

# Characteristics

## Principle of Operation

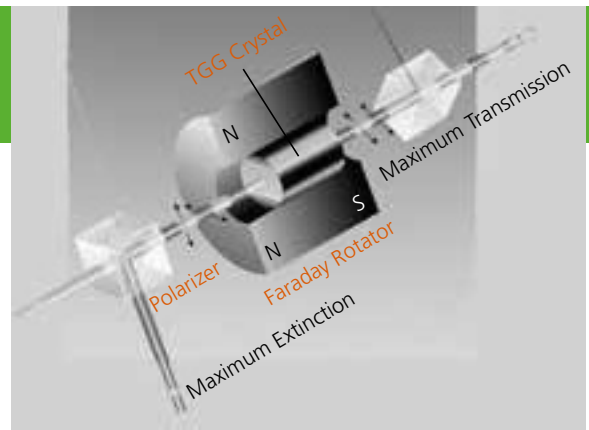
Faraday isolators are optical components which allow light travel in only one direction. Their mode of operation is based on the Faraday effect (linear magneto-optical effect). In principle, the function of an optical isolator is analogue to that of an electrical diode.

Faraday isolators are composed of three elements:

- Entrance Polarizer
- Faraday Rotator
- Exit Polarizer

Thin film polarizers are commonly used as entrance and exit polarizers, typically in form of a special polarizing beam splitter cube. These polarizers have an extremely high extinction ratio and are designed for use with high power lasers. The polarizer entrance and exit surfaces are coated with an antireflective coating for the specified wavelength range. The key element of the Faraday isolator is the Faraday rotator. The rotator consists of a strong permanent magnet containing a crystal with a high Verdet constant.

Light of any polarization entering the entrance polarizer exits it as horizontally or vertically linearly polarized light. Since laser light is usually linearly polarized, one can match the orientation of the entrance polarizer and the polarization of the laser by simply rotating the isolator. Light then passes through the Faraday rotator. For most wavelengths the crystal is a Terbium Gallium Garnet (TGG) crystal which is placed in a strong homogeneous magnetic field. Crystal length and magnetic field strength are adjusted so that the light polarization is rotated by  $45^\circ$  on exiting the crystal. In the figure above, the light is rotated counter clockwise when viewed in the



north/south direction of the magnetic field ( $\pm 45^\circ$ ) and the exit polarizer is also oriented at  $\pm 45^\circ$ , so that the maximum beam intensity is transmitted.

If light of any polarization, but with a reversed direction of propagation, meets the exit polarizer, it leaves at  $\pm 45^\circ$ , passes through the Faraday rotator and is again rotated by  $\pm 45^\circ$ . The non-reciprocal nature of the Faraday effect results in the direction of rotation once again being counter clockwise as viewed in the north/south direction of the magnetic field. Upon leaving the Faraday rotator, the polarization has gone through two  $\pm 45^\circ$  rotations resulting in a total rotation of  $\pm 90^\circ$ . In this polarization direction the light is deflected laterally by the entrance polarizer.

## Increased Isolation

The maximum isolation of the Faraday isolator is limited by inhomogeneities of the TGG crystal and the magnetic field. However, it is possible to square the extinction ratio by placing two isolators in series and by arranging the polarity of the two magnets to be opposite to each other. This way the polarization direction of the transmitted light remains unchanged in the transmission direction and the effect of both magnetic fields is enhanced. This arrangement also leads to a more compact isolator. The strength of this effect depends on the distance between the two magnets and can be used to tune the isolator to different wavelengths. The adjustment is necessary because the rotational angle of the TGG crystal is wavelength and temperature dependent. Please see section "Two Stage Isolators" (page 20) for more information.

# Advantages

## High Isolation

The properties of the LINOS Faraday isolators are determined by the quality of the optical elements and the uniformity of the magnetic field. The entrance and exit polarizers exhibit a very high extinction ratio, so that the isolation is mainly limited by inhomogeneities in the crystal material. Specially selected crystal materials with a high Verdet constant combined with permanent magnets with a high remanence enable Qioptiq to use shorter crystals and obtain an isolation > 30 dB.

The radiation blocked by the entrance and exit polarizers is not absorbed internally, but is deflected by 90° with respect to the beam direction. This ensures a stable thermal operation even at higher laser power levels. The blocked radiation can be used for other applications. All optical surfaces are slightly tilted relative to the beam axis.

## Low Insertion Loss

The high transmission, typically > 90%, is achieved by using materials with low absorption and anti-reflective coatings with low residual reflectivity on all entrance and exit surfaces.

## Large Aperture, Compact Design

All optical elements have been aligned to eliminate beam shading and allow for easy adjustment. Focusing is not necessary. The compact design is achieved by using rare earth magnets with the highest remanent magnetism and TGG crystal material with a high Verdet constant. The isolator is suitable for divergent beams or in setups with limited space. A minimal optical path length in the isolator results in the lowest possible influence on the image.

Three sides of the entrance and exit polarizers are usable and readily accessible for easy cleaning. The degree of isolation can be adjusted over a wide range.

