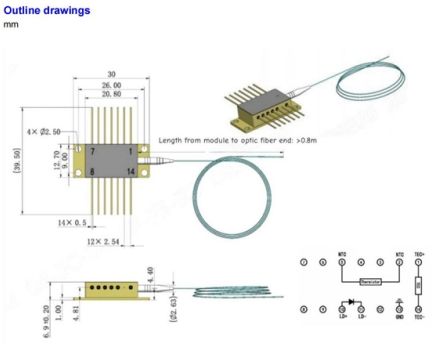
Fiber Optic Collimator Characteristic Parameter Table



Overview

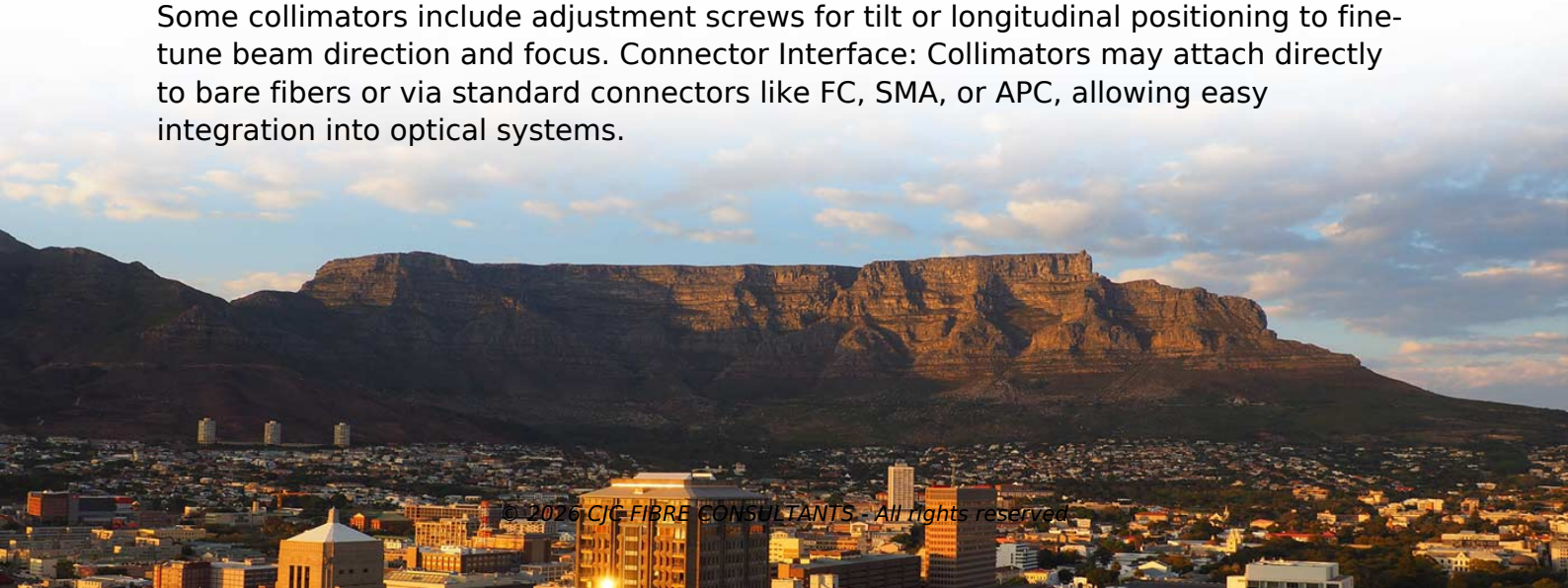
Fiber-optic Collimator 1mm d. SMA 2.0 L=20.2mm. /APC 2.0 L=24.1mm. Fiber Optic CollimatorsThese collimators can be glued into a 2D array with high precis.

Key Takeaways

A fiber optic collimator converts diverging light from a fiber into a collimated beam using a lens precisely aligned with the fiber end, with key parameters including focal length, beam diameter, divergence, and fiber type. Structure of a Fiber Optic CollimatorA typical fiber optic collimator consists of the following components: Optical Fiber Section: Usually single-mode fiber (SMF), but polarization-maintaining (PMF) or multimode fiber (MMF) can also be used. The fiber's end face is positioned at or near the lens's focal point to ensure proper collimation.

Lens: Can be a C-lens, aspheric lens, singlet, doublet, or GRIN (gradient-index) lens. The lens refracts the diverging light from the fiber into a parallel beam or focuses incoming light into the fiber. Mechanical Housing and Alignment: The fiber and lens are mounted in a precision housing that ensures sub-micron alignment.

Some collimators include adjustment screws for tilt or longitudinal positioning to fine-tune beam direction and focus. Connector Interface: Collimators may attach directly to bare fibers or via standard connectors like FC, SMA, or APC, allowing easy integration into optical systems.



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Key Parameters

Focal Length (f): Determines the collimated beam diameter and divergence. Longer focal lengths produce larger beams with lower divergence, suitable for long-distance free-space propagation. Beam Diameter and Divergence: The output beam radius depends on the fiber's mode field diameter (MFD) for single-mode fibers or core size/NA for multimode fibers, combined with the lens focal length.

Insertion Loss and Return Loss: High-quality collimators minimize insertion loss and back reflections, which are influenced by lens quality, alignment precision, and coatings. Lens Type and Material: GRIN lenses are compact and cost-effective for small beams, while aspheric or doublet lenses are used for larger beams or high-power applications. Materials like optical glass, fused silica, or sapphire ensure durability and low absorption.

Power Handling: For high-power fiber lasers, collimators must be designed to handle higher optical power without damage, often requiring larger lenses and optimized thermal management. Wavelength Range: Collimators can be optimized for specific wavelengths (e.g., 850 nm, 1310 nm, 1550 nm) or broadband operation.

Applications

Fiber optic collimators are widely used in: Fiber-to-free-space coupling and vice versaFiber-to-fiber couplingLaser systems and material processingOptical sensing and spectroscopyTelecommunications and research applications Proper selection of collimator parameters ensures efficient light transmission, minimal loss, and stable beam propagation in optical systems.

Article Content

Fiber Optic Collimators

These collimators can be glued into a 2D array with high precision and all light channels are thus parallel. The type of fiber, the operating wavelength, the working distance and other parameters

Fiber Optic Collimators: Types, Applications, and How

This article explains what fiber optic collimators are, the different types available, typical applications, design parameters to watch, and guidelines for

Compact Fiber Collimator Specification

Fiber collimator reduces the divergence angle of the light output from an optical fiber. Fiber collimators are used to match the beam divergence from a fiber with the optical setup.

Fiber Collimators – lens, collimated beam, focal length,

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A fiber collimator is an optical device used to transform the diverging light from an optical fiber into a free-space collimated beam. It consists of a lens that holds the

Fiber Optic Collimator

*Above specifications are for device without connector *For devices with connectors, IL will be 0.3dB higher and RL will be 5dB lower.

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