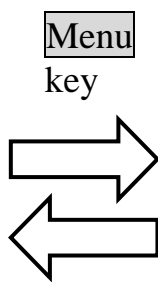
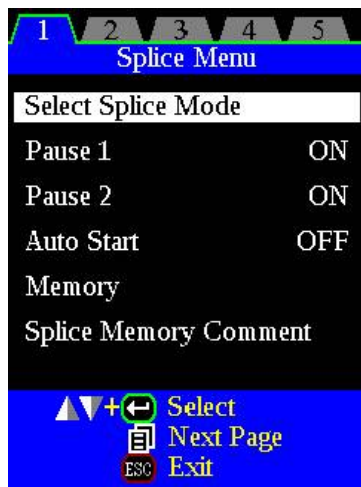


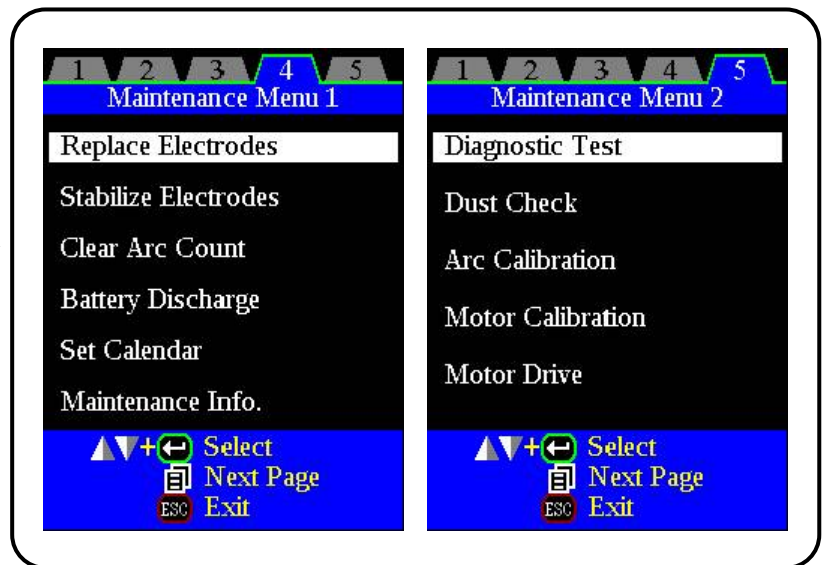
The splicer has the ability to perform routine maintenance. This section describes how to use the maintenance menu.

- (1) Press **Menu** key in [READY], [PAUSE1], [PAUSE2], [FINISH] state. Press **Menu** key to display [Maintenance Menu1], [Maintenance Menu2].
- (2) Select a function to perform.

Splice Menu



Maintenance Menu



1. Replace Electrodes

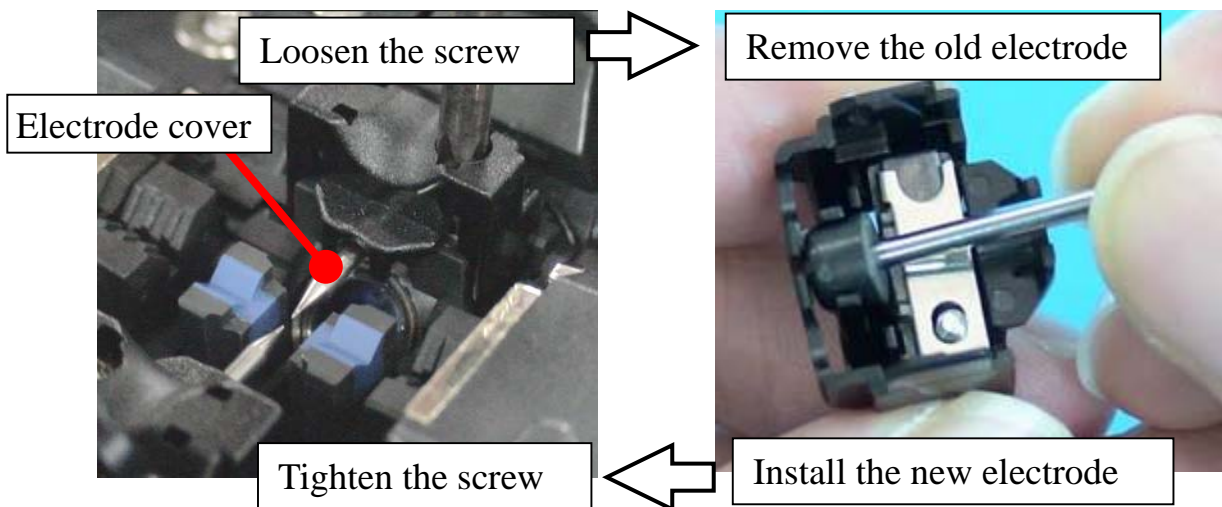
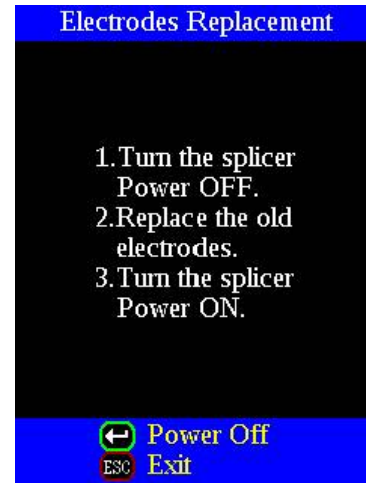
It is recommended that the electrodes be replaced after 2,500 arc discharges. When the number of arc discharges reaches a count of 2,500 a message prompting to replace the electrodes is displayed immediately after turning on the power. Using the worn electrodes will result in greater splice loss and reduced splice strength.