## Mounting Flexibility

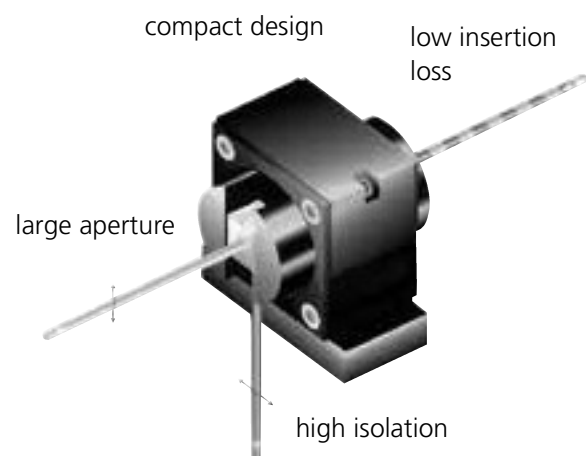
The LINOS Faraday isolators can be mounted directly via threaded holes in the housing or via additional base plates or angle brackets. New rotatable Faraday isolators are available.

## Applications

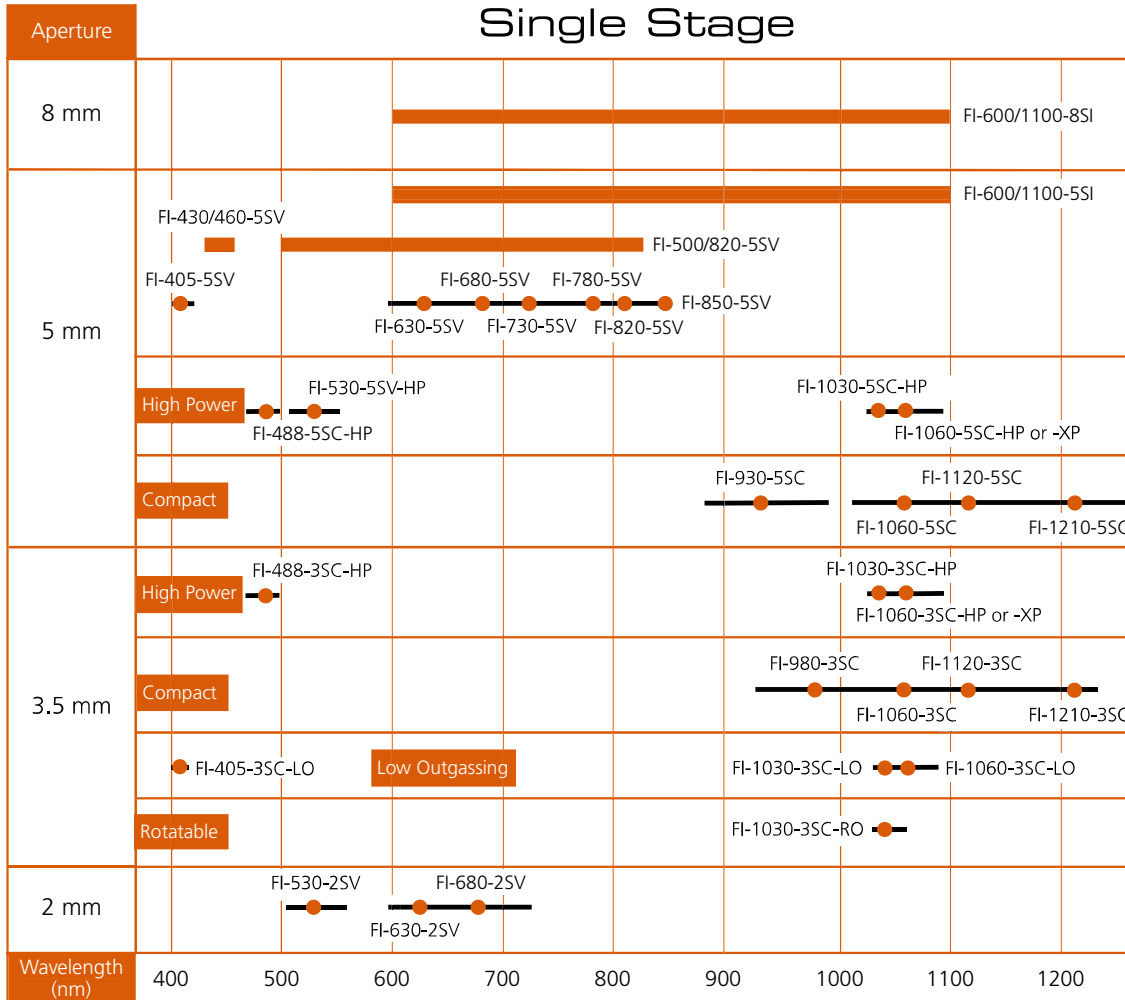
The ongoing development and refinement of laser technology have created a need for optical components that shield the laser resonator from back reflections. LINOS Faraday isolators provide an efficient method of suppressing instabilities and intensity fluctuations in laser devices.

