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› Signal Fire AI-20 Fusion Splicer User Manual

Signal fire AI-20

Signal Fire AI-20 Fusion Splicer User Manual

High-Precision One-Step Fiber Cutter, Integrated Optical Splicer & 3 in 1 Fiber Holder with VFL and OPM Function

1. INTRODUCTION

The Signal Fire AI-20 Fusion Splicer is a fourth-generation optical fiber fusion splicer designed for high-precision fiber optic work. It integrates an electric one-step fiber cleaver, a fusion splicer, and a 3-in-1 fiber holder, along with built-in VFL (Visual Fault Locator) and OPM (Optical Power Meter) functions. This manual provides essential information for the safe and efficient operation and maintenance of your AI-20 Fusion Splicer.

AI-20A

The fourth generation trunk line optical fiber fusion splicer

FULL LINK INTEGRATION DESIGN HIGHLY INTEGRATED



Six motors



Fiber core alignment



Built-in
OPM function



Built-in
VFL function



6S splicing



15S heating



Delay return electric
one-step fiber cleaver



Equipped with
Signal fire stripper

Figure 1: Signal Fire AI-20 Fusion Splicer overview with key features.

2. SAFETY PRECAUTIONS

Always observe the following safety precautions to prevent injury and damage to the device:

- **Eye Protection:** Always wear appropriate eye protection when working with fiber optics, especially when using the VFL, as laser light can cause eye damage.
- **Fiber Shards:** Handle cleaved fiber ends with extreme care. Fiber shards are very sharp and can cause serious injury. Dispose of all fiber scraps properly in a designated container.
- **Electrical Safety:** Ensure the device is powered off and unplugged before performing any maintenance or cleaning. Do not operate the device in wet conditions.
- **Cleaver Maintenance:** Keep the fiber cleaver clean to ensure accurate cuts. Refer to the maintenance section for cleaning instructions.
- **Battery Handling:** Use only the specified charger and battery. Do not expose the battery to extreme temperatures or physical damage.

3. SETUP

3.1 Unpacking and Inspection

Carefully unpack all components from the carrying case. Verify that all items listed in the packing list are present and undamaged. The carrying case also functions as a workbench and work stool for convenience.

Video 1: Unboxing and initial setup of the Signal Fire AI-20/AI-30 Fiber Fusion Splicer, demonstrating how to access components from the case.

3.2 Charging the Battery

The AI-20 is equipped with a 7800 mAh lithium battery. Ensure the battery is fully charged before initial use. The device supports multiple charging methods.

- Connect the power adapter to the charging port on the splicer or directly to the battery.
- A full charge typically takes approximately 3.5 hours.



Figure 2: Illustration of how to access and remove the battery for charging or replacement.

3.3 Installing the Fiber Stripper

The AI-20 comes with a 9-in-1 multifunctional signal fire stripper. This tool is essential for preparing the fiber before cleaving and splicing.



Figure 3: The Signal Fire stripper, a key accessory for fiber preparation.

4. OPERATING INSTRUCTIONS

4.1 Fiber Preparation and Cleaving

1. Use the provided fiber stripper to remove the protective coating from the fiber, exposing the bare fiber.
2. Clean the bare fiber with an alcohol wipe to remove any residue.
3. Place the prepared fiber into the electric one-step fiber cleaver. Ensure the fiber passes the far right of the cutter.
4. Close the cleaver lid. The fiber will be automatically cut. The factory standard delay time for the cleaver return is 0.5 seconds, adjustable from 0.2 to 2 seconds via the mobile app.



Figure 4: Detailed view of the automatic delayed return electric one-step fiber cleaver.

4.2 Fiber Splicing

1. Open the splicer's lid and place the cleaved fibers into the V-grooves, ensuring they are properly seated in the 3-in-1 fiber holder.
2. Close the splicer's lid. The AI-20 uses core alignment technology with six motors to automatically align the fibers.
3. The splicing process will begin automatically. The splicing time is approximately 6 seconds.
4. After splicing, the heater will automatically close, and the heat shrink sleeve will be heated in approximately 15 seconds.



Figure 5: The 3-in-1 fiber holder for various fiber types.

