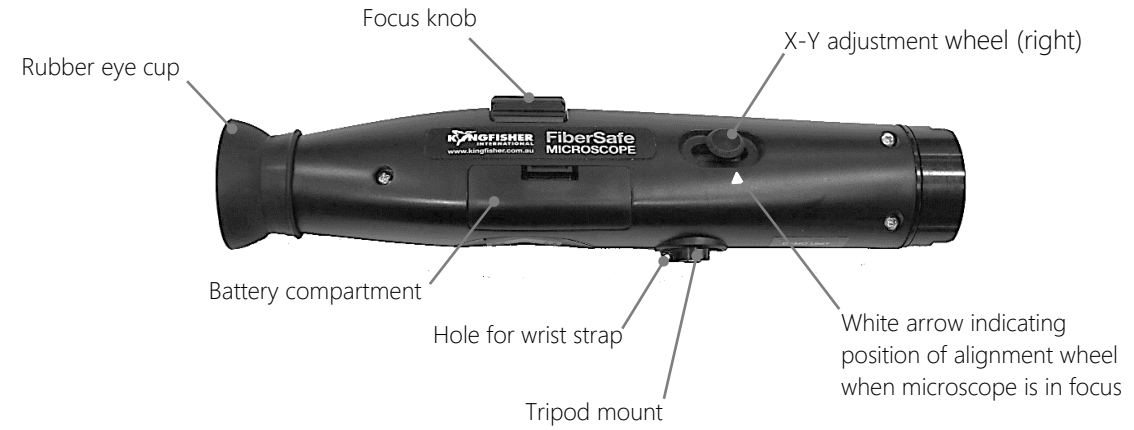
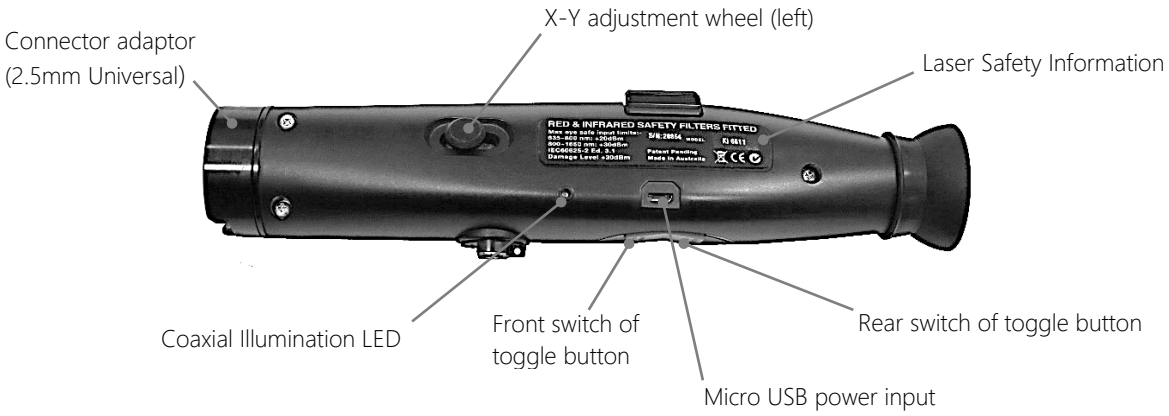
Introduction and Applications

The KI6600 Series 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, QA 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 can cause permanent damage to fiber connectors.





Instrument and Standard Accessories

Description	Quantity
FiberSafe Microscope (see Ordering Information section on last page for available models)	1
Option, Scope Adaptor 2.5 mm Universal (OPT681)	1
Type-A to Type-B(micro) USB cable	1
AAA Battery	1
Wrist strap	1
Soft carry pouch	1
Operation manual	1
QA certificate	1

Getting Started

- Install a single AAA (alkaline or NiMH) battery. A low battery (0.9 – 0.65V) is indicated by intermittent illumination flicker. Illumination level is unaffected by battery voltage. If a rechargeable battery is used, it must be removed for charging elsewhere. Alternatively, power externally using the supplied USB cable. When powered via USB, illumination of the microscope is on permanently.
- Select a screw-on connector adaptor to match your application. The adaptor must match both the connector polish type, e.g. PC or APC, and ferrule diameter, typically 2.5 mm or 1.25 mm. The unit comes with a 2.5mm PC Universal Adaptor. See Optional Interchangeable Connector Adaptors section on last page for other available adaptors.
- 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 using a Universal Adaptor, rotate the connector, so that end-face is flat, or focussing will be poor. However, it is recommended to use APC adapter with specific connector type as a better solution where possible.

  For the case of MPO adaptor, adjust the screw attached to the adaptor to move connector ferrule laterally to inspect all fibers on the ferrule.
- Press the front switch of toggle button to select coaxial illumination (see below). To select (green) oblique illumination (see below), press and hold the front switch of toggle button. Coaxial illumination uses a white LED on the side of the scope body. Pressing rear switch of toggle button will turn off instrument. For convenience and battery saving, illumination stays on for about 2 minutes; however, timer is disabled if using external power for bench use.
- To focus, while holding the rubber eye cup to your eye:

  - adjust the focus knob to achieve a clear image of the connector tip. When image is in focus, the centre of XY-alignment wheel (right) will typically be positioned near the white arrow on the right of focus knob.