## Typical Applications are:

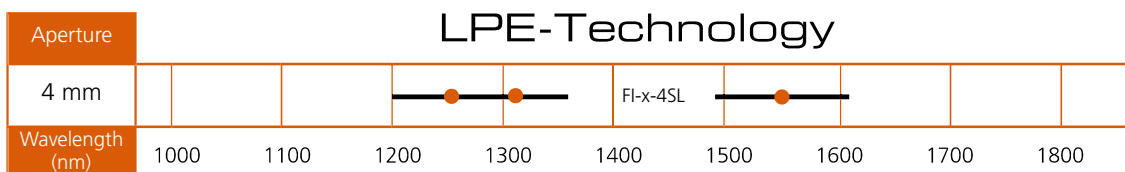
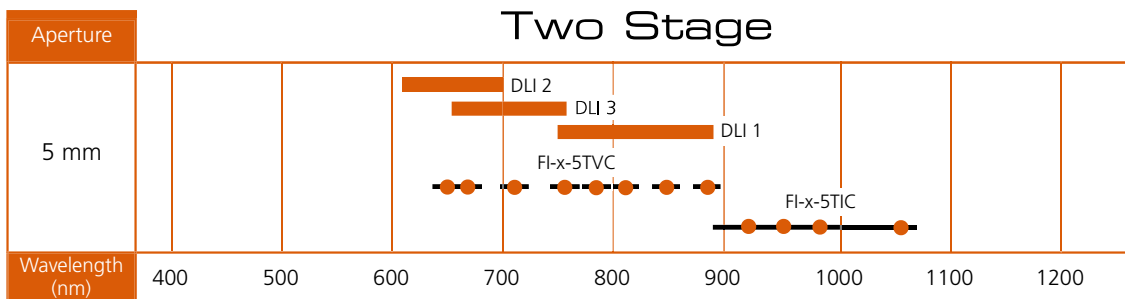
- Protection of the resonator in solid state and gas lasers from back reflections
- Prevention of parasitic oscillation in multistage solid state amplifiers
- Protection of diode lasers against back scatter and extraneous light



# Product Overview



XP ≥ 50 W, RO = Rotatable



# Single Stage Faraday Isolators

## Technical Overview

The compact LINOS Faraday isolators in this section use a single stage rotator. The length is kept to a minimum with the use of powerful permanent magnets in an optimized geometry. Rotation of the exit polarizer provides a maximum extinction over a certain range around the central wavelength. The entrance and exit polarizers are polarizing beam splitter cubes. The blocked radiation is diverted by 90° and is readily available for other applications. At 30 dB, the specification of the isolator is sufficient for most standard applications. For specialized applications, selected isolators with an extinction up to 45 dB are available. An even higher extinction is provided by the two stage isolator series.

## Wavelength Tuning

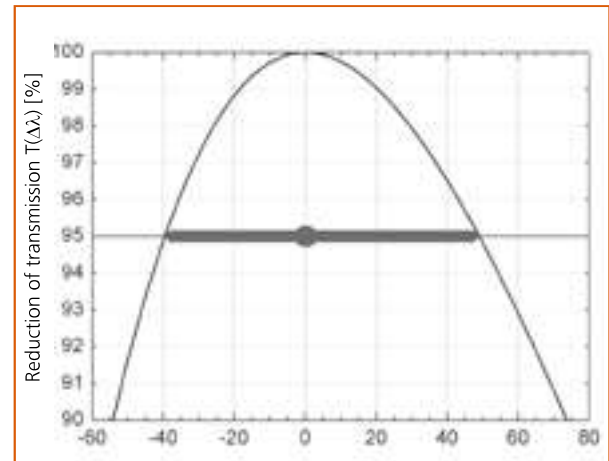
The Verdet constant of the TGG crystal is dependent upon wavelength and temperature. In order to compensate for different temperatures or different wavelengths, it is possible to tune the isolator in order to achieve maximum extinction. Tuning the isolator is accomplished by rotating the holder of the exit polarizer with respect to an engraved angular scale.

The graph shows the typical reduction factor of the transmission ( $T(\Delta\lambda)$ ) that is due to the tuning of the isolator to a wavelength  $\lambda$  that is different from the design wavelength  $\lambda_0$ . The bar has a length that covers the wavelength range for which  $0.95 < T(\Delta\lambda) < 1.05$ . The bullet indicates the design wavelength  $\lambda_0$ . The overall transmission of a Faraday isolator is equal to  $T_t = T_0 \times T(\Delta\lambda)$ , where  $T_0$  is a factor that represents the transmission of the polarizers. At the design wavelength the overall transmission of the Faraday isolator is  $T_0 > 90\%$ .

