o-*TOOL*™

Instruction Guide

1. **On/Off** – To energize the **o**-***TOOL***, place it on a flat surface and plug the wall plug transformer into a standard ac outlet. The **o**-***TOOL*** is a hands free device. To activate the **o**-***TOOL*** shine a light source, for example a standard laser pointer, into the aperture located on the side of the **o**-***TOOL***. To deactivate the **o**-***TOOL*** shine the light source in the aperture located on the side of the **o**-***TOOL***.

2. **Locating an Invisible Beam** - When invisible IR radiation strikes the **o**-***TOOL*** display white light will appear near the location of incidence. To locate an invisible beam place the **o**-***TOOL*** in the beam path. Energize the **o**-***TOOL*** (see Step 1 - On/Off) and slowly move it until the beam strikes the display and white light appears. The shape of the white light on the **o**-***TOOL*** replicates the IR beam shape. If the IR beam happens to be pointed at the center aperture circular colored rings may appear. If no rings appear, or to increase the number of rings, increase the display gain as described in (Step 4 - Adjusting the Gain).

3. **Aligning with Ease** - To align a laser resonator, place the **o**-***TOOL*** in the beam path, off center, so the beam will not strike the center aperture. Adjust the resonator until you observe a white flash and continue adjusting until the white light stays on continuously. Now move the **o**-***TOOL*** until the beam strikes the center aperture. To align an optic place the **o**-***TOOL*** in the beam path such that the beam will strike the center aperture.

   At this point circular colored rings most likely will not appear. To see rings or to increase the number of rings, increase the display gain as described in (Step 4 - Adjusting the Gain). The number of rings is proportional to the intensity of your beam. Adjust the gain setting of the **o**-***TOOL*** until two or three colored rings appear (see Step 4 – Adjusting the Gain). Adjust your resonator or optic while monitoring the number of rings on the **o**-***TOOL***. As the incident power increases the number of rings will increase. As the incident power decreases the number of rings will decrease. If the number or rings on the **o**-***TOOL*** reaches the maximum of 10, decrease the display gain (see Step 4- Adjusting the Gain) until two or three rings appear and begin adjusting the resonator or optic again. If the **o**-***TOOL*** gain is at its minimum and the number of rings on the display is too high, add an attenuator to the **o**-***TOOL*** and begin adjusting your resonator again. When you reach a maximum number of rings at the lowest possible gain setting you have reached the best possible resonator alignment.

4. **Adjusting the Gain** – To adjust the display gain, using hands free technology, shine a light source, for example a standard laser pointer, near the edge of the display. When the orange ring appears the **o**-***TOOL*** display gain is changing.

   To increase or to decrease the display gain keep illuminating near the edge of the display and the orange ring will remain on. At some point you will observe an increase or a decrease in the number of rings. If the number of rings is increasing then you are increasing the display gain. To decrease the display gain remove the light source from the front display for at least 1 second, i.e. the orange ring is off for one second. Then illuminate near the edge of the display again and the orange ring will reappear. The display gain will begin to decrease. (If you remove the light source for less than 1 second the gain will continue to increase.)

   To increase the display gain when it is decreasing, remove the light source from the front display for at least 1 second, i.e. the orange ring is off for one second. Then illuminate near the edge of the display again until the orange ring reappears. The gain will begin to increase. (If you remove the light source for less than 1 second the gain will continue to decrease.)

   Continuous illumination near the edge of the display, i.e. the orange ring remains on, will cause the display gain to oscillate. For instance when the display gain is increasing and it reaches its maximum it will automatically begin to decrease. Likewise, if the display gain is decreasing and reaches its minimum the display gain will begin to increase.

5. **Displaying Polarization** – To display polarization, deactivate the **o**-***TOOL*** (see Step 1 – On/Off) and attach a polarizer to the three pins located on the display PCB. To attach the polarizer hold the polarization attachment by the edges with the polarizing optic facing out. Gently align the three mounting holes on the attachment with the three mounting pins, note that the polarizer can only be attached one way. When properly aligned gently press the polarizer attachment onto the pins until the pins are flush with the top surface of the attachment. Place the **o**-***TOOL*** in the beam path and then activate it (see Step 1 – On/Off). Adjust the **o**-***TOOL*** until the incident light falls on the center of the front display. Adjust the display gain (see Step 4 - Adjusting the Gain) and observe the polarization, type and angle, of the incident light. Continue to adjust the display gain until the desired display in achieved.