

**SPECIFICATIONS  
FOR  
FSM-30PF  
FIBER FUSION SPLICER  
FOR HIGH TENSILE STRENGTH SPLICING**

**1. GENERAL**

These specifications cover the **FSM-30PF** fiber fusion splicer. This splicer has some new functions and improvements for factory use, such as wide arc profile, more accurate splice loss estimate, fiber holder system and arc test function. These are for variety fiber applications, stable low splice loss and minimal skill dependency.

In addition, this model is capable of high tensile strength splicing with short cleaved length. Around 30N can be achieved by clamping coating part of fiber. The FSM-30PF can realize the best splice for the factory demand.

The FSM-30PF features the followings.

1. Full automatic operation once fibers are set with core-to-core alignment.
2. Simultaneous observation of both X view and Y view.
3. Mechanical in-line proof tester (possible to be turned off by menu command).
4. Wide arc profile to minimize splice loss of dissimilar fiber splicing.
5. New arc parameters to generate various kinds of adequate arc discharges for all types of fibers.
6. Optical power monitoring splice with power meter feedback.
7. Automatic arc time control function for similar fiber splicing.
8. Intentional core offset function for an in-line fixed attenuator.
9. Fiber holder system for stable splice loss.
10. Automatic stuff speed calibrating function before every splicing.
11. Automatic gap-set position calibrating function before every splicing.
12. Arc test function to calibrate the arc power automatically and accurately.
13. Accurate splice loss estimator by observing core distortion and MFD mismatch.
14. Estimating parameters to adjust the estimating equation on each splice mode.
15. User programmable 25 splicing modes on internal memory.
16. User programmable heating condition for the tube heater on internal memory.
17. Individual threshold setting on each splice mode for acceptable cleaved angle, core angle and estimated loss.
18. Dust detecting function.

19. Electrodes stabilizing function.
20. Storage area on internal memory for the last 30 splice results.

## 2. COMPONENTS AND ACCESSORIES

One set of the arc fusion splicer FSM-30PF includes the followings (from Item 1 to 16), which are packed in the rugged FRP case.

**Table 1 List of Included Items**

Item	Model	Description	Q'ty
1	FSM-30PF	Arc Fusion Splicer FSM-30PF	1 pc.
2	ACC-XX	AC Power Cord	1 pc.
3		Rugged FRP Case	1 pc.
4	FH-30PF-250H	Fiber Holder for $\phi$ 250 $\mu$ m O.D. coated fiber	1 set
5	V-30PF-125	Detachable V-groove for cladding diameter of 125 (80-150) $\mu$ m	1 set
6	V-30PF-250	Detachable V-groove for outer diameter of 250 $\mu$ m	1 set
7	CLAMP-30PF-125	Detachable fiber clamp for cladding diameter of 125 (100-150) $\mu$ m	1 set
8	CLAMP-30PF-250	Detachable fiber clamp for outer diameter of 250 $\mu$ m	1 set
9	SPA-30PF-CLV	Cleaver spacer for CT-04B/100B or CT-03HT	1 pc.
10	SPA-30PF-HJS050	HJS spacer for stable cleaved length of 5mm	1 pc.
11		Spare Electrodes	1 pair
12		Spare Fuses	1 set
13		Spare Up-down Mirror	1 pc.
14		Hexagon wrench	1 pc.
15		Tweezers	1 pair
16		Instruction Manual (English)	1 pc.

**Table 2 Optional Accessories**

Item	Model	Description
1	FH-30PF-250H	Fiber Holder for $\phi$ 250 $\mu$ m O.D. coated fiber
	FH-30PF-400H	Fiber Holder for $\phi$ 400 $\mu$ m O.D. coated fiber
	FH-30PF-900H	Fiber Holder for $\phi$ 900 $\mu$ m O.D. coated fiber
	FH-30PF-***H	Ask us for other outer diameter
2	V-30PF-125	Detachable V-groove for cladding diameter of 125 (80-150) $\mu$ m
	V-30PF-250	Detachable V-groove for outer diameter of 250 $\mu$ m
	V-30PF-400	Detachable V-groove for outer diameter of 400 $\mu$ m
	V-30PF-***	Ask us for other diameter
3	CLAMP-30PF-080	Detachable fiber clamp for cladding diameter of 80 $\mu$ m
	CLAMP-30PF-125	Detachable fiber clamp for cladding diameter of 125 $\mu$ m
	CLAMP-30PF-250	Detachable fiber clamp for outer diameter of 250 $\mu$ m
	CLAMP-30PF-400	Detachable fiber clamp for outer diameter of 400 $\mu$ m
	CLAMP-30PF-***	Ask us for other diameter
4	CT-04B/100B	High precision fiber cleavers
	CT-03HT	High precision fiber cleaver for high tensile strength splicing
5	HJS-02	Thermal jacket stripper
	HTS-11	Thermal jacket stripper for high strength splicing
	ADC-XX	AC/DC converter for HJS-02
6	PS-02	Primary coat stripper
	JS-01	Jacket stripper
	JS02-900	Jacket stripper for 900um O.D. fiber for fiber holder system
7	RS232C-02	RS232C cable for PC Interface or Optical power monitoring splice
	GPIB-232CT	GPIB converter for Optical power monitoring splice

