



Components



Faraday Optical Isolators

- Peak isolation: >38 dB; >60 dB
- Transmission: >90%
- Broadband isolators
- Tunable isolators

Application:

- Feedback elimination
- Amplifier design



Tunable Faraday optical isolator

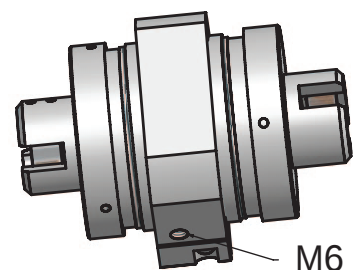
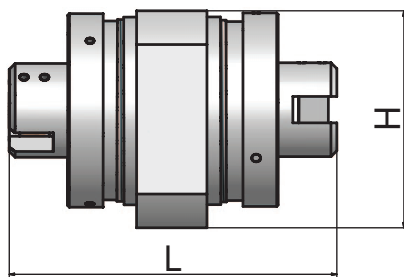
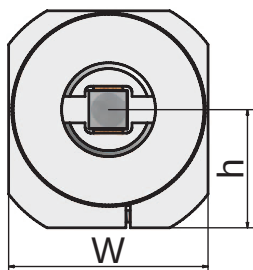
Product overview

A Faraday isolator (FI) is a nonreciprocal optical device which transmits the linearly polarized light in one direction and deflects the backward beam. It usually consists of a Faraday rotator and two polarizers. The Faraday rotator is made of magneto-optical active material which is placed into the permanent magnet system (Nd-Fe-B). Two types of the magneto-optical active materials are available: Terbium-doped glass, Terbium-Gallium-Garnet (TGG) crystals.

The isolator protects a laser source by attenuating the reflected and backscattered light by several orders of magnitude (10^4 to 10^6). It is also used when some devices have extreme sensitivity to optical feedback which can cause intensity instabilities, frequency pulling and other undesirable effects.

Our company offers a variety of optical isolator models:

- **Highly transparent single-stage isolators.** Isolation 38-44 dB, wavelength from 400 to 1250 nm (fixed), clear aperture 2-15 mm. Transmission >90%.
- **Broadband isolators.** Isolation >38 dB. Center wavelength - 800 nm (other designs are also available on request). Bandwidth - 120 nm (>30 dB). Clear aperture is 2-12 mm. HT and SE modifications are also available.
- **Tunable isolators.** Peak isolation 38-42 dB. Central wavelength - 780 nm. Tuning range from 710 to 880 nm. Other wavelengths available upon request. Simple and convenient operation.
- **Single stage isolators with side exit (SE).** Isolation 38-44 dB, wavelength from 400 to 1250 nm (fixed), bandwidth - 30 nm. Clear aperture 2-12 mm.
- **Double-stage isolators.** Isolation >60 dB. Wavelength is 600 - 1150 nm (fixed). Bandwidth - 30 nm. Clear aperture 2-12 mm.



Please see reverse for typical models and their specifications

Key: AFR - rotator (without polarizers), AFI - isolator (with polarizers)

