

# CLEANING PROCEDURE

## FIBER OPTIC CONNECTORS DIA-CLEAN DIGITAL VIDEO MICROSCOPE



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## 1. GENERAL

Proper performance of a fibre optic connection is strongly dependant on the cleanliness of the mated ferrules. DIAMOND connectors are thoroughly inspected and cleaned prior to shipment.

Before placing a connector in service, it is however advisable to inspect it before. After repeated matings, however, or when degraded performance is observed, it may become necessary to clean the individual ferrules and mating sleeve. The following instructions outline proper cleaning and inspection procedures to help ensure optimal connector performance.

User Manual

Refer to the Viavi user manual included with the microscope.

## 2. HANDLING INSTRUCTION

### OLP-82P microscope specifications

#### General technical (Typical at 25°C)

Weight:	1.2 lb (1.4 lb for PCM version)
Dimensions OLP-82P (HxWxD):	20.83 x 152.4 x 6.35 (8.2 x 60 x 2.5 in)
Video Display:	3.5 in color LCD, 4:3 ratio
Keypad:	11+2 dome-buttons membrane panels 4 LED indicators
Connector:	USB 2.0 (2 x host, Type A; 1 x device, Micro-B)
Power source:	AC adaptor, battery (Alkaline or rechargeable Li ion), USB port

#### Run Time

Rechargeable Li ion=(minimum):	8 hours
Alkaline:	5 hours
Power mode:	Active, Auto-off
Auto-shutoff time:	User programmable

#### Charge Time

AC adaptor:	8 hours
USB port:	16 hours
Power source:	USB port
Certification:	CE, IEC/EN61326
Low Mag Field-of-View (FOV):	Horizontal: 740 µm Vertical: 550 µm
High Mag Field-of-View (FOC):	Horizontal: 370 µm Vertical: 275 µm

### FBP probe specifications

Dimensions:	140mm x 46mm x 43mm
Weight:	110g
Low Mag Field-of-View (FOV):	Horizontal: 740 µm Vertical: 550 µm
High Mag Field-of-View (FOC):	Horizontal: 370 µm Vertical: 275 µm
Live Image:	640 x 480 fps
Connector:	USB 2.0 (backwards compatible to USB 1.1)
Cord length:	183 cm (6ft)
Camera sensor:	2560 x 1920, 1/2.5-in CMOS
Particle Size Detection:	<1 µm
Light Source:	Blue LED, 100,000 + hour life
Lighting technique:	Coaxial
Power Source:	USB Port
Certification:	CE

### Attention and Maintenance

- ▶ To avoid damage, don't disassemble and assemble the instrument or change the innercircuit and parts
- ▶ Prevent liquid getting into the battery house
- ▶ Protect it from violent shock
- ▶ With proper care this microscope will provide years of sale, reliable service

### Warranty

This product is warranted to be free of all defects in material and workmanship for a period of 12 months from the date of delivery. The warranty does not apply to any instrument that has become worn, defective, damaged, or broken due to abuse, misuse, tampering, or unauthorized repairs. Under this warranty, we will repair or replace, without charge to the purchaser, but we reserve the exclusive right to determinate the cause of failure and advice if a warranty replacement or repair can be made. If it should become necessary to return the instrument for service during or beyond the warranty period, the sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit.

### 3. SAFETY PRECAUTIONS TO AVOID BATTERY LEAKAGE IN THE VFL

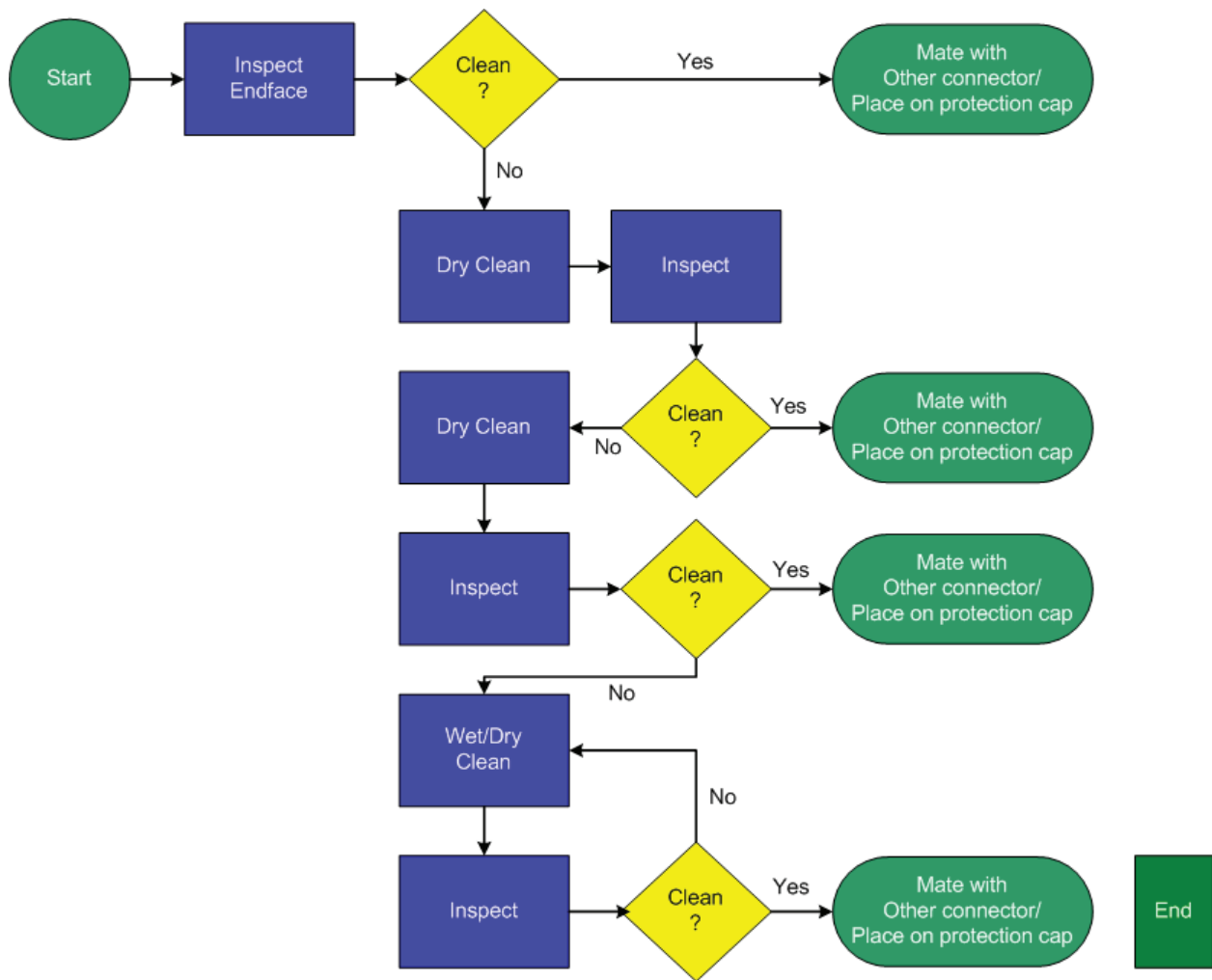
- Do not leave the VFL containing batteries in places where the temperature may rise significantly.
- When the batteries are not in use for a long period of time, be sure to remove them from the VFL and store them in a cool place.
- Do not use batteries after the expiring date.

