

LEYSOP LTD

manufacturers and suppliers of electro-optic components

Fixed, Tunable and
Broadband units
available

Wavelengths from
500nm to 1,100nm

>-30dB isolation
AR coating options

TGG Faraday material
and Glan-Taylor
polarizers ensure high
power handling



FOI-5/57 Isolator

Faraday Optical Isolators

The Faraday Optical Isolator is an essential tool for all laser applications. The plane of polarized light is rotated through an angle of 45° on passing through the device in one direction, and then through a further 45° in the same sense on passing back through the device in the opposite direction. The total rotation is thus 90° and the input polarizer then effectively rejects light returning through the device. This is the basis of using the Faraday rotator to form an optical isolator.

The Faraday effect relies on exceptionally strong magnetic fields to produce useful rotations, especially at longer wavelengths where the effect is substantially weaker. For this reason, our

devices are limited to operation in the visible and near infrared, even though we use the strongest practical NIB magnets available. The short wavelength limit is caused by the presence of an extremely deep optical absorption feature at $\sim 480\text{nm}$ (a property of all terbium containing materials including doped glasses). For a given integrated magnetic field strength in the device, only one wavelength will be rotated through the ideal 45° . Almost all of our devices may be re-tuned to some extent for alternative wavelengths by adjusting either the insertion of the TGG rod in the magnetic field or by changing the strength of the field directly. The exception is the broadband device which simultaneously covers from 700-900nm.

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Adjustable Isolators

There are three basic models of adjustable wavelength isolator, depending on the wavelength range and on the tuning mechanism employed. The basic model FOI-5/57 is available in three sizes to cover the nominal ranges 500-750nm, 750-850nm and 800-900nm. In these isolators the wavelength is adjustable over a typical sub-range of 100nm by removing the output polarizer and screwing the TGG rod holder into or out of the magnet assembly slightly to obtain 45° rotation at the desired wavelength (and then re-fitting the polarizer in its pre-aligned position).

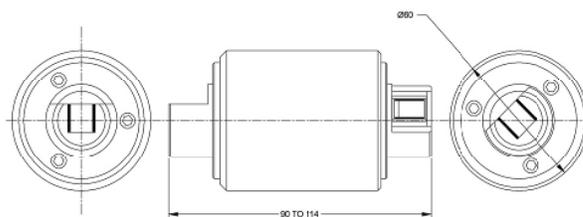
For the longer wavelengths, our FOI-5/711 uses an alternative arrangement of the permanent magnets to further increase the field strength and the TGG rod is fully enclosed within the magnet assembly. The field strength is adjusted by screwing the two main sections of the case in and out to adjust magnet separations directly.

Our final adjustable device, the FOI-5/57UWB provides an exceptionally large tuning range of ~700-1,100nm in one device by using a longer than normal TGG rod and a precision helical focuser to provide a longer than normal travel and hence tuning range. There is a further advantage that it is not necessary to remove polarizers to re-tune the device.

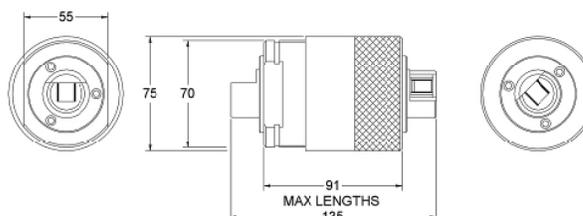
Broad-band Isolator for Ti:Sapphire/diode

This special version of the FOI-5/57 adds a quartz rotation plate to form a composite device in which the wavelength sensitivity of rotation is effectively reduced allowing almost as good isolation (at least 25dB) over the entire wavelength range of 700-900nm simultaneously (no tuning required). A further advantage is the more favourable 90° rotation angle produced.

FOI-5/57



FOI-5/711



FOI-5/57UWB

