

General overview

Using four attachment bolts and washers, the fiber coupler flange adapter is bolted onto the front panel of the HARMONIK module. An iris diaphragm is used to coarsely align the adapter with the output beam. Coarse alignment is achieved by using a power meter to measure the transmitted power and then maximize it by laterally shifting the adapter. This ensures the adapter is accurately centered on the output beam. Once the coarse alignment is completed, the fiber coupler is inserted and fixed to the flange adapter and then finely adjusted.

Installation environment

It is important that the installation environment is clean and free from dust or other contaminants. Further, the output windows should be free from any dust particles before installation of the fiber couplers.

Safety precautions

Align both the fundamental and second harmonic laser apertures using an appropriate beam dump. To further prevent damage and accidental exposure to personnel, ensure the beam path is safely contained and known.

All nearby personnel must wear suitable clothing and be aware of the laser operations and the danger involved.

Item list

- 1 Koheras HARMONIK
- 2 aeroGUIDE Power cable
- 3 Flange adapter
- 4 Four M2x6 hex screws with washers
- 5 Fiber coupler for second harmonic and/or fundamental output

Tools required

- 1 Adjustable iris diaphragm
- 2 50HD-15 hex screw driver
- 3 9D-12 screw driver
- 4 Eccentric key
- 5 Power meter

Removal of protection caps

To prevent contamination, the fiber couplers come with dust protection caps. Remove the caps before continuing the installation.



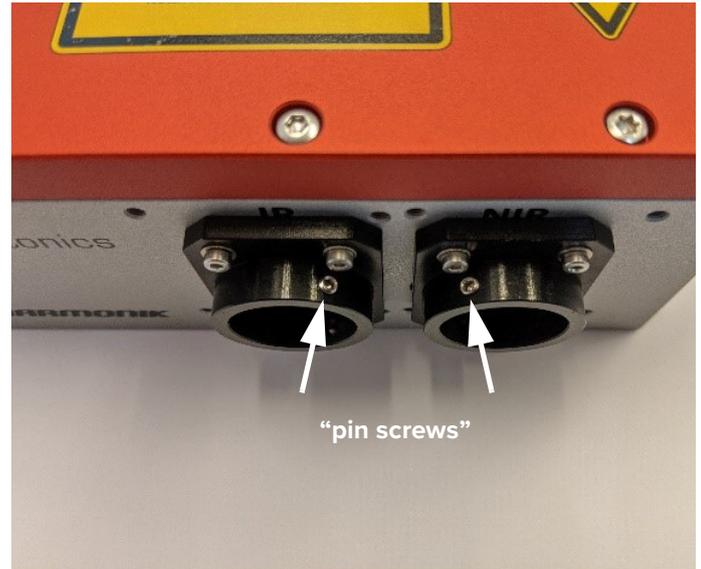
Warning: Koheras HARMONIK lasers are Class 4 lasers. Before any operation is attempted, ensure the procedures and notices within this Installation Guide and the hazard labels on the product are read, noted, and adhered to. In addition, make sure to follow all safety recommendations listed in the *Koheras HARMONIK Safety, Handling and Regulatory Information* document shipped with your laser. If in doubt, consult your laser safety officer.

Warning: Do not install the fiber coupler with the laser powered on. Ensure power to the laser is removed before proceeding with the installation.

Warning: Use of controls or adjustments or performance of procedures other than those specified herein and in the document *Koheras HARMONIK Product Guide* may result in hazardous radiation exposure.