Replacement Procedure

- (1) Execute [Replace Electrode] in [Maintenance Menu 1].
- (2) Instruction messages will appear on the screen to turn off the power. Press and hold **Enter** key till the LED color changes from green to red.
- (3) Remove the old electrodes.

To remove and replace the electrodes:

- (i) Loosen screw located on electrode cover.
- (ii) Take electrode out of electrode cover. (Electrode is fit in electrode cover)

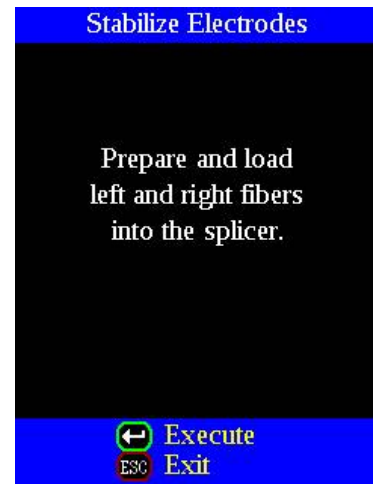


- (4) Install the new electrodes with care; do not hit the electrode tips.
 - (i) Fit the electrode in the electrode cover.
 - (ii) Place the electrode cover on the splicer and tighten screw.



- Apply tightening torque of 2kgf-cm when tightening screw to fix electrode.
- Make sure the electrodes are attached firmly after tightening screws.
- Electrode cleaning is not recommended.

- (5) Turn on the power, prepare and load fibers into the splicer and press **Enter** key. After executing the arc calibration, the splicer will repeat arc discharge 45 times in succession to stabilize the electrodes.
- (6) Upon completion of repeated arc discharge, the splicer executes an arc calibration again. The operator should repeat arc calibration until the “Test Finish” message appears. For details of the arc calibration process, see page 99 [Arc Calibration].



2. Stabilize Electrodes

In the event of sudden change in environmental conditions, etc., the arc power sometimes becomes unstable, resulting in higher splice loss. Especially when the splicer is moved from lower altitudes to higher altitudes, it takes time for the arc power to stabilize. In this case, stabilizing electrodes will expedite the process of making the arc power stable. If many tests are needed until the “Test OK” message appears in [Arc Calibration], use this function as well.

Operation Procedure

- (1) Select the [Stabilize Electrodes].
- (2) Set prepared fibers in both sides of the splicer as in the case of splicing.
- (3) Press **Enter** key and the splicer begins to stabilize the electrodes in the following ways:
 - Repeats short arc discharge four times to measure the arc position.
 - Performs [Arc calibration] to calibrate the arc power.
 - Perform 45-cycle continuous discharge to stabilize the electrodes.
- (4) After completing stabilization, always perform an additional [Arc Calibration].

3. Clear Arc Count

This function enables the stored number of arc discharges to be reset.

- (1) Select the [Clear Arc Count].
- (2) As the confirmation screen “Is it OK to clear?” appears, press **Enter** key to clear.



- This function is included in the [Replace Electrodes] function.
- The number of arc discharges in the “Total Arc Count” field displayed on the [Maintenance Info.] screen cannot be reset.

4. Battery Discharge

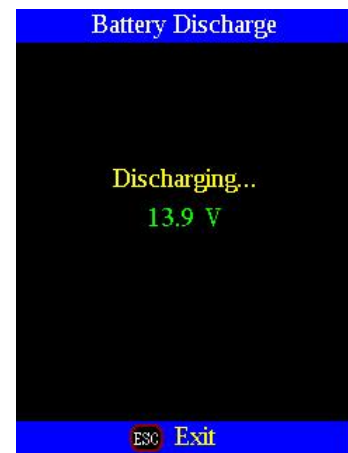
The battery pack (BTR-08) uses Ni-MH cells. If the battery pack is recharged repeatedly even though a sufficient capacity still remains, a memory effect would make it seem as if the battery capacity has decreased. If such a phenomenon occurs, execute [Battery Discharge] to reduce the remaining capacity to zero. Then, recharge the battery pack to restore the capacity. It is recommended that complete discharge of the battery pack should be performed every month.



