

FSM-100M and FSM-100P ARC FUSION SPLICER



FSM-100M



FSM-100P

GENERAL

These specifications cover FSM-100M arc fusion splicer and FSM-100P polarization maintaining (PM) fiber arc fusion splicer for large diameter fiber splicing. FSM-100M/P provides a series of new technologies and features for both factory / production applications as well as for laboratory and R&D use, with greater flexibility and reliability.

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Specifications and descriptions are subject to change without prior notice.

überreicht durch:

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Features of FSM-100M/P

1. Full automatic core-to-core alignment splicing with splice loss estimate function.
2. Short cleave-length splicing capability as short as 3 mm.
3. Motorized universal v-groove clamp system to cover 60 to 2,000 μm in diameter.
4. Motorized electrodes to change their gap for various heating pattern.
5. Wide fiber sweep motion up to +/- 5 mm for various splicing applications.
6. Fiber vertical height can be adjusted to cover various heating requirement.
7. Theta axis rotation for PM fiber with cross-talk estimate function (FSM-100P)
8. 35 seconds of fast PANDA splicing mode (FSM-100P)
9. New automatic PM modes (IPA) for aligning all types of PM fibers (FSM-100P)
10. Large diameter fiber splicing capability up to 500 μm cladding diameter.
11. Dual 4.1 inch monitors for various information display.
12. Wind-protector integrated fiber clamp with automatic up/down moving system for stable fiber loading.
13. USB2.0 (Mini-B) port for PC connection, GPIB port for power-meter connection and two Mini-DIN6 ports to control optional accessories.
14. Two sets of key-pads for various operation styles.
15. 300 splice modes available including a number of “standard”, “full manual”, “power-meter controlled (X/Y and theta alignment)”, “attenuation” and “fiber shaping mode” for non-splicing applications.
16. Total memory capacity for 2,000 splicing results and 100 visual image data.
17. Three types of arc power calibration methods available :
 - Conventional offset-back method for standard fibers.
 - Melt-back method with new parameters for special fibers.
 - Real-time calibration by arc brightness observation.
18. Arc position calibration by arc brightness pattern analysis.
19. Learning function, such as fiber identification, auto focus position and unique profile of various PM fibers (FSM-100P).
20. Various PC functions available :
 - Software upgrade by customer via internet.
 - PC communication for data/image/parameters transfer.
 - Parameters for splice loss estimate for specific fiber can be calculated.
 - Remote control by PC.

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FSM-100M



FSM-100P

2. LIST OF ITEMS

One set of FSM-100M and FSM-100P consists of the following standard items (Table1 and Table2) packed in the rugged carrying case CC-27. Optional items and accessories are shown in Table3 and Table4, respectively.

Table1 FSM-100M Standard items

Item	Model	Description	Q'ty
1	FSM-100M	Arc fusion splicer	1 pc.
2	CC-27	Carrying case	1 pc.
3	FH-100-250	Fiber holder (250 µm coating diameter)	1 pair
4	ADC-15	AC adapter	1 pc.
5	ACC-XX	AC power cord	1 pc.
6	ELCT2-25	Spare electrode	1 pair
7	USB-01	USB cable	1 pc.
8	DCS-01	Dust cleaning swab	1 set (20 pcs.)
9	W-100MP-E	Warnings and cautions	1 pc.
10	M-100MP-E	English instruction manual and software in CD	1 pc.
11	SR-01-E	Splicing report	1 pc.

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Table2 FSM-100P Standard items

Item	Model	Description	Q'ty
1	FSM-100P	Arc fusion splicer	1 pc.
2	CC-27	Carrying case	1 pc.
3	FH-100-250	Fiber holder (250 µm coating diameter)	1 pair
4	FH-100-400	Fiber holder (400 µm coating diameter)	1 pair
5	ADC-15	AC Adapter	1 pc.
6	ACC-XX	AC power cord	1pc.
7	ELCT2-25	Spare electrode	1 pair
8	USB-01	USB cable	1 pc.
9	DCS-01	Dust cleaning swab	1 set (20 pcs.)
10	W-100MP-E	Warnings and cautions	1 pc.
11	M-100MP-E	English instruction manual and software in CD	1 pc.
12	SR-01-E	Splicing report	1 pc.