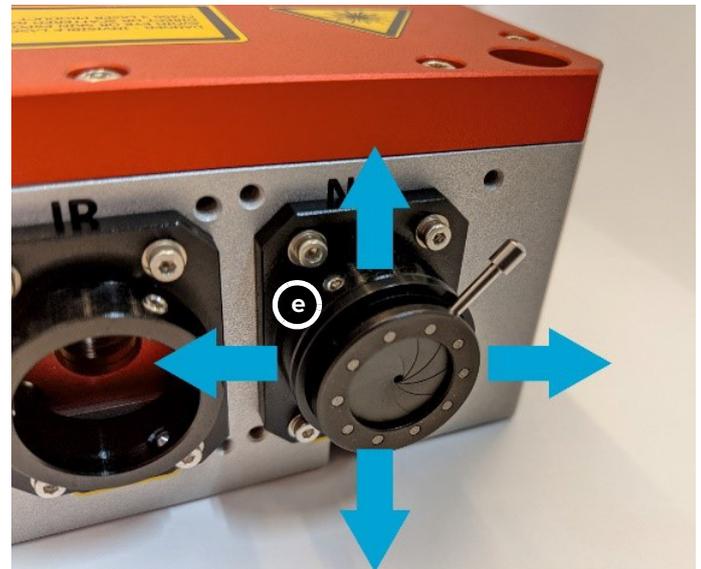
Step 1: Mount the optical flange adapter

- a Turn off laser power.
- b Insert the four M2x6 mounting screws with washers through the holes in the flange of the adapter.
- c Make sure the adapters are orientated with the fundamental/SHG output as shown with respect to the radially arranged pin screws.
- d Slightly tighten the mounting screws using a 50HD-15 hex key or driver.



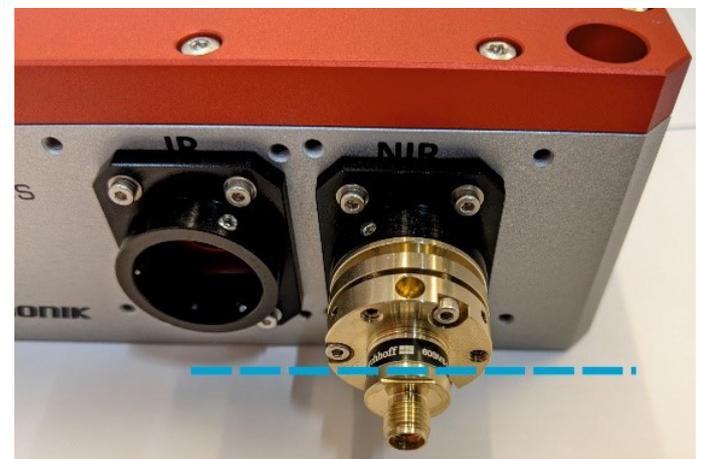
Step 2: Align the adapter

- a Insert the iris diaphragm into the flange adapter.
- b Minimize the iris diaphragm aperture.
- c Set the laser to the lowest-possible power and turn it on.
- d Measure the transmitted output power using a suitable power meter.
- e Maximize the transmitted power by laterally moving the flange adapter.
- f Tighten the four mounting screws while taking care not to move the flange adapter from the maximum power position.
- g Remove the iris diaphragm.
- h Measure the free space output power for a later comparison to the fiber coupled power to calculate the coupling efficiency.