DIAMOND SA assumes no responsibility in case fluid acid escapes from the batteries causing the microscope not to function any longer.

## 4. FIBRE OPTIC CLEANING AND TROUBLESHOOTING PROCESS FLOW

Fibre Optic Cleaning and Troubleshooting

Process Flow



If after repeated cleaning the connector still does not meet the acceptance criteria, the connector must be replaced or re-polishing.

Re-polishing should only be performed by trained personnel using Diamond polishing machines and should only be performed on-site when absolutely necessary. Always keep the protective cap on the connector when not in use.

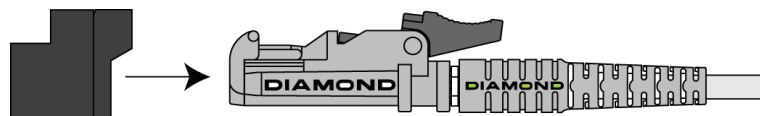
## 5. CLEANING THE CONNECTOR FRONT FACE USING EASY CLEAN (DRY)

Cleaning process

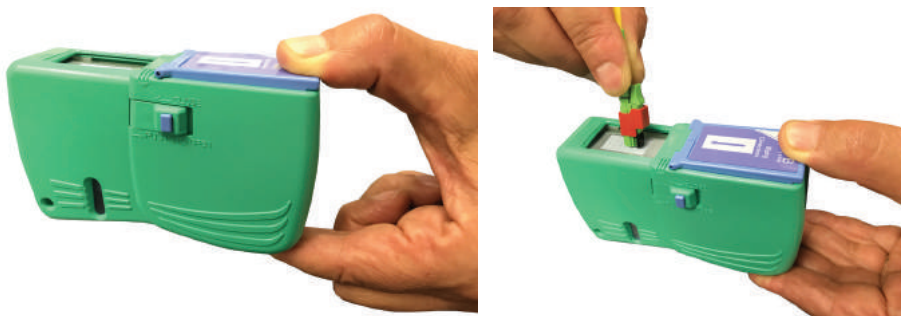
1. By pushing down the feeding lever a new part of the cleaning tape moves forward and the metal shutter on the upper side of the cleaning cartridge is opened.
2. Now the connector front face is set onto the upper end of the groove and is carefully moved along on the cleaning tape. Please observe the direction of the arrow on the cartridge.
3. Close the protective shutter by releasing the feeding lever.
4. To inspect the ferrule endface, insert the ferrule into the opening on the inspection microscope. Set the focus so that the observed features can be compared with the example on page 10. Also refer to the samples on page 11-12.
5. If the criteria is met, the connector may be returned to service.
6. If the criteria is not met, repeat the cleaning procedure. If after repeated cleaning the connector still does not meet the criteria, the connector must be replaced or returned for repolishing. Repolishing should only be performed by trained personnel and should only be performed on-site when absolutely necessary. Keep the connectors protective cap mounted at all times when not in use.

NB: E-2000™ with spring loaded protection cap

Insert the connector in the service adapter, part no. 1019034, and proceed cleaning according to the above description.



### 5.1 Ferrule end face dry cleaning procedure for unmated connectors



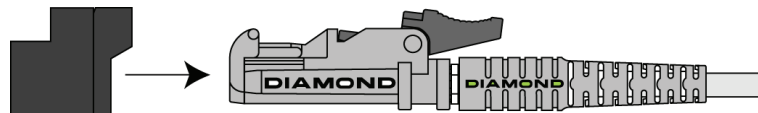
- A) When the lever is pushed down, the metal protection cover automatically slides back and a new section of tape appears, ready for use.
- B) Keep the lever down, hold the ferrule front face onto the tape and slide along the entire tape in the indicated direction .
- C) Attention: the same part of the tape may be used once.
- D) Close the metal protection cover by releasing the lever.
- E) Inspect the connector referring to the according "Acceptance Criteria" document. If the connector face is not clean repeat the procedure.
- F) If the result is not positive even after repeated cleaning, try with the wet procedure.

## 6. CLEANING AND INSPECTING FERRULE ENDFACE USING A ISOPROPYL ALCOHOL (WET)

1. Fold a precision wipe, disposable wipe three times to create a cleaning surface cushioned with eight layers of folded material. Be careful not to touch the cleaning surface.
2. Moisten a small area of the cleaning surface with solvent, ensuring that a portion of the surface remains dry.
3. Press the ferrule endface lightly onto the moistened portion of the cleaning surface.
4. With light pressure, rotate the ferrule and move it back and forth over the moistened surface.
5. Immediately repeat this motion on a dry portion of the cleaning surface to remove any traces of solvent.
6. To inspect the ferrule endface, insert the ferrule into the opening on the inspection microscope. Set the focus so that the observed features can be compared with the example on page 7. Also refer to the samples on page 8-9.
7. If the criteria is met, the connector may be returned to service.
8. If the criteria is not met, repeat the cleaning procedure. If after repeated cleaning the connector still does not meet the criteria, the connector must be replaced or returned for repolishing. Repolishing should only be performed by trained personnel and should only be performed on-site when absolutely necessary. Keep the connectors protective cap mounted at all times when not in use.

NB: E-2000™ with spring loaded protection cap

Insert the connector in the service adapter, part no. 1019034, and proceed cleaning according to the above description.



