

kineFLEX

Operating Instructions

POINT
SOURCE

kineFLEX

Operating Instructions

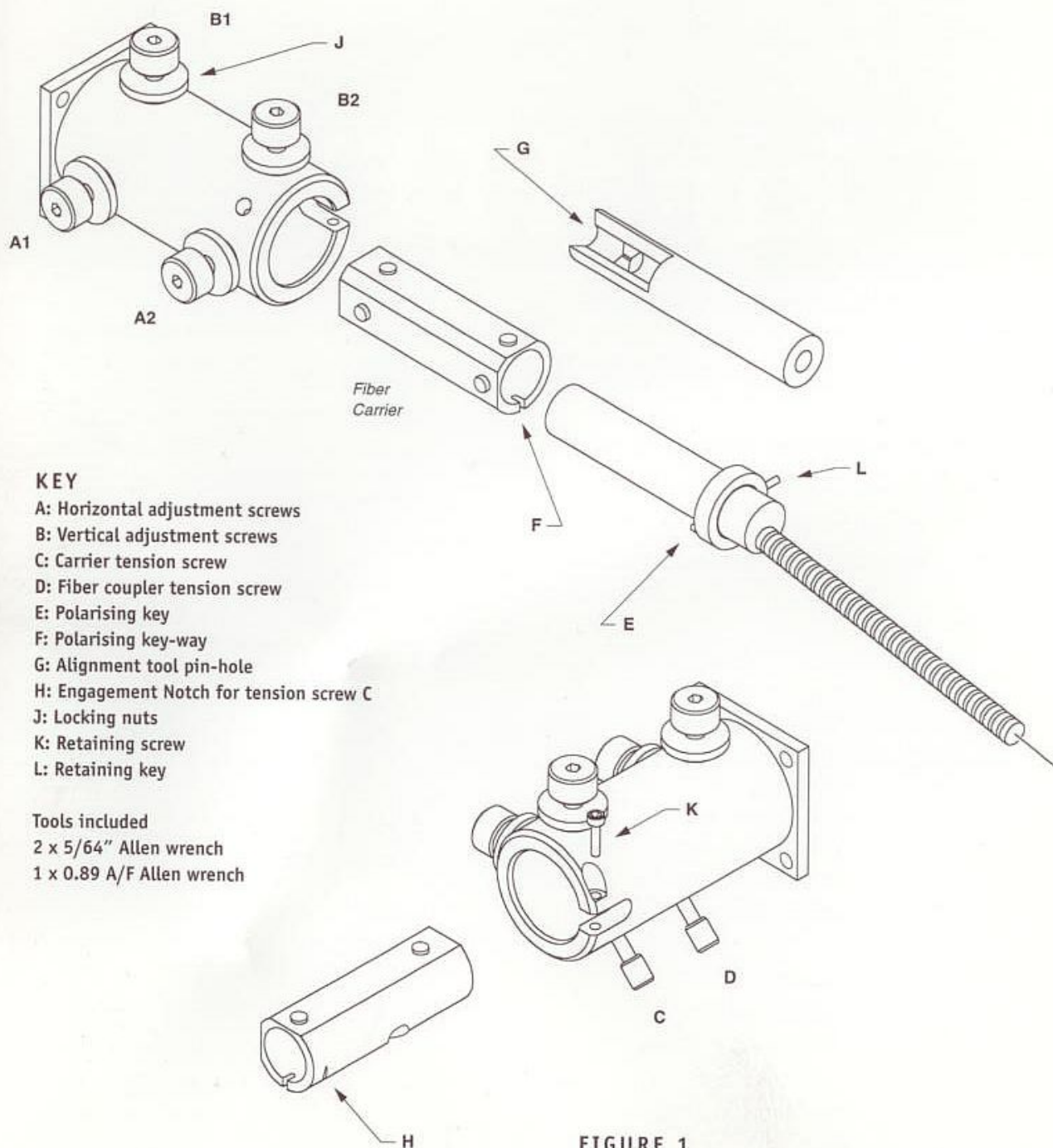


FIGURE 1
3D exploded view of manipulator and fiber

Laser/Fiber Manipulator Adjustment

The kineFLEX features a high precision ultra-stable manipulator for coupling the fiber to the laser of your choice.

Because the fiber has pre-focussed optic assemblies, tilt of the assembly becomes translation in the focal plane and translation becomes tilt. Refer to figure 2. Because the fiber has a relatively large acceptance angle the system is less sensitive to translational motion provided by the manipulator. The manipulator thus requires only 2 degrees of freedom enabled by using a 4 point cradle design that is kinematic.

