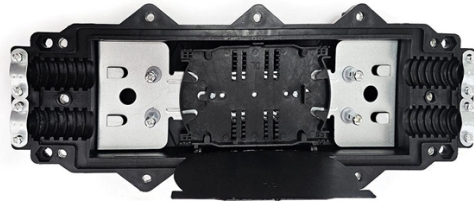


Fiber Tail Welding Fixture



Overview

Technical field The invention belongs to technical field of optical fiber communication, in particular to a kind of double tail fiber fixture.

Key Takeaways

A Fiber Tail Welding Fixture is a precision work-holding device designed to align and secure fiber optic pigtails for laser welding to photonic components with sub-micron accuracy.

Purpose and Function

A fiber tail welding fixture is used to precisely align optical fibers (pigtails) with photodiodes, laser diodes, or other optoelectronic components to ensure maximum optical coupling efficiency. The fixture must maintain sub-micron tolerances during welding while preventing any electrical interference or laser-induced damage to sensitive components. Key Design Requirements Sub-Micron Precision and Durability: The fixture must hold delicate components in perfect alignment for hundreds of thousands of cycles without deflection or wear.

This requires materials with high stiffness and hardness. Electrical Insulation: Since photodiodes and associated circuitry may be electrically active, the fixture must be a perfect insulator to prevent short circuits. Laser Compatibility: The fixture must absorb or minimize laser reflection to avoid damaging components.

Standard metals and reflective ceramics are unsuitable for high-power laser applications.

Material Selection

Black Yttria-

Toughened Zirconia (Y-TZP) is commonly used because it combines extreme hardness, electrical insulation, and low laser reflectivity. Zirconia provides near-zero wear, high dimensional stability, and maintains sub-micron accuracy over millions of cycles. Metals are avoided due to conductivity and reflectivity, while polymers lack stiffness and thermal resistance.

Standard alumina ceramics are too reflective for laser welding.

Operational Principles

The fixture positions the fiber pigtail relative to the photonic component, often using precision nests or micro-machined slots. Laser welding is performed either passively or on actively driven components, sometimes with an inert gas feed to improve weld quality. Automated systems, such as ficonTEC's LASER WELD stations, integrate multi-axis movement, machine vision, and post-weld characterization to ensure repeatable, high-yield assembly.

Applications

Fiber optic transceivers and photonic integrated circuits (PICs). High-density fiber arrays for telecommunications, data centers, and silicon photonics. Microfluidic glass assemblies, where adhesive-free laser welding ensures high optical power transmission and mechanical stability.

Advantages Adhesive-free bonding preserves optical properties and prevents misalignment due to aging or shrinkage. High packing density for fiber arrays. Robust mechanical and optical stability, suitable for automated high-volume production.

In summary, a fiber tail welding fixture is a critical precision tool in optoelectronic assembly, combining mechanical stability, electrical insulation, and laser compatibility to enable reliable, high-performance fiber-to-chip or fiber-to-photodiode connections.

Article Content

A kind of double tail fiber fixture

Technical field The invention belongs to technical field of optical fiber communication, in particular to a kind of double tail fiber fixture. Background technique

Fixturing For Fiber

Because fiber laser welding produces such a low level of heat, fabricators don't always need to invest in traditional machined fixtures and can

WELDING FIBER FIXTURE

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VELATEMOR Optical Fiber Cleaver Precise Cutting Tool for Fiber

[3 IN 1 FIXTURE FOR VERSATILITY] Comes with fixture for cutting bare fibers, tail fibers, sheathed wires, and cables without a length . [EASY CLEANUP] Detachable waste fiber

Welding Fixture Table Systems

Heavy Duty Tables 5 Sided - 1" Thick - 8" Sidewall Height HD Welding Fixture Table, 14" x 2.5" (168" x 30" x 8") \$15,560.00

SM&MM Six Motor Core Alignment Fiber Fusion Splicer Automatic

1. 6 Motors true optical fiber Core Alignment ARC Automatic Fusion Splicer. 2. 0.1um fiber alignment accuracy itable for medium to long-distance trunk fiber optic cable fusion projects.

Signal Fire Technology Co., Ltd.,

Signalfire fiber splicer AI-9 is a six-motor, fiber core alignment automatic fiber welding machine, with optical power, red light detection function. 5 inches high

FTTH Single Mode Optic Fiber Mini Welding Splicing

Simple Operation: The fiber optic splicer is lightweight and compact, which is easy to operate, with fast splicing speed and low loss, settable heating time and

Welding Fixtures

We design and build a full spectrum of welding fixtures – from the simplest sub-assembly fit and tack fixtures to multi-step pneumatic and hydraulic clamping fixtures for the highest quality, highest and

Custom Welding Fixtures

Flextur designs and builds custom welding fixtures that solve the biggest challenge in welding: secure, repeatable part holding. Our fixtures work seamlessly for both

4 Types of Welding Fixtures You Need to Know

Explore the essential guide to 4 types of welding fixtures: Modular, Dedicated, Hydraulic, and Pneumatic. Enhance efficiency in your welding projects.

Head & Tailstock Positioners for Welding | Koike Aronson

Koike head & tailstock enables secure holding and rotation of long weldments and workpieces. Ideal for welding trailer frames, railroad box cars, truck dump bodies and assembly applications.

Johnson Controls Automotive Experience Global Supplier ...

2 Scope This Fixture Design Requirement applies global within the Metals and Mechanisms manufacturing locations of Johnson Controls.

Fixed Height Head & Tailstock Welders | Koike Aronson

Engineered for Demanding Industrial Applications Koike's fixed height head & tailstock positioners are built for rugged, high-precision environments, supporting a wide range of welding and fabrication

Fiber Continuous Laser Welding Machine with Automation Fixture

Fiber Laser Welding Machine Laser Welding Machines for Chain Weaving Machines Laser welding machines for chain weaving are designed for high-precision, efficient welding of small, intricate metal

A guide to modular fixturing in welding

Simplify tack welding. When setting up a fixture, ensure that it will allow access to all weld joints so you can complete the tack welding all at one time. In cases such as this, a rotary positioner

Signal fire New Model AI-9 Fusion Splicing Six Motor Core ...

Signal fire New Model AI-9 Fusion Splicing Six Motor Core Alignment Fiber Fusion Splicer Automatic FTTH Fiber Optical Welding Splicing 5S Heating 15S

SLS 3D Printed Welding Fixtures and End of Arm

Etienne Lacroix Group's thermoplastics division significantly reduced operational spending through the integration of SLS 3D printed manufacturing aids.

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