### 6.1 Ferrule end face wet cleaning procedure for unmated connectors

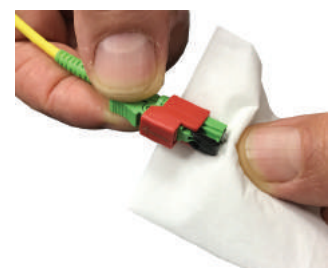
- A) Fold a new a lint-free, disposable wipe three times to obtain a cleaning surface cushioned with eight layers of folded material.



- B) Moisten a small area of the cleaning surface with some 99% isopropyl alcohol, ensuring that a small area of the surface remains dry.



- C) Moisten the connector with the tissue and leave it to act briefly. Rotate the ferrule on the moistened tissue with an axial movement several times applying a light pressure.







- E) Rotate the ferrule on dry zone of the tissue with an axial movement several times applying a very slight pressure.
- F) Inspect the connector referring to the according .Acceptance Criteria. document. If the connector face is not clean repeat the procedure.
- G) If the result is not positive even after repeated cleaning, we recommend re-polishing or replacing the connector.
- H) Re-polishing may be carried out only by specially trained staff and with the appropriate tools and devices.

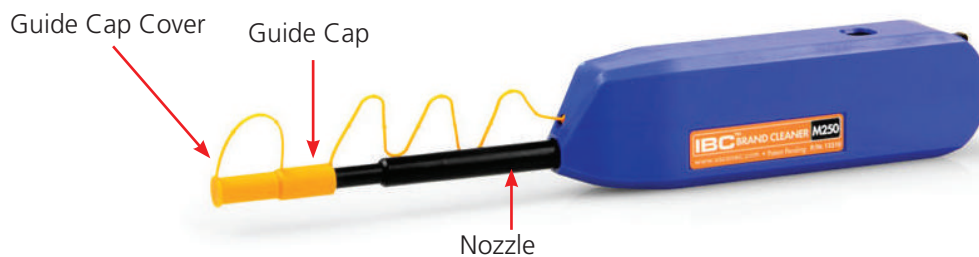
## 7. CLEANING THE CONNECTOR FRONT FACE USING “IBC CLEANER”

The IBC™ Brand Cleaning Tools are dry cloth cleaning tools specially designed to clean single fiber connectors residing in an adapter, faceplate or bulkhead. The dust cap of the cleaning tool acts as an adapter for cleaning unmated connectors. The IBC™ Brand Cleaning Tools for simplex connections are simple to use and highly effective at removing oil and dust contaminants that can negatively impact optical performance.

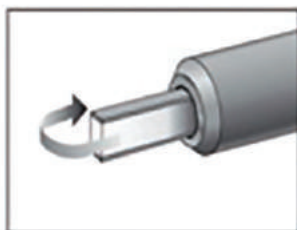
The IBC Brand Cleaner 1.25 mm is a device designed for cleaning the ferrule end faces of F3000 connectors with PC and APC polishes.



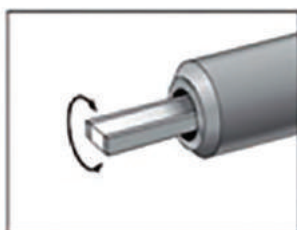
The IBC Brand Cleaner 2.5 mm is a device designed for cleaning the ferrule end faces of E-2000, SC, ST and FC connectors with PC and APC polishes.



### Technique



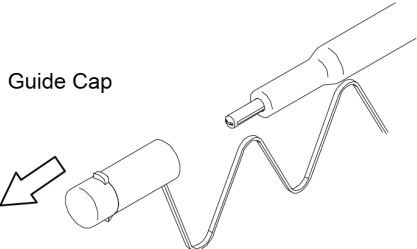
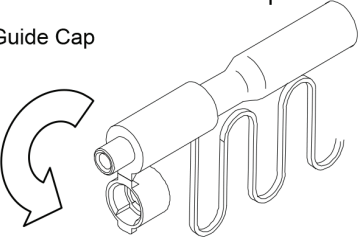
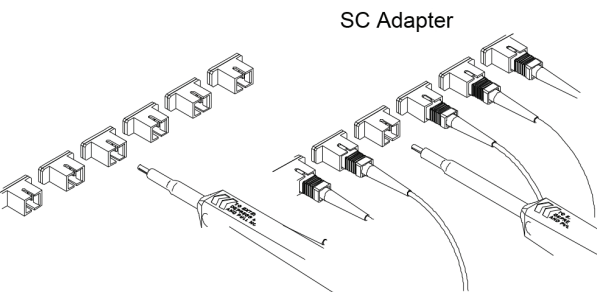
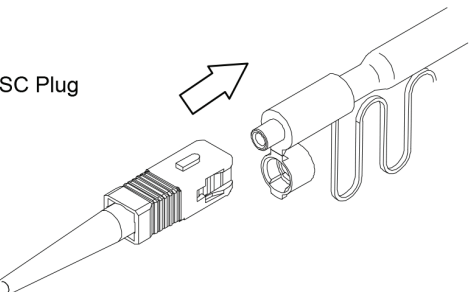
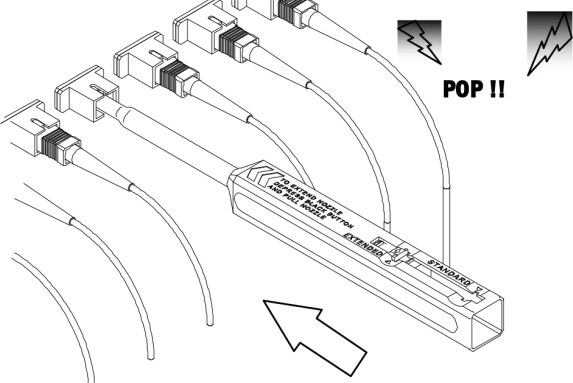
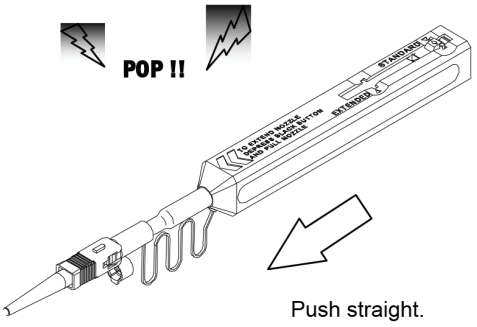
Pre-treatment with the first click