  - adjust the X–Y adjustment wheels to centre the image.

  If you find it difficult to locate and centre the image, do the following (much easier with a very dirty connector!):

  - 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 (at the unconnected end of patch lead) onto the white LED located at the side of microscope, and use the coaxial illumination mode. See sample image in Fig. 1 below.
- For convenience, the microscope can be mounted on a standard camera tripod (Fig. 2 below), or a wrist strap fitted to assist carrying.
- It is good practice to use the microscope with both eyes open, to avoid eye strain. The rubber eye cup helps this.
- To view and/or save microscope images on a computer, replace the scope's eyepiece with a digital camera (optional, see Optional Accessories section on last page) connectable to a computer via USB.

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.

Fig. 1: Connector end-face, single-mode fiber, viewed under coaxial illumination, x200. Note illuminated small core in the middle

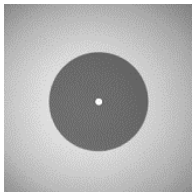
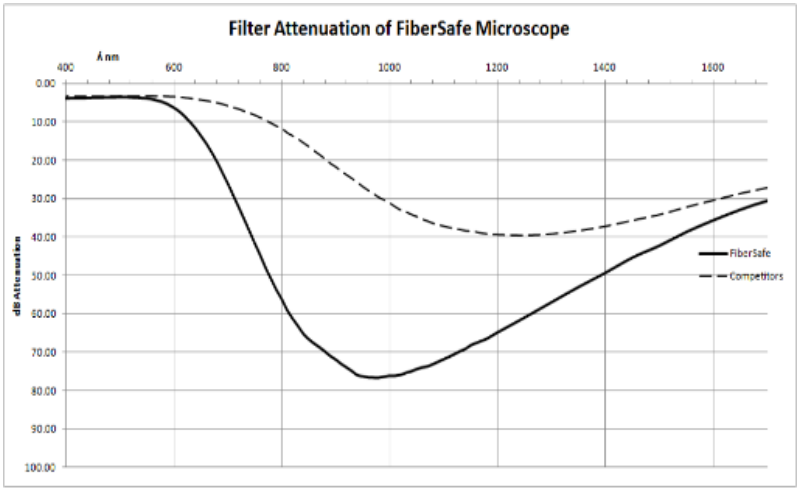


Fig. 2: Microscope mounted on tripod

Laser Safety Summary

The microscope is fitted with safety filters, which greatly reduce the risk of eye damage due to accidental exposure to red or infrared light. 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).



This microscope is 100% eye safety tested during production using traceable instruments to the maximum input power, according to IEC 60625-2 Ed. 3.2:
640 - 680 nm: 60 mW / 18 dBm (visible red)
680 - 1700 nm: Class 3B (infrared)

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.

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. Objective and eyepiece lenses should be cleaned with a microfiber cleaning cloth. During prolonged storage, remove battery to eliminate the possibility of acid leakage.

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 optical filter assembly could cause a laser eye hazard 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.

Ordering Information

Description	Part number
Instrument, Microscope Optical 40x, 2.5 mm Univ	KI 6608
Instrument, Microscope Optical 200x, 2.5 mm Univ	KI 6610
Instrument, Microscope Optical 400x, 2.5 mm Univ	KI 6611

Optional Interchangeable Connector Adaptors

Description	Part number
Option, Scope Adaptor LC APC	OPT661A[1]
Option, Scope Adaptor SC APC	OPT662A[1]
Option, Scope Adaptor FC APC	OPT663A[1]
Option, Scope Adaptor E2000 APC	OPT668A
Option, Scope Adaptor E2000 PC	OPT670
Option, Scope Adaptor MPO/MTP 16 x n (for x200 scope only)	OPT674
Option, Scope Adaptor MPO/MTP 16 x n, APC (for x200 scope only)	OPT674A
Option, Scope adaptor MPO/MTP 12 x n (for x200 scope only)	OPT677
Option, scope adaptor MPO/MTP 12 x n, APC (for x200 scope only)	OPT678
Option, Scope Adaptor SMA	OPT679
Option, Scope adaptor 2.5 mm Universal	OPT681
Option, Scope adaptor 2.5 mm Universal, APC	OPT681A[2]
Option, Scope adaptor 1.25mm Universal	OPT682
Option, Scope adaptor 1.25 mm Universal, APC	OPT682A[2]
Option, Scope adaptor converter to 7/8 UN-28 TPI, female	OPT683[3]

Note 1: APC adapter with specific connector type.
Note 2: Suitable for all 1.25 mm or 2.5 mm APC fibers. However, use APC adapter with specific connector type as a better solution where possible.
Note 3: OPT683 fits various common male scope adaptors with a 7/8 UN-28 TPI thread, e.g. JDSU/ Westover FMA Series, Lumen etc.

Optional Accessories

Description	Part number
Option, Scope Digital Eyepiece, 1.3 MP	OPT684

KINGFISHER INTERNATIONAL PTY LTD
720 Springvale Road, Mulgrave, Victoria 3170 Australia.
T (61) 3-8544-1700 F (61) 3-8544-1793 E sales@kingfisher.com.au W http://www.kingfisherfiber.com