K33A
ALL IN ONE FUSION SPLICER
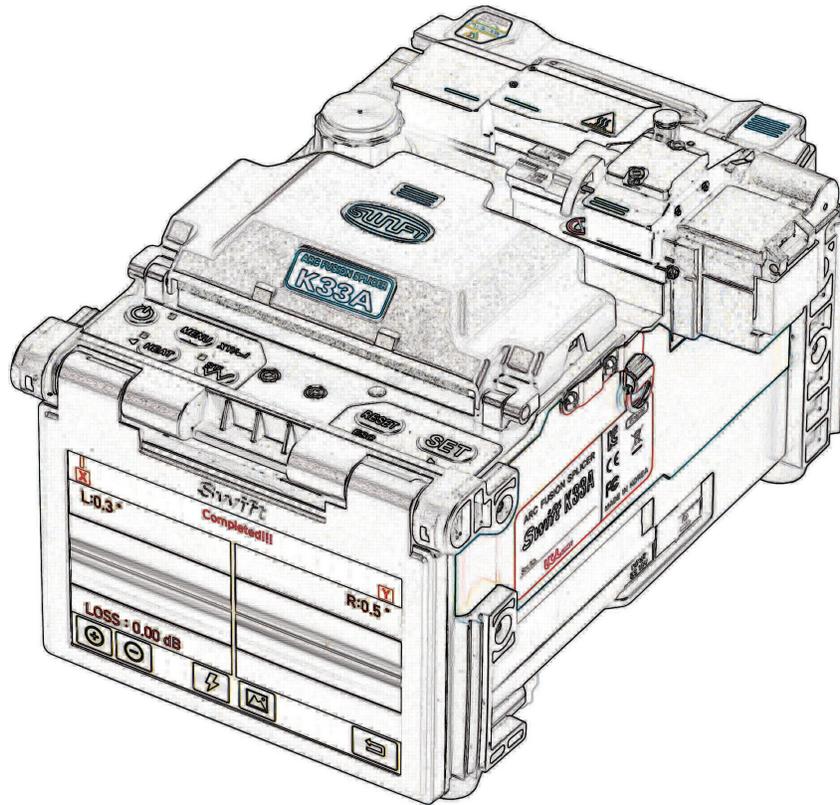
OWNERS MANUAL
& USER GUIDE

America ILSINTECH
A UCL SWIFT COMPANY

AmericaIlsintech.com

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K33A USER MANUAL

FOR YOUR SAFETY

The Swift K33A All in One core Align fusion splicer is designed for use both outdoors and indoors providing thermal stripping, cleaning, cleaving, fusion splicing and heat shrinking all with one easy to use tool. We strongly recommend users to read this manual carefully prior to operating the Swift K33A in order to prevent any accident or breakdown due to improper handling. Misuse of this device may cause injury or damage not covered by the warranty. This user manual provides all the necessary information to ensure splicing safely.

KEEP THIS USER MANUAL WITH THE DEVICE AT ALL TIMES.

UCLSWIFT Co., Ltd is not liable for any personal injury, any physical loss and damage to the device caused by inappropriate use or unauthorized modification of the equipment.

PRODUCT SAFETY WARNINGS

- Please, turn off the Swift K33A and disconnect the AC power cord from the AC adapter inlet or the wall socket immediately and contact UCLSWIFT Co., Ltd.
If any of following incidents occurs while operating:
    — Fumes, odor, noise or overheating.
    — Liquid or foreign substances fall into the device.
    — The splicer is dropped or damaged.

- Only use the supplied power cord with the Swift K33A. Using an improper AC power cord may cause fire, electric shock or personal injury.

- DO NOT touch the electrodes when the Swift K33A is powered on. The high voltage and temperature generated by electrodes may cause electric shock or injury.

- When connecting the supplied AC power cord to the battery check to ensure no dust or foreign substance is on the AC plugs before connecting it. Unsafe connection may cause fumes, fire or damage to the Swift K33A and result in serious personal injury or death.

- Apply correct voltage. The correct input AC power to the adapter is AC 100- 240V and 50-60Hz. Abnormally high AC output voltage or irregular frequencies generated by AC generators can cause damage to the battery and/or the K33A. Please measure the AC output voltage with a circuit tester. Abnormal high voltage and frequencies may result in serious electric shock, injury, death or damage to the equipment, it is important that regularly check the generator before use. DO NOT excessively pull, amend, misuse or apply heat to the AC power cable. Using a damaged power cable may result in fire or personal

injury. Connect 3-prong AC power cord. DO NOT use 2-prong, cable and plug.

- DO NOT touch the AC plugs, AC power cable or the Swift K33A with wet hands. It may cause an electric shock.

