



The TREND VFF5 visual fault locator has been in continuous production for nearly 15 years with a proven track record of durability and performance. One of the most common questions asked about the VFF5 is how far it can be used for fiber continuity checking. The answer depends mostly on the user's environment. When viewed indoors or in a dark cabinet, the fiber can be much longer than if it's trying to be viewed outdoors. The name VFF5 comes from the estimate that in most applications the light can be viewed over 5km (3.1 miles).

The VFF5 uses a Class II laser which has a maximum output of 1mW (milliwatt). This makes it eye safe when viewed for up to ¼ second. In that short time a person would instinctively look away from the light if they accidentally looked directly into the beam.

Recently there have been a proliferation of inexpensive visual fault locators that claim to be visible over 10+km (6+ miles) of fiber. These VFLs can be found online through any number of sellers, though rarely from typical test equipment distributors. When the specifications are available, these high power VFLs are reporting outputs of 10-50mW or more which are Class IIIb devices.

10mW Pen Shape Fiber Optic Visual Fault Locator (VFL) with 2.5mm Universal Adapter (650nm, 10km, ST/FC/SC Connector)

The Pen Shape Visual Fault Locator (VFL) is a robust, cost-effective fiber optical cable test tool for locating faults within OTDR dead zones. As a visual fault identifier (VFI), it can quickly identify faults in fiber optic jumper cables, distribution frames, patch panels, and splice trays. Using bright red laser light of 650nm wavelength, the FVFL-110 locates faults visually by having the light pinpoint the exact location of the fault. **With output power up to 10mW, a 10km range of usage and metal housing, the visual fault locator is a versatile and cost-effective tool for fiber evaluation. The 2.5mm universal connector interface mates with many connector styles including SC/FC/ST without needing an adapter.**

Features

- Easy identification of fiber break, bend, fiber tracing, and fiber routing
- Small size, easy to field test. High-quality pen-type visual fault locator
- Mates with 2.5mm ferrules including ST, SC, FC
- 650nm visible laser diode can be operated in continuous or pulsed modes
- Mode button cycles between Continuous Wave (CW) and Pulsed (2Hz) modes
- Metal sandblasting with matte paint design, better hand feeling and more durable
- Endcap protects laser unit



Specification

Product Series	Visual Fault Locator (VFL)	Optcore Part Number	FVFL-110
Wavelength	650nm ± 20nm	Output Power	10mW
Distance	<10km	Laser safety rating	Class III B
Fiber compatibility	Multimode and Singlemode	Operation Mode	Pulsed (2Hz) and Continuous Wave (CW)
Connector	2.5mm universal connector, for FC/SC/ST connector	Dimension	175x26x26mm
Battery type	2 x AA	Battery Life	≥ 10 hours

Figure 1: Data sheet from a high power VFL



Reputable test equipment manufacturers like TREND Networks limit and test the output of their VFLs to 1mW to ensure they are eye safe. The chart below describes the various laser safety classes and the recommended precautions for each class.

ANSI and IEC laser classification Sub-class U.S. FDA laser classification	Class 1		Class 2		Class 3		Class 4
	Class 1	Class 1M	Class 2	Class 2M	Class 3R	Class 3B	Class 4
	Class I	No special FDA class	Class II	No special FDA class	Class IIIa (definition is different but results are similar)	Class IIIb	Class IV
Human-accessible laser power (for visible light)	For visible light, emits beam less than 0.39 milliwatts, or beam of any power is inside device and is not accessible during operation.		Emits visible beam of less than 1 milliwatt.		For visible light, emits beam between 1 and 4.99 milliwatts.	For visible light, emits beam between Class 3R limit (e.g. 5 milliwatts) and 499.9 milliwatts	For visible light, emits beam of 500 milliwatts (1/2 Watt) or more
Caution/warning indication	No special caution/warning indication		No special caution/warning indication		CAUTION	WARNING	DANGER
Label descriptive text		DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS	DO NOT STARE INTO BEAM	DO NOT STARE INTO BEAM OR EXPOSE USERS OF TELESCOPIC OPTICS	AVOID DIRECT EYE EXPOSURE	AVOID EXPOSURE TO BEAM	AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
EYE AND SKIN HAZARDS							
Eye hazard for intraocular exposure (having a direct or reflected beam enter the eye)	Safe, even for long-term intentional viewing. For visible light, usually applies when the laser is enclosed inside a device (ex: CD or DVD player) with no human access to laser light.	Safe for unaided eye exposure. May be hazardous if viewed with optical instruments such as binoculars or eye loupe.	Safe for unintentional exposure less than 1/4 second. Do not stare into beam.	Safe for unintentional (< 1/4 sec) unaided eye exposure. May be hazardous if viewed with optical instruments such as binoculars or eye loupe.	Unintentional or accidental exposure to direct or reflected beam has a low risk. Avoid intentional exposure to direct or reflected beam.	Eye hazard; avoid exposure to direct or reflected beam.	Severe eye hazard; avoid exposure to direct or reflected beam.
Maximum or typical Nominal Ocular Hazard Distance (for 1 milliradian beam, exposure time less than 1/4 second)	Not an eye hazard -- does not apply	Consult an LSO as described in the Technical Note below	NOHD of 0.99 mW beam: 23 ft (7 m)	Consult an LSO as described in the Technical Note below	NOHD of 4.99 mW beam: 52 ft (16 m)	NOHD of 499.9 mW beam: 520 ft (160 m)	NOHD of 1000 mW (1 Watt) beam: 733 ft (224 m). NOHD of 10 W beam: 2320 ft (710 m)
Eye hazard for diffuse reflection exposure (looking at the laser "dot" scattered off a surface)	None	Consult an LSO	None	Consult an LSO	None	Generally safe. Avoid staring at the laser "dot" on a surface for many seconds at close range.	To avoid injury, do not stare at laser "dot" on a surface. The light is too bright if you see a sustained afterimage, lasting more than about 10 seconds.
Skin burn hazard	None	Consult an LSO	None	Consult an LSO	None	Can heat skin if beam is held long enough on skin at close range	Can instantly burn skin. Avoid direct exposure to the beam.
Materials burn hazard	None	Consult an LSO	None	Consult an LSO	None	Can burn materials if beam is held long enough on substance at close range	Can instantly burn materials. Avoid direct exposure to the beam, for materials susceptible to burning.

Figure 2: Laser safety classes

Notice that other than not staring into the beam, there are no precautions or warning labels needed with a Class II laser that is used in the VFF5.

The example high power VFL shown in Figure 1 is Class IIIb in which a Warning label is required, the user should avoid exposure to the beam and that when for direct or reflected exposure is an eye hazard. Failure to comply with these safety recommendations can result in permanent eye damage. This power level can even heat the skin and burn materials at close ranges.

For these reasons TREND Networks limits the power of our visual fault locator to 1mW so that it is eye safe in all applications.