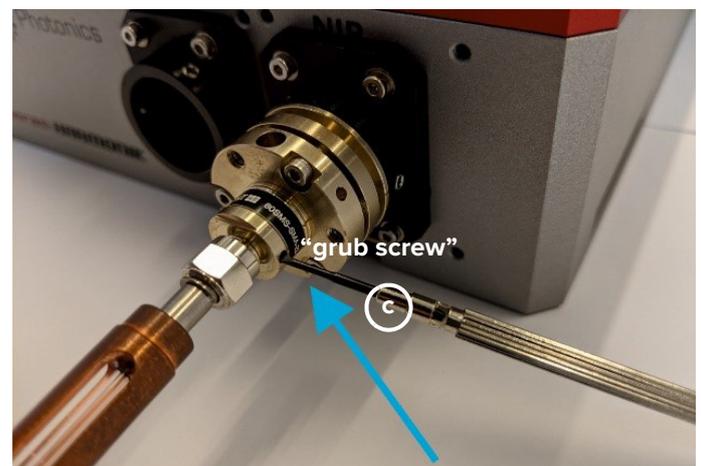
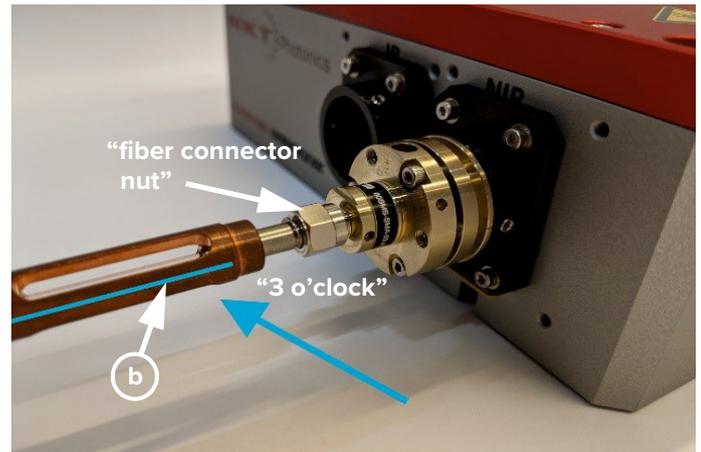
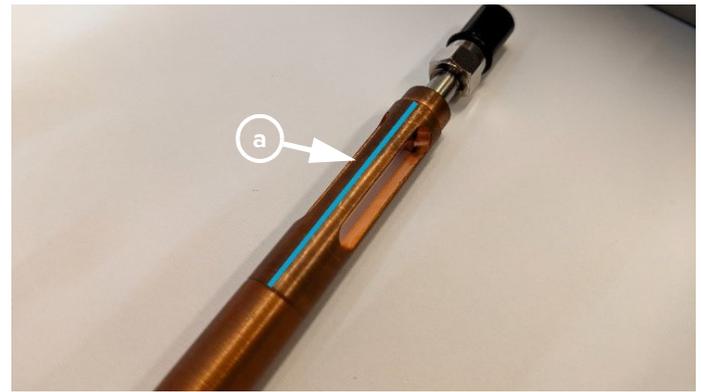
Step 3: Mount the fiber coupler

- a Insert the fiber coupler into the adapter flange.
- b Make sure the fiber coupler has the same orientation as depicted in the figure on the right. The flat surface has to be aligned horizontally - perpendicular to the laser output polarization.
- c Tighten the three tapered pin screws to fix the fiber coupler in the adapter flange.



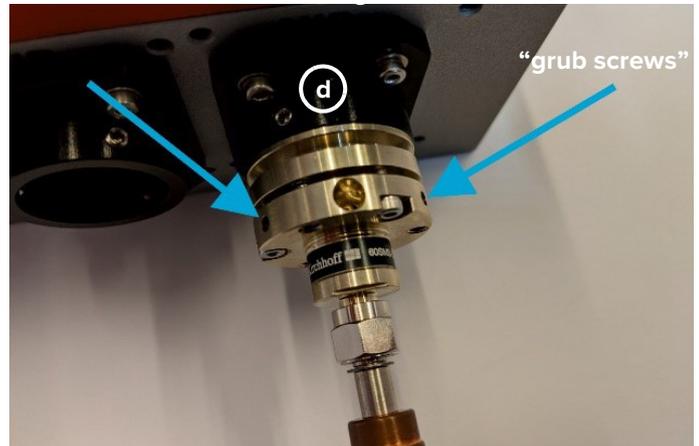
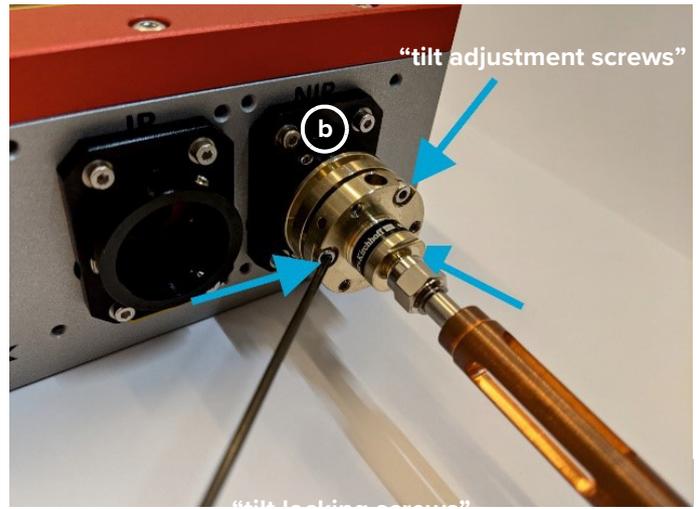
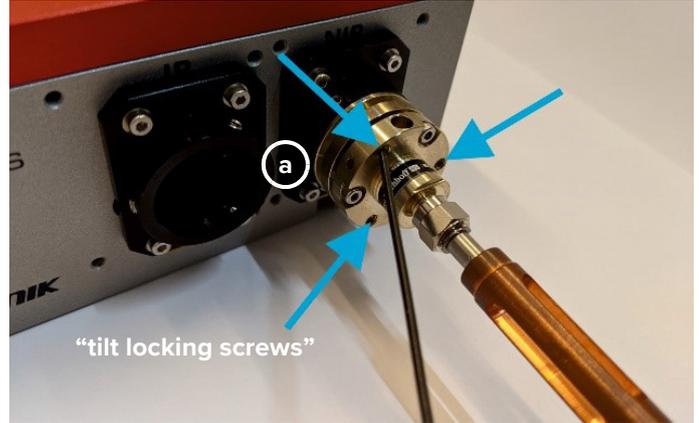
Step 4: Connect the external DC power supply