- If the splicer is left in the normal power-on state, the splicer will shut down before the battery is discharged completely. Therefore, it is necessary to use the [Battery Discharge] function to discharge the battery pack completely.
- The power saving function turns off automatically during [Battery Discharge].

Operation Procedure

- (1) Insert the battery pack inside the splicer that is intended to discharge completely, and turn on the power.
- (2) Change the screen from [Main Menu] to [Maintenance Menu 1] and execute [Battery Discharge].
- (3) The [Battery Discharge] screen is displayed, and the remaining battery voltage is indicated.
- (4) Upon completion of full discharge, the buzzer sounds and the power turn off.



- If the battery pack is almost fully charged, it will take a significant amount of time to discharge it completely. It is recommended that this function be used after considerable time of use when the capacity is low.

- (5) Recharge the battery pack.

5. Set Calendar

This function sets the date and time in the calendar incorporated in the splicer.

Operation Procedure

- (1) Select the [Set Calendar]
- (2) As the year, month, day and time are displayed, press **Menu** key to move the cursor to the parameters, and press **Up/Down** Arrow key to adjust numerical values.
- (3) After completion of calendar setting, press **Enter** key. The date and time are stored.



6. Maintenance Info.

Select the [Maintenance Info]. The following information is displayed.

Parameter	Description	
Serial Num.	Displays the serial number of the splicer.	
ROM Version	Displays the version number of the software.	
Arc Count	Displays the number of arc discharges after electrode replacement. Performing the function [Replace Electrodes] or [Clear Arc Count] resets this parameter to zero.	
Total Count	Displays the total number of arc discharges.	
Last Maintenance	Displays the date of last maintenance.	To enter the date, see page 86 [Maintenance Settings].
Next Maintenance	Displays the scheduled date of next maintenance.	

7. Diagnostic Test Function

The FSM-60S has a built in diagnostic test feature that allows the operator to perform a simple one step evaluation of splicer performance covering several different critical variables. Perform this function in the event of splicer operation trouble.

Operation Procedure

- (1) Select the [Diagnostic Test] in the [Maintenance Menu 2] and execute [Diagnostic Test]. The following checks will be made.

	Check Item	Description
1	LED Check	Measures and adjusts the brightness of the illumination LED.
2	Dust Check	Checks the optical path for dust or dirt and judges whether they disturb fiber observation. If contamination exists, this function indicates the location.
3	Motor Check	Check the Motor Limit Sensor.
4	Arc Calibration	Automatically calibrates the arc power factor and fiber splicing position.
5	I/O Port Check	Checks for normal operation of the input and output terminals of the internal circuit.
6	Memory Check	Checks the memory of the internal circuit.



- Before the start of the test, remove the fibers from the splicer.
- When the Motor check is completed, prepare and load the fibers into the splicer and press **Enter** key.

- (2) Upon completion of all checks and adjustments, a list of results is displayed.
If the dust check result is not good, clean the objective lenses. In the case that cleaning cannot eliminate contamination, there is a possibility that the contamination may have entered the inside of the optical path. Please contact the authorized distributor for additional instructions.
The dust check and Motor Calibration functions exist as independent instructions in [Maintenance Menu 2]. It is possible to execute them independently.

8. *Dust Check*

The splicer observes fibers through image processing. Dust or contaminants on the cameras, lenses and wind protector mirrors disturb normal observation of fibers and may result in improper splicing. This function checks the optical path for the presence or absence of contaminants and judges whether they cause trouble for fiber splicing.

Operation Procedure

- (1) Select the [Dust Check] in the [Maintenance Menu 2].
- (2) If fibers are set in the splicer, remove them and press **Enter** key again. The splicer begins the dust check.
- (3) The message “Now Checking” is displayed in the middle of the screen. After observation, the location of contamination judged as a potential problem blinks. If contamination is discovered, clean the wind protector mirrors and objective lenses and redo [Dust Check]. See page 52 the section of [Maintenance of Splicing Quality] for cleaning instructions.
- (4) Press to finish dust check.



- In case you have cleaned or replaced the wind protector mirrors, and have cleaned the objective lenses, and dirt or dust still remain, contact the authorized distributor.

9. Arc Calibration

Atmospheric conditions such as temperature, humidity, and pressure are constantly changing, which creates variability in the arc temperature. This splicer is equipped with temperature sensor that is used in a constant feedback monitoring control system to regulate the arc power at a constant level.

