

# Handling SFP Modules and Optical Cables

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## USER GUIDE

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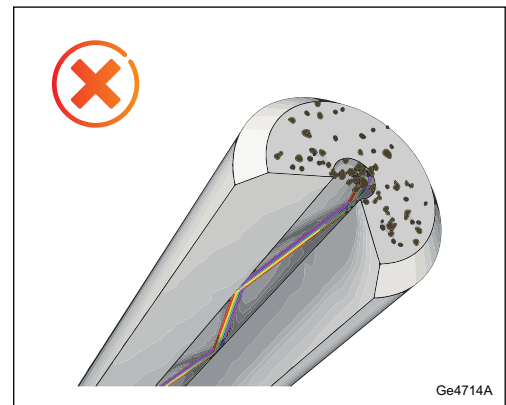
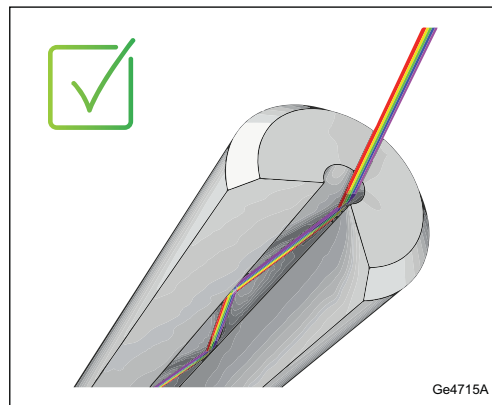
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# 1 Optical Connections

Optical cables and connectors are sensitive. Dirty interfaces of optical connectors and SFP modules can cause major disturbances in the network. Any contamination, even small invisible particles such as dust and grease, can cause major component or system failures.

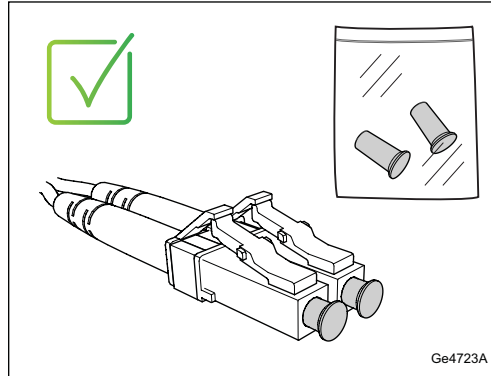


## 1.1 Generic Guidelines

To ensure full network performance follow the guidelines about how to handle SFP module and optical cables.

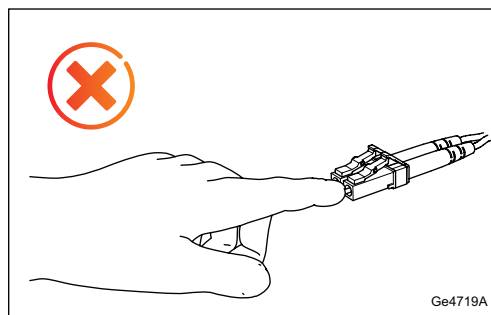


## Handle SFP Modules, Optical Connectors, and Optical Interfaces

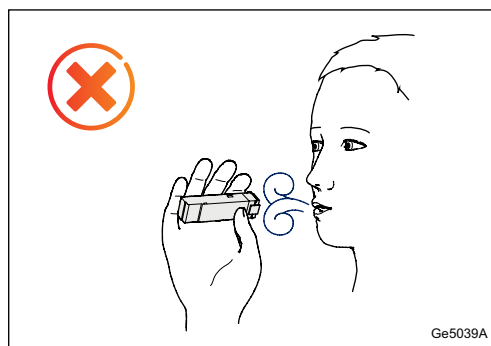


Always keep the protective dust caps on unplugged optical connectors and SFP Modules. Remove the dust caps just before cleaning and connecting.

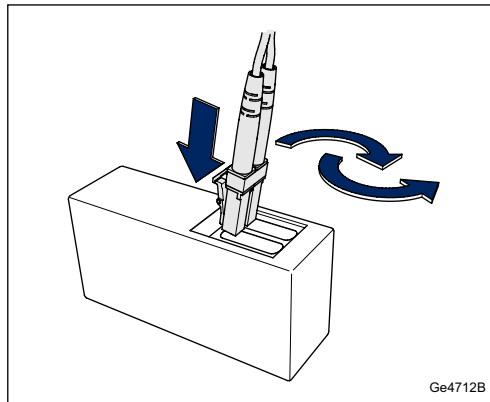
Store the dust caps in a clean sealed container or plastic bag.