## Applications

The following single stage LINOS Faraday isolators are suitable for all lasers operating in the range especially:

- Ar+ and Kr+ lasers
- Other Ion lasers
- HeNe lasers
- Other gas lasers
- Dye lasers
- Diode lasers
- Ti:Sapphire lasers
- Cr:LiCAF lasers
- Short pulse lasers
- Mode-synchronized lasers
- Alexandrite lasers



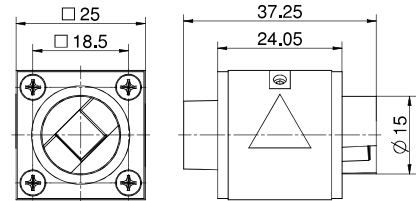
Tuning of design wavelength  $\Delta\lambda$

# Isolators with 2 mm Aperture, SV Series



## FI-x-2SV

- Isolation better than 30 dB / typically 38-42 dB over the entire wavelength range
  - Custom isolation values on request
  - TGG crystal
  - Rare earth magnet
  - Output polarizer, 360° rotation, engraved tuning scale
  - Access to blocked beam
- Mounting 2SV-version: via two M3 threaded holes at the bottom side, 20 mm separation



FI-x-2SV (x = 530, 630, 680 nm)

10

## Isolators with 2 mm Aperture, SV Series

Product	Isolation, guaranteed/ typical (dB)	Transmission at design wavelength (%)	Transmission at boundary wavelength (%)	Tuning range typical (nm)	Aperture Ø (mm)	Dimensions (mm)	Damage threshold @ 1.2 ps pulses (J/cm <sup>2</sup> )	Damage threshold @ 8 ns pulses (J/cm <sup>2</sup> )	Part No.
FI-530-2SV	>30/38-42	>90	>85	505 - 565	2	25x25x37	0.1 @ 530 nm	0.5 @ 532 nm	84501010007
FI-630-2SV	>30/38-42	>90	>85	595 - 670	2	25x25x37	0.1 @ 630 nm	0.6 @ 632 nm	84501011000
FI-680-2SV	>30/38-42	>90	>85	645 - 725	2	25x25x37	0.2 @ 680 nm	0.7 @ 680 nm	84501010009

Subject to technical changes

### A closer look

The excellent quality of the high-precision LINOS magneto- and electro-optics from Qioptiq is a testament to decades of experience at both Gsänger and Qioptiq. More than 50-year history of these products is marked by immense customer satisfaction, and has established Qioptiq as a leader in laser technology.



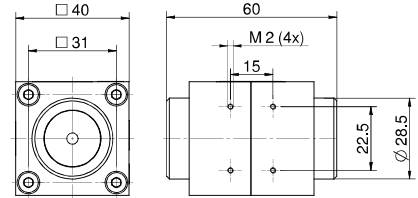
Dr. Gsänger, founder of Gsänger Optics in Munich, was instrumental in the success of electro-optics in laser technology.

# Isolators with 3.3 and 5 mm Aperture, SC Series

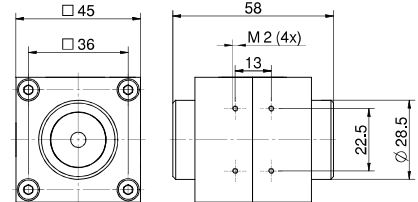


## FI-x-3SC / FI-x-5SC

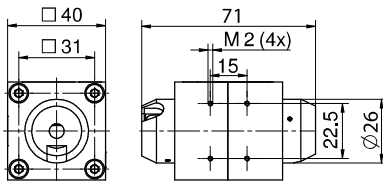
- Extremely compact design
- Isolation better than 30 dB, typically 38-42 dB over the entire wavelength range
- TGG crystal
- Rare earth magnet
- Access to blocked beam
- Brewster polarizers (BP) available
- High power (HP versions) include optically contacted polarizers
- Mounting: via four M2 threaded holes on the bottom side and backside



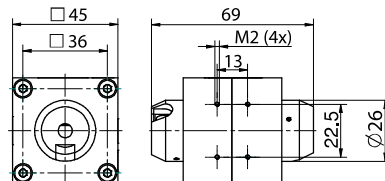
FI-x-3SC (x = 488, 980, 1060, 1120 nm)  
FI-x-3SC HP (x = 1030, 1060 nm)



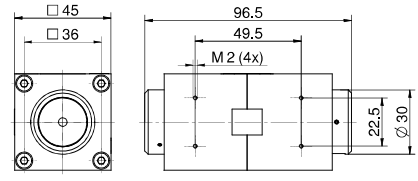
FI-x-5SC (x = 488, 930, 1060, 1120 nm)  
FI-x-5SC HP (x = 1030, 1060 nm)