- DO NOT disassemble the AC adapter, battery or the Swift K33A. Any modification may cause fire, electric shock or personal injury and void the warranty.
When using the battery, follow instructions below:
    — Using battery other than in the package or provided by UCLSWIFT Co., Ltd may cause fumes, damage to the device, burn, serious injury or even death.
    — DO NOT throw the battery into fire or an incinerator.
    — DO NOT charge the battery near a flame.
    — DO NOT apply excessive shock to the battery.
    — If the battery is not fully charged or the green LED is not turned on in about two hours, stop charging immediately and contact UCLSWIFT Co., Ltd. DO NOT put anything on the AC adapter while charging.

- Use the supplied AC adapter (F1-1) at all times. DO NOT use other type of AC power cord and the battery. Excessive electric current may cause damage to the machine and personal injury.

- DO NOT run the Swift K33A near flammable liquid or explosive gas storage. The electric arc of the Swift K33A may cause fire or explosion.

- DO NOT clean the Swift K33A using compressed air or gas.

- Please check the shoulder belt before transporting. Transporting the case with a damaged shoulder belt may cause the damage of the Swift K33A and possibly personal injury.

- Make sure to wear protective glasses while splicing with the K33A at all times. If the fiber fragments come into contact with the eyes or skin, it can be extremely dangerous.

- DO NOT operate the Swift K33A at a high temperature or near heat, otherwise personal injury or damage to the device may occur.

EXTREMELY HOT

CAUTION HIGH VOLTAGE

DO NOT SPRAY FREON GAS

PRODUCT SAFETY WARNINGS (CONT'D)

- DO NOT touch the sleeve heater or the sleeve during or immediately after heating them. The hot surface may cause skin burn.

- DO NOT place the Swift K33A in an unstable or unbalanced position. The machine may fall, causing injury or damage to the Swift K33A.

- The Swift K33A is precisely adjusted and aligned. DO NOT allow the unit to receive a strong impact. Use supplied carrying case for its transportation and storage. The carrying case protects the Swift K33A from damage, moisture, shake and shock during storage and transportation.

- Replace the electrodes in a timely manner and maintain them as instructed below:
    — Use only the device specific electrode.
    — Place a new electrode in the correct position.
    — Replace the electrodes as a pair.

- Failure to comply with above instructions may cause abnormal arc discharge, resulting in damage to the machine or degradation in splicing performance.

- DO NOT chemicals other than ethyl-alcohol (96% or greater) to clean the objective lenses, V-groove, V-block, LCD monitor and body of the Swift K33A. Use of other solutions can cause blurring, discoloration, damage resulting in a degradation of performance and require factory service or repair. The Swift K33A requires no lubrication. Oil or grease may degrade its performance and damage the equipment.

- DO NOT store the Swift K33A in a place where temperature or humidity is high. Damage to the machine may occur.

- Repair and maintenance of the Swift K33A should be performed by a factory trained technician. Discuss with UCLSWIFT Co., Ltd to use the service.

K33A SPECIFICATIONS

GENERAL SPECIFICATIONS

SUBJECT	DESCRIPTION
Fiber alignment	IPAAS Core Alignment
Applicable fibers	SM(G.652), MM(G.651), DS(G.653), NZDS(G.655), SM(G.657 A1, A2/B2, B3), SM(G.654E)
Fiber count	Single fiber
Applicable fiber dimensions	Cladding diameter: 80~150 um , Coating diameter: 100 um – 3mm
Fiber cleave length	250 um: 5~16mm, 900 um: 8~16mm
Splicing modes	Splice mode: 300, Heat mode: 50
Average splice Loss	SM: 0.02dB, MM: 0.01dB, DS: 0.04dB, NZDS: 0.04dB
Return loss	> 60dB (Typical)
Splicing time	Typical 6 sec. (Quick Mode)
Splice loss estimate	Available
Sleeve heating time	9 sec (IS-45 Sleeve, IS-45 mode), 13 sec (IS-60 Sleeve, IS-60 mode)
Applicable protection sleeve	32mm, 40mm, 60mm (Fiber) / 28mm or 32mm (Connector)
Storage of splice result	10,000 results to be stored in the internal memory. (Image 10,000 results). External SDHC Memory slot
Tension test	1.96N ~ 2.25N
Operating conditions	Altitude: 0~5,000m above sea level, Temperature: -10ºC~50ºC, Humidity: 0~95%, Wind: 15m/s, Non-condensing, Dust proof, Waterproof, Shock proof
Storage conditions	Temperature: -40ºC~80ºC, Humidity: 0~95%
Dimensions	136(W) x 215(L) x 137(H)mm (Excluding bumper)
Weight	2.45kg (Including battery)

