

INSTALLATION INSTRUCTIONS FOR
THE FIBEROPTIC LIGHT SCRAMBLER ON
NIKON ECLIPSE MICROSCOPES

PLEASE READ THIS BEFORE SCRAMBLER INSTALLATION

Your microscope should already be set up for **Koehler Illumination** or focused for epi illumination.*

Scrambler Installation requires a **VOM or Multimeter** that reads Ohms. To set up this system quickly and efficiently **you must use the LOP** (light output photodiode), a device made by Technical Video, Ltd. specifically for maximizing light throughput in the system. Your LOP was calibrated using an HBO 100W mercury lamp. Your readings may vary depending on arc lamp life, filters, etc.

The Scrambler requires accurate alignment to function properly. Realignment will be necessary only when replacing the arc lamp bulb. If you experience any problems please call or fax Technical Video, Ltd. We will be happy to assist you.

Installation instructions must be followed or guarantee is void. Unpack and inspect the parts. **Do not move** knobs or make adjustments until called for in the Instructions as they have been approximately set at the factory.

*If the Fiberoptic and the lenses have been installed in your Scrambler Input Module, please follow the instructions from Part 1 *"Now secure the Input Module to the tripod..."* *

The Input end of the Fiberoptic within the Module has been installed with a new heat dissipating device called Fintip. Please call, fax or email us if it is necessary to remove the fiberoptic.

Unloop and uncoil the fiber. Leave the protective bags on the fiberoptic ends. Note that the **lamp end is red banded**. Do not reverse ends! **Never** sharply bend the fiber. The ends are optically polished flat surfaces and should not be touched. Treat them as you would any lens. If it becomes necessary to clean, place a drop of acetone on lens tissue and draw it across the surface.

1. INPUT MODULE

The Input Module has been grooved to aid in heat dissipation. Twist and pull the WHITE Z-axis knob completely out. Insert the collector lens (see schematic drawing) into the MODULE, with the small lens end toward the fiberoptic holder, until the slot in the lens housing is visible in the Z-knob hole.

Then, put

the Z- knob end pin in the slot and turn it so that the lens is in the approximate middle of its travel.

Open the tripod legs fully and lock. *Now secure the INPUT MODULE to the tripod using the 1/4" tapped hole in the body. Loosen the upper lock knob and rotate the Input Module so that the lamphouse will be mounted over the **long** leg of the tripod for stability.

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2. LAMP SET UP

IMPORTANT! Wear UV blocking eye protection glasses! An arc lamp is required. Leave the existing collector lens in the lamphouse. Now turn on the lamp. Align the arc so the mirror image is not directly on the cathode. This precaution will prolong lamp life. Keep the mirror image toward the anode but **do not** make a double image. Next adjust the lamp collector lens to focus the electrodes at infinity or a surface 15-20 feet away. Mount the lamphouse to the Input Module. *(We recommend turning the arc lamp on no more than 30 minutes before use and shutting it off when through in order to conserve bulb life.)*

3. CURVE CALIBRATOR ROD

Always insert the fiber through the hole on the "dimpled" side of the CCR.

- a. First, remove the ziploc bag and the lock collar from the black-sleeved output end of the fiberoptic.
- b. Thread the fiber end through the outermost hole at one end of the CCR.
- c. Slide the CCR along the fiber a distance of about 30" (76 cm).
- d. Thread the fiber end through the closer hole at the opposite end of the CCR.
- e. Pull and gently work the fiber through this hole until it forms an approximate semi-circle of 2 1/8" (5.4 cm.) radius, measured from the **CCR surface**.
- f. Thread the fiber through the closer hole at the opposite end .
- g. Adjust the loop to 2 1/8 (54 mm.) height, as in Step 4 .
- h. Thread the fiber through the last hole; adjust the loop to 2 1/8"; replace the S.S. lock collar.

The following graphic illustrates the fiberoptic properly threaded through a CCR. The CCR forces the fiber through three right angle bends when viewed along its axis. The CCR broadens the plateau of the projected light and makes the already nearly flat illumination from the fiberoptic even more uniform.

Microscope end (Black)

Lamphouse end (Red)

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4. USING THE LOP

PLEASE DO NOT remove the red tape or move the X and Y screws of the Input Module until instructed! The fiberoptic has been carefully precentered at the factory; setting up the Scrambler System correctly involves bringing the arc into alignment with the pre-centered fiberoptic, not vice-versa.

Put the LOP that is attached to the fiberoptic into the jack on your digital ohmmeter. Next, loosen the fiber locking screw on the Fiber holder of the Input Module. Slowly move the fiber into the Module while observing the ohmmeter for lowest ohms (maximum throughput). Lock the fiber in place when you read the lowest Ohms setting. Now turn the white Z-axis knob of the Input Module lens to fine tune this adjustment.

Next make **all adjustments** that are available **on the lamphouse** until you get the lowest ohms reading. Find the 'center' of each adjustment. Repeat the previous adjustments on the Input Module and the lamphouse twice more to "tweak" the system. A difference of 0.1 ohm makes a significant difference! Remove the red tape carefully and if you have done the foregoing correctly you will only have to adjust the X and Y knobs very slightly to maximize throughput. Your ohms reading should now approximate the "test" reading done at the factory if you are using an HBO100 W/2 arc lamp.

When you have maximized the light throughput then slide the lock collar on the red Input fiber ferrule until it seats against the fiber holder and tighten it; if there is a need to remove the fiberoptic it will then be reseated in the same place. Remove the free end of the fiber from the LOP, and aim it at a smooth surface 6" to 8" away. You should see a virtually flat white disk of light with a very narrow shadow around the periphery.

Remove any ground glass diffusers from the light path!

5. OUTPUT MODULE

Now hold the Output Module in one hand and slowly insert the fiber; project the beam of light onto a flat surface some distance away. Lock the fiberoptic thumbscrew when the perimeter of the disk of light is sharply focused. Fine focus with the Z-axis knob. Attach the Module to the appropriate port.

6. For **DIC** start with the microscope set up for Koehler illumination with the Scrambler in place. A telescope or Bertrand lens is necessary to do this properly. Open the field diaphragm completely, and do not use it to attenuate the light. Use the X-Y adjusters on the OUTPUT MODULE to center the circle of light. On some setups it may also be necessary to move the condenser up 1 or 2 mm to critically illuminate the condenser aperture. This takes you out of true Koehler illumination, but optimizes image resolution. Move the Z-axis knob slightly only if necessary.

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7. For **epi-fluorescence** remove the objective and adjust the white Z-axis knob of the Output Module so that the projected disc of light is in focus on a piece of white paper at the specimen plane.

8. MAXIMIZE ILLUMINATION THROUGHPUT

To **maximize** illumination throughput, use your microscope photometer (or a photodiode secured to the end of the fiber and connected to a VOM) and fine-tune the X, Y and Z Scrambler INPUT MODULE adjusters and the lamp and mirror adjusting screws. Careful adjustment of all variables will result in maximum effectiveness of the Scrambler. Critical **coaxial** alignment of the arc, its collector lens, the INPUT MODULE collector lens and the fiber tip will optimize uniformity of the illumination. If you move the lamp and change the particular degree and curvature of the fiber the flatness and intensity will vary.

9. FILTER WHEELS

Filter wheels, electronic shutters, diaphragms and other light attenuators should be mounted between the lamphouse and the INPUT MODULE. This isolates vibration, heat and EMI from the microscope and specimen area .

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