4.3 Using the Built-in OPM and VFL

The AI-20 features integrated Optical Power Meter (OPM) and Visual Fault Locator (VFL) functions.

- **OPM:** The OPM can measure connection losses and verify continuity. It supports wavelengths of 850nm, 1300nm, 1310nm, 1490nm, 1550nm, 1625nm, 980nm, 1270nm, 1577nm, and 1650nm.
- **VFL:** The VFL helps evaluate fiber link transmission quality. It can be switched between three power states: 15mW, 2Hz flashing, and steady on mode.



Figure 6: Location of the built-in Optical Power Meter (OPM) and Visual Fault Locator (VFL) ports.

4.4 Mobile App Connectivity

The splicer can connect to a mobile app for intelligent interaction. This allows users to:

- Check splicing data.
- Download or output data at any time.
- Store splicing records indefinitely.
- Adjust cleaver settings, including delay time and LED brightness.
- Switch between ten different languages.

5. MAINTENANCE

5.1 Cleaver Blade Maintenance

The electric one-step cleaver features an automatic blade change mechanism. If three consecutive unqualified cuts occur,

the cutter will automatically change the cleaver blade surface to a new cutting point. You can also manually change the blade surface via the app or by pressing the button on the device.

Important: Keep the cleaver clean when using it; otherwise, it will affect the accuracy of the cuts.



Figure 7: The cleaver's automatic and manual blade surface change mechanism.

5.2 Cooling Tray

The splicer includes a cooling tray that can be folded and expanded to accommodate heat-shrink sleeves after heating.

5.3 General Cleaning

Regularly clean the splicer's V-grooves, electrodes, and display screen with appropriate cleaning tools and solutions (e.g., lint-free wipes and isopropyl alcohol) to ensure optimal performance.

6. TROUBLESHOOTING

If you encounter issues with your Signal Fire AI-20 Fusion Splicer, refer to the following common problems and solutions:

| Problem | Possible Cause | Solution |
|---------|----------------|----------|
|---------|----------------|----------|

| Problem | Possible Cause | Solution |
|-------------------------------------|---|--|
| Poor splice loss / High attenuation | Dirty fiber ends, incorrect cleave angle, worn electrodes, dirty V-grooves. | Clean fiber ends thoroughly. Inspect and clean the cleaver. Replace electrodes if worn. Clean V-grooves. Perform arc calibration. |
| Cleaver not cutting cleanly | Dirty cleaver blade, worn blade surface, incorrect fiber placement. | Clean the cleaver blade. Manually or automatically change to a new cutting point on the blade. Ensure fiber is correctly positioned. |
| Device not powering on | Low battery, faulty battery, power adapter issue. | Charge the battery. Check battery connection. Test with a different power source or battery if available. |
| Error Codes (e.g., E11, E20, E22) | System malfunction, calibration required, sensor issue. | Perform a factory reset and recalibration. Clean all optical components. If the issue persists, contact customer support. |

For further assistance, please refer to the support section or contact Signal Fire customer service.

7. SPECIFICATIONS

Key technical specifications for the Signal Fire AI-20 Fusion Splicer:

| Feature | Detail |
|-----------------------|--|
| Brand | Signal fire |
| Model | AI-20 |
| Power Source | Battery Powered (7800 mAh Lithium Battery) |
| Splicing Time | 6 seconds |
| Heating Time | 15 seconds |
| Display | 5-inch High-Resolution LCD Screen |
| Magnification | Up to 320x (X/Y axis separately), 200x (X and Y axis dual display) |
| Fiber Cleaver | Electric One-Step Fiber Cleaver with automatic delayed return |
| VFL Output Power | 15mW (3 states: 15mW, 2Hz flashing, steady on) |
| OPM Wavelengths | 850nm, 1300nm, 1310nm, 1490nm, 1550nm, 1625nm, 980nm, 1270nm, 1577nm, 1650nm |
| OPM Measurement Range | -50 to +30dBm |
| Item Weight | 7.06 Ounces (Splicer unit only) |
| Item Dimensions | 6.5 x 9.06 x 10.04 inches |
| Certifications | CE, NIST, RoHS, UL |