SUBJECT	DESCRIPTION
Viewing method and display	Two CMOS cameras and 5.0-inch color LCD monitor with Electrostatic touch screen
Fiber view and magnification	X/Y: 200X, Max 400X
Power supply	100 ~ 240V AC
Battery life with heat-shrink	Typical 230 cycles (6000mAh)
Electrode life	Typical 18,000 splices
Terminals	USB

K33A COMPONENTS

STANDARD ITEMS

DESCRIPTION	MODEL NO.	QUANTITY
Arc Fusion Splicer	SWIFT K33A	1
User guide CD	—	1
Spare electrode	EI-23	1 pair
Cooling Tray	—	1
Transporting Case	Hard Case	1
Battery	K3360(6000mAh)	1
AC Adapter	100-240V	1
Toolbox	—	1

OPTIONAL ITEMS

DESCRIPTION	MODEL NO.
Battery	K3360(6000mAh)
Cleaver Blade	BI-07
Electrode	EI-23
External Power	DC 12V (available for car cigar jack)
Sleeve	S-160 (60mm), S-140 (40mm)
Sleeve Clamp	—
Sleeve Loader (2ea)	—
Optical Fiber Holder	HS-250, HS-900, HS-2.5F, HS-IN, HS-SC/FC, HS-ILC, HS-ST, LS-900(Loose tube)
SOC Connector	SC, LC, FC, ST (refer to FTTx solution catalogue)

K33A PRODUCT DESCRIPTION

FUNCTION BUTTON

BUTTON	DESCRIPTION
⏻	To turn the power on/off-press button for about 1 second. Press for about 1 second in POWER ON status, the LCD monitor turns off. Unit will power down after 2~3 seconds.
MENU	Press once to enter the main menu screen.
SET	Press To initiate splicing of aligned fibers in the splicing chamber.
RESET	Return to the previous menu screen.
HEAT	To activate the sleeve heater.
ST	To supply power to the Automatic Fiber Stripper heater.
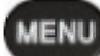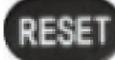
K33A PART NAMES

Sleeve Heater

Cleaver

Thermal Stripper

Cleaning Station

Windshield Cover

Battery

LCD Touch Screen Display

Data Sync Port/Power Port

Battery Release Button

Battery Indicator Display

Power On/Off Indicator

On/Off Button

Heat On/Off Indicator

Heat Button

Thermal Stripper On/Off Indicator

Thermal Stripper On/Off Button

Reset/ESC

Set/Fuse Button

Heat Cover 1

Heater

H-Connector Block

K33A AUTO STRIPPER

Swift K33A automatic fiber stripper automatically carries out an accurate stripping of the coating of single- and multi-mode fibers. Featuring excellent tensile force of fiber, the automatic stripper strips up to 28.0mm in length without damaging the surface of fiber. Read the user manual sufficiently to maintain the best performance of the unit.
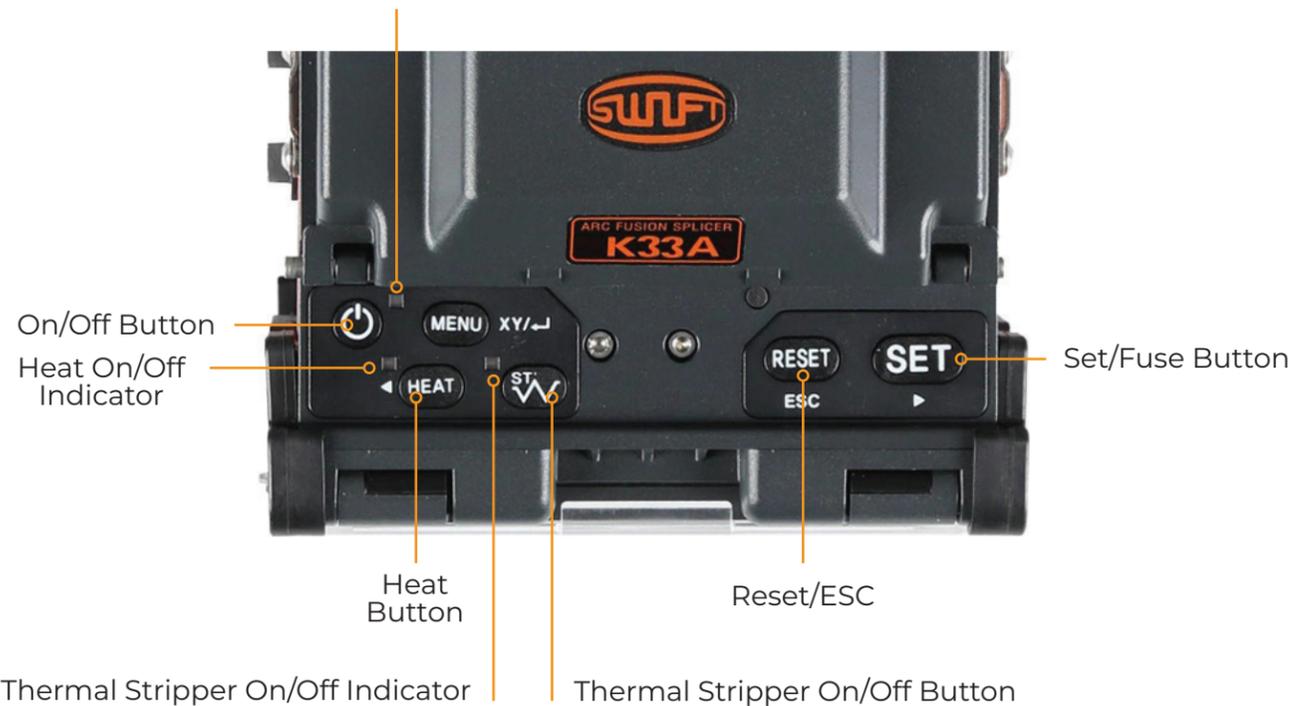
K33A THERMAL STRIPPER SPECIFICATIONS