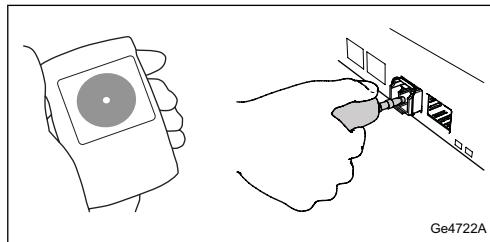
Never touch the end face of the optical connectors or let it come in contact with other surfaces.



Never blow on SFP modules or optical connectors.



Always clean optical connectors (ferrule) before connecting to the SFP module, even if the connector is new and unused. Use a cleaning cassette or ferrule end face cleaner. Follow the instructions given by the manufacturer of the equipment.



Only clean optical receptacles, like SFP modules and bulk-head adapters, if needed. Inspect optical receptacles before cleaning.

### Store and Transport SFP Modules

- Keep the SFP modules in its original packaging as long as possible.
- Always keep the protective dust caps on unplugged optical connectors and SFP Modules. Remove the dust caps just before cleaning and connecting.

### Handle Optical Cables

- Handle the optical cables with care, they are sensitive for bends and twists. Modern optical cables are more resistant to outside forces but correct handling is still important.
- Strap the optical cable properly to the structure or use protective cable runs. Do not tighten the straps to hard, ensure that the cable jacket is not deformed.
- Use a lifting sling when hoisting optical cables in masts and high buildings.
- Avoid disconnection of optical cables. When disconnection is necessary, protect the SFP modules and optical connectors with clean dust caps. Always clean the optical connector on the cable before reconnecting.

## 2 Clean Optical Interfaces

This section gives an overview of methods that can be used for cleaning optical interfaces. Independent of preferred method, always follow the detailed instructions given by the manufacturer of the cleaning equipment or tool.

### 2.1 Clean Optical Connectors

The preferred way of cleaning optical cable connectors is to use a tool with dry materials.

The connectors end face is scrubbed over a clean, soft, and optical certified material.

Examples of cleaning equipment are:

- Cleaning cassettes (recommended).
- Dry lint free wipes.
- Ferrule end-face cleaner.
- Special cards.

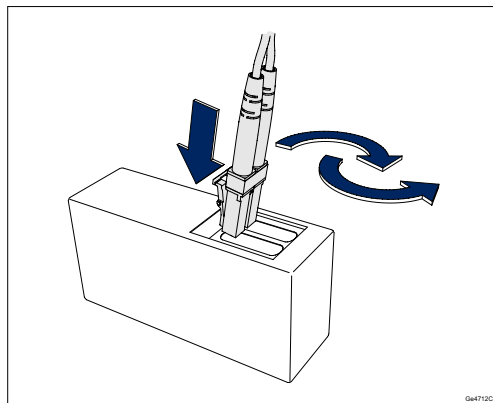


Figure 1 Example of Optical Connector Cleaning (Cleaning Cassette)

### 2.2 Clean Optical SFP Modules and Adapters

It is assumed that new SFP modules are clean at the delivery if the dust caps have been on at all time. Therefore cleaning of optical female receptacles (like SFP modules, optical bulk-heads adapters, or optical adapters) are only performed if the interface is dirty.





However, it is always recommended that the SFP modules are inspected with a proper tool to ensure that the interface is clean before taking the network into operation.

Do the following when cleaning SFP modules:

