

Variable LP01-LP11 Mode Coupler

Product Overview

The Phoenix Photonics variable LP01-LP11 mode coupler is for use with dual mode optical fiber. The principle of operation is to create a periodic bending of the fiber by varying the pressure applied by a mechanical long period grating (LPG). The pressure grating created in the fiber will couple power between the LP01 mode and the LP11 mode when the period is matched to the beat length between the modes.

The unit has been designed to enable the user to place the fiber across the grating beneath the pressure plate so it can be placed at any position along the fiber. As with any coupling device the transfer of power between modes is cyclic. For a pure LP01 input mode applying pressure couples power to LP11, through 50/50 coupling position to complete coupling to LP11. Increasing pressure further reduces coupling to LP11 until all power is once again in LP01. Adjusting coupling ratio for 100% coupling gives isolation between modes of typically 30dB at the center wavelength. Inputting an LP11 mode couples to LP01. For conversion from LP01 to LP11 a LP01 mode filter at the input of the LPG is recommended.

The mechanical gratings are replaceable enabling different pitch gratings to be used with different fibers and different number of coupling points to change coupling bandwidth. The LPG is angularly adjustable to move the center coupling wavelength.



Features & Applications

FEATURES

- Adjustable coupling between LP01 and LP11
- Coupling center wavelength
 adjustment
- Custom fiber design
- High mode isolation

EXAMPLE APPLICATIONS

- LP01 to LP11 mode conversion
- Mode division multiplexing
- Dual mode fiber component test
- Dual mode fiber sensors

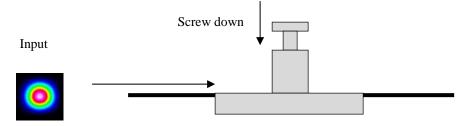
For more information please contact Phoenix sales: sales@phoenixphotonics.com or visit us at www.phoenixphotonics.com



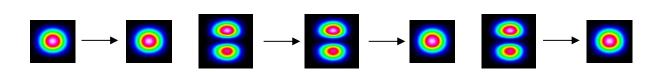


Variable power coupling between modes

 LP_{01} input and turning adjustment screw to increase grating pressure changes the modal content cyclically form LP_{01} to combined to LP_{11} to combined to LP_{01} .

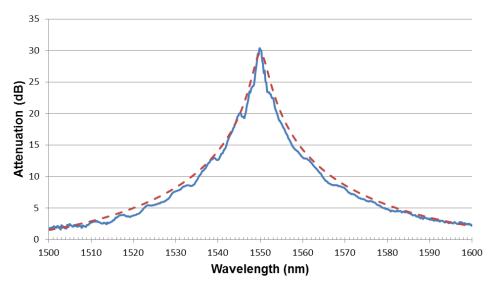


Output mode content as increasing pressure by screwing down



Wavelength response

The graph below shows typical wavelength response for 30 coupling points giving 30dB isolation.



Wavelength response of $LP_{\sigma 1}$ transmission for mechanical LPG. Solid curve shows experimental results and dashed curve theoretical curve with the same number of coupling points and coupling coefficient.





Phoenics		
SPECIFICATION	Units	
Center wavelength range	nm	1520 - 1620
Center wavelength tuning	%	3
Bandwidth (3dB)	nm	5nm to 30nm (depending on number of coupling points)
Insertion Loss ¹	dB	<0.5
Maximum isolation (output mode to input mode)	dB	30
Return Loss ¹	dB	>60
Operating Temperature Range	°C	0 to 50
Storage Temperature	°C	-40 to +85

Notes:

1. Losses do not include connectors.

Mechanical Grating

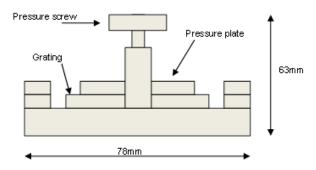


The mechanical grating is cut at an angle of 15 deg and screws are in place to allow rotation and change the center wavelength. Gratings are ordered separately from the variable coupler and several can be selected

for different bandwidth and center wavelength requirements.

Dimensions

All dimensions are approximate and may vary slightly.



Ordering Information

The LPGs are supplied separately to the variable coupler and designed with grating period to meet the customer fiber specification.

Mode Coupler