FI-1060-3SC-BP



FI-1060-5SC-BP



FI-1210-3SC, FI-1210-5SC

## Isolators with 3.3 and 5 mm aperture, SC Series

Product	Isolation, guaranteed/typical (dB)	Transmission at design wavelength (%)	Transmission at boundary wavelength (%)	Tuning range typical (nm)	Aperture Ø (mm)	Dimensions (mm)	Damage threshold @ 1.2 ps pulses (J/cm <sup>2</sup> )	Damage threshold @ 8 ns pulses (J/cm <sup>2</sup> )	Part No.
FI-488-3SC HP	> 35/38-42	> 90	-	478 - 498	3.3	40x40x60	0.3 @ 488 nm	6.5 @ 488 nm	845110900016
FI-488-5SC HP	> 35/38-42	> 90	-	478 - 498	5	45x45x58	0.3 @ 488 nm	6.5 @ 488 nm	845110900013
FI-930-5SC	> 30/38-42	> 90	> 85	880 - 990	5	45x45x58	0.2 @ 930 nm	0.9 @ 930 nm	84501037007
FI-980-3SC	> 30/38-42	> 90	> 85	925 - 1040	3.3	40x40x60	0.2 @ 980 nm	1.0 @ 980 nm	84501036004
FI-1030-3SC HP	> 32/38-42	> 94	> 85	1025 - 1064	3.3	40x40x60	0.6 @ 1030 nm	8.2 @ 1030 nm	845110100194
FI-1030-5SC HP	> 32/38-42	> 94	> 85	1025 - 1064	5	45x45x58	0.6 @ 1030 nm	8.2 @ 1030 nm	845110100196
FI-1060-3SC HP	> 32/38-42	> 94	> 85	1030 - 1090	3.3	40x40x60	0.6 @ 1060 nm	8.5 @ 1060 nm	845110100156
FI-1060-3SC BP	> 30/ >30	> 90	-	1060	3.3	40x40x71	-	15.7 @ 1060 nm	845110100011
FI-1060-5SC HP	> 32/38-42	> 94	> 85	1030 - 1090	5	45x45x58	0.6 @ 1060 nm	8.5 @ 1060 nm	845110100195
FI-1060-5SC BP	> 30/ >30	> 90	-	1060	5	45x45x69	-	15.7 @ 1060 nm	84501037002
FI-1120-3SC	> 30/38-42	> 90	> 85	1080 - 1170	3.3	40x40x60	0.2 @ 1120 nm	1.1 @ 1120 nm	845110100057
FI-1120-5SC	> 30/38-42	> 90	> 85	1080 - 1170	5	45x45x58	0.2 @ 1120 nm	1.1 @ 1120 nm	845110100009
FI-1210-3SC	> 30/38-42	> 90	> 85	1160 - 1260	3.3	45x45x96	0.3 @ 1210 nm	1.2 @ 1210 nm	845110100043
FI-1210-5SC	> 30/38-42	> 90	> 85	1160 - 1260	5	45x45x96	0.3 @ 1210 nm	1.2 @ 1210 nm	845110100053

Subject to technical changes

# Low Outgassing Isolators with 3.3 mm Aperture, LO Series

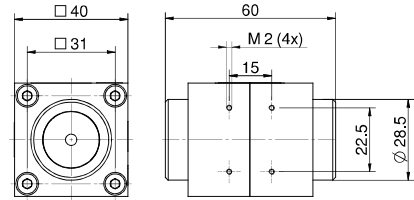


## FI-x-3SC LO

Our extensive experience and innovations in optical solutions for semiconductor manufacturing have led to the first ever Low Outgassing Faraday Isolators. These Isolators are ideally suited for integration in encapsulated and high-power laser systems in the wavelength range from the violet to the NIR. The unique design emits 25-times less volatile organic compounds (VOCs) than conventionally produced isolators.

Optically contacted, fused-silica input and output polarizers ensure high damage threshold while delivering highest isolation of 33 dB and outstanding transmittance of 95% in the NIR and 86% in the violet.

They feature a 3.5 mm clear aperture and a patented magnet system, which enables an exceptionally compact design footprint.



### Less is more

These LO versions emit 25-times less volatile organic compounds than usual, combined with highest isolation as well as high damage threshold.

- Emitting 25-times less volatile organic compounds (VOC) than conventionally produced isolators
- Sophisticated, low outgassing design and assembly
- Isolation  $\geq 33$  dB, typically 38-42 dB over the entire wavelength range
- Extremely compact design
- Optically contacted polarizers for high damage threshold and long lasting quality
- Rare earth magnet
- Access to blocked beam
- Stable and flexible mounting via four M2 threaded holes on the bottom side and backside
- Custom wavelengths and specifications upon request
- Integrated waveplate optional

## Low outgassing Isolators with 3.3 mm aperture, LO Series

Product	Isolation, guaranteed/typical (dB)	Transmission at design wavelength (%)	Transmission at boundary wavelength (%)	Tuning range typical (nm)	Aperture $\emptyset$ (mm)	Dimensions (mm)	Damage threshold @ 1.2 ps pulses (J/cm <sup>2</sup> )	Damage threshold @ 8 ns pulses (J/cm <sup>2</sup> )	Part No.
FI-405-3SC LO	> 33/38-42	$\geq 86$	$\geq 86$	400 - 410	3.3	40x40x60	0.2 @ 405 nm	2.6 @ 488 nm	845110900026
FI-1030-3SC LO	> 33/38-42	$\geq 95$	$\geq 90$	1025 - 1064	3.3	40x40x60	0.6 @ 1030 nm	8.2 @ 1030 nm	845110100230
FI-1060-3SC LO	> 33/38-42	$\geq 95$	$\geq 90$	1030 - 1090	3.3	40x40x60	0.6 @ 1060 nm	8.5 @ 1060 nm	845110100231