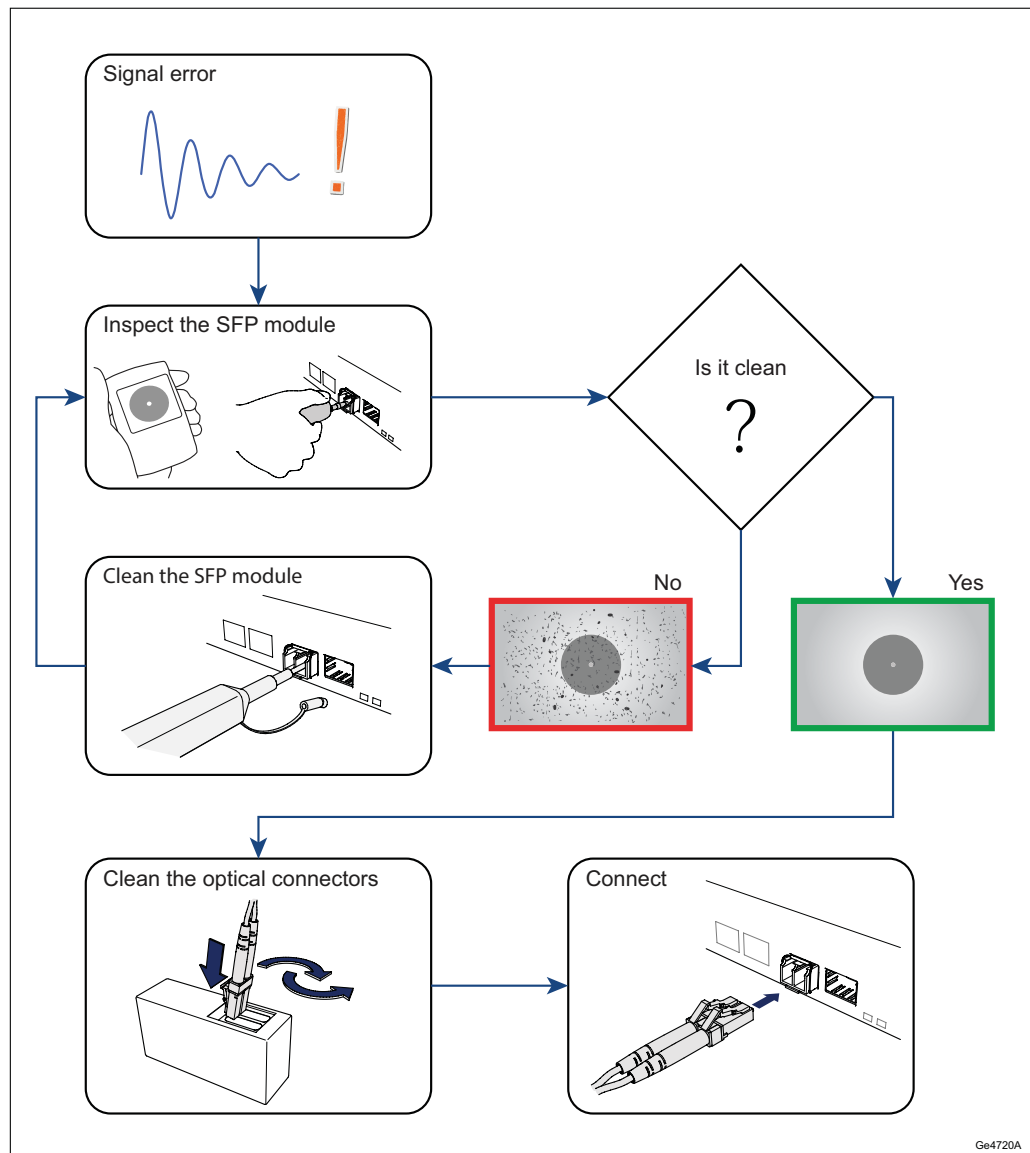


Figure 2 Flow chart, Inspecting and Cleaning SFP Modules

1. If a fault is suspected, then inspect the SFP module for dirt with applicable equipment.
2. Clean the SFP Module if needed.

Only clean dirty SFP modules, because of the risk of permanent damage on the optical interface.

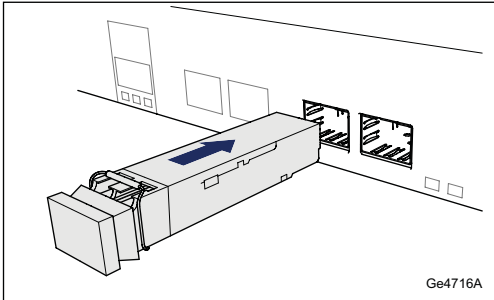
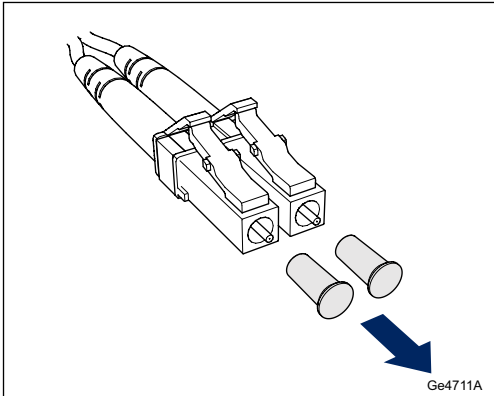
3. Inspect the SFP module once again before reconnecting to the network.
4. If, needed clean the SFP module once again.

