S183PM Fusion Splicer for PM Fibers Achieving High Strength

1. OUTLINE

Due to the expansion of FTTH services, the volume of traffic over optical fiber is increasing and technologies for optical fibers and optical devices have been improved. This creates a need for an advanced fusion splicer, and the S183PM has been developed to meet this need.

2. FEATURES

The S183PM has many unique functions designed to achieve the most advanced splices. It is optimally suited to the new rotation mechanism that allows fibers to rotate while keeping them straight and stable, minimizing fiber twist and eliminating fiber damage. The S183PM has functions superior to those of other splicers, such as faster splice time, advanced fusion control, ease of use, and a wide range of preinstall programs.

2.1 Appearance

The S183PM is designed so that it is easy to use indoors, as in factories or laboratories. The worktable height is only 106 mm, and the vertical screen display orientation can be changed to allow operation with the LCD monitor in the front or rear of the unit. This function provides flexible layout for factory space.

Figure 1 Appearance of the S183PM fusion splicer.

2.2 Easy Operation and New Rotation Mechanism

The use of fiber holders ensures easy operation from preparing the fiber to splicing for any user. Fiber set-up is completed in only two steps: placing the holders on the splicer and lowering the windshield. Splicing is then accomplished automatically by pushing one button.

In splicing PM fibers where fiber rotation is needed, the holder is rotated to match the faces of the stress materials of the PM fiber (see Figure 2). The fiber is kept straight and stable, and twisting is minimized. This mechanism helps to avoid fiber damage and guarantees quality during the manufacturing process. The gears that transmit rotation from the motor to the holder shaft are disposed at the rear, and the holder is at the front, so that the fiber length from the holder is made 13 mm, the usual length for most splicing applications.

This rotation mechanism is also very useful for the removal of PM fiber after splicing. The user can not open the lid of the fiber holder and removes the fiber if the fibers are rotated to match the faces. In a conventional splicer it is a complicated operation to open the windshield, manually release one side holder to avoid twisting fiber, and push the button to reset the splicer. The S183PM eliminates these operations because it is equipped with a mechanism known as “automatic fiber holder release”. By pushing the button once, the fiber holders are automatically reset to the state where the windshield is closed. This makes the operation of removing the fiber easy and safe.

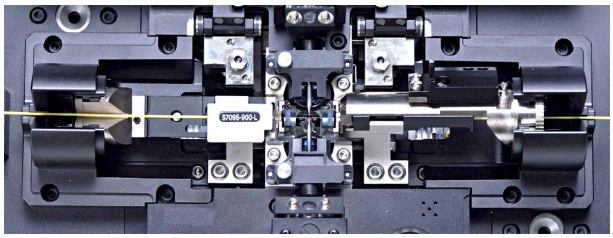

Figure 2 Fiber rotation.

2.3 Specifications

Table 1 shows S183PM specifications.

The S183PM comes with a variety of splice programs installed to handle splicing of different fibers, splicing of PM fibers, splicing with attenuation, etc. The user can create new programs up to total of 150. In PM fiber

splicing, splice time is shortened sharply compared to the conventional splicers because of software upgrades.

Table1 Specifications of the S183PM fusion splicer.

Description	Specification
Applicable fibers	SMF, DSF, MMF, NZ-DSF, EDF, PANDA, Tiger, Bow-tie, etc.
	Clad diameter: 80 to 200 μm Coating diameter: 160 to 900 μm
Fiber cleave length	4 mm (coating clamping) 10 mm (clad clamping)
Typical insertion loss	SMF: Avg. 0.02 dB
Typical extinction ratio	PANDA: Avg. 40 dB
Splice time	SMF: Avg. 20 sec PANDA: Avg. 42 sec
Tension strength	Avg. 20 N (with coating clamping)
Dimensions/weight	350W x 197D x 154H mm / 8.7 kg
Fusion program storage capacity	150

2.4 Automatic Adjustment of Fiber Position

Fibers are fixed by a method in which the fiber is placed in a V-groove and pressed tightly by a fiber clamp. The V-groove and clamp in the S183PM can handle both bare glass (clad) and coated fibers without changing any parts. If necessary for high-strength splicing, the coated part of the fiber is placed on the V-groove in order to prevent damage to the clad. In conventional splicers, the user must change the electrode, V-groove or fiber clamps because the height of the fiber center changes. In the S183PM, this change is not necessary. The fiber clamp is designed to hold a fiber from 80 μm to 900 μm in diameter and is equipped with two kinds of sub-clamps. In addition, the left and right V-grooves can move in all directions to adjust the position for bare or coated fibers..

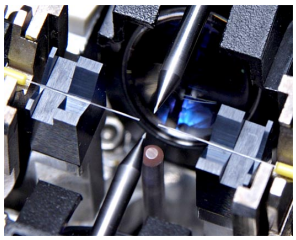

Figure 3 V-grooves.

Figure 4 Fiber clamps.

2.5 Advanced Fusion Control

The S183PM is provided with a range of newly developed functions, including arc scanning and arc curving. In arc scanning the spliced fiber is heated at a wide range by moving the fiber around the arc center during arc discharge. In arc curving the fiber is heated at a lower temperature during arc discharge. A ceramic rod is lifted up during the arc discharge process and changes the temperature distribution across the electrode pair, thereby achieving a lower temperature in the center of electrode pair. The S183PM also has an arc sequencing function, in which the arc power patterns are changed during the arc discharge process.

These unique arc functions can help the user achieve minimized insertion loss for any combination of specialty fibers.

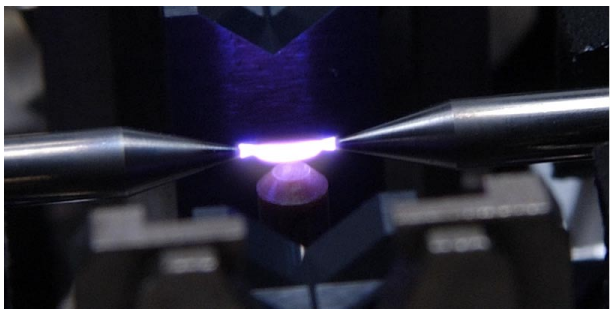

Figure 5 Arc discharge in the arc curving function.

3. FUTURE PRODUCT DEPLOYMENT

While developing the S183PM, a variety of tools have been developed for preparing the fibers. These include the S183-X-A-0009 ultrasonic cleaner for cleaning fibers for high-strength splices, the S533A curl remover for straightening out curled fibers, and the S323S cleaver for cleaving fibers with a clad diameter of 80 μm. These tools are designed to achieve high splicing performance combined with easy operation, and are especially for the preparation of fibers for the S183PM.

In the meantime, further improvements are being carried out to achieve splicing of special fibers such as the Holey fiber or other newly developed fibers. The S183PM will be further improved to become a more flexible splicer.

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