent Optical Path Schematic</i>	<i>4</i>
Chapter 4	Operation.....	5
	<i>4.1. Forward Mode</i>	<i>5</i>
	<i>4.2. Reverse Mode.....</i>	<i>5</i>
Chapter 5	Warranty	5
Chapter 6	Specifications	6
Chapter 7	Drawing	7
Chapter 8	Regulatory.....	8
	<i>8.1. Waste Treatment is Your Own Responsibility.....</i>	<i>8</i>
	<i>8.2. Ecological Background</i>	<i>8</i>
Chapter 9	Thorlabs Worldwide Contacts.....	9

Chapter 1 Safety



WARNING



This isolator contains a powerful permanent magnet. Keep all steel objects and anything affected by a magnetic field at a minimum distance of 1" (25 mm) from the isolator.



WARNING



Do NOT attempt to disassemble this isolator. The isolator must remain contained by the isolator body. Any disassembly of the isolator voids the warranty and can be unsafe.

Chapter 2 Setup

2.1. Unpacking

Note: Thorlabs aligns the isolator with unpolarized light. This unit is fusion spliced with the laser source fiber and individually tested. See the included test report for details.

2.2. Installation Procedure

- 1) Carefully remove the unit from the box by removing the pins holding the input and output fibers. Be wary of damaging the fiber when removing the unit from the box.
- 2) Place the isolator into your fiber optic system.
- 3) Secure the base of the isolator to the table via the 4-40 (M3) mounting slot.
- 4) Orient the isolator according to the engraving on the lid.
- 5) Splice the fiber to the source via fusion (recommended) or mechanical splice.
- 6) Turn on the power source within the isolator wavelength range (± 10 nm of the center wavelength).
- 7) Ensure you apply only the maximum rated power of the isolator as indicated on this spec sheet.

Chapter 3 Description

Fiber isolators protect light sources from back reflections and signals that can cause intensity noise and optical damage. Optical isolators, also known as Faraday isolators, are magneto-optic devices that preferentially transmit light in the forward direction while absorbing or displacing light propagating in the reverse direction.

This Thorlabs' polarization-independent isolator is compatible with single mode (SM) fibers. There is 0.8 m to 1.0 m of fiber built in to each side of the isolator, and an arrow engraved on the body indicating the transmission direction. In addition, each unit is tested before shipment to ensure compliance with our specifications and a complete test report comes with every serialized part.

An isolator consists of a Faraday rotator, at least two polarizers, a half-wave retarder and collimating lenses.

The main body of the isolator contains the Faraday rotator, polarizers and retarder. The outer aluminum sleeves protect the input and output ports containing the collimating lens and fiber ferrule.

This isolator is mounted on a baseplate with two 4-40 (M3) counterbored slots for securing the unit to a breadboard or optical table. This base may be removed by the user if desired. However, do not remove the lid as this is considered disassembling and will void the warranty.

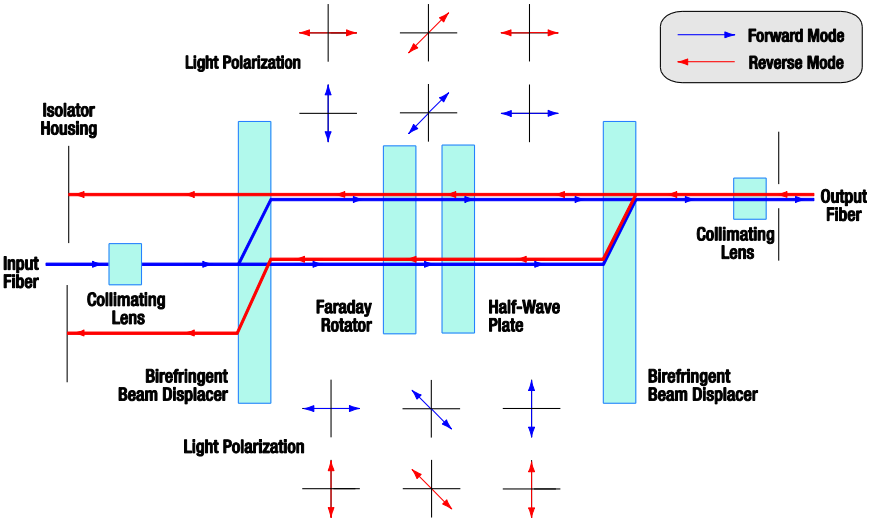
Part Number

The part number consists of the following:

- **IO** (The Isolator Code)
- **Letter**
 - Polarization dependence (F/K – Independent; J/L – Dependent)
 - Maximum Power Level (F/J – 3W CW max; K/L – 10W CW max)
- **Center Wavelength** (nm)

Example: **The IO-K-2000 isolator is a polarization independent fiber isolator with a max power level of 10 W (CW) and a center wavelength of 2000 nm.**

3.1. Polarization Independent Optical Path Schematic



Chapter 4 Operation

4.1. Forward Mode

Laser light enters the isolator via the input single mode fiber. A lens collimates the light and splits it as it goes through a birefringent beam displacer polarizer. The light then enters the rotator, which rotates its plane of polarization 45° . It then passes through a retarder and second displacer polarizer. Finally, it exits via another collimating lens coupling into output fiber.