Clean using the second click

- ▶ Simple pushing motion to engage tool
- ▶ Audible CLICK to alert the operator when tools is fully engaged

## 5. Applications

Connector inside adapter	Connector plugs alone
<p>1. Remove Guide Cap from the device.</p>  <p>Guide Cap</p>	<p>1. Open the Cover on the Guide Cap.</p>  <p>Guide Cap</p> <p>Cover</p>
<p>2. Insert tip of cleaner into SC Adapter</p>  <p>SC Adapter</p> <p><b>Standard</b>                      <b>Extended Mode</b></p> <p><b>Note:</b> This drawing shows only SC, but this product can clean ST, FC and E-2000.</p>	<p>2. Insert SC connector into the Guide Cap.</p>  <p>SC Plug</p> <p><b>Note:</b> This drawing shows only SC, but this product can clean ST, FC and E-2000.</p>
<p>3. Push the Outer Shell to start cleaning the SC connector end face. A “pop” sound indicates end of cleaning process. Close the cover after use.</p>  <p><b>POP !!</b></p> <p>Be careful not to slant the IBC Brand Cleaner while inserting into the adapter.</p> <p>Do not overly exert force during insertion as this may cause damage to both the connector and the IBC Brand Cleaner.</p> <p>If pushing Outer Shell is inhibited, remove IBC Brand Cleaner from adapter and ensure that there is no sizable debris inhibiting the cleaning process.</p>	<p>3. Push the Outer Shell to start cleaning the SC connector end face. A “pop” sound indicates end of cleaning process. Close the cover after use.</p>  <p><b>POP !!</b></p> <p>Push straight.</p> <p>Be careful not to slant SC connector while inserting into the Guide cap.</p> <p>Do not overly exert force during insertion as this may cause damage to both the connector and the IBC Brand Cleaner.</p> <p>If pushing Outer Shell is inhibited, remove IBC Brand Cleaner from adapter and ensure that there is no sizable debris inhibiting the cleaning process.</p>

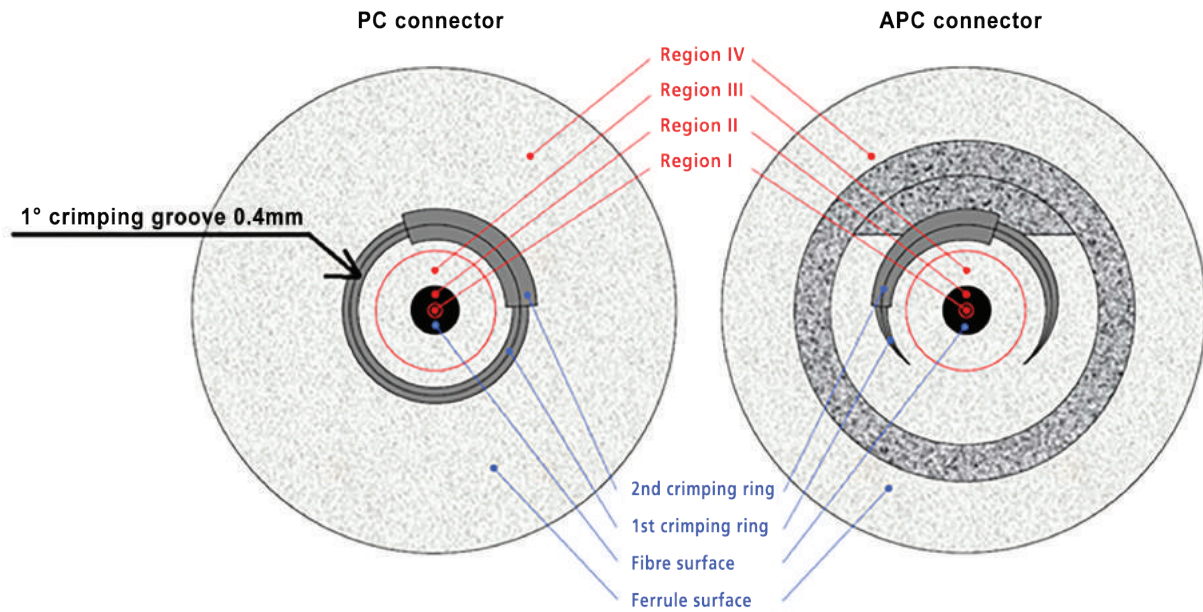
With the IBC cleaner 80% of cases the cleaning is carried out without problems, there is a 20% of cases where cleaning with the IBC Cleaner won't meet the criteria if so try to pull out the plug from the mating adapter and clean it wet (see CLEANING AND INSPECTING FERRULE ENDFACE USING A ISOPROPYL ALCOHOL) If after repeated cleaning the connector still does not meet the acceptance criteria, the connector must be replaced or re-polishing.

### **Applications**

- ▶ Fiber network panels and assemblies
- ▶ Cleans harsh environment 2.5mm or 1.25mm based connector systems
- ▶ Cable assembly production facility
- ▶ Testing laboratories
- ▶ Servers, switches, routers and interfaces with E-2000, SC, FC, ST and F-3000

Do NOT use this cleaner when the cloth is empty. This may can cause damage to the connector.  
The dust cap should be closed at all times when device is not in use.

## 8. ZONE DEFINITION



Ferrule end face regions of a PC connector (left) and an APC connector (right) Magnification ca. 80x.

### Region 1+2

Contamination is strictly prohibited from Fibre Core Area defined as 0um to 120um.

### Region 3

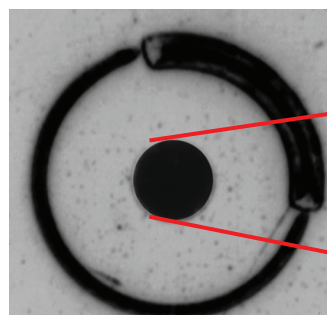
Contamination larger than 3um prohibited from Contact Area defined as 120um to 250um.

### Region 4

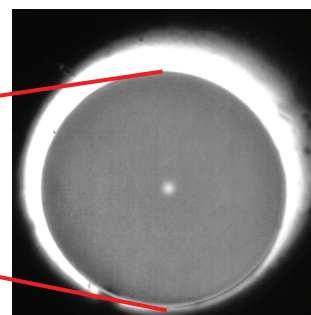
Contamination larger than 30um prohibited from Ferrule Area.

