



THE EXPANDED BEAM TECHNOLOGY

How to maintain
optical signal in
harsh environments?

Why expanded beam can solve signal loss concern?

Contents:

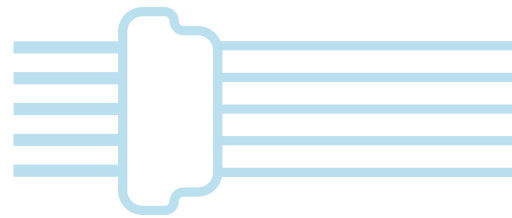
- Overview of **expanded beam** technology.
- The signal loss concerns
- Enhanced resistance against contamination
- Enhanced reliability in harsh environments
- A durable design
- Global reach of expanded beam technology



Overview

The **expanded beam** technology

→ An expanded beam connection is made of two fiber optics; equipped with lenses, facing each other. They are here to expand and collimate the signal.



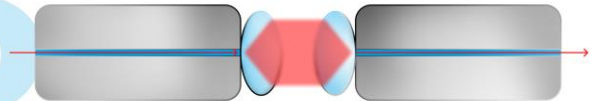
This technology presents multiple benefits, especially in harsh environments.

Physical Contact



VS

Expanded Beam



PHYSICAL CONTACT TECHNOLOGY



- Low Insertion Loss
- Compact Size
- Cost Effective



- High sensitivity to mechanical stress
- Susceptible to contamination

EXPANDED BEAM TECHNOLOGY



- Resistant to Contamination
- Enhanced Durability
- Easier cleaning and maintenance



- Higher initial insertion loss



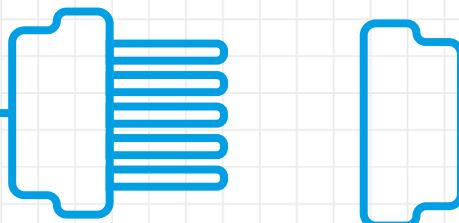
The Signal Loss Concerns

→ Signal loss represents a significant issue for engineers, especially in applications in harsh environments. In the field of optical fiber, signal integrity is the cornerstone of effective communication and data transmission.

- Reduces the risk of signal loss
- Facilitates the use and maintenance of optical fiber

The expanded beam technology

The expanded beam technology is an innovative solution that helps to limit signal loss due to contamination risks. Moreover, it is particularly interesting in cases where the plugging and unplugging cycles are frequent.

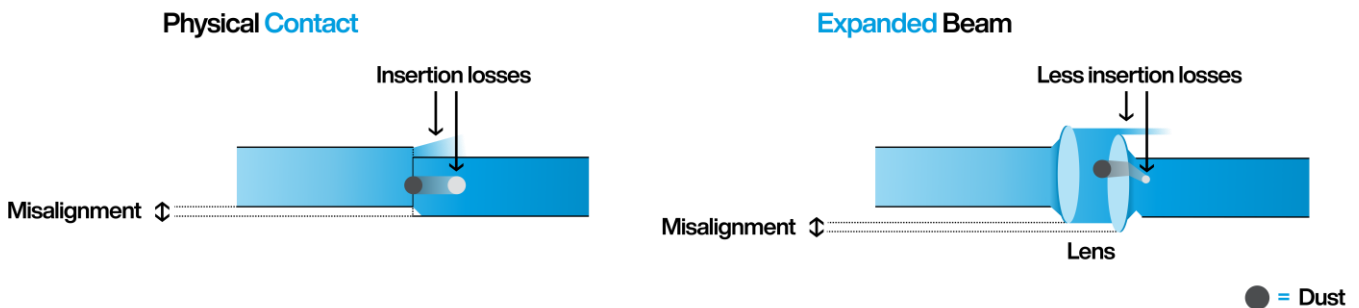


against
contami-
nation

Enhanced resistance

In the case of an *expanded beam* solution, the light beam is enlarged between the two connectors. This technology significantly reduces the detrimental impact that certain debris and contaminants can have on the surface of the connector.

Indeed, the larger diameter of the beam inherently makes it less sensitive to small particles.



Contamination is a recurring problem faced by physical contact connectors, where a focused beam is subject to signal losses due to microscopic debris.