	SUBJECT	DESCRIPTION
1	Applicable Fiber Diameter	125um
2	Applicable Cable Diameter	250um, 900um
3	Strip Length	Max 28.0mm
4	Heating Time	0~15 sec
5	Heat Temp. Range (HEATING TYPE)	60ºC~150ºC
6	Tensile Force after Stripping	4kgf

K33A THERMAL STRIPPER PART NAMES

PARTS VIEW

Blade Heater Cover
Slider Cover
Heater
Slide Base
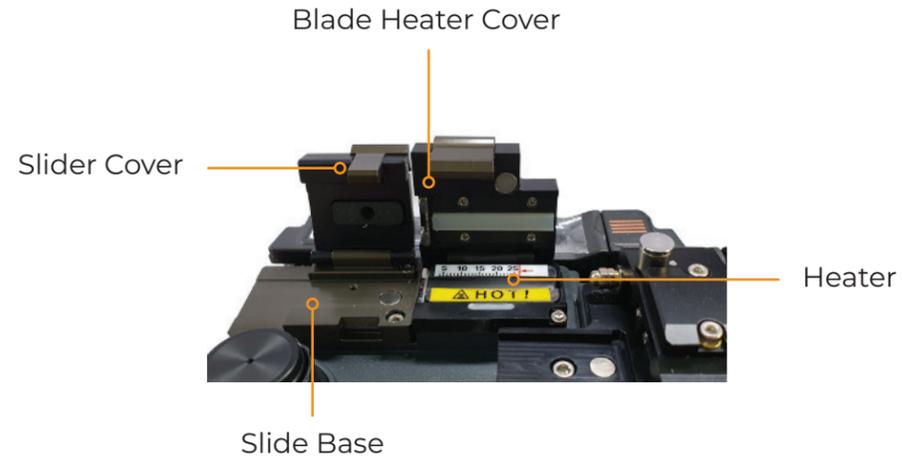
CONTROL PANEL
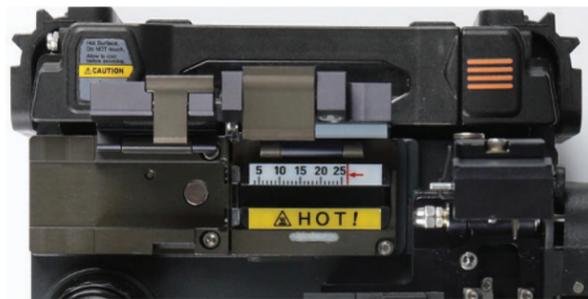
FRONT VIEW

FIBER STRIPPER USE AND OPERATION

Turn on the thermal stripper and open and close the doors to warm up the unit and test its functionality.

Place fiber into the holder as shown below pictures. The minimum stripping length should be longer than 25mm.

900um Fiber

Mount the holder containing the fiber onto the slider and close slide cover.

900um Fiber

Once the thermal stripper covers are closed the fiber is heated up to the user selected setting and the coating is stripped as the left side fiber sled slides away from the fixed stripper base leaving the removed fiber jacket debris under the right side of the thermal stripper on the stripper plate.

When stripping is completed, open the slider cover and remove the holder containing the stripped fiber prior to opening the heater cover door as opening the heater cover door will return the slider base to its original position.

Open the right-side heater cover door and remove any remaining coating residue from thermal stripper surface and clean the blade areas using a soft brush for next operation.

Be careful in handling the gripper blade part as its sharp edge could cause injury.

K33A CLEANING STATION

The cleaning dispenser in the Swift K33A has limited capacity and should be removed for filling to prevent spills onto the K33A which can cause damage or injury.