Two visual inspections are necessary

1. Contact area
2. Fibre



Contact area



Fibre

## 9. EXAMPLES

### VIAVI MICROSCOPE OLP-82P




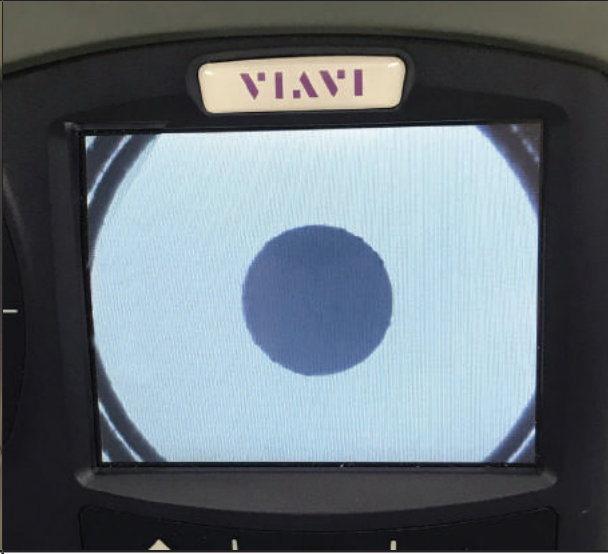
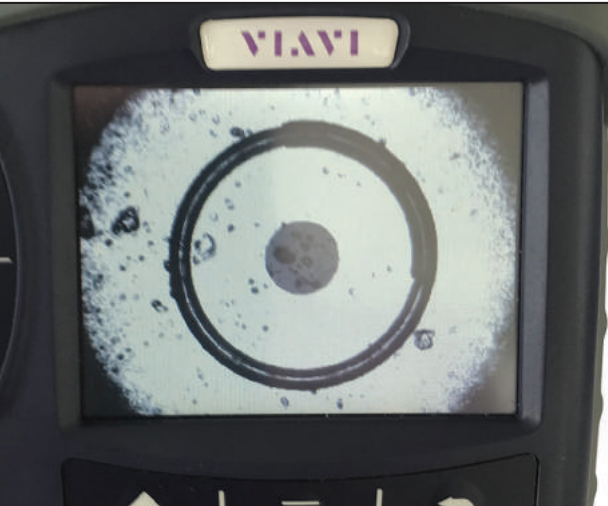
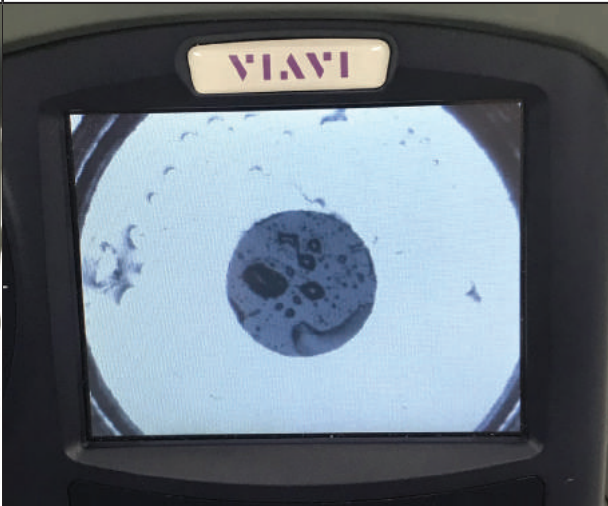