Changes in arc power due to electrode wear and glass adhesion cannot be corrected automatically. Also, the center position of arc discharge sometimes shifts to the left or right. In this case, the fiber splicing position has to be shifted in relation to the arc discharge center. It is necessary to perform an arc power calibration to eliminate both of these issues.



- Arc calibration is performed automatically using [AUTO] mode only. So arc calibration does not have to be performed when splicing in this mode.
- Execute [Arc calibration] before using non-auto mode.
- Performing the [Arc Calibration] function changes the arc power “factor” value. The factor value is used in the algorithm program for all splicing. The arc power value will not change in the splice modes.

Operation procedure

- (1) Select [Arc Calibration] in [Maintenance Menu 2] to display Arc Calibration screen.
- (2) Set prepared fibers in the splicer.



- Use standard SM or DS or MM fiber for arc calibration.
- Use well prepared fibers for arc calibration. Dust on the fiber surface affects arc calibration.

- (3) The following is performed after pressing **Enter** key.

1. Calculating the Arc center

Arc discharge is performed without fibers in the view screen to detect the center of arc discharge and adjust the gapset position.

2. Cleaning arc discharge

The left and right fibers move forward. The splicer performs the cleaning arc discharge.

3. Gap setting

The left and right fibers further move forward and stop at the specified gap setting position.

4. Arc discharge

The splicer performs an arc discharge without stuffing the fibers together. . The gap between the left and right fibers is melted back by the arc discharge.

5. Measurement result

After the arc discharge, the melt-back amounts of the left and right fibers are measured by image processing circuits in the splicer.



- Cleave angle threshold does not link to the parameter "Cleave Limit" in splicing modes. Cleave angle threshold is independently set for arc calibration. See page 86 [Maintenance Settings] to change cleave angle threshold.

“Good” message

Arc power and splicing position calibration are successfully completed. Press **Escape** key to exit.

“Not Adequate” message

Arc power and splicing position calibration are completed but further calibration is strongly recommended, as the change from the previous arc calibration is too large. Press **Enter** key to perform arc calibration, or **Escape** key to exit even though arc calibration is not completed.

Select the [Arc Calibration]
in the [Maintenance Menu]

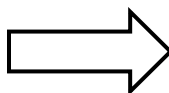


Enter key

Arc Calibration

Arc Calibration	
Prepare and load left and right fibers into the splicer.	
←	Execute
ESC	Exit

Enter key



Arc Calibration Result

Arc Calibration Result	
Results	
Power	Good
Position	Good
The arc power and the standard gap set position are calibrated adequately	
←	Execute
ESC	Exit

Arc Calibration Result	
Results	
Power	Not Adequate
Position	Good
The arc condition were not adequate. It is necessary to perform this function again. Prepare and load left and right fibers into the splicer.	
←	Execute
ESC	Exit



- In some cases, multiple iterations of arc calibration are needed until the calibration process is successfully completed and the "Test Finish" message is displayed. Arc calibration can be considered almost completed if multiple iterations are completed without receiving the message.
- Number threshold can be set so that "Test Finish" message is displayed after specific number of arc calibrations are performed. See page 86 [Maintenance Settings] for detail.

10. Motor Calibration

Motors were adjusted at the factory before shipping. However, settings could change due to various reasons. This function automatically calibrates the speed of all six motors.

Operation Procedure

- (1) Select the [Motor Calibration] in the [Maintenance Menu 2].
- (2) Load prepared fibers in the splicer and press **Enter** key.
- (3) Speeds for all motors are automatically calibrated. Upon completion, [Maintenance Menu 2] is displayed.



- Perform this function when "Fat" or "Thin" error has occurred, or fiber aligning or focusing is taking too much time.

11. Motor Drive

The six motors incorporated in the splicer can be manually operated individually. In the course of splicing, the motors can also be operated by calling this menu in the [PAUSE1], [PAUSE2] or [FINISH] state.

- (1) Select the [Motor Drive].
- (2) Pressing **Menu** key changes motor selection. The name of the selected motor is displayed in the upper section of the screen.
- (3) Press **Up/Down** Arrow key to drive the motor in the desired direction.

Motor	Up Arrow key	Down Arrow key
ZL/ZR	Forward.	Backward.
X/Y	Upward.	Downward.
Focus X Focus Y	Lens moves nearer fiber.	Lens moves away from fiber.



- When the motor reaches the limit of the operating range, the buzzer sounds and the motor stops. Press the opposite arrow key to reverse and move the motor again.
- Display messages can be erased by pressing **Enter** key. The message can be displayed by pressing **Enter** key again.
- If the motor is moved too much with respect to the spliced fiber, the fiber may break.