1310/1550 nm Multi-function Single Mode Fiber Fused Taper System

Product Description

The full-function fiber taper system is a highly automated production system jointly developed by Idealphotonics and UBC in Canada, integrating multiple technologies such as optics, electronics, precision machinery, and computers, as well as multiple functions such as production, detection, and control. In addition to providing the functions of an ordinary fiber taper machine, the machine can also be upgraded to a polarization-maintaining fiber taper machine, a large-core multimode fiber taper machine, a tapered

fiber stretching system, etc. according to the customer's research requirements. It is a powerful platform for you to engage in the development of core components such as fiber splitters, wavelength division multiplexers, communication market development, fiber sensors and fiber lasers, biomedicine, and laser micro-nano research.

Product features

Polarization maintaining fiber design; Multi functional process mode; High precision melting cone control; Intelligent operation interface; high stability

Part Number

MP-IPCS-5000-ST

Application area

Fiber optic communication network | Fiber optic sensing system | Laboratory research and development | Quantum communication | Teaching experiments

Core parameters

Operating Wavelength	Bandwidth
1310/1550nm	±20nm,±40nm

● General Parameters

Features

(A) Software Features:

◆ The software developed by the all-English intelligent UBC team can optimize parameters according to the specific experimental requirements of customers

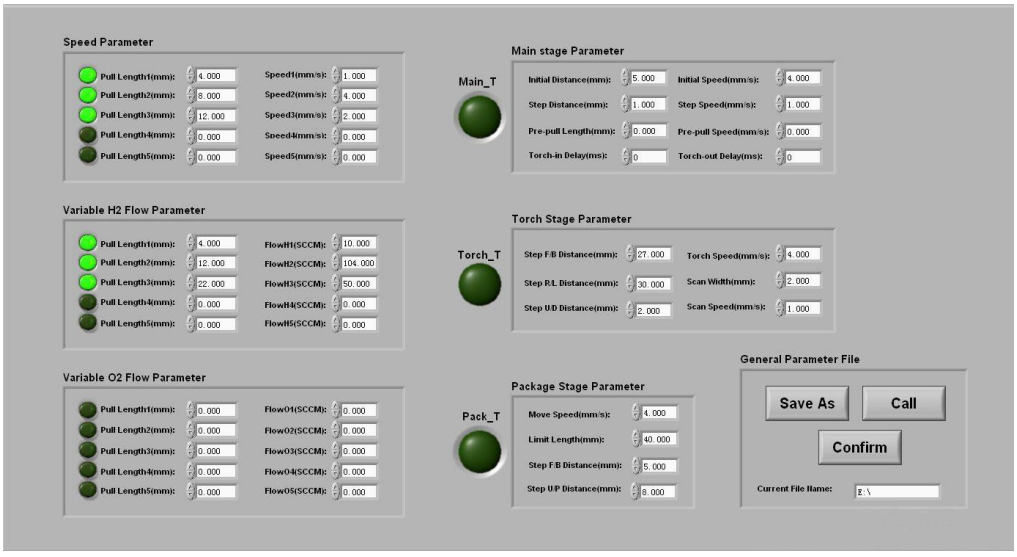
◆ The amplitude of the flame head scan can be set according to the required stretching length and cone shape

◆ The stretching speed can be changed according to the change of stretching length and cone temperature.

◆ The flow rate of hydrogen and oxygen can be changed according to the stretching length and stretching speed

◆ The intelligent energy software storage memory function facilitates users to call the optimal production data

Software interface GUI



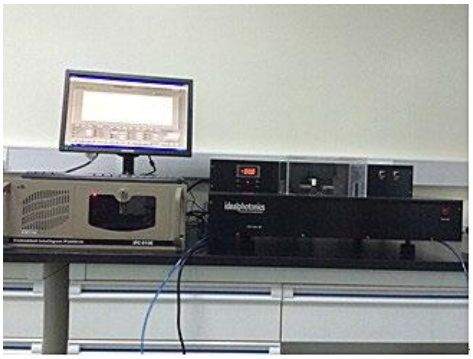
(B) Hardware features (different hardware designs are selected according to the differences in the developed devices)

- **The system adopts an external hydrogen and internal oxygen mixed flame head to improve the temperature instability caused by the original upper and lower oxygen addition, and improve the heating temperature and heating uniformity**
- **The extended InGaAs detector is used to facilitate customers to develop and produce 2um devices**
- **The Japanese sliding wire guide + precision ball screw is used to ensure the maximum single-sided stretching range of 40mm**
- **The American Alicat gas flow meter and driver are used to ensure the stability of the flame temperature during the stretching process**
- **Special fixtures can be designed according to the core diameter of the optical fiber used**
- **Different detectors are selected according to the working wavelength of the developed device**
- **According to the core diameter of the optical fiber used, a flow meter with a suitable range is selected**
- **Different flame heads and fixing methods are designed according to the requirements of optical fiber taper**