Cleaning Dispenser Sealing Cup

Cap
Pump
Seal?
Cup?

ASSEMBLED   **DISASSEMBLED**
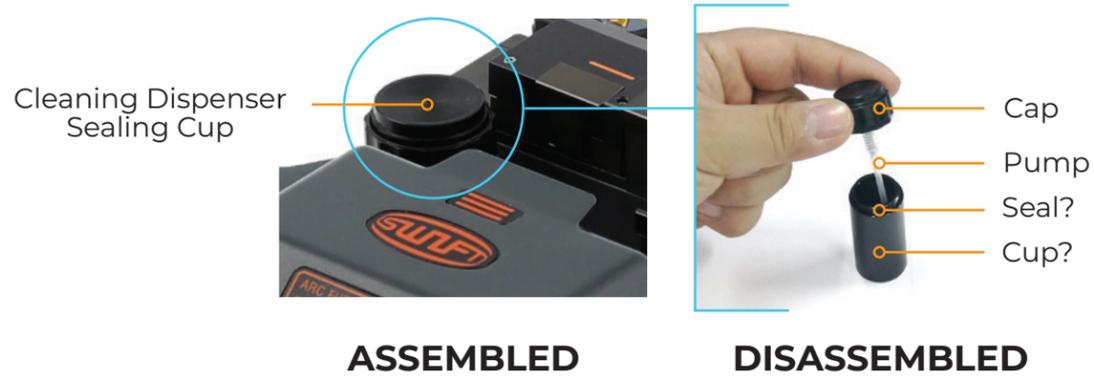
⚠️ **Remove the fluid reservoir prior to filling to avoid overfilling and spilling solution on unit. Keep the K33A in a clean condition at all times as many of splicing issues are caused by dust or moisture.**

Store the K33A at room temperature for consistent performance. Store the K33A in its toolbox to protect it during transport and handling when not in use. Never use organic solvents such as acetone except alcohol to clean rubber part of the equipment.

To clean place a clean fiber cleaning wipe on top of the dispenser and press down on the alcohol dispenser pump 2 or 3 times. as shown in the picture below.

At this time be sure to completely cover the two holes on top of the dispenser to avoid splashing the alcohol onto the K33A splicer body.
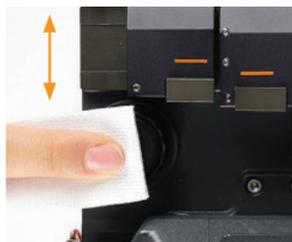
If no alcohol is discharged, remove the dispenser, open cap and refill the dispenser. Add alcohol after completely removing it from the Swift K33A body by pulling upward. It is connected to the body by magnets.

Be sure to use an approved fiber cleaning solution as recommended by the fiber manufacturer.

K33A CLEAVER

The cleaver is designed to cleave the fiber at a 90-degree angle. For the best results be sure to use the following guidelines.

The coating of fiber needs be completely removed the fiber cleaned with fiber cleaning solution. The fiber shall be properly placed in the holder or fiber clamp upon cleaving. The physical condition and height of the cleaver blade shall be adequately maintained.

Cover
Clamp
Blade
Slider
Cleaver Body
Battery?

FRONT VIEW   **BOTTOM VIEW**
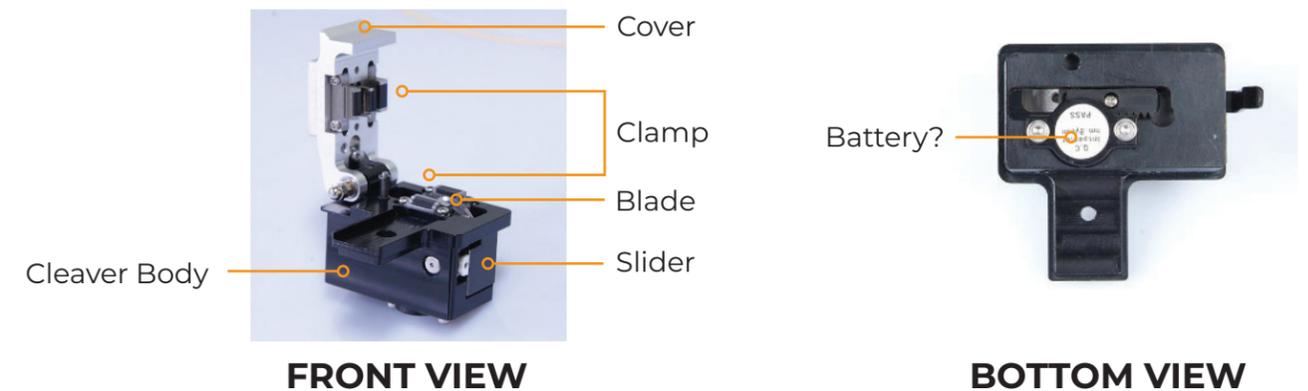
K33A FIBER CLEAVER OPERATION

Open cover and set the holder containing stripped fiber into the cleaving position. Be sure the fiber is properly placed perpendicular to the clever blade and it is laying over the chip collection box located at the right side of the body.