- a Insert the fiber into the fiber coupler's receptacle. The fiber connector has a thin notch mark indicating its orientation.
- b Make sure the orientation of the fiber cable is as depicted. Orientate the thin notch mark to exactly the "3 o'clock" position, before tightening the fiber connector nut.
- c Gently tighten the grub screw to fix the fiber ferrule in the receptacle.
- d Connect the fiber's output end to a power meter.



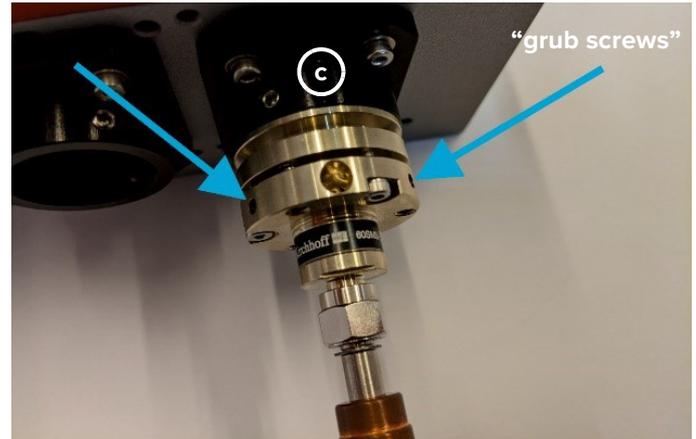
Step 5: Adjust the coarse tilt

- a Loosen the three tilt locking screws.
- b Turn the tilt adjustment screws in sequence over a wide range in both directions while observing the power meter.
- c If there is no measurable light coupled into the fiber while turning the adjustment screws, perform steps “d” to “f”, otherwise go to step “g”.
- d Loosen the two grub screws holding the collimator lens.
- e Insert the eccentric key and rotate it until the collimator lens is closest to the fiber end. This orientation is where the white indicator on the eccentric key points towards the fiber end as the white arrow shows. From this position, rotating in either direction moves the lens away from the fiber end.
- f As was done in step “b”, turn the tilt adjustment screws in sequence until the signal is found on the power meter.
- g Optimize the tilt adjustment for maximum power coupled into the fiber.