◆ On the basis of the customized optical fiber stretching platform, the ordinary optical fiber taper function is opened to realize the "one machine multi-function open system"

◆ CCD visual system (optional) to assist in observing the process of optical fiber alignment/tapering

(C) Compared with general machines (as shown below)

	
Ordinary optical fiber fusion taper machine	Idealphotonics Fiber Fused Taper Machine

◆ The brushed shell has an excellent industrial texture

◆ The working platform is 1/3 longer than ordinary machines, ensuring the convenience of secondary upgrades

◆ Equipped with a precision ball screw (pitch 2mm) to ensure the axial stretching accuracy and stable movement speed of the machine

◆ In addition to the manufacturing of the taper platform, we can provide users with a real "one-basket" service in the selection of special optical fibers, packaging materials and finished product testing instruments

Cone platform indicators:

A. Ordinary single-mode fiber coupler

Working wavelength	1310 nm, 1550 nm, 1310/1550 nm
Additional loss	<0.2 dB
Insertion loss	<3.2 dB
Bandwidth	+/-20 nm, +/-40 nm
Split ratio	1—99% , Error: ±2%
Package size	30-40 mm
Curing method	Heat curing adhesive
Standard 50/12.5um, 60/125um multimode fiber optic devices, WDM are all compatible	

B. Polarization-Maintaining Fiber Coupler

Working wavelength	1310 nm, 1550 nm
Extinction ratio	⩾ 20dB Some can reach 25dB
Additional loss	0.2-0.5dB（Domestic or imported Panda polarization-maintaining matching optical fiber）
Package size	30-40 mm
Split ratio	50：50±5%（Split ratio can be set arbitrarily）
Device structure	1x2, 2x2 and 1x3
Curing method	Heat curing adhesive
Used optical fiber	125/250um, 80/165um Panda PM fiber (Special fixture)

C. N x M Large Core Multimode Fiber Combiner

N	2,3.4……7 or(N+1)
Fiber core diameter	50 um, 100 um, 200 um, 400 um, 600 um….
Fiber	N.A0.11, 0.22, 0.37, 0.48
Device carrying power	W grade
According to the thickness of the optical fiber core diameter, the flow meter range is improved and the size of the optical fiber clamp is designed.	

D. Fiber Optic Single Taper

Single-mode fiber	core: 9 um to 1 um, even less
Multimode fiber	core 400 um to 62.5 um, core 600 um to 200 um, even less

Main device indicators:

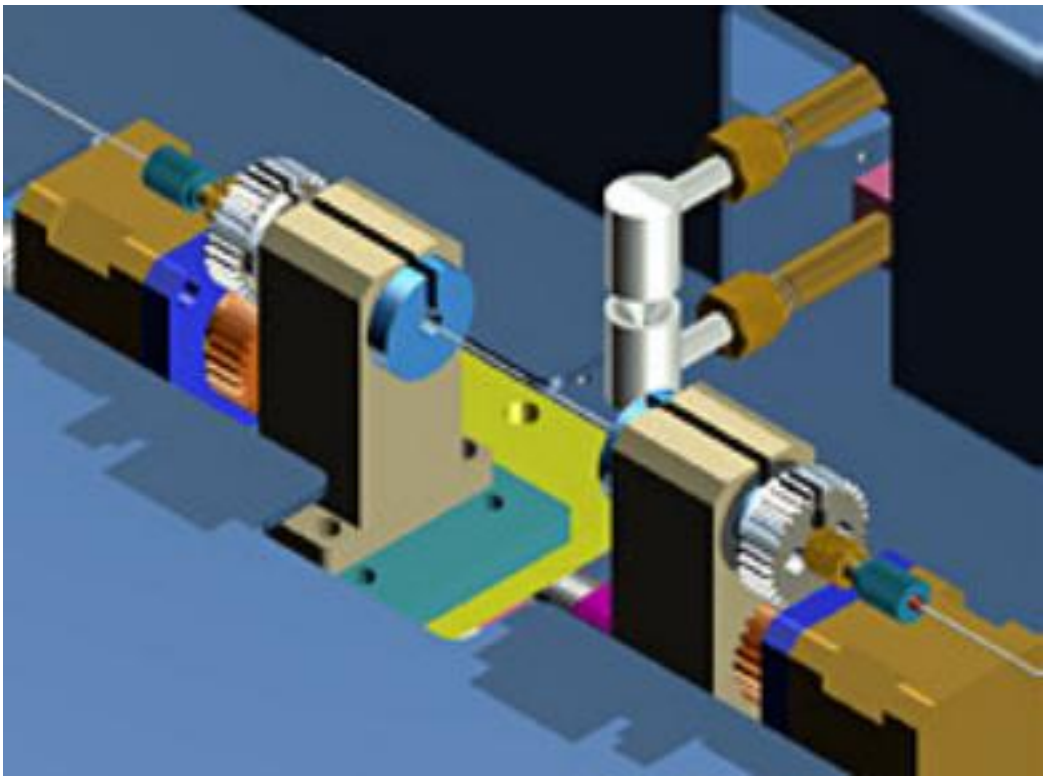
Flame heating unit	
Flame axial swing	0-21 mm
Movement rate	0-4 mm/s Continuously adjustable
Combustion gas	Hydrogen (or Oxygen)
Hydrogen flow rate	0-500 SCCM
Oxygen flow rate	0-400 SCCM