Press the cover to cleave the fiber and push the button on the self-rotating blade cleaver.

Open the cover and check the result.

Take out the cut fiber and holder. Be careful not to contaminate the fiber with dust or foreign substance. The fiber shards are collected in the slide-type chip-box placed at the side of Swift K33A body. Be sure to get the shard into the collection box, if it does not fall in automatically use tweezers to put it in the collection box.

K33A BLADE REPLACEMENT & ADJUSTMENT

Remove worn out blade by unscrewing fixing bolts as shown below picture. At this time, move the slide part to the left-hand side.
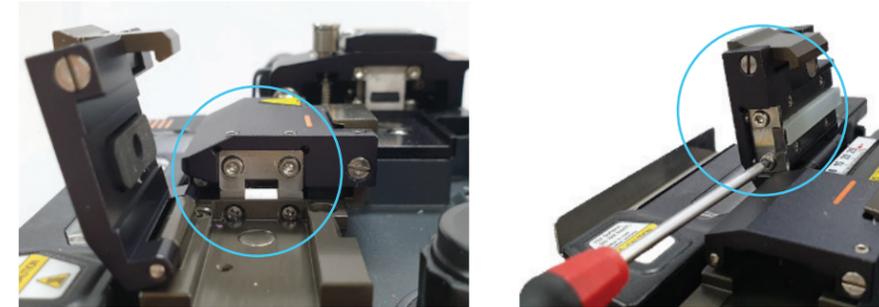
Install new blade in the reverse manner of removing. (Two blades as a pair at top and bottom). Make sure that both blades fit tightly in place in order to achieve a good strip result.

HANDLING & STORAGE

- Use care in the handling and storage of parts including the cleaver blade and the heater as they can affect the operation and use of the K33A.

- Do not apply excessive weight or subject the K33A to extreme impact when handling and transporting. Keep the K33A clean and free of dust and debris to ensure consistent performance.

- Store the K33A in its toolbox when not in use which will increase the life of the equipment.

K33A SLEEVE HEATER

The sleeve heater is designed to use heat to shrink a splice protector sleeve over the exposed fiber splice to strengthen and protect it.

To ensure maximum reinforcement the following conditions must be met. Be sure to select the correct heater setting for your application, either a shrink sleeve length or a splice on connector type.

After completing the splice, the display screen will show the estimated loss. Open the wind cover and wait for the tensile test to complete, 3 seconds of so and then remove the splice or connector front he holders and visually inspect the splice results.

Next slide the shrink sleeve over the splice being sure to center it over the splice and place the fiber with the shrink sleeve into the heater unit. Be sure to place the splice correctly in the heater, failure to place the sleeve and fiber in the correct position can result in incorrect heating and possible damage to the splice joint. Take note of the 40mm and 60mm marks in the heater for alignment. For splice on connectors (SOC's) be sure to remove the magnet from the right side of the heater and lay the SOC body on the right side of the heater in alignment with the SOC markings on the heater.

When splicing, the heater cover cannot be left open, it must be in the fully closed position.

SPECIFICATIONS

	SUBJECT	DESCRIPTION
1	Applicable Cable Diameter	250um, 900um, 2.0mm~3.0mm
2	Sleeve Length	32mm (standard)
3	Sleeving Timing	20~35 sec
4	Heat Temp. Range (HEATING TYPE)	130ºC~200ºC

K33A HEATER PARTS

Left Heater Cover Door

Right Heater Cover Door

Heater Channel

Heater Top View

CONTROL PANEL

Keeping the K33A clean will ensure that it performs consistently, moisture, dust and debris that accumulate on the K33A cab effect its performance. Store the K33A at room temperature whenever possible. If the K33A is exposed to extreme temperatures be sure to perform and arc calibration using Single Mode Fiber. Store the K33A in its toolbox to protect it during transport and handling when not in use. Never use organic solvents such as acetone to clean rubber parts of the equipment, use only recommended cleaning solutions.

K33A SLEEVE HEATER OPERATION

As shown in the picture below, press the power button to start the K33A.

CONTROL PANEL

SLEEVE HEATING OVEN

Set the sleeve tube over centered over the exposed newly spliced that needs to be reinforced and place the fiber inside the heater. For a connector be sure to set the connector o the right-most position so that sleeve tube rests in the heater floor.

