Service Cable Assembly Installation Instructions

Overview

Purpose

This document provides instructions for installing an optical fiber service cable assembly into a Cisco optical node, optical hub, or similar equipment housing or enclosure.

Audience

These installation instructions are intended for all cable system operators or installers who need to install a service cable assembly into Cisco cable system transmission equipment.

Qualified Personnel

Only appropriately qualified and skilled service personnel should attempt to install, operate, maintain, and service this product.

WARNING:

Allow only qualified and skilled personnel to install, operate, maintain, and service this product. Otherwise, personal injury or equipment damage may occur.

Service Cable Assembly Components

This service cable assembly consists of the following components:

- 2-fiber to 8-fiber outside plant cable
- 2-piece metal entry fitting
- Heatshrink tubing
- Hex key (Allen wrench)
- Installation Instructions

Required Tools and Materials

The following tools and materials are required for this installation procedure:

- 2 adjustable wrenches, each with 1-inch opening, for entry fitting
- Torque wrench, capable of settings up to 15 ft-lb (20.3 Nm)
- Heat gun and power supply, to apply heatshrink tubing
- Cleaning materials to clean the endface of the fiber optic connectors
- Installation and Operation Guide for the Cisco product into which the service cable is being installed

Installation Procedure

The following installation procedure applies to enclosures in aerial, pedestal, and underground vault environments.

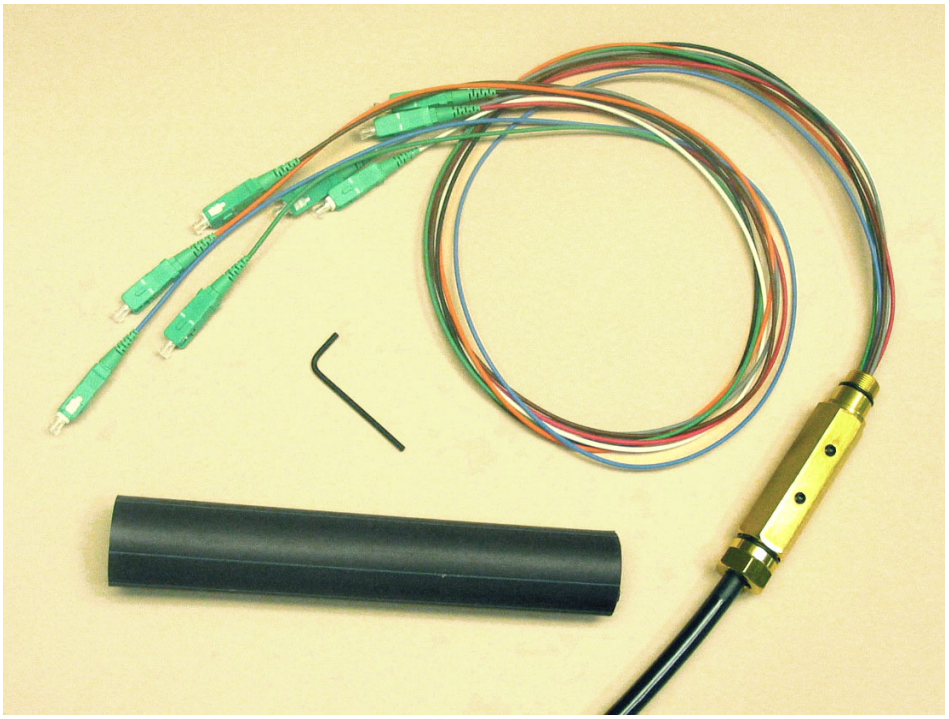
Installing the Service Cable Assembly

Perform the following steps to install the service cable.

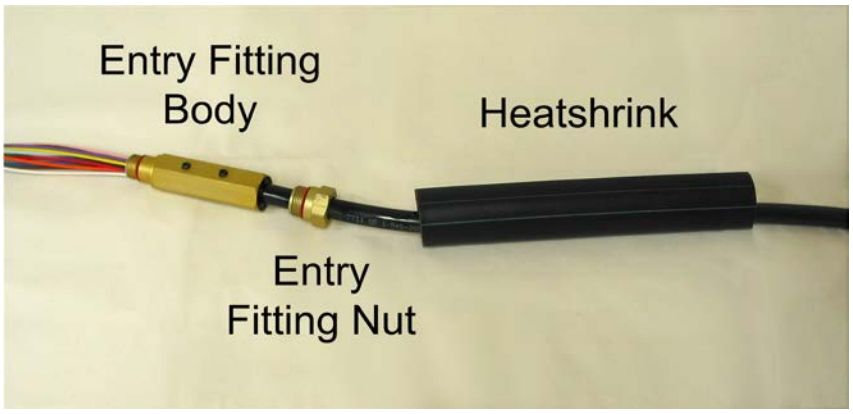
CAUTION:

Optical fibers are sensitive to bending and pulling. Do not force, kink, or tightly bend any optical fibers.

