Enhancement of Splice Performance for High End Fusion Splicer S183PMⅡ/S184PM-SLDF

1. INTRODUCTION

Various types of optical fibers are used to optical fiber application products, such as optical fiber laser, optical fiber sensor etc.. These optical fibers are different in shapes (non-circular, holey), in cladding diameter, in core diameter, etc, from the typical fiber used in telecommunication industry. In order to splice these fibers, fine tuning or thorough review of the operating conditions of equipment are necessary, therefore experienced and skilful operators are required. Now, Furukawa Electric commercialized the high-end fusion splicer S183PMⅡ and S184PM-SLDF. Both are loaded with a new function to automate the set-up of the equipment.

2. FEATURES

The main features of these equipments are the basic performances, which realized both various functions and usability in a higher level, and adequacy to a wide range of optical fiber cladding diameters. Without altering these features, we have significantly enhanced the software of S183PMⅡand S184PM-SLSF and improved the splicing performance.

The ease of use in the optical components factory line has been considered: its physical configuration is the same as the existing equipments and, its height of the working surface is lower. The display Screen of LCD monitor, which shows operation condition, can be inverted up and down, and also the monitor position can be swapped between the front and the rear. Therefore, the optimum usage environment can be provided in accordance with the size of manufacturing optical component and the factory layout.

Figure 1 Appearance of S183PM II.

2.1 Optimization of Rotational Adjustment for Polarization Maintaining Optical Fiber (PM fiber)

On splicing PM fiber, the stress applying parts within fiber shall be aligned by a fiber rotation adjustment. Cross sectional shape of the stress applying parts is slightly different amongst manufacturers and manufacturing lots. Sometimes, its fiber image cannot be accurately recognized by the operating condition that is installed in the equipment. Now, by installing the optimization function that automatically makes fiber image analysis of PM fiber and automatically correct the operating condition, various types of PANDA type PM fibers can be easily spliced.

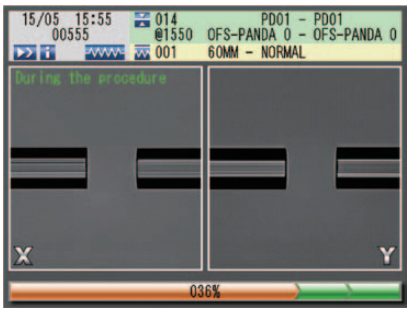

Figure 2 Optimization of rotational adjustment for PM fiber.

2.2 Splicing Dissimilar Fiber Mode

In case of optical amplifiers and passive components, optical fibers of different core diameter from standard optical fiber for telecommunication, though outside diameter is 125 μm, shall be spliced with low loss. A heating condition adjustment is necessary for each optical fiber combination; now the automatic heating condition adjusting function is loaded.

Figure 3 Splicing dissimilar fiber mode.

2.3 Intuitive Manual Splicing

There are various types of optical fibers, and some types of optical fibers are difficult to be spliced automatically by fiber image recognition. These types of optical fibers often require glass processing treatment other than splicing. We reviewed conventionally installed manual fusion function, so that more intuitive and simple operations are possible. Full manual operation, partial manual operation and full automatic operation are available. Further, fusion splicing and optical fiber process treatments corresponding to optical fiber types and their combinations are available. Moreover, automatic axis alignment and automatic rotational adjustment tools are loaded, so that rotational adjustment condition of PM fiber can be displayed comparing the left and the right, and then splicing can be easily performed while checking the adjustment condition.

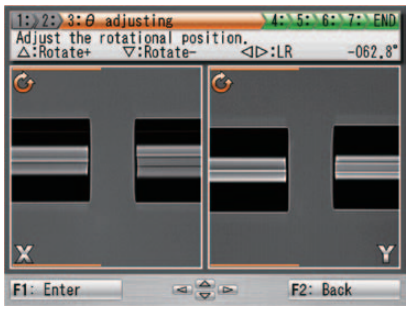

Figure 4 Manual splicing.

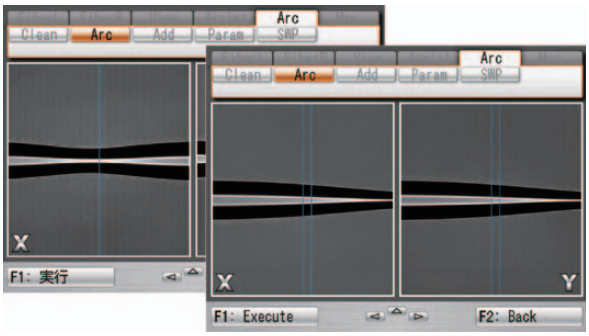

Figure 5 Example of special glass processing.

2.4 Improvement of Management and Workability by PC Splicing

Screen display, transmission and management of fusion data, fusion condition setting, remote control and fusion splicing linked to measuring equipment are available by the specialized software (SmartFuse: option). The fusion splicer has wider scope of application.

Figure 6 Specialized software: SmartFuse.

2.5 Splicing Performance

Major products specifications are shown in Table 1. Preset programs for same kind fiber splicing, dissimilar fiber splicing and PM fiber splicing etc. have been further improved.

Table 1 Specifications of S183PMⅡ and S184PM-SLDF.

Item	S183PMⅡ	S184PM-SLDF
Applicable fibers	SMF, DSF, MMF, NZDSF, High ΔF, EDF,PMF, PCF, etc.	
Cladding diameter	80 to 500 μm	80 to 1200 μm
Coating diameter	160 to 2000 μm	
Fiber cleave length	3 to 5 mm (Coating clamping)	5 mm (Coated Coating clamping)
	9 to 11 mm (Cladding clamping)	
splicing loss*	SMF : Ave. 0.02 dB	SMF : Ave. 0.03 dB
Splicing extinction ratio*	PANDA : -40 dB	PANDA : -35 dB
Splicing time	SMF : Ave. 15 sec.	SMF : Ave. 20 sec.
	PANDA : Ave. 35 sec.	PANDA : Ave. 45 sec.
Data interface	USB1.1, LAN (10 Base-T)	
Dimension	350 W×197 D×154 H mm (Protrusions not included)	
Weight	8.5 kg	8.8 kg
Number of fusion program	70 (Factory setting)	41 (Factory setting)
	150 (Total)	150 (Total)
Number of PM program	21 (Factory setting) 100 (Total)	

* These values, measured during splicing under favorable ambient conditions to show characteristics of the splicing machine, are not guaranteed.

3. FUTURE PRODUCTS EXPANSION

Due to software improvement, splice performance of S183PMⅡand S184PM-SLDF has substantially enhanced. These equipments present better optimal products for fiber splicing of fiber laser and in other various optical application fields

We will keep expanding the application fields of the equipments for splicing of the continuously growing special types of fibers, such as multi core fiber etc.

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