## 3 Connect Optical Cables

This section describes how to clean and connect optical cables.

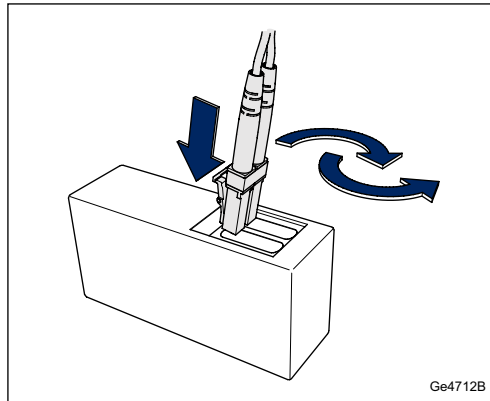
**Note:** Always follow the instructions supplied with the cleaning tool and follow the recommendations given by the cable manufacturer.

Do the following, in one flow, just before connecting the optical cables.

1.  Insert the SFP modules in the unit and ensure that it is fastened correctly.  
Keep the protective dust caps on.  
Ge4716A
2.  Remove the protective dust caps from the optical cable connectors (end-face ferrules).  
Ge4711A

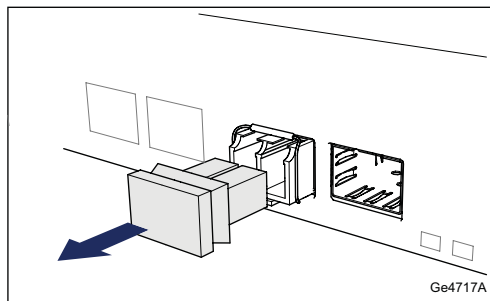


3.



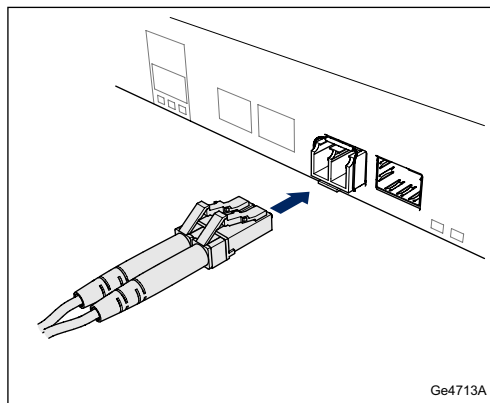
Clean the optical cable connector (ferrule end-face) with an appropriate tool or equipment (for example a cleaning cassette).

4.



Remove the protective dust cap from the SFP module or optical adapter (bulkhead adapter).

5.



Connect the optical cable to the SFP module.



## 4 Troubleshoot

If the optical link is indicated as faulty, the following steps are done to localize the fault.

Common faults are:

- Dirty optical connectors and SFP modules.
- Sharp bends or kinks on the optical cable.
- Incompatible equipments, for example different types of SFP modules.

Inspect the connections in the optical link, one by one, start with the one that is easiest to access.