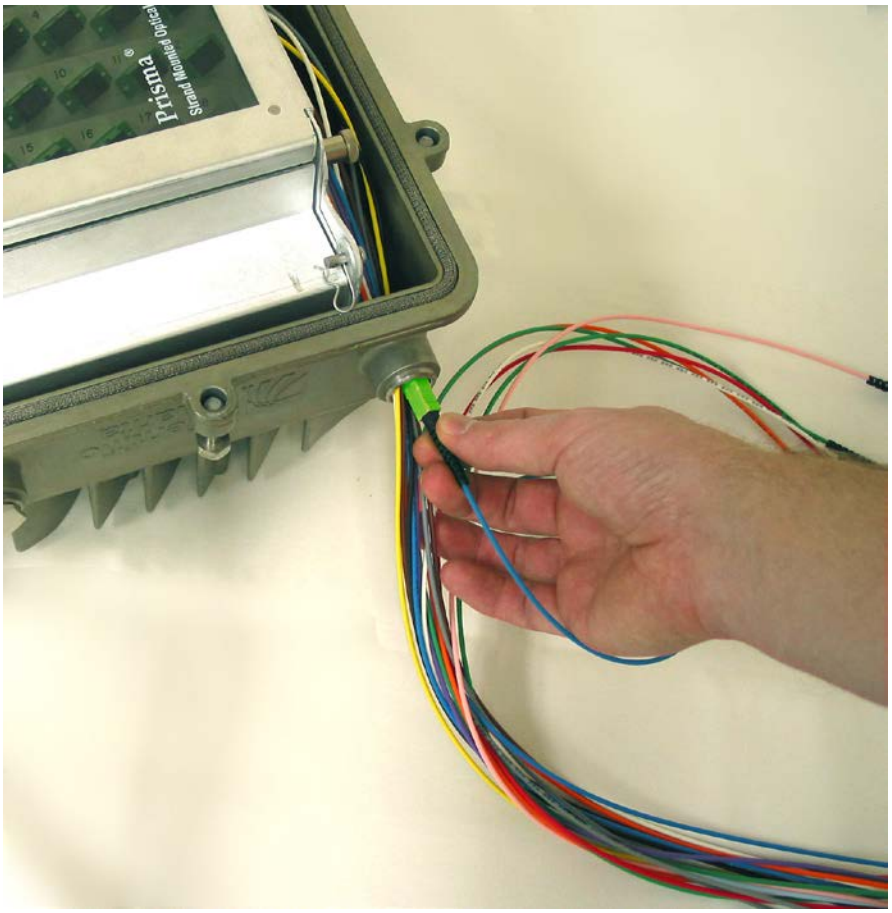
1. Open the node or hub enclosure according to the Cisco Installation and Operation Guide for the product.
2. Carefully remove the service cable assembly from its protective packaging.



3 Locate the heatshrink tubing and carefully feed the connectors and colored fibers through the heatshrink tubing. Then slide the heatshrink tubing over the entry fitting and down the cable a few feet.