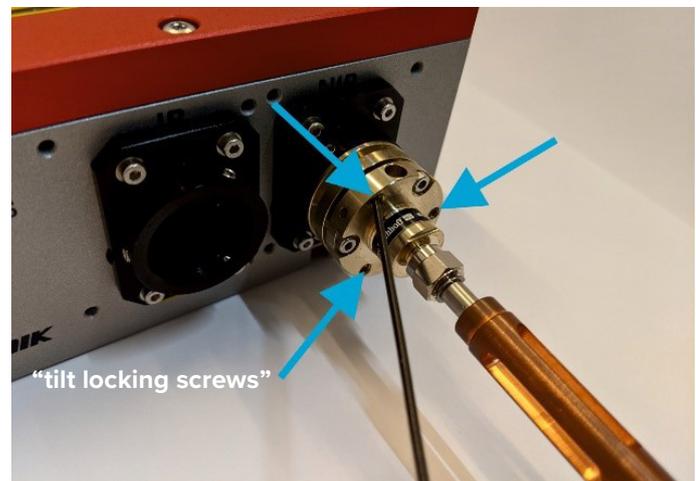
Step 6: Adjust the focus

- a While monitoring the power meter, rotate the eccentric key until the maximum signal is attained.
- b Iteratively repeat steps “5g” (tilt optimization) and “6a” (focus optimization) until the maximum signal cannot be increased further.
- c Tighten the two grub screws holding the collimator lens.



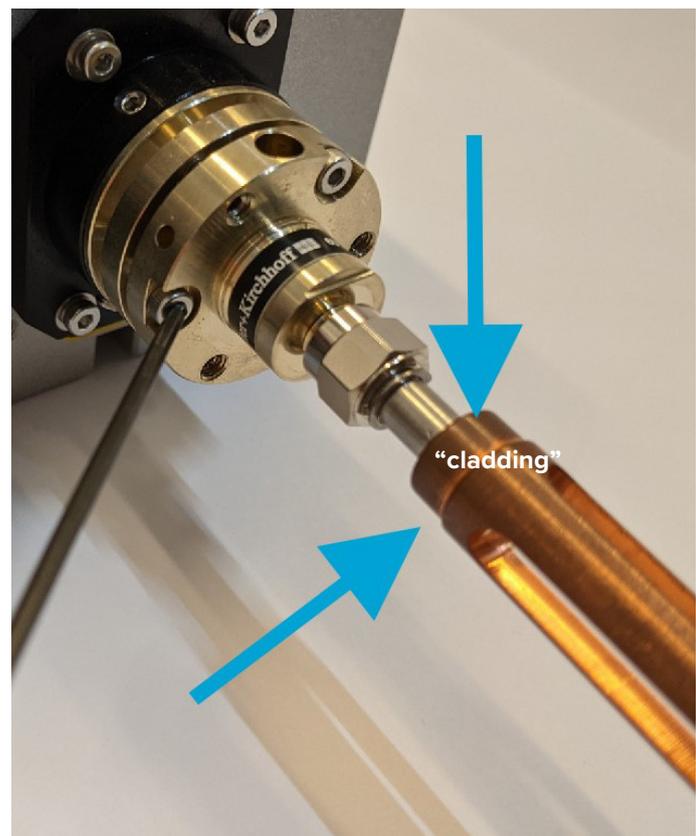
Step 7: Adjust the fine tilt

- a Once more, check if you can enhance coupling efficiency by using the three tilt adjustment screws.
- b Finally, lock the tilt adjustment by tightening the three tilt locking screws. Besides their locking function, the tilt locking screws can also adjust the fine tilt.
- c While tightening the first two tilt locking screws, the power meter signal typically drops significantly. However, when tightening the third screw, the maximum signal should recover.



Step 8: Final check

- a While observing the fiber output power, gently press against the cladding stripper of the fiber from the side.
- b When pressing against the cladding stripper in different directions, the signal normally drops.
- c Release the cladding, the signal should recover to its maximum value.
- d In case the signal increases while pressing against the connector in a specific direction, the adjustment is not at its optimum. The corresponding locking screw has to be fine tuned further, until the fiber output power decreases symmetrically in each push direction.



Support

| | |
|-------------------------|--|
| Web | https://www.nktphotonics.com/lasers-fibers/ support/technical-support-and-customer-service/ |
| Shipping Address | NKT Photonics A/S Blokken 84 3460 Birkerød Denmark |