Principles of Operation

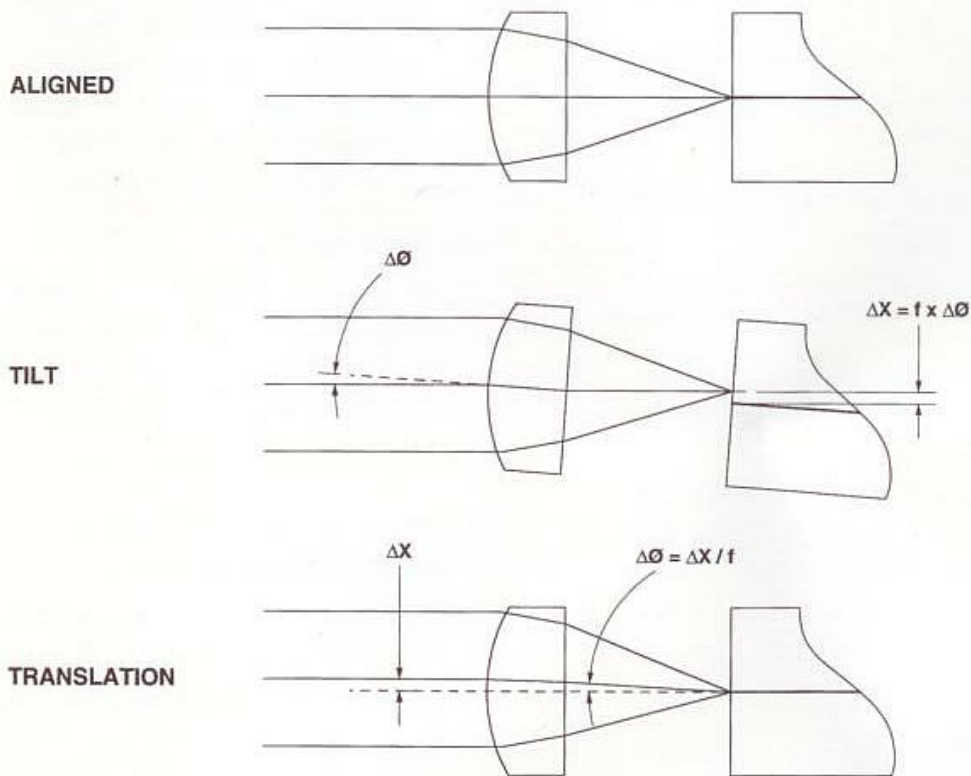


FIGURE 2

Principles of Operations

- The manipulator is pre-aligned using an alignment tool with a pinhole aperture.
- The input fiber coupler and manipulator are keyway aligned such that the polarization alignment is instantaneous.
- Once optimized for coupling efficiency, locking mechanisms on the adjustment screws ensure long term stability of launch conditions.
- The kinematic design ensures maintenance of polarity on repeat connections.

Launch Optimization

You will be required to monitor the transmitted power through the fiber. For this you will require a power meter preferably with an audible output or analogue display. Normalize the power reading by taking a direct reading from the laser. You are now ready to optimize the launch of the fiber and laser.

10. Insert the fiber input coupler assembly into the carrier and increase tension on screw **D**.

*Ensure the polarizing key **E** locates into the keyway **F** on the fiber carrier. Monitor the transmitted light on the power meter.*

11. Rapid adjustment is provided using screws **A1** & **B1**.

*Tilt the fiber coupler using screws **A1** & **B1** in turn to achieve the highest transmission efficiency.*

12. Optimize the launch by ultra-fine adjustment using horizontal translation provided by screws **A1** & **A2**.

*Alternately turn screws **A1** & **A2** in the same direction in small steps whilst monitoring the output power. The fiber coupler can be translated in one direction axis by using this 'walking' motion and the point of maximum coupling efficiency detected.*

13. Adjust screws **B1** & **B2** by vertical translation for final optimization.

*Repeat step 8 for screws **B1** & **B2**.*

Fixing of Launch

14. Lock down all adjustment screws **J**.

*Tighten locking nuts **J** whilst holding the adjustment screw in position using Allen wrench provided. Monitor the transmitted power whilst performing the lock-down process. It is now safe to fully tension screw **D** (see points of note).*

15. Insert retaining screw **K**.

*The regulations governing laser safety dictate that the laser beam is prevented from free space propagation if the fiber is accidentally removed. Once the fiber launch has been optimized the retaining key **L** on the fiber coupler will locate in the open section of the mount. A retaining screw **K** is provided to ensure that the fiber is not accidentally removed from the mount.*

Repeat Coupling

If the fiber is required to be repeatedly coupled and uncoupled from the laser, then only screw **D** should be used to release the bias of the fiber coupler in the mount.