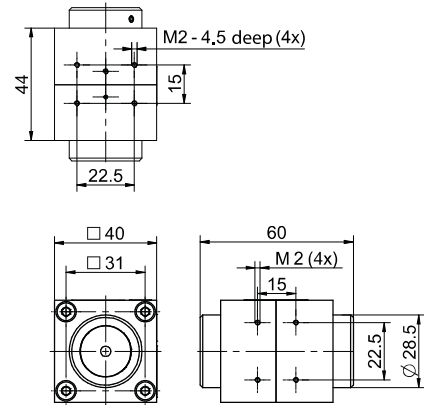
Subject to technical changes

# High Power Faraday Isolators with 3.5 mm and 5 mm Aperture, XP Series

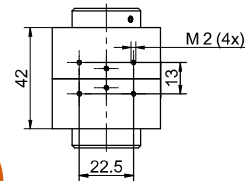


## FI-1060-x-SC XP

- Extreme compact design
  - Isolation better than 30 dB
  - Suitable for high laser power above 50W
  - Low thermal lens effect
  - Low absorption magneto-optical crystal
  - Strong rare earth magnet
  - Mounting: via four M2 threaded holes at the bottom side and at backside
  - Damage threshold 8.5 J/cm<sup>2</sup> at 8 ns 1064 nm
- Custom wavelengths and specifications on request
  - Available with integrated wave-plate on request
  - This product is export controlled according to regulation (EC) No. 428/2009, list item 6A005. Shipping is subject to the existence of a valid export license, if necessary.



FI-1060-3SC XP



FI-1060-5SC XP

### Forget thermal lensing

These Isolators are ideally suited for integration in medium to high power laser systems (CW laser power  $P \geq 50W$ ) in the wavelength range from red to NIR.

The XP Series Isolators are uniquely designed with a low absorption magneto-optical material that results in significantly lower thermal lens effect and enhanced optical isolation.

## High Power Faraday Isolators with 3.5 mm and 5 mm aperture, XP Series

Product	Isolation, guaranteed/typical (dB)	Transmission at design wavelength (%)	Transmission at boundary wavelength (%)	Tuning range typical (nm)	Aperture $\varnothing$ (mm)	Dimensions (mm)	Damage threshold @ 1.2 ps pulses (J/cm <sup>2</sup> )	Damage threshold @ 8 ns pulses (J/cm <sup>2</sup> )	Part No.
FI-1060-3SC XP	>30	>94	>85	1030-1090	3.3	40x40x60	0.6 @ 1060 nm	8.5 @ 1060 nm	845110900030
FI-1060-5SC XP	>30	>94	>85	1030-1090	5	45x45x58	0.6 @ 1060 nm	8.5 @ 1060 nm	845110900029

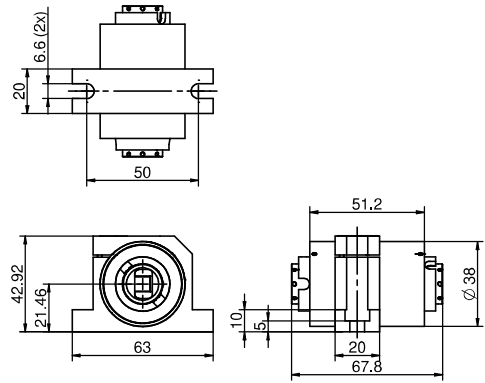
Subject to technical changes



# Rotatable Faraday Isolator with 3.5 mm Aperture



- Single stage Faraday Isolator
- Rotatable isolator housing (for arbitrary input polarization)
- Compact design
- Mounting option for half-wave plate at the optical output
- Aperture:  $\varnothing$  3.5 mm
- Isolation: 32 dB (typically 38-42 dB)
- Mounting: via mounting bracket
- Damage threshold: 8.5 J/cm<sup>2</sup> at 8 ns 1064 nm
- Custom wavelengths and specifications on request
- Available with integrated half-wave plate on request



Rotatable Faraday isolator in OEM mount

## Rotatable Faraday Isolator with 3.5 mm aperture

Product	Isolation, guaranteed/typical (dB)	Transmission at design wavelength (%)	Transmission at boundary wavelength (%)	Tuning range typical (nm)	Aperture $\varnothing$ (mm)	Dimensions (mm)	Damage threshold @ 1.2 ps pulses (J/cm <sup>2</sup> )	Damage threshold @ 8 ns pulses (J/cm <sup>2</sup> )	Part No.
FI-1030-3SC RO	>32	>92	>85	1025-1064	3.3	45x43x67	0.6 @ 1030 nm	8.2 @ 1030 nm	845110100253

Subject to technical changes

### Improved flexibility

These Isolators are ideally suited for integration in laser systems in cases where the output polarization orientation is neither horizontal nor perpendicular. The new rotatable Faraday Isolator

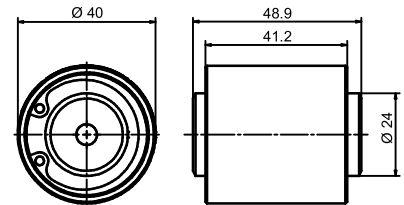
series provides easy alignment of the Isolator-input polarization according to the output polarization of the laser system.