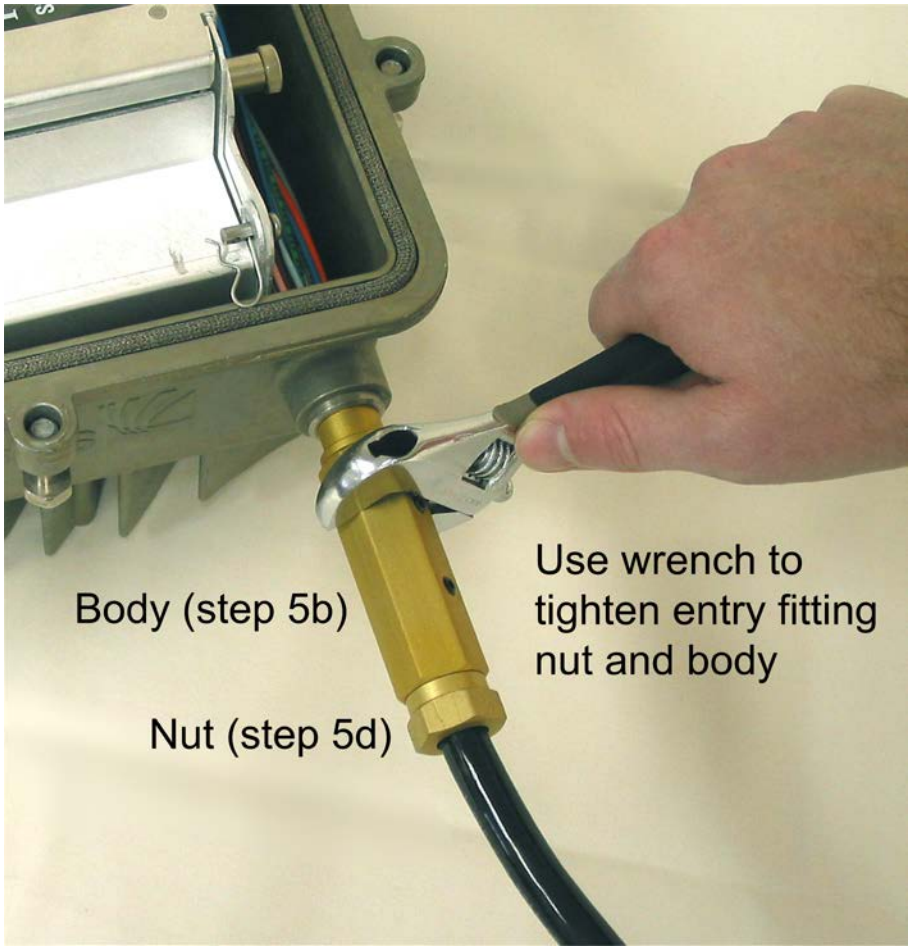
4 With the fiber optic connector's protective endcaps still in place, insert one connector at a time through the threaded opening of the enclosure. Take care not to bend or kink the fibers. Carefully pull the connectors and colored fibers into the enclosure, bringing the entry fitting up to the enclosure opening.



5 Attach the fitting to the enclosure as follows:

a To avoid spinning the cable and the bundle of individual fibers, loosen the entry fitting nut from the entry fitting body and loosen the two set screws with the hex key provided.

b By hand, thread the entry fitting body into the threaded opening of the enclosure. Screw by hand and then tighten with a wrench. Do not overtighten; use 15 ft-lbs maximum.



c Make sure that the cable is pushed all the way into the entry fitting (toward the enclosure), and then tighten the set screws with the hex key provided.

d By hand, thread the entry fitting nut into the entry fitting body, and then tighten with the wrench. Do not overtighten; use 15 ft-lbs maximum.

e Confirm that the entry fitting and service cable assembly are now securely fastened to the enclosure.

6 Connect and route the optical fibers according to the Cisco Installation and Operation Guide for the product.

7 Close the node or hub enclosure according to the Cisco Installation and Operation Guide for the product.

Installing the Protective Heatshrink Tubing

You are now ready to apply the protective heatshrink to the entry fitting.

WARNING:

Do not aim the heat gun at your skin. Do not apply more heat than is needed to make the heatshrink tubing shrink and adhere to the entry fitting and cable.

1 Bring the heatshrink over the entry fitting until it touches the enclosure. Apply heat with a heat gun starting at the end closest to the enclosure. Apply heat evenly around the heatshrink tubing until that end shrinks onto the entry fitting, with no gap between the heatshrink tubing and the enclosure.

2 Once the enclosure end is secure, wait 1-2 minutes, then continue heating the heatshrink tubing evenly around the tubing. Work your way down to the cable end of the heatshrink.

CAUTION:

Do not apply more heat than is needed to make the heatshrink tubing shrink and adhere to the entry fitting and cable. Excessive heat at the cable may damage the outer jacket of the cable.

3 Before handling the heatshrink tubing or moving the enclosure, allow a few minutes for the heatshrink to cool.

Removal Procedure

This section provides service cable removal instructions in the event of equipment damage or a requirement to reconfigure the network.

Removing the Service Cable Assembly

Perform the following steps to remove the service cable.

1. Open the enclosure per the Cisco Installation and Operation Guide for the product.
2. Remove any fiber retention hardware, and then disconnect the fiber optic connectors.
3. Carefully slice the heatshrink along its entire length with a sharp knife or razor. Make sure that you do not cut into the cable's outer jacket. Remove and discard the heatshrink.
4. With one wrench on the entry fitting, loosen the entry fitting nut with a second wrench.
5. With a hex key, loosen the two set screws on the entry fitting.
6. With a wrench, loosen the entry fitting body from the enclosure. Once the fitting is free of the enclosure, carefully remove the connectors and optical fiber from the enclosure.
7. Confirm that the service cable is now free of the enclosure.