Technical Support

If you have any difficulty in following the above instructions, or if you require some specific assistance then please call

US Toll free: 1 800 898 6504

Europe: +44 (0)23 80 744 500

Or e-mail

technical.support@point-source.com

Points of Note

During adjustment, the tension provided by screw **D** on the fiber coupler will change dependent on the direction of travel provided by the adjustment. Therefore additional tensioning or release of screw **D** may be required during the launch optimization process.

The purpose of tension screw **C** is to locate the carrier in the mount such that the pads will be correctly aligned with the adjustment screws. Screw **C** should not be tensioned fully as it is not intended to increase the level of bias against the adjustment screws. If excessive tension is provided on screw **C**, then the translational movement range of the fiber coupler will be limited.

To avoid damage to the end face of the fiber, the fiber manipulator alignment process must be performed at low powers, ideally less than 30mW C.W. Ensure that adequate laser safety precautions are taken before proceeding.

Mounting

1. Drop the carrier into the body of the mount.
Kinematic operation is achieved by contact between the adjustment screws and the hardened pads on the fiber carrier.
2. Increase tension on screw **C** to engage into notch **H** on the underside of the carrier.
*Limited tension is required. See points of Note regarding screw **C**.*
3. Loosen tension screw **D** and ensure there is no protrusion into the bore of the carrier.

4. Mount the manipulator to the laser or a mounting bracket using 4 M3 mounting screws. The manipulator must be aligned vertical to the input plane of polarization.

The polarization keyway on the carrier must be positioned at the bottom of the mount as shown in figure 1

Pre-alignment

Pre-alignment can be performed visually and without the aid of a power meter.

5. Insert Alignment Tool with the pinhole aperture **G** nearest to the laser and, increase the tension on screw **D**.
The alignment tool is used to pre-position the adjusting screws relative to the position of the laser beam.
6. Increase tension on screw **D**.
This increases bias on the tool against the carrier and creates kinematic contact between the pads and the adjustment screws
7. Align the Tool by adjusting screws **A1 & B1**, such that the pinhole aperture is causing minimal clipping the beam.
*Adjust each screw in turn to maximize the light transmitted through the pinhole aperture. Release tension on screw **D**.*
8. Reverse the Tool and align screws **A2 & B2**.
Repeat step 5 for screws above.
9. Reverse the Tool once more and repeat step 5 for **A1 & B1**.
The mount is now pre-aligned and ready for the insertion of the fiber delivery system.

Care and Maintenance

Output optic couplers

During the lifetime of the product it will undoubtedly be exposed to environments with air-borne contaminants. To avoid contamination of the lenses & fiber ends the unit must operate according to the terms of warranty.

When the system is not in operation the dust caps provided should be used.

Connectors

Careless handling and poor maintenance can have a detrimental effect on the connector's performance. The following guidelines should help maintain the connector's integrity.

- Do not touch or expose the fiber end to any contaminants.
- Use the protective dust cap provided when not in use or connectorised.
- Adhere to strict cleaning procedures.

If the fiber connector end is contaminated, it is essential that the contaminant is removed as quickly as possible. If you are unsure whether the fiber has been exposed, it is preferable to clean the fiber. The contaminant could otherwise cause irreparable damage to the core of the fiber, which would require the connector be replaced.

Cleaning Procedure

- Ensure no light is emitted from the fiber.
- Point Source recommends cleaning connectors with an 'automatic connector cleaner', which incorporates a dry, woven polyester cloth as the cleaning medium.

These units are commercially available on request from Point Source or from fiber termination houses.

- Alternatively moisten a cotton bud with acetone and wipe the face of the connector.
- Inspect the emitted beam for circularity and flare.

Connector Adapters

For kineFLEX systems that contain in-line FC/PC polarization maintaining connectors, the connector adapter will influence the performance of the system. A good adapter should provide a lifetime of around 2500 couplings. Point Source adapters contain only zirconia insert sleeves for extended lifetime performance. However, repeated coupling/ uncoupling of connectors can result in a build up of dirt and contaminants and system performance degradation. This may be detected if system transmission decreases with an adapter that has been used several times.

Point Source recommends cleaning the adapter every 25 connector insertions. Cleaning should be performed with a clean cotton bud and alcohol.

Terms of Warranty

The product is covered by the following.
Continuous use @ 100mW CW
for 12 months.

Under the following conditions.

- Optimal coupling efficiency for maximum transmission. Any extended period of time where the laser and fiber is not optimized, the fiber is susceptible to damage. This damage is not covered by the warranty. The maximum period for misalignment during optimization @ 30mW is 30 mins.
- Operating temperature: 10-40°C
- Operating Humidity: Non-condensing
- Operating Pressure: Atmospheric

Warranty does not cover.

Damage to exposed
fiber/connectorised ends.