Optical components	
Detector	Extended InGaAs: 1100-2400 nm
Optional	Si : 400-1000 nm, Ge:1000-1800 nm
Light source	Optional: 1310/1550 nm dual wavelength benchtop detection light source (1 mW), 2um benchtop detection light source (device development around 2um)
UV detector optional	UV lamp is optional, customers need to research and manufacture UV band devices

Main device	
Taper platform stretching accuracy	0.15 μm
Taper platform stretching speed	0.15—12000 μm/s
Maximum taper platform stretching distance	55 mm
Fiber that can be clamped	0.1—0.5 mm
Minimum distance between clamps	30mm
Workbench shape and dimensions	21.65” x 16” x 9.65” (550 x 405 x 245mm)
Weight	70lb (31.5kg) Approx.
Power supply	100-240V, 50/60Hz, 150Watt

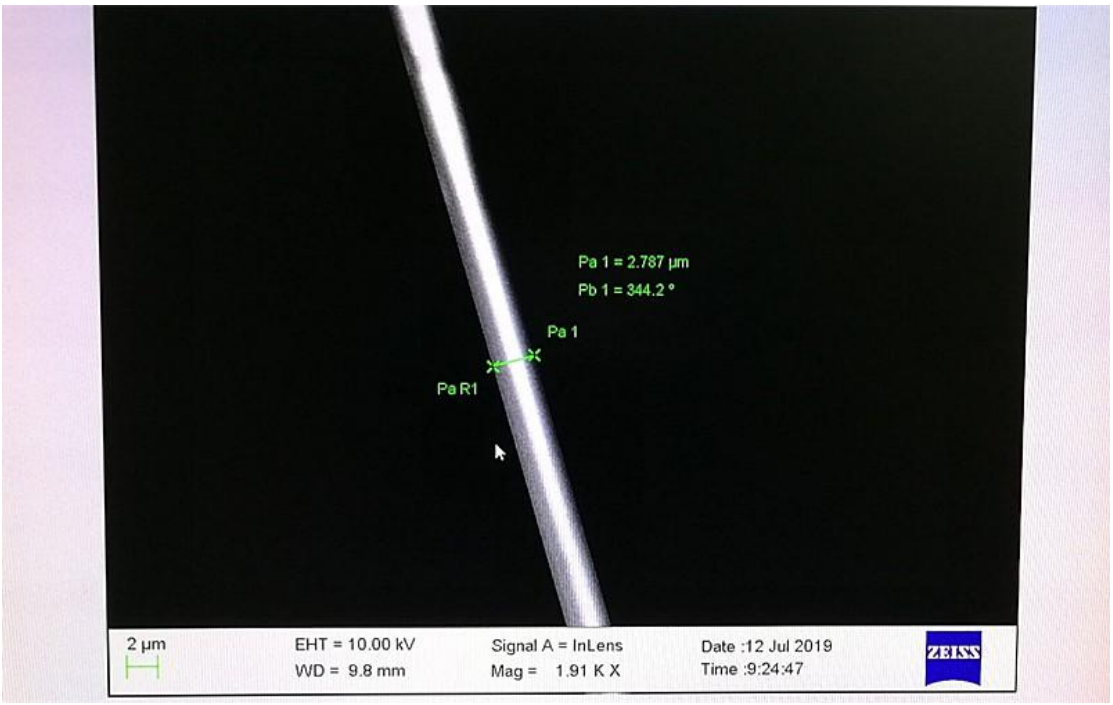
Principle of fused taper:

The optical fiber taper system uses vacuum adsorption and special fixtures to position and clamp two or more optical fibers on the optical platform, and rotates the two or more bare fibers without coating in a certain way, brings the axes (only for polarization-maintaining fibers) closer, heats and melts them under hydrogen-oxygen flame, and stretches them to both sides at a certain speed, eventually forming a special waveguide structure in the form of a double cone in the heating area, thereby achieving the purpose of making various optical fiber coupling devices and optical fiber tapers.