Possible central wavelength, nm	CA, mm ¹⁾	Part number	Rod material	Peak isolation, dB ²⁾	Bandwidth (at >30 dB), nm	Tpeak, %	LxWxH (beam height), mm
1250	5	5AFR-1250C	TGG	38	±5	98	65x71x77 (42)
		5AFI-1250C				90	90x71x77 (42)
1030-1070, fixed	2	2AFR-1064C	TGG	38	±10	98	50x38x46 (26)
		2AFI-1064C				90	78x38x46 (26)
	4	4AFR-1064C		38	±10	98	52x45x51 (28.5)
		4AFI-1064C				90	85x45x51 (28.5)
	6	6AFR-1064C		38	±10	98	55x48x54 (30)
		6AFI-1064C				90	92x48x54 (30)
	8	8AFR-1064C		38	±10	98	62x59x65 (35.5)
		8AFI-1064C				90	100x59x65 (35.5)
	10	10AFR-1064C		38	±10	98	65x66x72 (39)
		10AFI-1064C				90	110x66x72 (39)
	12	12AFR-1064C		38	±10	98	69x71x77 (41.5)
		12AFI-1064C				90	120x71x77 (41.5)
1030, broadband	2-12	(2-12)AFRB-1030C	TGG	35	980-1070	98	W, H same as
		(2-12)AFIB-1030C				88	fixed, L+8 mm
700-900, fixed	2	2AFR-800C, G	TGG (C) or Glass (G)	38	±10	98	50x38x46 (26)
		2AFI-800C, G				90	78x38x46 (26)
	4	4AFR-800C, G		38	±10	98	52x45x51 (28.5)
		4AFI-800C, G				90	85x45x51 (28.5)
	5	5AFR-800C, G		38	±10	98	52x48x54 (30)
		5AFI-800C, G				90	88x48x54 (30)
	8	8AFR-800C, G		38	±10	98	62x59x65 (35.5)
		8AFI-800C, G				90	100x59x65 (35.5)
	10	10AFR-800C, G		38	±10	98	65x66x72 (39)
		10AFI-800C, G				90	110x66x72 (39)
	12	12AFR-800C, G		38	±10	98	69x71x77 (41.5)
		12AFI-800C, G				90	120x71x77 (41.5)
	15	15AFR-800C, G		38	±10	98	71x81x84 (46)
		15AFI-800C, G				90	140x81x84 (46)
700-880, broadband	4-12	(4-12)AFRB-800C, G	TGG (C) or Glass (G)	35	±60	98	W, H same as
		(4-12)AFIB-800C, G				88	fixed, L+6 mm
710-880, tunable	4-12	(4-12)AFIT-800C, G	TGG (C) or Glass (G)	38	±10	88	W, H same as
							fixed, L+50 mm
633	4	4AFR-633C	TGG	38	±10	98	52x45x51 (28.5)
		4AFI-633C				90	85x45x51 (28.5)
	5	5AFR-633G	Glass	38	±10	98	52x48x54 (30)
		5AFI-633G				90	90x48x54 (30)
532	2	2AFR-532C	TGG	38	±10	97	30x38x46 (26)
		2AFI-532C				88	75x38x46 (26)
	5	5AFR-532C		38	±10	97	30x48x54 (30)
		5AFI-532C				88	90x48x54 (30)
	8	8AFR-532C		38	±10	97	42x59x65 (35.5)
		8AFI-532C				88	100x59x65 (35.5)
	10	10AFR-532C		38	±10	97	45x66x72 (39)
		10AFI-532C				88	110x66x72 (39)
400	4	4AFR-400C	TGG	38	±5	85	30x45x51 (28.5)
		4AFI-400C				75	60x45x51 (28.5)
	6	6AFR-400C		38	±5	85	30x48x54 (30)
		6AFI-400C				75	70x48x54 (30)

Polarization-independent isolators:

1064	1.5 ³⁾	PI35C ⁴⁾	TGG	35	±5	90	120x48x52 (28)
1064	1.5 ³⁾	PI35C3 ⁵⁾	TGG	35	±5	90	80x32x32

- 1 - typical apertures, other apertures are available upon request;
- 2 - >60 dB double-stage optical isolators are available upon request;
- 3 - input beam diameter at 1/e²;
- 4 - the PI35CF model with fiber-input is available;
- 5 - small package.

Notes:

- Damage thresholds are as follows: isolators: 1 J/cm² at 10 ns; rotators: 5 J/cm² at 10 ns
- Optical power: TGG rods have higher average power threshold than Glass rods (we recommend using TGG for beams with average power roughly >10 W/cm²)
- AFR in part number means Faraday rotator (supplied without polarizers), AFI means Faraday isolator (supplied with polarizers), PI means polarization-independent isolator (with polarizers).
- Isolation ratio in case of a rotator shows achievable isolation ratio with the use of properly chosen external polarizers.