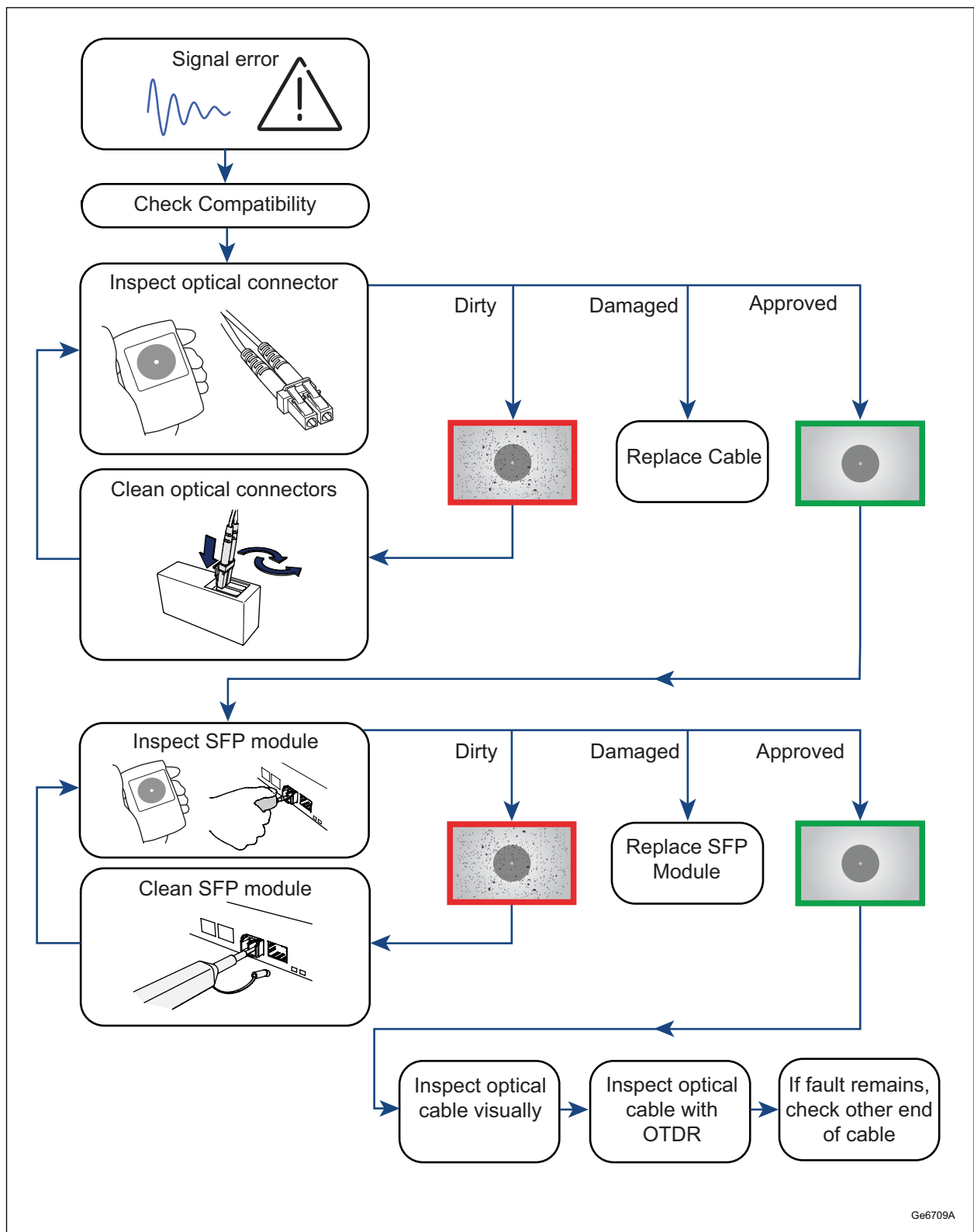


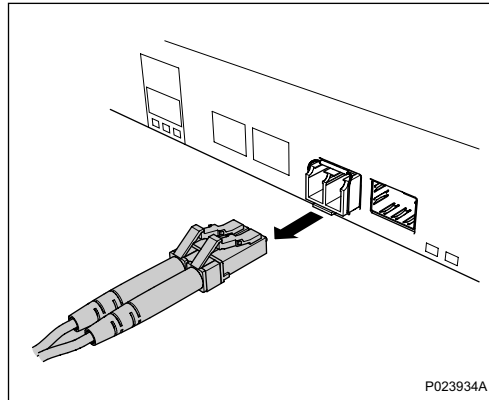
Figure 3 Troubleshoot Optical Link



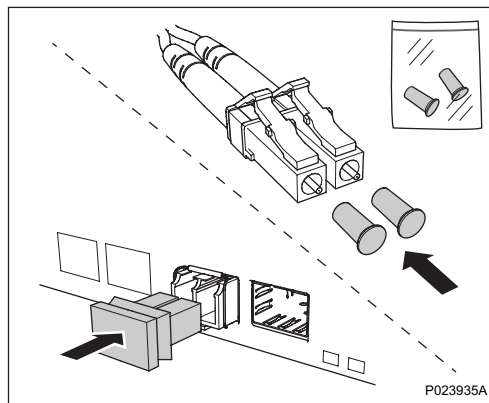
To troubleshoot the optical link, do the following:

1. Ensure that the SFP modules are compatible with each other and with the installed equipment. Refer to the document *SFP Module Selector Guide*, 3/006 51-HRB 105 601.

2.



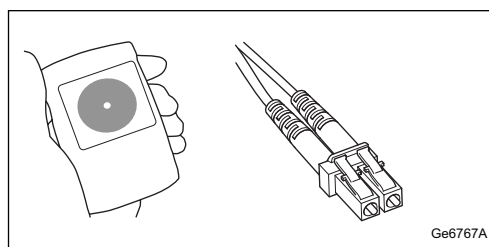
Disconnect the optical cable from the SFP module.