# Isolators with 5 mm Aperture, SV Series

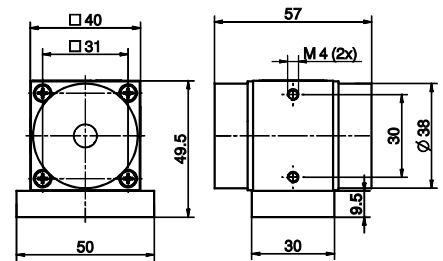


## FI-x-5SV

- Isolation better than 30 dB, typically 38-42 dB over the entire wavelength range
- Custom isolation values on request
- TGG crystal
- Rare earth magnet
- Output polarizer, 360° rotation, engraved tuning scale (not available for FI-405-5SV)
- Access to blocked beam (not available for FI-405-5SV)
- Optional version with optically contacted polarizers on request
- FI-405-5SV optically contacted polarizers as standard
- Mounting: via two M4 threaded holes on the bottom side and the back side, 30 mm separation (5SV-version), or via base plate (not available for FI-405-5SV)
- Base plate included (not available for FI-405-5SV)



FI-405-5SV



FI-x-5SV (x = 530, 630, 680, 730, 780, 810, 850 nm)

15

## Isolators with 5 mm aperture, SV Series

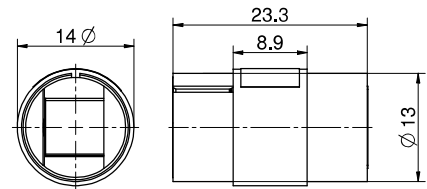
Product	Isolation, guaranteed/typical (dB)	Transmission at design wavelength (%)	Transmission at boundary wavelength (%)	Tuning range typical (nm)	Aperture Ø (mm)	Dimensions (mm)	Dimensions base plate (LxWxH) (mm)	Damage threshold @ 1.2 ps pulses (J/cm <sup>2</sup> )	Damage threshold @ 8 ns pulses (J/cm <sup>2</sup> )	Part No.
FI-405-5SV	> 35	> 88	> 85	400 - 420	5	Ø40x48.9		0.2 @ 405 nm	2.6 @ 405 nm	845110100131
FI-530-5SV HP	> 30/38-42	> 90	> 85	515 - 550	5	40x40x57	50x30x9.5	0.3 @ 530 nm	7.0 @ 530 nm	845110100197
FI-630-5SV	> 30/38-42	> 90	> 85	595 - 670	5	40x40x57	50x30x9.5	0.1 @ 630 nm	0.6 @ 630nm	84501013004
FI-680-5SV	> 30/38-42	> 90	> 85	645 - 725	5	40x40x57	50x30x9.5	0.1 @ 680 nm	0.7 @ 680 nm	845110100126
FI-730-5SV	> 30/38-42	> 90	> 85	690 - 780	5	40x40x57	50x30x9.5	0.2 @ 730 nm	0.7 @ 730 nm	84501013034
FI-780-5SV	> 30/38-42	> 90	> 85	740 - 830	5	40x40x57	50x30x9.5	0.2 @ 780 nm	0.8 @ 780 nm	84501013008
FI-810-5SV	> 30/38-42	> 90	> 85	765 - 865	5	40x40x57	50x30x9.5	0.2 @ 810 nm	0.8 @ 810 nm	84501013033
FI-850-5SV	> 30/38-42	> 90	> 85	805 - 905	5	40x40x57	50x30x9.5	0.2 @ 850 nm	0.8 @ 850 nm	84501013027

Subject to technical changes

# Isolators for NIR with 4 mm Aperture and Magneto-Optical Crystal Film and Magneto-Optical Crystal Film



- Extremely small size
  - Isolation better than 35 dB
  - Faraday Material: magneto-optical crystal film in saturation
  - Rare earth magnet
  - Output polarizer, 360° rotation
  - Access to blocked beam
- Max. cw power: 8 W



16

## Isolators with 4 mm aperture with magneto-optical crystal film

Product	Isolation, guaranteed (dB)	Transmission at design wavelength (%)	Transmission at boundary wavelength (%)	Tuning range typical (nm)	Aperture $\emptyset$ (mm)	Dimensions (mm)	Damage threshold @ 8 ns pulses ( $J/cm^2$ )	Part No.
FI-1250-4SL	> 35	> 85	> 80	1200 - 1300	4	14x23.3	1.0 @ 1250 nm	845110200004
FI-1310-4SL	> 35	> 90	> 85	1260 - 1360	4	14x23.3	1.0 @ 1310 nm	84501071000
FI-1550-4SL	> 35	> 90	> 85	1485 - 1615	4	14x23.3	1.3 @ 1550 nm	84501072000

Subject to technical changes

Customized isolators ...

... are our passion. We are keen to develop customized isolator and rotator versions for your application.

# Isolators with a Broad Tuning Range

## Technical Overview

The function of the tunable LINOS Faraday isolators in the following section is based on a single stage isolator. Precision mechanics allow a continuous adjustment of the interaction between the magnetic field and the TGG crystal without moving any optical components.

It is possible to set the rotation angle to any value between  $0^\circ$  to  $45^\circ$  within the wavelength range in order to study the effects of varying degrees of feedback. Easy access to the blocked beam is provided by polarizing beam splitter cubes, which divert the blocked beam by  $90^\circ$ .

