KI661X FiberSafe Microscope

Operation and Maintenance Guide

The KI661X FiberSafe Microscope is a robust handheld tool for visual inspection of a fiber optic connector end-face. It is fitted with red and infrared safety filters, and high quality glass lenses. Easy to operate and ergonomically shaped, this microscope is ideal for field or laboratory use.

Inspection and cleaning of fiber connectors should be performed every time an optical fiber connector is mated, so every technician needs easy access to a microscope. Failure to ensure connector end-face cleanliness is the most common cause of problems in fiber systems, and mating when contaminated with some types of dirt, can cause permanent damage to fiber connectors.

Service and support

For assistance, please visit our web site www.kingfisherfiber.com for FAQs, your local contact details, or for return material instructions (RMA). Our applications support or service teams would be pleased to help.

Caution! Opening the instrument invalidates the warranty, and damage or incorrect filter assembly could cause a laser eye hazard.

Getting started:

- Install a single AAA (alkaline or NiMH) battery, or power externally, using the supplied USB cable. A low battery (0.9 – 0.65V) is indicated by intermittent illumination flicker. The illumination level is stabilised, and is generally independent of battery voltage. If a rechargeable battery is used, it must be removed for charging elsewhere.
- Screw on a fiber connector adaptor. The adaptor must match both the connector polish type, eg PC or APC, and ferrule diameter, typically 2.5 mm or 1.25 mm.
- To inspect a fiber connector end-face, push the connector ferrule into the microscope adaptor, so that it is positioned against the end stop. If inspecting an APC connector, rotate the connector, so that end-face is flat, or focussing will be poor.
- Press the front switch of toggle button to select coaxial illumination. To select oblique illumination, press and hold the front switch of toggle button. Note that coaxial illumination uses a white LED and oblique illumination uses a green LED. Pressing rear switch of toggle button will turn off instrument. For convenience and battery saving, coaxial illumination stays on for about 2 minutes; however, timer will be disabled if using external power.
- While holding the eye piece to your eye:

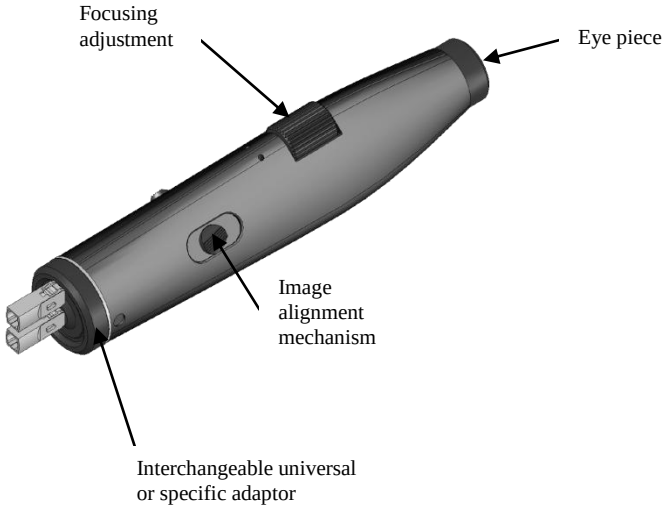
  - adjust the focus to achieve a clear image of the connector tip.

  - adjust the X – Y position to centre the image.

  If you find it difficult to locate and centre the image, do the following:

  - loose X-Y adjustment wheels and move them to find the edge of the connector

  - from the edge of the connector, project to the centre of the image, which will be the centre of the connector, and rotate X-Y adjustment wheels to move the image along projection path to this point.
- To illuminate a patch lead core, position and hold ferrule tip (on the unconnected end of patch lead) onto the white LED located at the side of microscope, and use the coaxial illumination mode.
- For convenience, the microscope can be mounted on a standard camera tripod, or a lanyard fitted to assist carrying.
- It is good practice to use a scope with both eyes open, to avoid eye strain. The rubber eye cup helps this.



Illumination Explanation

The microscope has triple illumination capability, each with different attributes:

- **Coaxial:** White LED light hits the fiber end-face at right angle, providing the highest level of image details.
- **Oblique:** Green LED light hits the fiber end-face at an acute angle, which makes the fiber core readily visible, but allows users to see only major defects and contaminants, with minimal training.
- **Core:** White LED light travels up the fiber core to show continuity or sub-surface fiber core defects.

Laser safety summary

The microscope is fitted with safety filters, which greatly reduce the risk of eye damage due to accidental exposure to light from either an operating system or visual fault locator. Always observe eye safety procedures compliant with your company policy, relevant laser safety standards and safety practices.

NOTE: It is accepted safety practice to avoid viewing active optical fiber signals. In potentially risky situations, always check for the presence of light before viewing, using a Ge, InGaAs or high power optical power meter set to its least sensitive practical setting (often 850 nm).

Above 635 nm, filter attenuation determines the safety limit. Above 800 nm, filter thermal damage determines the safety limit.

The IEC 60825 eye-safe emission limit is either Class 1 or 2

Sometimes it may be desirable to check filters integrity. There are two safety filters installed-red and infra-red. The infra-red filter is integral with the coaxial illumination, so if it's physically damaged, the illumination will not work. Red filter integrity can be easily checked by pulling off the eyepiece. A further check would be to perform an attenuation test using a large area detector against the eyepiece.

Pass/fail acceptance guidelines

Proper guidance on pass/fail criteria is beyond the scope of this manual, since it is likely to vary significantly.

The Standard **ISO/IEC14763-3 Testing of optical fibre cabling** specifies requirements and visual standards for connector end face inspection with a microscope.

The standard and common industry practices recommend the following pass/fail acceptance criteria:

- Markings on the core or damage to the cladding close to the core are unacceptable.
- Slight scratches and small pits on cladding, away from the core, are acceptable.
- Cracks are not permitted in either core or cladding.

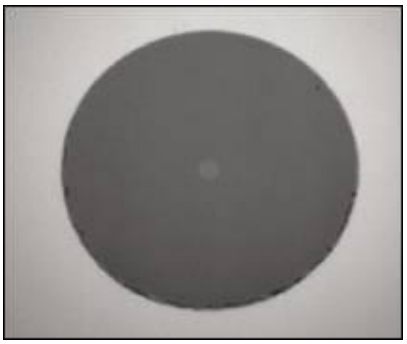


Figure 1. Connector end-face, singlemode fiber, viewed under coaxial illumination, x400. Note small core in the middle.

Care of your instrument

This is a precision optical instrument. Keep it clean, dry and do not drop. Avoid exposure to moisture or excessive vibration. The connector adaptor tip should be cleaned on the regular basis with a cleaning stick. Objective and eyepiece lenses should be cleaned with a microfiber cleaning cloth. During prolonged storage, remove battery to eliminate the possibility of acid leakage.

Disclaimer and warranty

This manual is given in good faith for the benefit of the user. It cannot be used as the basis for claims against Kingfisher International or its representatives. This product is guaranteed against defective components and workmanship for 3 years from delivery, unless stated in the purchase contract. This warranty excludes connector adaptors or incorrect use. Opening the instrument invalidates the warranty. Liability is limited solely to repair of the equipment.

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