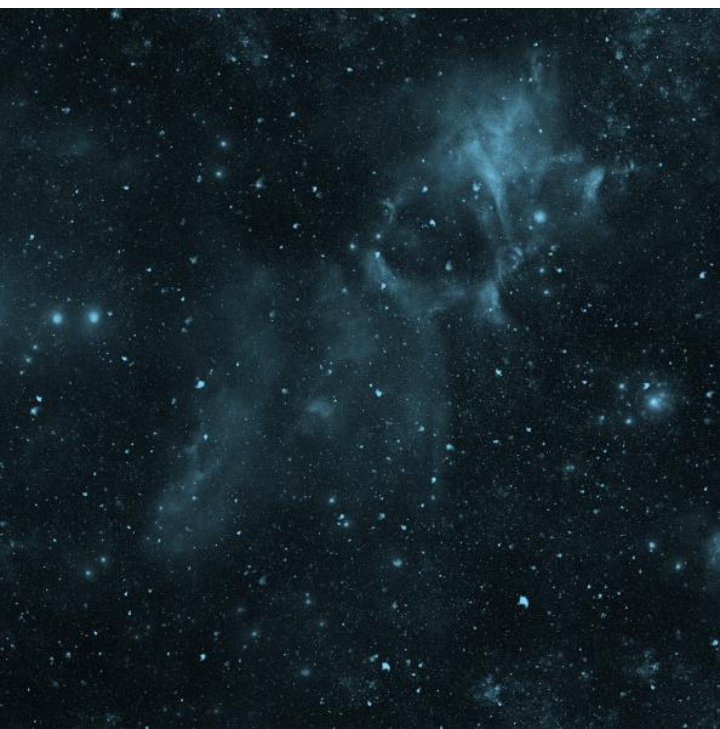
Enhanced Reliability in Harsh Environments



→ The challenges of optical connectivity are even greater in harsh environments such as military or space settings.

Indeed, in these types of applications, micro-connectors are exposed to strong environmental stresses that can negatively impact signal transmission.

Shocks
Humidity
Vibrations
Temperatures
...



A robust solution

Connectors using expanded beam technology have reduced sensitivity to environmental stresses.

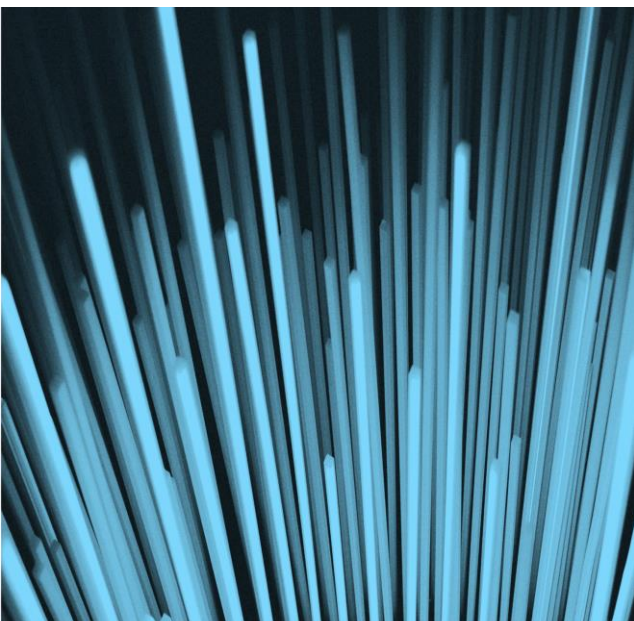
Integrating expanded beam technology into a Nicomatic connector ensures a robust connection, reduces the frequency of replacement and cleaning, and facilitates maintenance phases. It is therefore essential to ensure the longevity and reliability of communication systems in fields where the costs of a failure can be very high.

A durable design



→ Expanded beam connectors are designed to be durable. One of the main aspects of their durability lies in the absence of physical contact between fibers. This significantly extends the lifespan of the connectors, due to the lack of fiber wear during repeated connection cycles. This characteristic is particularly beneficial in applications that require frequent maintenance.

Expanded beam connectors are designed for a long lifespan



The mechanical design of these connectors facilitates ease of installation, service, and maintenance. Indeed, the lenses offer greater tolerance to small impurities and a simpler cleaning process than that of standard optical fibers.

Global reach of expanded beam technology



In summary, the use of expanded beam technology in the field of optical fiber connectors marks a significant advancement in facing the challenges posed by harsh environments. Its superior resistance to contamination, ease of maintenance, and robustness make it the ideal choice for applications where physical contact fiber optic connectors may exhibit certain weaknesses.

- **Minimizes loss**
- **Ease of maintenance**
- **Increased durability**

Interested in expanded beam?

→ Contact our team and discover our VITA 66 range that integrates the PRIZM® MT ferrule from US Conec.



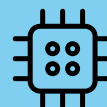
100% integrated and globalized family-owned company



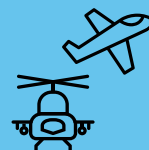
No minimum order quantities for majority of products



Short delivery times



Unlimited product configurability



Certified ISO 9001:2015 and EN9100:2016 for aerospace and defence

Nicomatic is a designer and manufacturer of interconnect solutions for harsh environments since 1976.