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SPECIFICATION
FOR
FSM-30S
SINGLEMODE / MULTIMODE
FIBER FUSION SPLICER

SPECIFICATION FOR FSM-30S SINGLEMODE/MULTIMODE FIBER FUSION SPLICER

1. GENERAL

This specification covers the FSM-30S Singlemode/Multimode Fiber Fusion Splicer with a built-in 4-inch LCD TV monitor and a built-in tube heater, necessary for splicing and protection of singlemode, multimode, dispersion shifted, or cut-off shifted fibers.

The method to detect the core axes and align those with very high precision is identical to the former model FSM-20CSII. The FSM-30S therefore features the same advantages as the FSM-20CSII as well as newly added functions, features and benefits.

The new FMS-30S features the following:

1. Fully automatic operation once fibers are set. (Core-to-core alignment)
2. Observation of both X and Y axes (three dimensional observation) simultaneously
3. Atmosphere, humidity and temperature compensation function provided
4. Mechanical proof test function
5. The FSM-30S can store automatically the last 100 splice losses together with the dates. A built-in memory card slot is available as an option for more data storage.
6. Mode field diameter mismatch compensation splicing programs are provided, suitable for splicing 2 different fibers (such as splicing a DS fiber to an Er doped fiber).
7. Splice loss control function is provided for creating an in-line fixed attenuator.
8. Arc power is optimized automatically by an integrated arc power test.
9. Heating cycle of the tube heater can be programmed by the customer.
10. Dust detection function is provided.
11. The threshold of the acceptable cleaved angle of the fibers can be set by the customer.
12. Messages can be displayed in many languages.

2. FUSION SPLICER AND INCLUDED ACCESSORIES

One FSM-30S Singlemode/Multimode Fiber Fusion Splicer kit includes the following (from Item 1 to 8) which are packed in the rugged FRP case.

Table 1 List of Included Items

| Item | Description | Qty. |
|------|------------------------------------------|--------|
| 1 | FSM-30S SM/MM/DS/CS Fiber Fusion Splicer | 1 pc. |
| 2 | AC Power Cord | 1 pc. |
| 3 | Rugged FRP Case | 1 pc. |
| 4 | Spare Electrodes | 1 pair |
| 5 | Spare Fuses | 1 set |
| 6 | Spare Mirror | 1 pc. |
| 7 | Tool Set | 1 set |
| 8 | Instruction Manual | 1 pc. |

3. SPECIFICATION

3.1 Applicable Optical Fibers

Singlemode fibers irrespective of the refractive index profile (matched cladding and depressed cladding optimized at 1310nm, dispersion shifted at 1550nm, cut-off shifted, dispersion flattened at both 1310 and 1550 nm and Er doped fiber) and irrespective of the coatings (tight buffer or loose tube in structure, and clear or colored) and multimode fibers.

3.1.1 Fiber Cladding Diameter
100 to 150 μm , but upon request 80 to 100 μm may be applicable as an option.

3.1.2 Fiber Cleaved Length
8 - 16mm, with 250 μm O.D. coated fibers, and 16mm with 900 μm O.D. coated fibers

3.1.3 Fiber Coating Diameter
0.1 to 1.0 mm, but upon request 1.0 to 1.5 mm also applicable as an option. For fiber coatings with diameters exceeding 1.5 mm, please consult Fujikura.

3.2 Fiber Clamping Method

A pair of double clamping mechanical chucks are employed.

3.3 Check and Alignment

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

With multimode fibers, fiber-to-fiber (not core-to-core) alignment, using the same technique.

3.3.1 Setting of Cleaved Angle Threshold for Alarm

The threshold of the acceptable total included cleave angle prior to fusing splicing is selectable between 1 degree and 5 degrees in 1 degree increments. When the actual angle(s) is (are) more than the preset angle threshold, the splicer stops and displays an alarm.

3.4 Arc Fusion Splice Method

Automatic pre-fusion and fusion controlled by the built-in computer.

