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KT112 - Single Mode Fiber Launch System

9 mm Laser Diode to Single Mode Fiber

Special Notes:

- **Never look directly into a laser.**
- **It is recommended that the laser power be limited to a few milliwatts during the alignment process.**

Operation Instructions:

To best use these instructions please refer to the Engineer Support Drawing that has been included. The KT112 comes fully assembled except for the laser diode and optics, which can be purchased separately. Coupling the laser output to a single mode fiber involves: installation of the laser and collimating lens, collimation, centering of the output along the optical axis, installation of the focusing lens, and focusing the beam on the fiber, making fine adjustments for maximum coupling efficiency.

I. Installation of the Laser and Collimating Lens.

The slip plate positioner (SPT1) and thick cage plate (CP02T) are removed and the collimating lens and diode are mounted.

1. Remove the slip plate positioner and thick cage plate from the KT112.
2. Install the diode in the slip plate positioner. If a 5.6mm diode is being used, use the supplied adapter.
3. To take advantage of the mechanical features of the xy-translator, the elliptical output of the diode should be oriented so the major axis (long axis) of the ellipse is along the vertical axis. This can be achieved by rotating the 9-mm laser mount and using the knurled locking ring to lock it in place.
4. Install the collimating optic you have chosen using the spanner wrench (SPW301-1). The collimating optic should be installed so the flat side of it will be aimed towards the diode when it is remounted on the KT112.
5. With the collimating optic and diode installed, replace the thick cage plate and the slip plate positioner on the KT112.

II. Collimation of the Laser.

Obtain a collimated beam by locking the slip plate positioner, removing the adapters in the xy-translator (ST1XY-D) and z-translator (SM1Z), and sliding the thick cage plate.

1. Remove the z-translator, the rods that make up its support cage, and aspheric lens adapter (S1TM09).
2. Lock the slip plate positioner that holds the laser in place and loosen locking screws of the thick cage plate on the cage assembly. The idea is that the collimating lens can be moved along the optical axis by sliding the thick cage plate.
3. Turn on the laser and find its spot on a card at a distance of approximately a meter away from the KT112.
4. Move the card along the beam and observe the size of the spot. If the spot stays a constant size over a large range of distances then the beam is collimated. If the spot keeps changing size, adjust the location of the collimating lens by sliding the thick cage plate. When a position for the collimating lens is found where a constant spot size is maintained, lock down the thick cage plate.

III. Centering the Output Along the Optical Axis.

The beam will be centered along the optical axis. The two long ER rods will be used to make an extended cage for centering.

1. Remove the z-translator (SM1Z) and the four support rods (ER1.5) that support it.
2. Attach the two 4" long support rods (ER4) to make a diagonal pair.
3. Place the z-translator at the end of the rods at the greatest distance possible from the xy-translator and lock it down.
4. Move the slip plate positioner (SPT1) from side to side until the collimated beam hits the center of the z-translator where the ferule of the fiber would protrude from the fiber adapter (SM1FC).
5. When the beam is correctly pointed, lock down the slip plate positioner.

IV. Installing the Focusing Lens.

The focusing lens will be put into place and a rough realignment of the beam will again be achieved.

1. Screw the focusing lens into the adapter (S1TM09) in the xy-translator. (*When using the C220TM lens as a focusing lens, make sure that the curved side is aimed towards the diode.)*
2. With the lens and adapter inserted in the xy-translator use the coarse adjustment of the differential adjuster to aim the beam at the center of the SMA adapter.
3. Remove the two long ER rods (ER4) and the z-translator. Move an index card in front of the lens and watch how the size of the spot changes. At the focal point, the spot should be at its smallest and show a pronounced speckling effect. This is the point where you will want the tip of the fiber to be.
4. Reattach the four ER rods (ER1.5) and the z-translator moving it into position so it is at approximately the distance you found for the focal point. You should again see the speckling effect as you reach that point.

V. Making Fine Adjustments for Maximum Coupling Efficiency.

Fine adjustments will be made to attain maximum coupling efficiency. It is often easy to get a rough coupling by visual inspection when using a visible laser.

1. Using a power meter or visual inspection shine the tip of the fiber at a tabletop. Adjust the x and y of the xy-translator to get the maximum amount of light through the fiber.
2. Use the locked down z-translator to continue to increase the coupling to a maximum.
3. Repeat steps 1 and to 2 to attain the maximum coupling efficiency. Typical values for single-mode fiber should range from 40-50% efficiency.

For Further Technical Support or Other Optical Components Please Call Thorlabs, Inc. at 973-579-7227