Care and Cleaning of Optical Connectors

CAUTION:

Proper operation of this equipment requires clean optical fibers. Dirty fibers will adversely affect performance. Proper cleaning is imperative.

The proper procedure for cleaning optical connectors depends on the connector type. The following describes general instructions for fiber optic cleaning. Use your company's established procedures, if any, but also consider the following.

Cleaning fiber optic connectors can help prevent interconnect problems and aid system performance. When optical connectors are disconnected or reconnected, the fiber surface can become dirty or scratched, reducing system performance.

Inspect connectors prior to mating, clean as needed, and then remove all residue. Inspect connectors after cleaning to confirm that they are clean and undamaged.

Recommended Equipment

- CLETOP or OPTIPOP ferrule cleaner (for specific connector type)
- Compressed air (also called “canned air”)
- Lint-free wipes moistened with optical-grade (99%) isopropyl alcohol
- Bulkhead swabs (for specific connector type)
- Optical connector scope with appropriate adaptor

Tips for Optimal Fiber Optic Connector Performance

- Do not connect or disconnect optical connectors with optical power present.
- Always use compressed air before cleaning the fiber optic connectors and when cleaning connector end caps.
- Always install or leave end caps on connectors when they are not in use.
- If you have any degraded signal problems, clean the fiber optic connector.
- Advance a clean portion of the ferrule cleaner reel for each cleaning.
- Turn off optical power before making or breaking optical connections to avoid microscopic damage to fiber mating surfaces.

To Clean Optical Connectors

WARNING:

- **Avoid personal injury! Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.**
- **Avoid personal injury! The laser light source on this equipment emits invisible laser radiation. Avoid direct exposure to the laser light source.**
- **Avoid personal injury! Viewing the laser output with optical instruments (such as eye loupes, magnifiers, or microscopes) may pose an eye hazard.**

- Connect or disconnect fiber *only* when equipment is OFF or in Service mode.
- Do not apply power to this equipment if the fiber is unmated or unterminated.
- Do not look into an unmated fiber or at any mirror-like surface that could reflect light that is emitted from an unterminated fiber.
- Do not view an activated fiber with optical instruments such as eye loupes, magnifiers, or microscopes.
- Use safety-approved optical fiber cable to maintain compliance with applicable laser safety requirements.

Connector cleanliness is crucially important for optimum results in fiber optic communications links. Even the smallest amount of foreign material can make it impossible to obtain the expected insertion and return losses. This can reduce the range of the equipment, shorten its expected service life, and possibly prevent the link from initializing at all.

New equipment is supplied with clean optical connectors and bulkheads. Clean these connectors and bulkheads in the field *only* if you observe and can verify an optical output problem.

Connectors

Most fiber optic connectors are of the physical contact (PC) type. PC type connectors are designed to touch their mating connector to prevent air gaps, which cause reflections. For optimum performance, *all* dirt must be removed.

WARNING:

Avoid damage to your eyes! Do not look into any optical connector while the system is active. Even if the unit is off, there may still be hazardous optical levels present.

Note: Read the above warning before performing cleaning procedures.

Cleaning Connectors

It is important that all external jumper connectors be cleaned before inserting them into the optical module. Follow these steps to clean fiber optic connectors that will be connected to the optical module:

Important: Before you begin, remove optical power from the module or ensure that optical power has been removed.

1. Inspect the connector through an optical connector scope. If the connector is damaged, e.g., scratched, burned, etc., replace the jumper.
2. If the connector is dirty but otherwise undamaged, clean the connector as follows:
   - **a** Make several swipes across the face of the connector with the appropriate ferrule cleaner. This will remove dust and some films.
   - **b** Listen for a slight "squeak" typically generated during this process, indicating a clean connector.
   - **c** Inspect the connector again through the scope to confirm that it is clean.
3. If a second inspection indicates that further cleaning is needed:
   - **a** Use 99% isopropyl alcohol and a lint-free wipe to clean the connector.
   - **b** Use the appropriate ferrule cleaner again to remove any film left over from the alcohol.
   - **c** Inspect the connector again through the scope and confirm that it is clean.
4. If necessary, repeat steps 3a-3c until the connector is clean.

Verifying Equipment Operation

Perform circuit turn-up. If the equipment does not come up, i.e., fails verification or indicates a reflection problem, clean the connectors again.

For Information

If You Have Questions

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.

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