4.2. Reverse Mode

Some random beam reflections will be reflected back through the fiber towards the laser. This feedback enters the isolator and is split by the output beam displacer. The two beams are rotated 45° by the waveplate and another 45° by the faraday rotator. The two beams are now oriented 90° as compared to the forward beams and walk off a second time instead of being recombined. These beams do not couple into the input fiber and are absorbed inside the isolator housing. The laser is now isolated from downstream reflections.

Chapter 5 Warranty

All Thorlabs fiber isolators are covered by Thorlabs' six-month warranty against defects in materials and workmanship.



WARNING



**Do not attempt to disassemble the isolator.
Disassembly of the isolator voids the warranty and can be unsafe.**

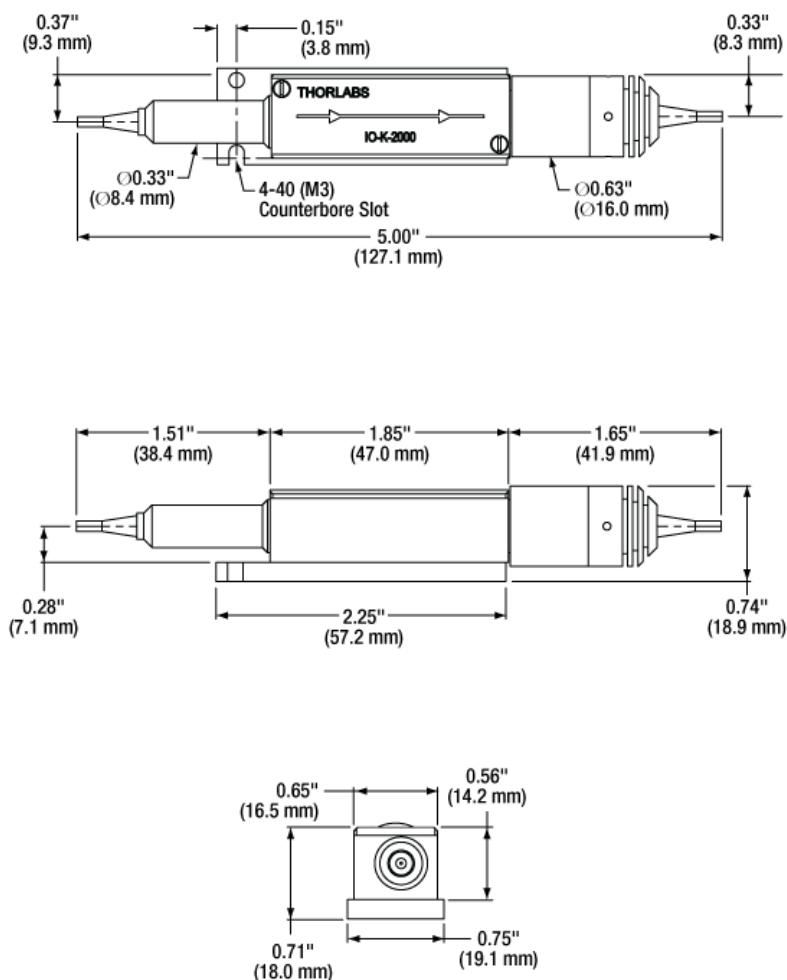
Please contact technical support if you have questions regarding performance or operations. See page 9 for contact information by region.

Chapter 6 Specifications

Item #	IO-K-2000
Polarization	Independent
Fiber Type	Single Mode (SM), SM2000
Center Wavelength	2000 nm
Operating Range	1990 - 2010 nm
Weight	0.50 kg
Optical Specifications	
Isolation @ 2000 nm	28 dB (Min) 30 dB (Typ.)
Max Power ^a	10 W (CW)
Insertion Loss (Without Connectors)	1.6 dB (Typ.) 1.6 dB (Max)
Polarization Dependent Loss (PDL)	≤ 0.20 dB
Return Loss	≥ 50 dB

a) The maximum power specification represents the maximum power for the combined forward and reverse directions. Therefore, the sum of the powers in the forward and reverse directions cannot exceed the maximum power specification.

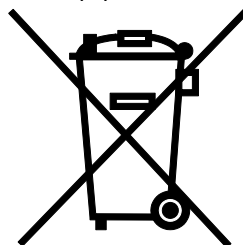
Chapter 7 Drawing



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



THORLABS

www.thorlabs.com