Protect the optical connectors and SFP modules with clean dust caps.

### Inspect Optical Connectors

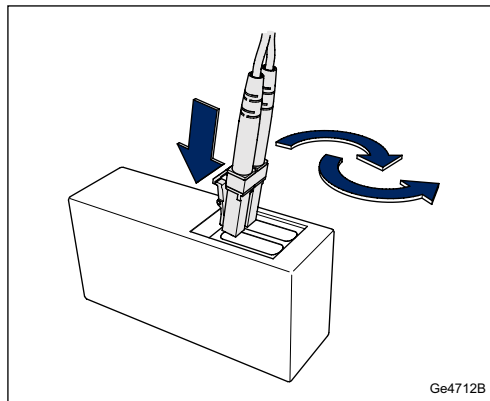
3.



Inspect the optical connectors on the optical cables with an optical inspection tool.



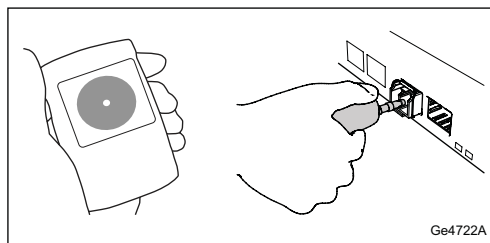
4. If needed, clean dirty connectors.  
Refer to Section 2.1 on page 4.



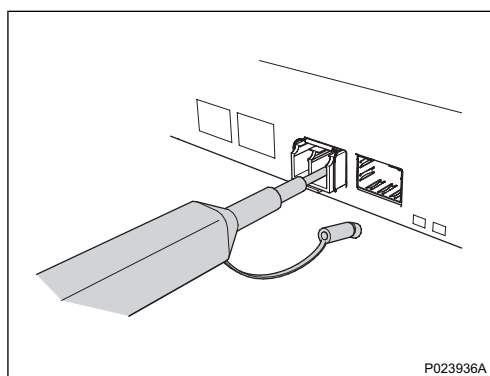
5. Inspect the optical connectors again with an optical inspection tool.
- If the connector is clean, then inspect the SFP module.
  - If the connector is still dirty, then clean it again.
  - If the connector is hard to clean, or if the surface is damaged, then the optical cable must be replaced.

### Inspect SFP Modules

6. Inspect the SFP module with an optical inspection tool.



7. If needed, clean dirty SFP modules.  
Refer to Section 2.2 on page 4.



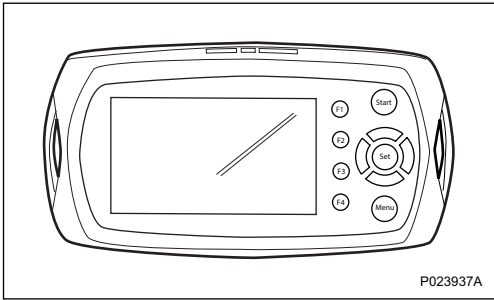
8. Inspect the SFP module again with an optical inspection tool.
- If the SFP module is clean, then inspect the optical cable.



- If the SFP module is still dirty, then clean it again.
- If the SFP module is hard to clean, or if the surface is damaged, then the SFP module must be replaced.

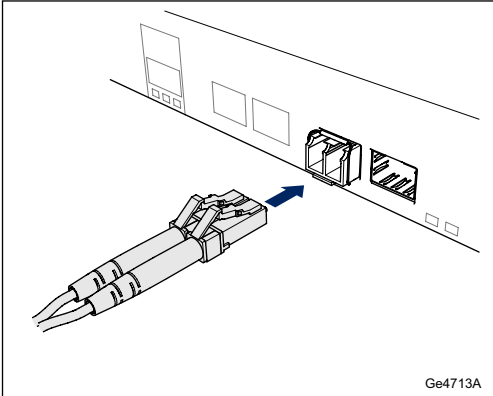
### Inspect Optical Cable

9. If possible, visual inspect the optical cables for sharp bends or damages on the cable.

10.  Use an Optical Time Domain Reflectometer (OTDR) to check for reflections and loss in the optical cable.

11. If the fault is a sharp bend or a kink in the cables, try to correct it.

### Reconnect

12.  Reconnect the SFP module and the optical cable.  
Refer to Section 3 on page 6.  
Clean any connectors that has been disconnected before reconnecting.

### Repeat

13. If the fault indication remains, repeat the previous steps with the next connector.