Connector

Sleeve Tube
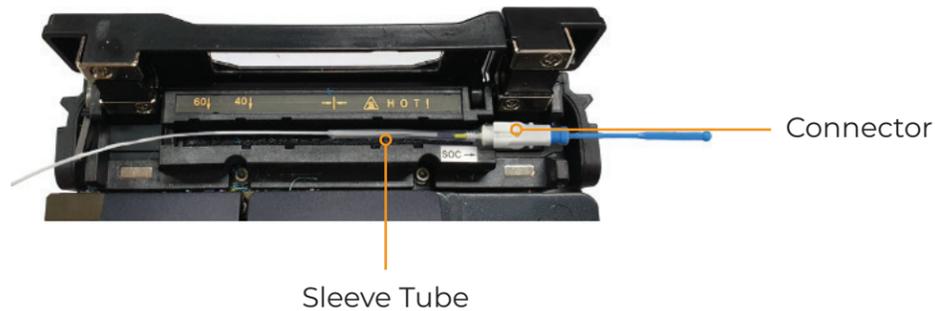
Activate the heater after placing the fiber. The cooling fan will run to cool the tube 20 seconds after heater activation.

Open the cover when cooling is completed and take out the reinforced fiber and place into the cooler tray.

250um Fiber

900um Fiber

Splice On Connector

Cooling Tray
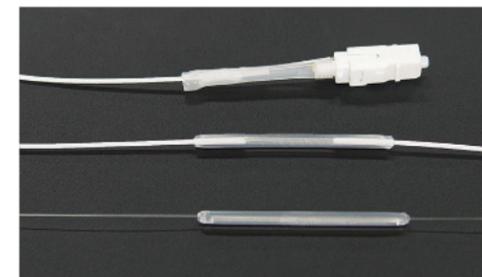
Splice On Connector

900um Fiber

250um Fiber

HANDLING & STORAGE

● Be careful in using, handling or storing principal parts including blades, heater and splice chamber as neglect can affect the performance of the K33A.

● Do not apply unnecessarily weight or physical impact when handling the equipment and always use the toolbox for transporting K33A.

● Keep the principal parts of the equipment clean to ensure consistent performance.

K33A OPERATION

The Home screen is displayed as below. The user must choose the correct splice mode, heater mode and stripper mode specific to the fiber type, shrink sleeve fiber size to ensure an accurate splicing result. The basic information of the Swift K33A is displayed on the initial page. Before splice, make sure the appropriate mode is selected.

Battery Status Indicator

Current Splice Mode Display
Current Heater Mode Display

SUPPLYING POWER TO THE SWIFT K33A

It is strongly recommended to use the AC adapter (F1-1) and battery (K3360) provided with package. Using a battery other than provided may cause fumes, fire, and damage to the device, personal injury and death.

INSERT & DETACH BATTERY

Insert the battery into the battery groove until it clicks. Remove the Battery by pressing the battery release button and slide it out.

Battery

Lock Lever

Battery Pack Status Display

The unit be powered off before removing the battery to avoid damage. Remove the battery by releasing lock lever.

Battery

HOW TO CHARGE THE BATTERY

Plug the AC cord into a UL approved outlet and then connect the DC cord of the AC/DC adapter to the DC jack of the battery. The LED turns to green when the charging is completed. The battery includes the protection circuit that prevents full discharge and full charge. The supply of power stops once the protection circuit is activated. In order to deactivate the protection circuit and resume feeding power, wait about 10 seconds and connect again the DC cord to the DC jack.