BASIC PARAMETER

| | |
|------------------------|--|
| Cutting length | Coating layer 250µm below: 8-16mm/coating layer 250-1000µm: 16mm |
| Heat shrink tube | 60mm, 50mm, 40mm, 25mm |
| Tensile testing | standard 2N |
| display | 5 inch TFT color display screen |
| Boot time | 1s, boot can enter the working mode |
| Data is stored | Unlimited, machine storage 1000 groups, the excess part can be stored in the server, can export data. |
| Wireless communication | Based on bluetooth 4.2 protocol standard, the working band is 2.4GHz, the maximum transmission range is 60m |
| Software upgrade | Mobile phone APP Internet update, enable Bluetooth synchronization upgrade machine software |
| Management function | The equipment owner can be bound as the highest authority, and can remotely view the welding records, welding time, loss, etc. through the mobile phone APP. The number of welding times or working time of the equipment can be set. The manager can effectively manage a single or multiple equipment. |
| Return loss | Better than 60 db |
| Product protection | Waterproof, dustproof and fall proof |
| Power supply | Input AC100-240V 50/60Hz, output DC13.5V/4.8A, the current power mode can be identified, real-time monitoring of the current battery level |
| The work environment | Temperature: -15 ~ +50°C, humidity: < 95%RH (no condensation), working altitude: 0 ~ 5000m, maximum wind speed: ≤15m/s |

| | |
|--------------------------|---|
| Fiber alignment | Core/cladding; Real-time luminous flux assisted alignment (Only applicable to environments with stable optical signal link from front) |
| Motor number | 6 motors Accurate of fiber alignment 0.1µm |
| Splicing time | 6s |
| Heating mode | 15s, can be customized according to the external environment |
| Fiber type | Single-mode fiber (SMF/G.652), BIF/G.657; Suitable for single mode, multi-mode, bare fiber, tail fiber, drop cable, jumper, invisible optical fiber. |
| The cladding diameter | 80-150µm |
| Splicing loss | 0.02dB (SM) , 0.01dB (MM) 0.04dB (DS/NZDS) |
| Splicing mode | Automatic focusing core alignment, conventional/high precision splicing |
| Splicing way | Automatic, semi-automatic, manually |
| Fiber cleaver | High precision delay return electric one-step fiber cleaver |
| Visual Fault Locator | Power:15mw,2hzflashing And Constantly Bright Mode |
| Optical Power Meter | Wavelength:850nm, 1300nm, 1310nm, 1490nm, 1550nm, 1625nm, 980nm, 1270nm, 1577nm, 1650nm; Measuring Range:-50+30dbm Absolute Error:<0.3db(-50dbm ~ +3dbm Range) |
| Fusion splicer languages | 10 languages (Chinese, Russian, English, French, Italian, Thai, Portuguese, Spanish, Arabic, Polish) |
| Fiber holder | Three in one fixture, no need to change, suitable for single/multi-mode, multi-core cable/bare fiber, tail fiber, jumper, leather cable |
| Battery capacity | 7800mAh large capacity lithium battery charging time ≤3.5 hours; It can continuously weld and heat about 240 cores |
| Magnification | 320x (X or Y axis single display), 200x (x and Y axis dual display) |
| Fiber diameter | Coating diameter: 80-150µm/Coating diameter: 100-1000µm |

Figure 8: Detailed basic parameters and specifications for the Signal Fire AI-20.



Figure 9: Weight and dimensions of the Signal Fire AI-20 splicer and its toolbox.

8. WARRANTY AND SUPPORT

8.1 Product Warranty

The Signal Fire AI-20 Fusion Splicer is designed for durability and performance. For specific warranty details, please refer to the warranty card included with your product or contact Signal Fire customer service. Optional protection plans, such as a 4-Year Protection Plan, may be available for extended coverage.

8.2 Returns and Replacements

A 30-day return/replacement policy is typically offered. Please check your purchase documentation for the exact terms and conditions.

8.3 Customer Support

For technical assistance, troubleshooting, or inquiries regarding your Signal Fire AI-20 Fusion Splicer, please visit the official [Signal Fire Store on Amazon](#) or contact their customer service directly.