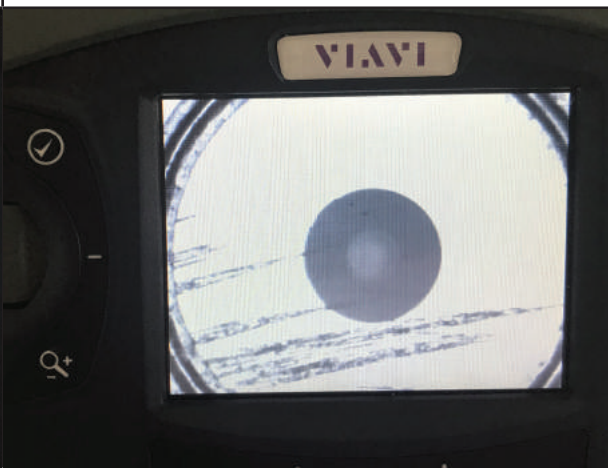
#### DISCLAIMER

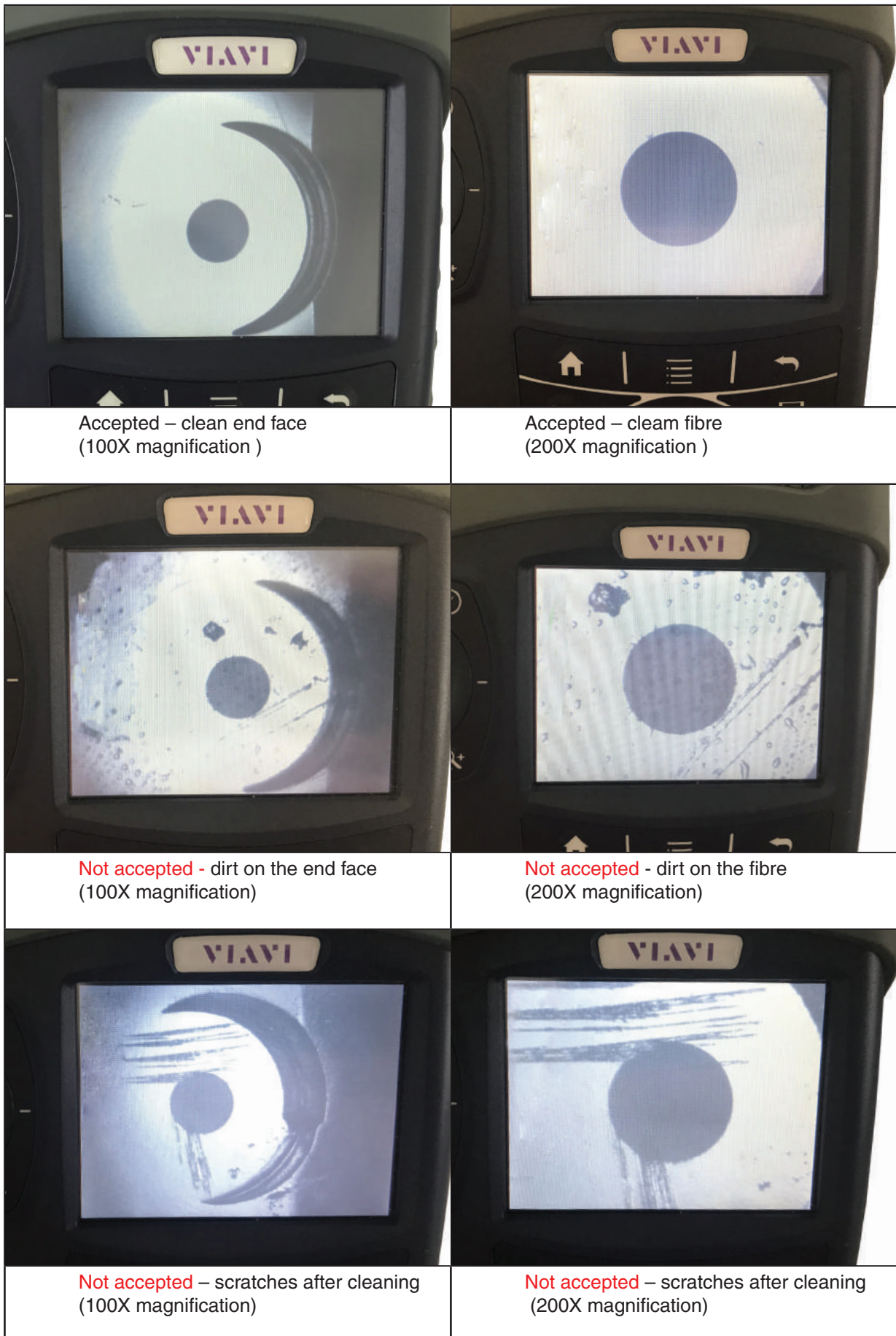
Diamond provides connectors respecting the criteria below, but with mating and de-mating the optical surface will degrade visually while the optical performance (IL, RL) remain normally intact. Visual Inspection is NOT a valid return criteria.

The reliable assessment of the power transmission and/or the reflection performances in an optical link between two fibers should be performed through direct measurements of IL and RL since those are the values that the end user will actually observe once the system is deployed.

Visual inspection for surface imperfections is an acceptable back-up solution in case direct measurements cannot be performed. However, it can only indicate the suitability of a connection for use but cannot guarantee that IL and RL specifications are going to be met. In this context, visual inspection should be considered only as a qualitative assessment of the connector's performance.

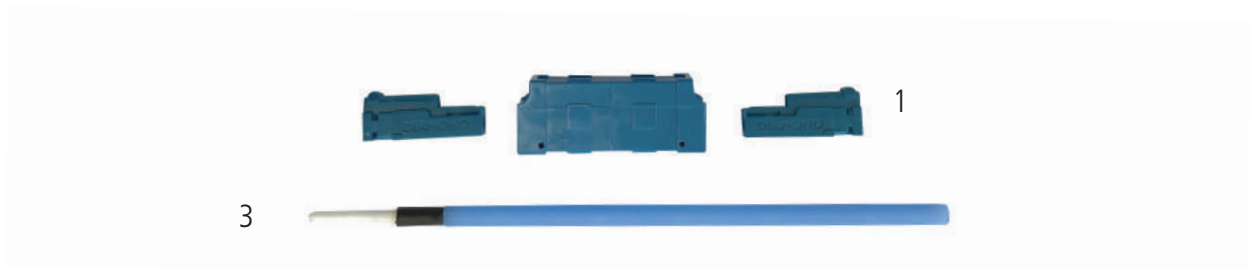
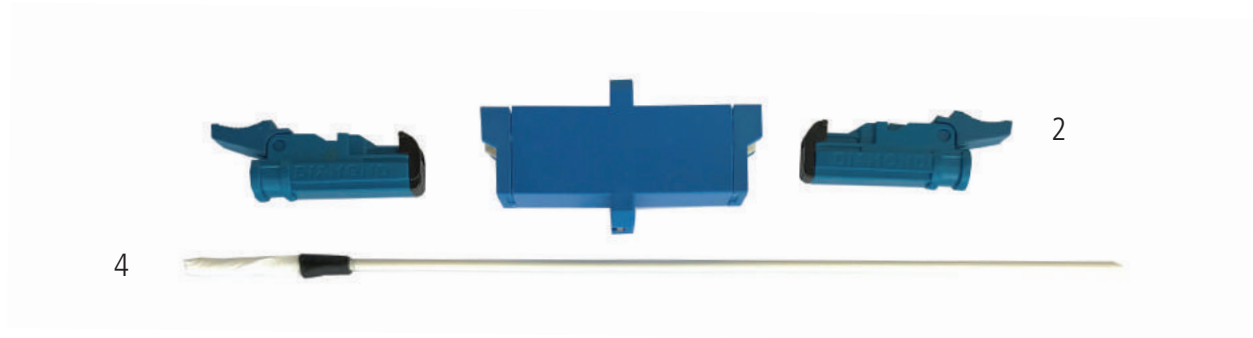
9.1 VISUAL INSPECTION EXAMPLES OF PC SM 9 & MM 50/62,5  $\mu\text{m}$  FIBRE ON OLP-82P VIAVI MICROSCOPE

	
<p>Accepted – clean end face (100X magnification )</p>	<p>Accepted – clean fibre (200X magnification )</p>
	
<p><b>Not accepted</b> - dirt on the end face (100X magnification)</p>	<p><b>Not accepted</b> - dirt on the fibre (200X magnification)</p>
	
<p><b>Not accepted</b> – scratches after cleaning (100X magnification)</p>	<p><b>Not accepted</b> – scratches after cleaning (200X magnification)</p>