### 3. SPECIFICATIONS

#### 3-1 Applicable Optical Fibers

Almost all type optical fibers described below for telecommunication, EDFA modules and dispersion compensation modules can be spliced.

- Standard single-mode fiber
- Multi-mode fiber
- Dispersion shifted fiber
- Cut-off shifted fiber
- Erbium doped fiber
- Dispersion compensation fiber

#### 3-2 Fiber Clamping Method

For normal splicing, coating part of fiber is clamped with fiber holder and cladding part is clamped with fiber clamp and V-groove.

For splicing with short cleaved length, UV or Nylon coated part of fiber is clamped with a fiber holder and coating part is clamped with a fiber clamp and V-groove.

The fiber holder is designed so that it is to be put directly in Fujikura precision fiber cleavers CT-04B/100B or CT-03HT and jacket strippers HJS-02/03FH or JS02-900. The fiber held with the fiber holder can be stripped with the jacket strippers, cleaved with the cleavers. There are three types of fiber holders available for major fiber coating diameters.

##### 3-2-1 Fiber cladding diameter

- $\phi$  100 to  $\phi$  150  $\mu\text{m}$  with standard fiber clamp and V-grooves
- $\phi$  80 to  $\phi$  125  $\mu\text{m}$  with optional fiber clamp and V-grooves.

##### 3-2-2 Fiber outer diameter

- $\phi$  250  $\mu\text{m}$  outer diameter with standard fiber holder
  - $\phi$  400 and  $\phi$  900  $\mu\text{m}$  outer diameter with optional fiber holder
- Coating part of fiber whose outer diameter is 250 and 400  $\mu\text{m}$  can be clamped by fiber clamp and V-groove for splicing with short cleaved length.

### **3-2-3 Fiber Cleaved Length**

Standard 16 mm (13 mm to 19 mm) for normal splicing by clamping cladding part of the fiber.

Standard 5 mm (3 mm to 6 mm) for splicing with short cleaved length by clamping coating part of the fiber.

### **3-3 Cleaved Angle Check and Core Angle Check**

The thresholds of the cleaved angle and core angle prior to fusion splicing are selectable between 1 degree and 5 degrees with 0.1degree step. These values can be set on each splice mode individually. These functions can be turned off.

When either of both angles is greater than the preset thresholds, the splicer stops and displays the alarm message. After splicing, the splicer checks the core angle again.

### **3-4 Automatic Stuff Speed and Gap-set Position Calibration**

Before splicing, the splicer measures fiber stuff amount and arc discharge position. Then, stuff speed and gap-set position are automatically calibrated.

### **3-5 Alignment Method**

With single-mode fibers, automatic core-to-core alignment with PAS (Profile Alignment System) aided by a computer controlled CCD camera and image processor.

With multi-mode fibers, automatic cladding-to-cladding (not core-to-core) alignment aided by the same technique as one with the single-mode fibers.

The alignment method is selectable on each splice mode individually.

### **3-6 Arc Fusion Splice Method**

Prefusion process and fusion process are controlled by built-in computer.

Discharge between electrodes are described below.

Trigger voltage	10000 V DC
Arc voltage	500 – 600 V AC
Frequency	110 kHz

Arc current            10 – 20 mA approx.

**3-6-1      Wide Arc Profile and stable discharge**

Low splice loss on dissimilar fiber splicing is achieved with the wide arc profile.

**3-6-2      User Programmable Splice Modes**

User programmable 25 splicing modes on internal memory are equipped in order to store arc parameters. New arc parameters can generate various kinds of adequate arc discharges for all types of fibers.

**3-6-3      Optical Power Monitoring Splice with Power meter Feedback**

The arc discharge automatically stops at the lowest splice loss with power meter measuring actual loss during splicing.

**3-6-4      Attenuation Splice**

The splice loss control function with intentional core off-set is provided to obtain intentionally high splice loss between 1 dB and 15 dB with 1 dB step for an in-line fixed attenuator.

**3-6-5      Arc Time Control Function**

The arc time of the fusion program setting is optimized automatically by observing the fiber core eccentricity.

