

Automated Assembly Process for Pigtail Fibers



AI Overview

Automated fiber pigtailing machines align and attach optical fibers to optoelectronic devices with sub-micron precision, enabling high-throughput, repeatable, and operator-independent assembly. Overview of Automated Pigtailing Automated fiber pigtailing involves attaching optical fibers to devices such as laser diodes, photodiodes, and waveguides with extremely high precision, typically in the sub-micron range. This process is critical because the light-emitting or receiving areas of these devices are only a few micrometers in diameter, making manual alignment labor-intensive and prone to variability. Automation eliminates human error, increases throughput, and ensures consistent optical performance. Key Components and Methods Precision Alignment Stages: High-precision motorized stages move the fiber ends relative to the fixed optoelectronic device. Some systems use a two-step alignment process where computer vision first roughly aligns the fiber, followed by fine-tuning to maximize light coupling. Fiber Work Trays: Automated systems often employ specialized trays to transport fibers through the assembly process without violating the minimum bend radius. These trays provide strain relief, retention mechanisms, and chemical/temperature resistance, ensuring fibers remain undamaged during handling. Process-Centric Automation: Modern systems analyze each step of the pigtailing process to remove human subjectivity. This approach establishes measurable parameters for fiber placement, curing, and testing, resulting in repeatable, high-yield production. Modular Design: Machines are often modular, allowing customization for different device geometries, such as photodiodes or waveguides. Modular systems can operate unattended for extended periods, typically up to an hour, and are compatible with mass-production environments. Performanc...

Article Content

The Production Process of Fiber Patch Cord/Pigtail

How to produce Fiber Patch Cord/Pigtail A fiber patch cord and pigtail production line typically involves several key processes to ensure high-quality

Assembling Fiber Optics | 2020-01-15 | ASSEMBLY

“With an optimized assembly process, the fiber tips are located close to each other afterwards. “Currently, the machine has to be fed by an operator

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In this abstract we will introduce combining these four pigtail operations into single station and automating the alignment process through the novel use of several virtual pivot points surrounding

US5857047A

The Automated Fiber Pigtailling Machine (AFPM) provides automatic fiber alignment and attachment in an optoelectronic (OE) assembly process. The AFPM is designed in a modular manner for...

Guide to Fiber Optic Pigtails: Introduction, Applications

Automated assembly processes, precision machining techniques, and advanced testing equipment are utilized to ensure the highest level of quality and

Construction of an automated fiber pigtailling machine

Automating the packaging processes should result in a significant cost reduction. One of the most labor-intensive steps is aligning and attaching the fiber to the OE device, the so-called

Construction of an Automated Fiber Pigtailling Machine for ...

The purpose of this program was to design and evaluate a low cost Automated Fiber Pigtailling Machine (AFPM). The pigtailling process attaches fibers to optoelectronic devices with submicron alignment

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Photonics Automated Assembly & Testing From Lab to Fab Cutting-edge assembly and testing machines serving requirements in R& D and all the way through to

Automated fiber pigtailling machine (Patent) | DOE Patents

The so-called pigtailling process is completed with sub-micron accuracies in less than 3 minutes. The AFPM operates unattended for one hour, is modular in design and is compatible with a

Fiber Patch Cord and Pigtail Manufacture production Line

Complete Fiber Optic Patch Cord and Pigtail Production Lines. High-efficiency manufacturing machines for cable cutting, crimping, polishing, and testing. Build

The Ultimate Guide to Fiber Pigtail

Remember, each step in the installation process is crucial, and skipping or rushing through steps can lead to poor performance or even damage

Fiber-optic pigtail assembly and attachment alignment shift using a

Under the NIST ATP Precision Optoelectronics Assembly Consortium program, Adept Technology has developed a low cost assembly platform for automated assembly of optoelectronic components.

Fiber Optic Pigtail: The Complete Guide to Types,

Confused about fiber optic pigtails—which connector type, which polish, fusion or mechanical splice? Our guide covers LC vs SC, APC vs UPC,

What Is a Pigtail Connector: Types, Uses & Guide

A pigtail connector is a short, pre-terminated length of cable with one end connected to a connector and the other end left open or spliced into another assembly. It allows easy integration of

Fiber-optic pigtail assembly and attachment alignment shift using a

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What is Fiber Pigtail? A Complete Guide for Beginners

A fiber pigtail is a thin multimode or single-mode fiber optic cable with a connector installed on one end. The purpose of the fiber pigtail is to terminate

What Is Fiber Optic Pigtail and How to Splice It?

While for mechanical fiber optic pigtail splicing, it precisely holds a fiber optic pigtail and fiber patch cord together, the joint could be temporary or permanent, enabling light to pass from one

Fiber Optic Pigtail Introduction and Installation Guide

Mechanical fiber optic pigtail splicing precisely aligns a pigtail and fiber patch cord, creating a joint that can be temporary or permanent, facilitating

Pigtail Fiber: Essential Component in Modern Fiber Optic Connectivity

Introduction In the rapidly evolving landscape of fiber optic networks, precision and reliability are non-negotiable. Among the critical components enabling seamless optical connectivity,

Fiber Optic Pigtail: What Is It and How to Splice It?

Fiber optic pigtails are essential components in fiber optic installations, used to connect fiber optic cables to devices or equipment. They

Fiber Patch Cord and Pigtail Manufacture production Line

Our Fiber Optic Patch Cord Production Line equipment includes everything

Silicon Photonics Packaging Automation: Problems, Challenges, and ...

Such progresses must be compliant with the necessity to have industrial automation. We cannot imagine that proper high volume production can be reached in silicon photonics without the

Automated Pigtail Fabrication Needed for Future Networks

Automating the fiber pigtail fabrication process improves the assembly of fiber optic components by eliminating the problems associated with human intervention.

Low-cost automated fiber pigtailling machine

Subsequent generations of the AFPM may build upon the design concepts developed here to pigtail fibers to OE devices in more complicated geometries. For example, all applications for

What Is It and How to Splice It

What Is It and How to Splice It In fiber optic cable installation, how cables are attached to the system is vital to the success of network. If done properly, optical

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