What kind of connectors are typically used for optical cables



Overview

This article explores the wide range of fiber optic connector types, from legacy SC and ST to modern MPO/MTP and VSFF designs.

Key Takeaways

The most common optical cable connectors are SC, LC, ST, FC, and MPO/MTP, each designed for specific applications and performance requirements. Overview of Common Connector TypesSC (Subscriber Connector): SC connectors are square-shaped with a push-pull coupling mechanism. They are widely used in FTTH deployments, data centers, and GPON networks where low return loss is important.

SC/APC variants are preferred for applications requiring minimal signal reflection, such as RF video transmission and high-speed broadband networks.

L

C (Lucent Connector): LC connectors are a miniaturized version of SC connectors with a 1. 25mm ferrule. They use a latch mechanism similar to an RJ45 plug, making them ideal for high-density applications in modern data centers.

L

C connectors support both simplex and duplex configurations and are commonly used for single-mode and multimode fibers.

S

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T (Straight Tip): ST connectors feature a bayonet-style twist-lock mechanism. They are primarily used in legacy systems, industrial networks, and some military applications. While less common in modern networks, ST connectors are valued for their robust mechanical connection.

F

C (Ferrule Connector): FC connectors have a threaded coupling, providing a secure connection in high-vibration environments such as factories, railway networks, and aviation systems. They are often used in single-mode fiber applications where stability and low insertion loss are critical. MPO/MTP (Multi-Fiber Push-On / Multi-Fiber Termination Push-On): MPO/MTP connectors are designed for high-density fiber applications, supporting multiple fibers in a single connector.

They are widely used in data centers and enterprise networks for parallel optics and high-speed transmission, enabling efficient deployment of 40G, 100G, and higher-speed links. Expanded Beam Connectors: These connectors use a lens to expand the light beam, reducing sensitivity to dust and contamination. They are more expensive and slightly higher in insertion loss but are ideal for rugged environments, frequent mating cycles, and outdoor or military applications.

Key ConsiderationsSingle-mode vs Multimode: Connector choice depends on fiber type; SC, LC, and FC are common for single-mode, while LC and ST are often used for multimode fibers. Simplex vs Duplex: Simplex connectors carry a single fiber, while duplex connectors handle two fibers for bidirectional communication. Polish Types: UPC (Ultra Physical Contact) and APC (Angled Physical Contact) affect return loss and reflection, with APC preferred for high-performance applications.

Durability and Environment: Industrial or outdoor deployments may require ruggedized or expanded beam connectors to withstand harsh conditions. Choosing the right connector ensures low insertion loss, high return loss, and reliable performance in the intended network environment.

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