**3-7 Splice Loss**

**3-7-1      Actual Splice Loss**

Typical 0.02 dB with identical single mode fibers (ITU-T G.652)

Typical 0.01 dB with identical multi mode fibers (ITU-T G.651)

Typical 0.05 dB with identical dispersion shifted fibers (ITU-T G.653)

These above are measured by the cut-back method to the relevant ITU-T and IEC standards.

**3-7-2      Splice Loss Estimating Function**

Splice loss estimator calculates accurate estimated splice loss by observing core distortion and MFD mismatch. Estimating parameters to adjust the estimating equation can be set on each splice mode. 5 estimation modes are

available.

### **3-7-3 Storing Splicing Situations and Results**

Last 30 splice results including date and splice loss can be stored automatically and can be reviewed on the LCD monitor.

### **3-8 In-line Proof Tester**

A proof test for tensile strength test of 2N is automatically carried out on each splice. This function can be turned off. For the values other than 2N, please consult Fujikura.

### **3-9 Built-in Tube Heater**

The built-in ceramic heater can be equipped as an option. The heating program can be changed in order to optimize the heating process with any kinds of the heat shrinkable protectors.

### **3-10 TV Monitor**

The TV monitor of 5 inches low reflective LCD is equipped. The image on the monitor can be seen even in daylight.

### **3-11 Arc Test Function**

Arc test function measures and calibrates the arc power automatically and accurately.

### **3-12 Electrodes Stabilizing Function**

With the Electrodes stabilizing function, some deposit is formed on the tip of the brand-new electrodes to generate stable arc discharge. Operators are recommended to use this function after electrode replacement.

### **3-13 Dust Check Function**

The dust detector counts the dust and dirt in the optical pass. In addition, judgment of the dust check, good or bad, is automatically performed. The judgement (i.e. "OK" or "NG") are displayed on the monitor.

### 3-14 PC interface

Splicing parameters, such as arc power or time etc., can be input with your PC and stored in EXCEL file. The splice results, such as estimated splice loss etc., can also be output to the PC in EXCEL file.

### 3-15 Dimensions and Weight

Splicer Body : 210 mm W × 187 mm D × 173 mm H, and 8 kg  
8.3"W × 7.4"D × 6.8"H, and 17.6 *lb.*

Carrying Case : 468 mm W × 290 mm D × 382 mm H  
18.6"W × 11.6"D × 15.2"H

Package : 630 mm W × 410 mm D × 540 mm H  
25"W × 16.3"D × 21.5"H

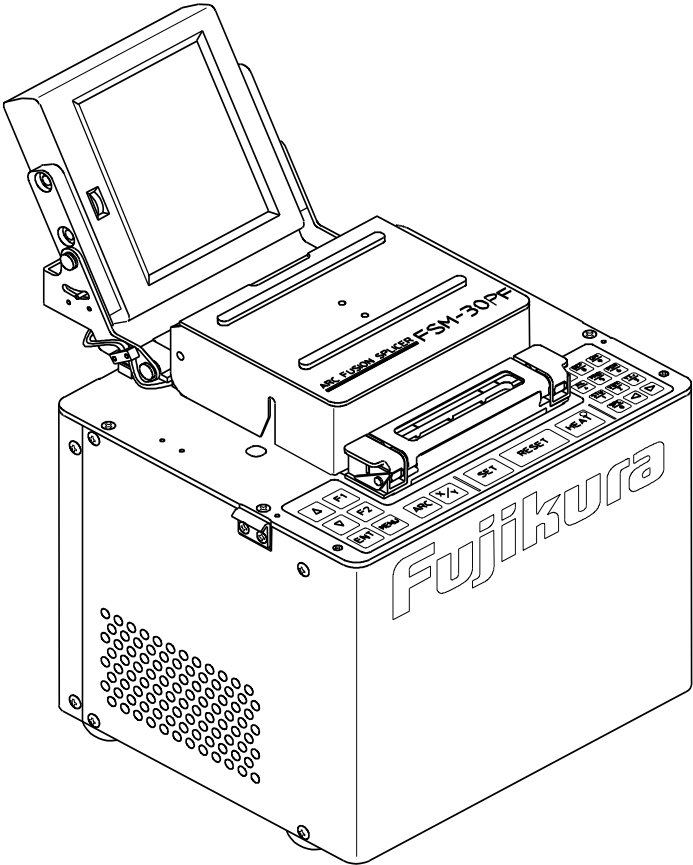
### 3-16 Power Supply

2 types of power supply inlets are equipped. One terminal is for DC 12 V, and another terminal is for AC 100 to 240 V (50/60 Hz). Automatic voltage selection is provided for the AC power supply.

Power Consumption: 24 W approx. (DC power supply)  
29 W (AC power supply)



3-17 Outside view



----- END OF SPECIFICATIONS -----

**Specifications subject to change without prior notice.**