9.2 VISUAL INSPECTION EXAMPLES OF APC SM 9  $\mu\text{m}$  FIBRE ON OLP-82P VIAVI MICROSCOPE


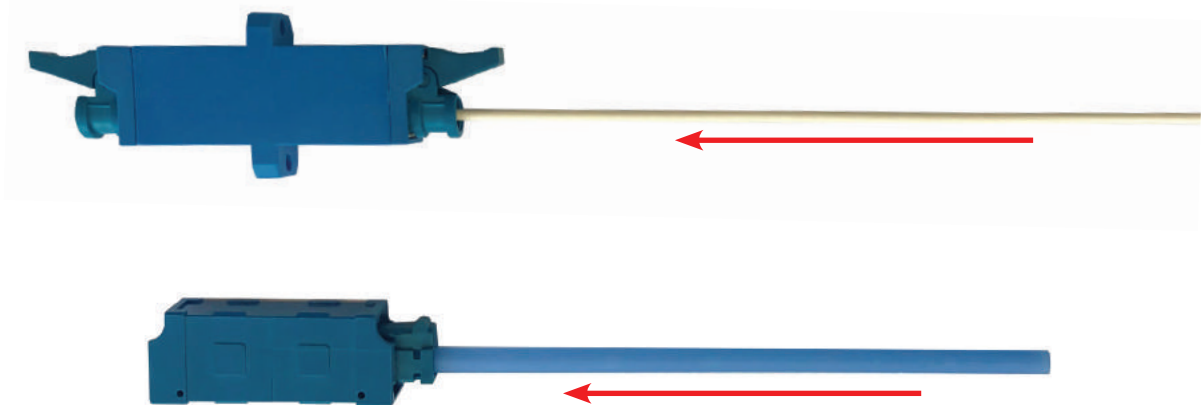


## 10. CLEANING THE MATING ADAPTER SLEEVE



No.	Denomination	P.N
1	F-3000 body for cleaning	1066909
2	E-2000 body for cleaning	1031687
3	Cletop cleaning sticks L=150mm ø1.25 - 5pz	1020857
4	Cletop cleaning sticks L=150mm ø2.5 - 5pz	1065369

2. Clean the mating sleeve by pushing the nylon brush back and forth through the sleeve several times and follow with a blast from the miniature bellows or the compressed air canister.



3. Cleaning of E-2000™/F3000™ mating adapters.  
Introduce 2 E-2000™/F3000™ blank-bodies into the mating adapters, so that the way to alignment sleeve becomes free. Clean the adapter by using the correct cleaning stick, 1.25/2.5mm and by following upper description from 1 to 5. Remove the blank-bodies after cleaning.
4. Clean the outer parts of the mating adapter with a lint-free wipe.
5. Keep the protective caps mounted when not in use.
6. Damaged mating adapters should be replaced.

## 11. INSPECTION

The ML3S Visual Fault Locator is a hand-held, lightweight, visible laser light source used to identify tight bends or crimps, damaged components, bad splices fiber breaks and also to isolate high losses and faults in fibers cables. By emitting a bright beam of red light into a fiber, breaks can be seen as a glowing red light. The ML3S can be used with either singlemode or multimode cable sections. Model ML3S is recommended for applications in cable length up to 6-8 km.



Characteristics:

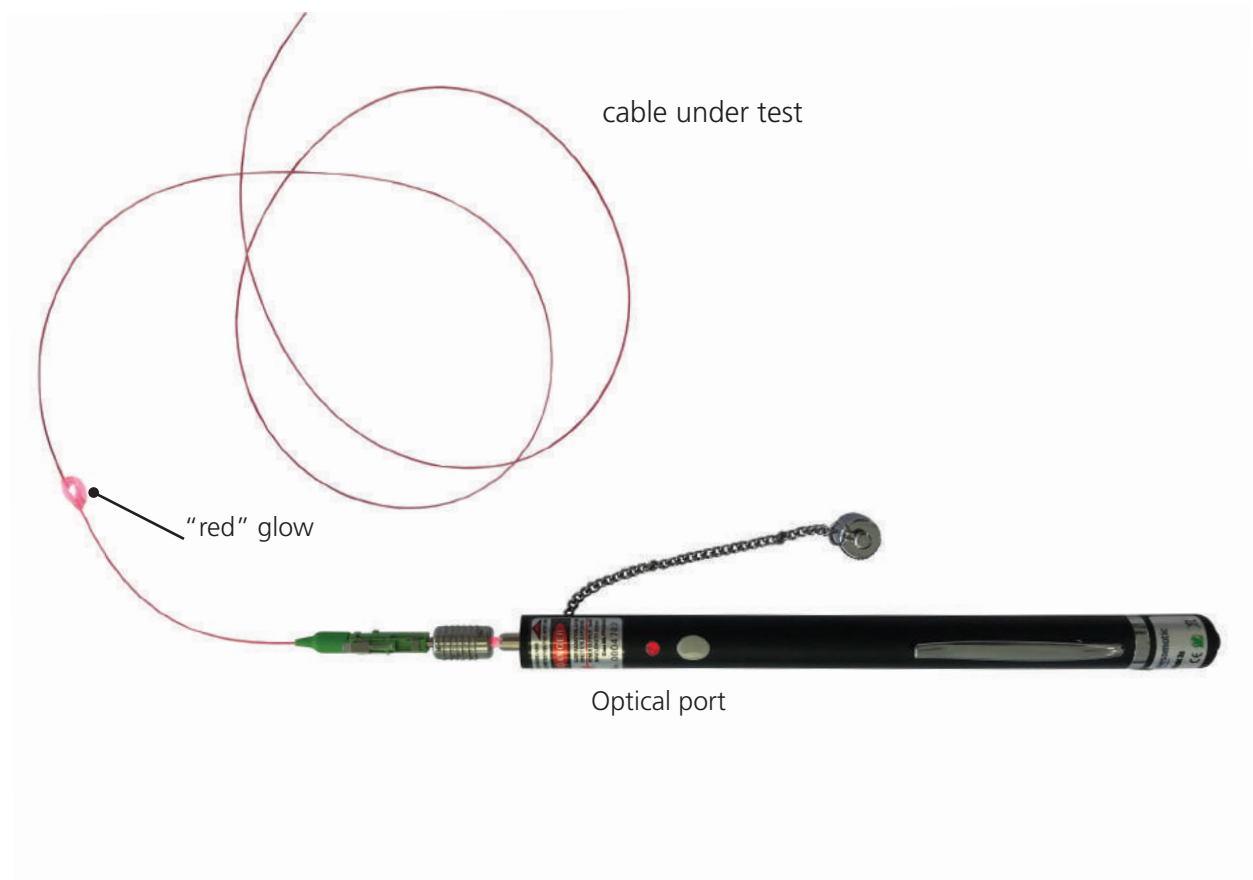
- ▶ For Singlemode and Multi-Mode Fiber
- ▶ Small and easily manageable, robust
- ▶ Universal style optical port connector 2,5 mm.
- ▶ Universal 1.25mm Adapter as option
- ▶ Operating Distance: approximately 8 km