Table3 Optional items

Model	Description
---	<p>[Fiber Straightener] instead of [Sleeve Heater]</p>  <p>Note: Necessary to specify when purchasing the FSM-100 splicer.</p>
FH-100-100	Fiber holder (100 µm coating diameter)
FH-100-125	Fiber holder (125 µm coating diameter)
FH-100-150	Fiber holder (150 µm coating diameter)
FH-100-180	Fiber holder (180 µm coating diameter)
FH-100-210	Fiber holder (210 µm coating diameter)
FH-100-250	Fiber holder (250 µm coating diameter)
FH-100-300	Fiber holder (300 µm coating diameter)
FH-100-350	Fiber holder (350 µm coating diameter)
FH-100-400	Fiber holder (400 µm coating diameter)
FH-100-500	Fiber holder (500 µm coating diameter)
FH-100-600	Fiber holder (600 µm coating diameter)
FH-100-700	Fiber holder (700 µm coating diameter)
FH-100-800	Fiber holder (800 µm coating diameter)
FH-100-900	Fiber holder (900 µm coating diameter)
FH-100-***	Ask us for other diameter
FH-40-LT900	Fiber holder (for 900 µm loose-tube buffer coating)

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Table 4 Accessories

Model	Description	Notes
CT-32	High precision fiber cleaver	For 125 µm cladding dia. Cleave length : 4 mm / 9 mm
CT-32	High precision fiber cleaver	For 80µm cladding dia. Cleave length : 4 mm / 9 mm
CT-30	High precision fiber cleaver	For 125µm cladding dia. Cleave length : 5 mm / 10 mm
CT-10	High precision single fiber cleaver	For 125µm cladding dia. Cleave length : 5 mm / 10 mm
CT-11	High precision angle fiber cleaver	For 125µm cladding dia. Cleave length : 5 mm / 10 mm
SPA-40-CT22-040	Cleaver spacer for CT-32/38	This item included in CT-32/38
SPA-40-CT22-050	Cleaver space for CT-32/38	-
JS-02-900	Jacket stripper	For 900 µm coating dia.
SPA-40-JS030	JS Spacer	-
HJS-02	Hot jacket stripper	For 250/400 µm coating dia.
ADC-09	AC adapter for HJS-02	-
ACC-**	AC power cord for ADC-09	ACC-08 to ACC-12
SPA-40-HJS030	HJS spacer	For 4 mm cleave
SPA-40-HJS040	HJS spacer	For 5 mm cleave
HTS-12	High precision fiber stripper	-
USC-02	Ultrasonic cleaner	-
FSR-02	Recoater & Proof-tester	-
FP-03 / 03(L=40)	Fiber protection sleeve	-
FPS01-400 -12/15/2025/34/40	Micro sleeves for 400 µm fiber	-
FPS01-900 -15/20/2534/45	Micro sleeves for 900 µm fiber	-

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3. SPECIFICATIONS

3-1 Applicable optical fibers

Applicable fiber	Silica based Single-mode and Multi-mode glass fiber : SMF (G.652), MMF (G.651), NZDSF (G.655), EDF, DCF, LDF and PMF. etc.
Fiber dimension	Cladding dia. : 0 to 500 μ m Coating dia. : 100 to 2,000 μ m
Fiber length	3.0 to 8.5mm (distance between fiber end and v-groove edge)

3-2 Splicing performance

Splice loss	SMF : 0.01 to 0.03 dB
	MMF : 0.00 to 0.02 dB
	NZDSF/LDF : 0.02 to 0.05 dB
	PMF : 0.03 to 0.06 dB
Splicing time	SMF/MMF : 15 to 20 sec.
	NZDSF/LDF : 25 to 30 sec.
	PMF (PANDA) : 35 to 50 sec. (FSM-100P)
	PMF (IPA) : 90 to 300 sec. (FSM-100P)
Polarization cross-talk	PMF (PANDA) : -40 dB / 0.6 degree (FSM-100P)
	PMF (IPA) : -32 dB / 1.4 degree (FSM-100P)
Return loss	60dB or more

* The above splice loss depends on fiber type, wave length, clamping method and alignment method.