Discharge between electrodes

| | |
|-----------------|---------------------------|
| Trigger voltage | 7000 VDC |
| Arc voltage | 500-600 VAC |
| Frequency | 120 kHz |
| Arc current | 12 to 21 mA approximately |

3.4.1 Fusion Splicing Programs

Four different fibers' fusion programs are pre-installed and pre-programmed in the built-in ROM by Fujikura.

- 1 program for singlemode fiber optimized at 1300nm
- 1 program for dispersion shifted fiber and dispersion flattened fiber
- 1 program for cut-off shifted fiber
- 1 program for multimode fiber

In addition, 30 different fusion programs can be stored in the built-in RAM by the customer. These customer definable fusion programs can be applied to singlemode fiber optimized at 1310nm, dispersion shifted and dispersion flattened fiber, cut-off wavelength shifted fiber, and multimode fiber. In addition, these programs can be optimized to compensate for mode field diameter mismatch when splicing two different fibers, such as splicing a singlemode or DS fiber to an Erbium doped fiber.

3.4.2 Controlled Attenuation Fusion Program

The splice loss control function is provided to obtain an intentionally high splice loss. The attenuation value may be set at values from 0.5dB to 20dB in 0.5dB increments. This program may be selected for either singlemode or dispersion shifted fiber.

3.4.3 Atmosphere, Humidity and Temperature Compensation Function

The splicer has three built-in sensors: an atmospheric pressure sensor, a humidity sensor and a temperature sensor. The sensors feed back the ambient conditions to the microprocessor to optimize the arc current automatically. The ranges covered by the automatic compensation are 0 to 3,500 meters in altitude, 0 to 95% RH and -10 to +50°C, respectively.

3.4.4 Arc Power Adjustment

The arc power is automatically analyzed and adjusted by the microprocessor after every splice.

3.5 Splice Loss

3.5.1 Actual Splice Loss

Typical 0.02dB with identical singlemode fibers, typical 0.04dB with identical dispersion shifted fibers, and typical 0.01dB with identical multimode fibers to ITU-T Recommendations G.652, G.653 and G.651 respectively, when measured by the cut-back method to the relevant ITU-T and IEC standards.

3.5.2 Splice Loss Estimation Function

An estimated splice loss shall be displayed on the LCD monitor irrespective of singlemode fiber, dispersion shifted fiber (at 1550 nm), cut-off shifted fiber (at 1550 nm) or multimode fiber splicing.

3.5.3 Storing Splicing Data

The last 100 splice losses together with the dates can be stored automatically and can be reviewed on the LCD monitor. Such data can be printed out, if necessary, using an optional external printer.

In addition, a built-in memory card slot is available as an option for more data storage. When the memory card (PCMCIA) is installed in the splicer main body, the following number of splice losses together with the cleaved fiber angles, splice conditions and the dates are stored automatically.

| Memory Card Capacity | Storage Capacity |
|----------------------|-------------------------|
| 1 Mb | 24,000 splicing results |
| 64 Kb | 1,600 splicing results |

The stored data in the memory card can be loaded into an IBM-compatible PC, if necessary, using an optional data down load program.

3.6 In-line Proof Tester

A proof test or tensile strength test of 200 grams is carried out on each spliced fiber. For proof test values other than 200 grams, please consult the factory.

3.7 Built-in Tube Heater

The built-in ceramic heater is provided unless otherwise ordered. The heating program may be changed in order to optimize the heating process with any kind of the heat shrinkable splice protectors and to compensate for ambient conditions. In addition, a dual circuit heating element allows the tube heater to be switched between modes optimized for 60mm length splice protectors or 40mm length splice protectors.

3.8 TV Monitor

The TV monitor shall be a 4-inch LCD. The image on the monitor shall be seen even in daylight.

3.9 Dust Check Function

A dust detection function is provided to inspect for dust in the optical path. Judgment of the dust check, good or bad, is automatically performed. The judgment of acceptability is displayed on the monitor.

3.10 Language of Displayed Messages

Messages on the monitor are displayed in English unless otherwise ordered. The following languages are available as of the date of this issue: French, German, Italian, Spanish, Portuguese, Korean, Chinese. For other languages, please consult the factory.

3.11 Interface

RS-232C, 2400bit/sec, start 1 bit, stop 1 bit, data 8 bits, parity none.