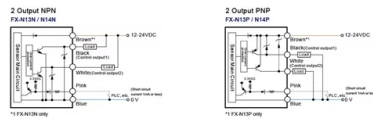


What is the longest possible transmission distance using optical fiber



Overview

A: For most applications, the maximum distance of a single-mode cable is around 160 kilometers. Take the common OM2. The more power coupled into the fiber, the longer the transmission distance. Given perfect conditions in a lab-like setting without ensuring no signal degradation, how far could fiber optics transmit data?

Hundreds of. Dispersion limits fiber optic transmission distance by causing signal distortion and is classified into chromatic dispersion, modal dispersion, and polarization mode dispersion (PMD). Chromatic dispersion occurs when different wavelengths of light travel at different speeds within the fiber. Single mode fiber can transmit light signals over 100+ kilometers without amplification, making it ideal for long distance communication, campus backbones, and metropolitan area networks. However, real-world systems face fundamental limitations. Light pulses degrade as they travel over long spans, primarily.



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