* Above data for homogeneous fiber splicing.

3-3 Tube heating performance

Heating time	FP-03 (40 mm) : 30 sec.
	FP-03 (60 mm) : 35 sec.
	Micro sleeves : 55 sec.

* Data in room temperature.

* Micro sleeve heating time depends on type.

3-4 Dimensional data

Dimensions	311W x 232D x 160H [mm]
Weight	7.7 kg or 7.9 kg (FSM-100P) excluding AC adapter.

* Dimensions: Monitor / wind protector included, but not protruded parts.

3-5 Operation and storage condition

Operation	Temperature : 0 to 40 C degrees
	Humidity : 0 to 95 % RH (non-dew)
Storage	Temperature : - 40 to 80 C degrees
	Humidity : 0 to 95 % RH (non-dew)

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3-6 Display

Monitor type	4.1 inch TFT color LCD monitor x 2 pcs.
Features	Scratch-proof transparent protector equipped. Monitor image turns up side down depending on monitor angle.
Magnification	125 µm : 187 to 300 X 250 µm : 93 to 150 X 400 µm : 58 to 93 X

* Magnification can manually be changed.

3-7 Fiber clamping

- Motorized v-groove covers 60 to 2,000 cladding / coating diameters with no additional accessories / adjustment.
- Fiber clamps are integrated into wind-protector. Fiber clamps open / close with wind-protector action.
- Fiber clamps move up / down automatically after wind-protector is closed for stable fiber loading to v-groove.

3-8 Sweep function

- Z axis can move during arc discharge 1) to control heat distribution to the fiber to allow gentle MFD thermal expansion for dissimilar fiber splicing, or 2) to taper or shape fibers for non-splicing applications. Sweep length is +/- 5 mm.

3-9 Z axis proof test

Tensile proof test	1.96 N (259 g) to 2.45 N (277 g)
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* Proof test strength depends on distance between splice and v-groove. This function can be cancelled in menu.

3-10 Fiber vertical height adjustment function

- Fiber height can be vertical moved relative to the splicing arc. This is to control heat distribution to fiber and is beneficial for splicing heat sensitive fibers or low melting point fibers. Moving range -0.3 mm to +0.1 mm against electrode vertical position.

3-11 Electrode

Electrode type	ELCT2-25 (2 mm in dia. x 25 mm long)
Electrode life	2,500 arcs (SMF G.652 with electrode gap of 1mm)
Electrode gap	1.0 to 3.0 mm motorized

3-12 Terminals

DC input terminal	DIN 4 pin, DC 19 V / 4.5 A
PC interface	USB2.0 (Mini-B) slave
 GPIB terminal	IEEE488 24 pin for power-meter connection
Other terminal	Mini-DIN 6 pin x 2 to control optional accessories

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3-13 Operation key arrangement

- Two sets of key-pads are arranged on the top plate for more flexible operation styles.

3-14 Power supply

External AC-adapter	ADC-15
Input	AC100 to 240 V (50 Hz to 60 Hz)
Output	DC 19 V / 7.9 A
Power consumption	Max. 100 W

3-15 Software related

Splice modes	Total 300 modes with a series of pre-programmed modes. - Standard splice modes - Full manual splice modes - Power-meter splice modes - Attenuation splice modes - Fiber shaping modes
Heater mode	Total 100 modes
Storage of splice result in memory	Splice result : 2,000 results Screen image : 100 images
Arc power Calibration	- Offset-back method for standard fiber splicing - Melt-back method for special fiber splicing - Real-time calibration by arc-brightness observation
Arc position Calibration	- Arc brightness pattern analysis during arc-discharge - Arc brightness pattern analysis during fusion splice
Leaning function	- Fiber identification and warning - Auto-focus position result - Unique profile of PM fibers (FSM-100P)

3-16 PC communication

Software upgrade	Software can be upgraded via internet.
Screen image Transfer	Screen image can be uploaded to PC.
Data / parameter	Splice parameters, heating parameters and utility parameters can be uploaded / downloaded with PC.
Parameters for splice loss estimate	Parameters for splice loss estimate can be calculated with PC
PC operation	Splicer can be operated by PC. Sample software (open source-file) and complete set command codes are available.

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