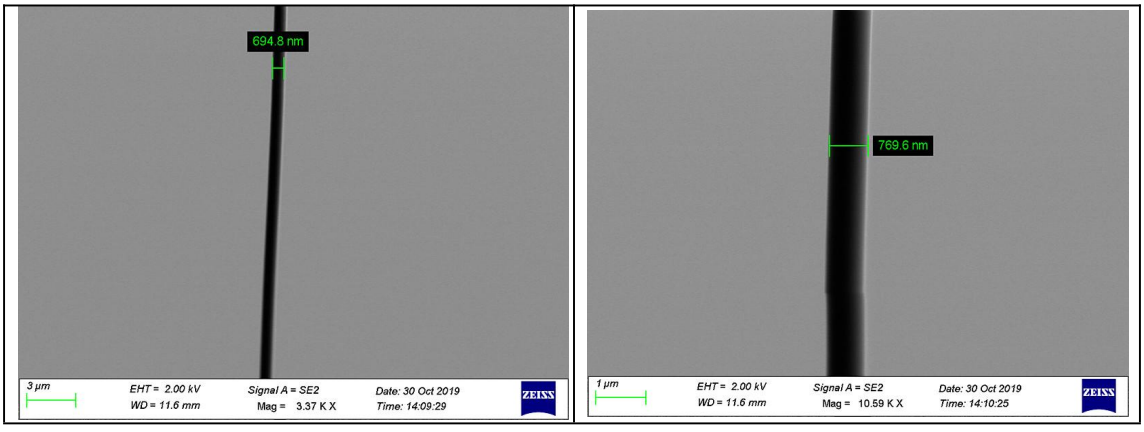


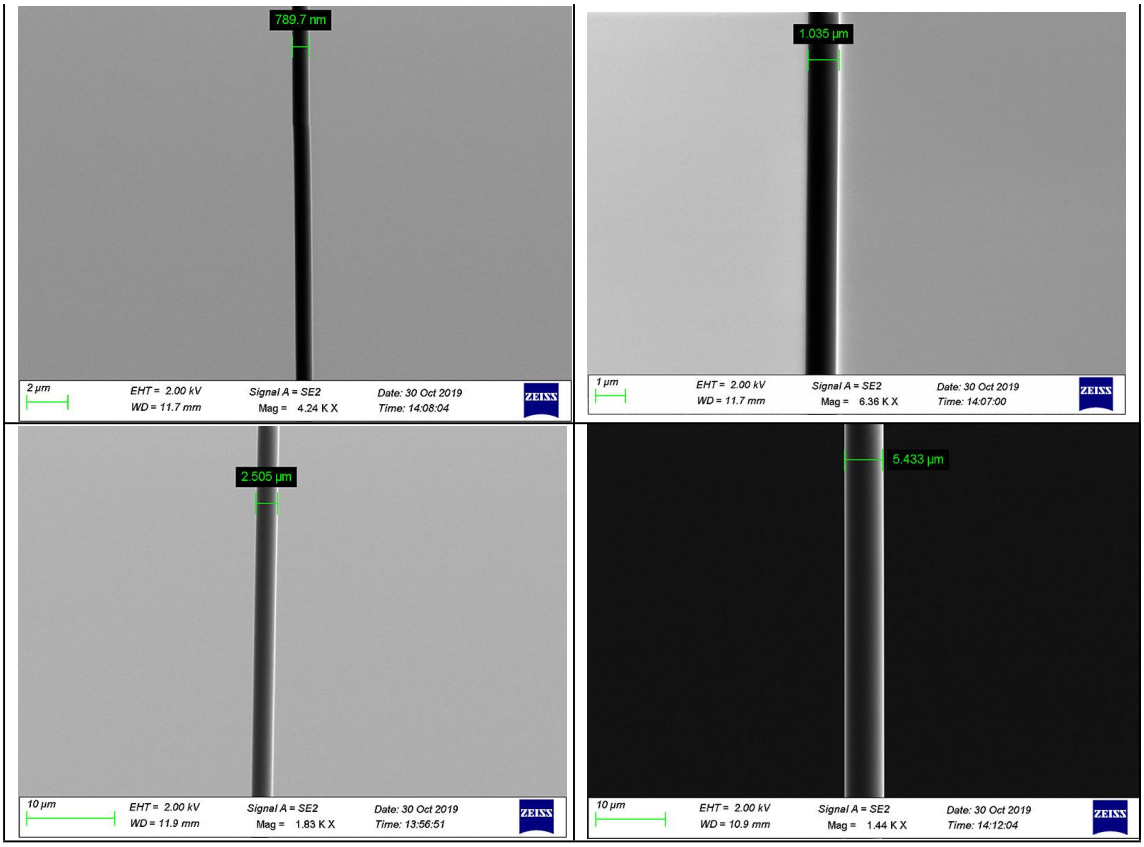
Tapered Fiber Testing:

Tapered fiber test results



Micron-level optical fiber data measured by power microscope





Tapered Fiber Placement:

How to place tapered fiber