Precision mechanics allow the exact reproduction of adjustments previously established. With the addition of an optional micrometer display, an angular resolution in the arc minute range is achievable. The incorporation of very powerful magnets ensures a compact and efficient design.

## Operation

The isolator can be mounted on rods, cylindrical mounts or by using the assembly surfaces so that the laser polarization can be oriented horizontally or vertically. The entry and exit polarizers can be easily cleaned by removing the security rings.



## Applications

These isolators are suitable for all lasers operating in the ranges 430-460 nm and 500-1100 nm wavelength range especially for:

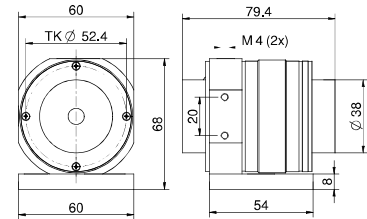
- Ar+ and Kr+ lasers
- Other Ion lasers
- HeNe lasers
- Other gas lasers
- Diode lasers
- Nd:YAG lasers
- Ti: Sapphire lasers
- Cr:LiCAF lasers
- Dye lasers
- Alexandrite lasers
- Mode-locked lasers
- Short-pulse lasers
- Tunable lasers

# Tunable Isolators with 5 mm Aperture, SV/SI Series

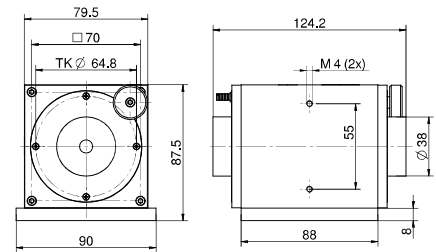


## FI-x/y-5SV / FI-x/y-5SI

- Continuous adjustment for wavelength without movement of optical components
  - Tunable with maximum transmission and isolation over the complete wavelength range
  - Isolation better than 30 dB, typically 38-42 dB over the entire wavelength range
  - Custom isolation values on request
  - TGG crystal
  - Access to blocked beam
- Mounting: via two M4 threaded holes on the bottom side and the back side, 20 mm separation (5SV-version), 55 mm separation (5SI-version), or via base plate, or via angle bracket (5SV-version only)
  - Base plate included, angle bracket included (5SV-version only)



FI-x/y-5SV



FI-600/1100-5SI



18

## Tunable Isolators with 5 mm aperture, SV/SI Series

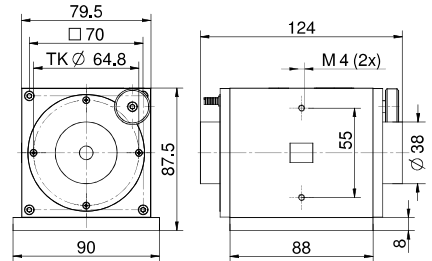
Product	Isolation, guaranteed/typical (dB)	Transmission at design wavelength (%)	Tuning range typical (nm)	Aperture Ø (mm)	Dimensions (mm)	Dimensions base pate (LxWxH) (mm)	Damage threshold @ 1.2 ps pulses (J/cm <sup>2</sup> )	Damage threshold @ 8 ns pulses (J/cm <sup>2</sup> )	Part No.
FI-430/460-5SV	> 30/38-42	> 90	430 - 460	5	60x60x79.4	54x60x8	0.1 @ 460 nm	3.7 @ 460 nm	84501046001
FI-500/820-5SV	> 30/38-42	> 90	500 - 820	5	60x60x79.4	54x60x8	0.2 @ 820 nm	0.8 @ 820 nm	84501041000
FI-600/1100-5SI	> 30/38-42	> 90	600 - 1100	5	79.5x79.5x124.2	88x90x8	0.2 @ 1060 nm	1.1 @ 1060 nm	84501044000

Subject to technical changes

# Tunable Isolator with 8 mm Aperture



- Continuous adjustment for wavelength without movement of optical components
- Tunable with maximum transmission and isolation over the complete wavelength range
- Isolation better than 30 dB, typically 38-42 dB over the entire wavelength range
- Custom isolation values on request
- TGG crystal
- Access to blocked beam
- Mounting: via two M4 threaded holes at the bottom side and the back side, 55 mm separation, or via base plate
- Base plate included



**High quality**

Precision engineering parts enable smooth continuous wavelength adjustment. Without movement of the optics a broad wavelength range is realized.

## Tunable Isolator with 8 mm aperture

Product	Isolation, guaranteed/typical (dB)	Transmission at design wavelength (%)	Tuning range typical (nm)	Aperture Ø (mm)	Dimensions (mm)	Dimensions base plate (LxWxH) (mm)	Damage threshold @ 1.2 ps pulses (J/cm <sup>2</sup> )	Damage threshold @ 8 ns pulses (J/cm <sup>2</sup> )	Part No.
FI-600/1100-8SI	>30/38-42	>90	600 - 1100	8	79.5x79.5x124	88x90x8	0.2 @ 1060 nm	1.1 @ 1060 nm	84501045000

Subject to technical changes