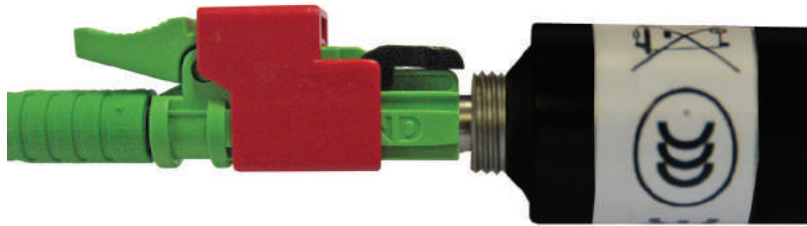
Technical Characteristics:

- ▶ Output power: 3 mW; -9 dBm in the SM 9/125 $\mu$  Fiber
- ▶ Emittertype Laser: (FDA and IEC Class III)
- ▶ Wavelength: 650 nm (visible)
- ▶ Port connector: 2,5 mm Universal fix or 1,25mm Adapter optional
- ▶ Modulation: 2 Hz or continuous
- ▶ Weight: 60 g without batteries
- ▶ Dimension: 170x15 mm
- ▶ Electric power supply: 2 AA Battery for approx. 5 hours operating
- ▶ Operating temperature: -10° to +50° C
- ▶ Storage Temperature: -20° to +80°C
- ▶ Humidity: 0 to 95% (non-condensing)

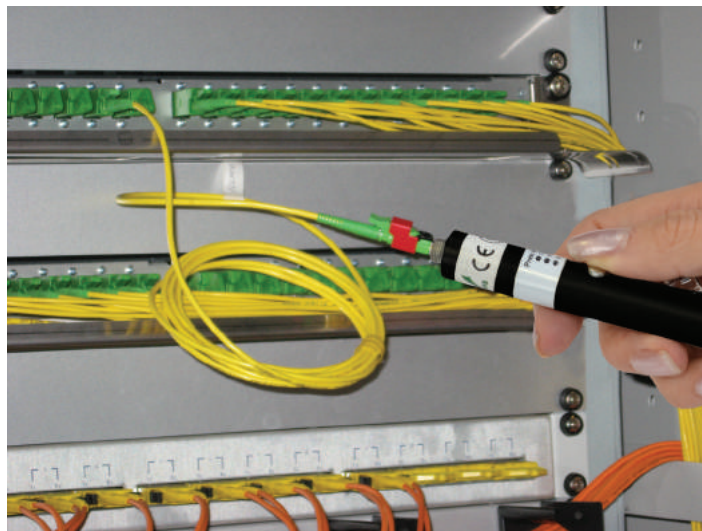
Use the following procedure for fault locate detection:

1. Remove the dust cap covering the unit's OPTICAL PORT.
2. Connect a cable to the OPTICAL PORT connector.
3. Push the switch to the to the desired function:
  - Turns the LASER off.
  - Turns the LASER on with a continuous laser output. The red Laser Active LED remains on.
  - Turns the LASER on with a pulsing laser output. (The red Laser Active LED pulses at a 2 Hz rate).
4. Visually examine the fiber components, locating the faults by a red glow (see Figure 1).
5. Turn unit off.
6. Remove cable from port and replace cap.





- Example of application with a rack using an E-2000™ patchcord:



### **Maintenance**

The dust cap is provided for the optical output port, and must be in place when the unit is not in use to prevent foreign material from entering the port.

### **Battery Replacement**




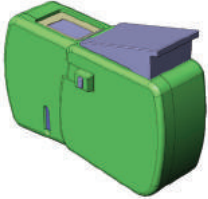
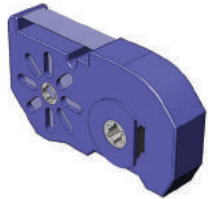
To replace the AA battery, remove the screw at the end of the VFL. After new battery has been replaced, close and screw the cover.




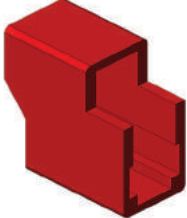



### **Safety**


The ML3 Visual Fault Locator is a Class III laser product. As such it presents no hazard to users who view the output when using proper operating procedures. It is recommended that users should not stare directly into the beam.

The ML3 has a safety feature which automatically switches OFF the red light avoiding eye injuries. This occurs after an impact such as falling out one's hands, violent shaking or brusquely leaning it on a bench.

## 12. ACCESSORIES/CONSUMABLES

Denomination	Part no.	Image
Digital video inspection microscope kit	1081582	
P5000i Digital inspection probe, including universal 2.5mm (PC) tip for free connector inspection. Further tips may be ordered. Laptop excluded.	1074601	
Universal adapter Ø1.25mm	1070129	
Universal adapter Ø2.5mm	1070134	
For the complete adapter list for free connector and in adapter inspection, see our website: <a href="https://www.diamond-fo.com/products/product-single/video-inspection/">https://www.diamond-fo.com/products/product-single/video-inspection/</a> or contact Diamond SA		
Cletop Cassette Cleaner Type B	1038981	
Replacement reel for Cletop Cassette Cleaner Type B	1038970	

Denomination	Part no.	Image
Cletop cleaning sticks L=150mm ø2.5 5pz	1065369	
Cletop cleaning sticks L=150mm ø1.25 5pz	1020857	
Service adapter F-3000™	1019483	
Service adapter E-2000™	1019034	
Assembled E-2000 body for cleaning	1031687	
F-3000 cleaning body	1066909	
Alcohol dispenser 150ml without alcohol	1070135	

Denomination	Part no.	Image
Spender box with fibre optic lint-free wipes 10x10 cm 100 pcs.	1070137	
Fibre optic lint-free wipes to refill spender box 100 pcs.	1070130	
Adapter Ø2.5 mm, Ø1.25 mm Visual fault locator	1067799	
Visual fault locator ML3	1071628	