Swift K33A can be charged during operation because the floating charging method is applied. The battery can be also charged with a 12V Cigar jack charger.
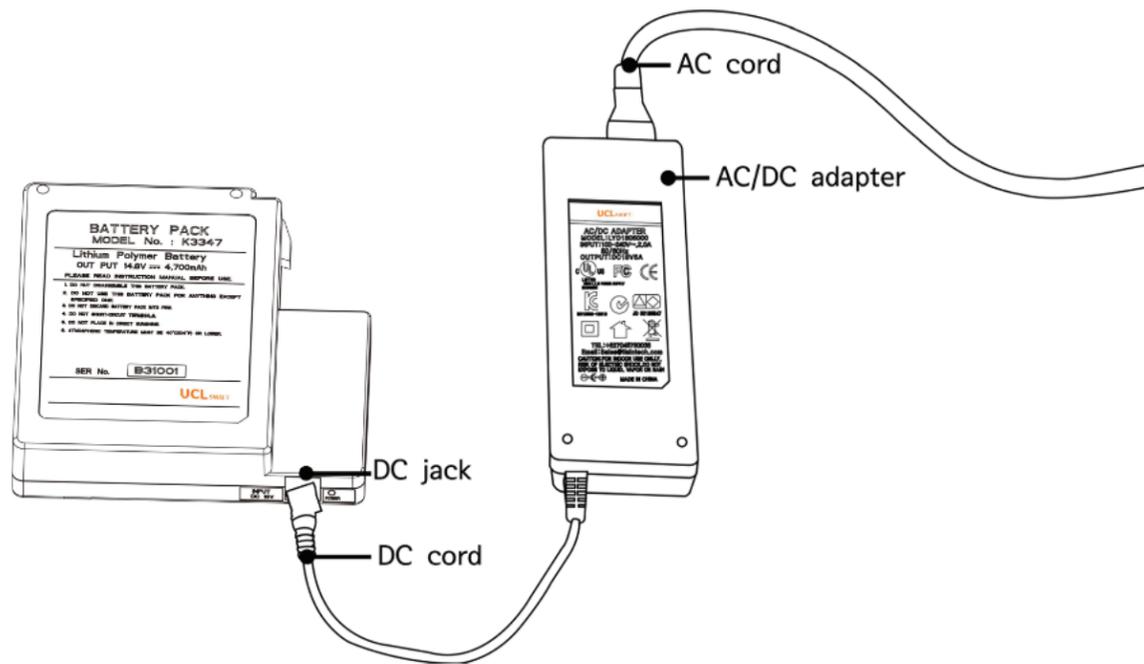
HOW TO CHECK REMAINING BATTERY CAPACITY

Insert the battery into the battery groove until it clicks. Remove the Battery by pressing the battery release button and slide it out.

Press to check the remaining battery capacity.

REMAINING BATTERY AMOUNT (MONITOR)		REMAINING BATTERY CAPACITY (LED DISPLAY)		REMAINING %
	5 Bars		5 LED	80~100%
	4 Bars		4 LED	60~80%
	3 Bars		3 LED	40~60%
	2 Bars		2 LED	20~40%
	1 Bar		1 LED	10%
	No Bar		0 LED	5% or less

It is strongly recommended that the battery be charged once capacity falls to 10 % (1 bar). Below 10% of capacity could have an effect on splicer performance.

K33A GENERAL USE & OVERVIEW

POWER ON THE K33A

Press ⏻ and hold for about 1.0 second without opening the windshield cover. The initial screen is displayed as below after K33A initializes each of its on board functions. Be sure to select the correct splice, stripper and heat mode settings to ensure accurate trouble-free splicing results. The current splice and heat and stripper modes are displayed at the bottom of the Home Screen. (see below)

INSTALLING THE SLEEVE LOADER/COOLING TRAY

Remove the sleeve loader from the toolbox and install into the splicer body sleeve loader mounts as seen in the picture below:
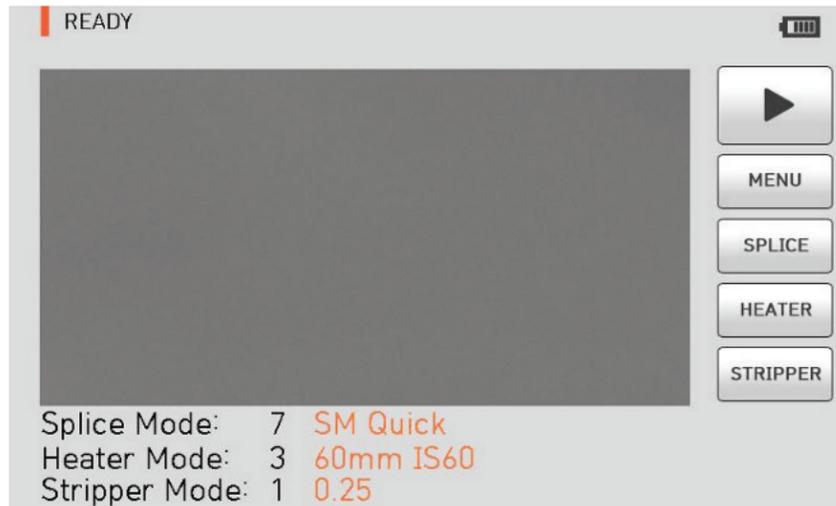
Remove the cooling tray from the toolbox and Install into the splicer body cooling tray mount on the rear side of heater as seen in the picture below:

SETTING A SHRINK SLEEVE ONTO THE FIBER CABLE

Insert the fiber through the sleeve and position it from the fiber 100mm from the fiber end.

OPTICAL FIBER CLEANING AND STRIPPING

Strip approximately 26mm from the end of optical fiber by using Auto Thermal Stripper. You can use either fiber clamps for fiber holders. After stripping the fiber jacket from the fiber moisten a fiber cloth with fiber cleaning solution in the cleaning station and wipe the optical fiber clean. Be sure to remove the fiber jacket scrap from the thermal stripper plate prior to processing the next fiber.
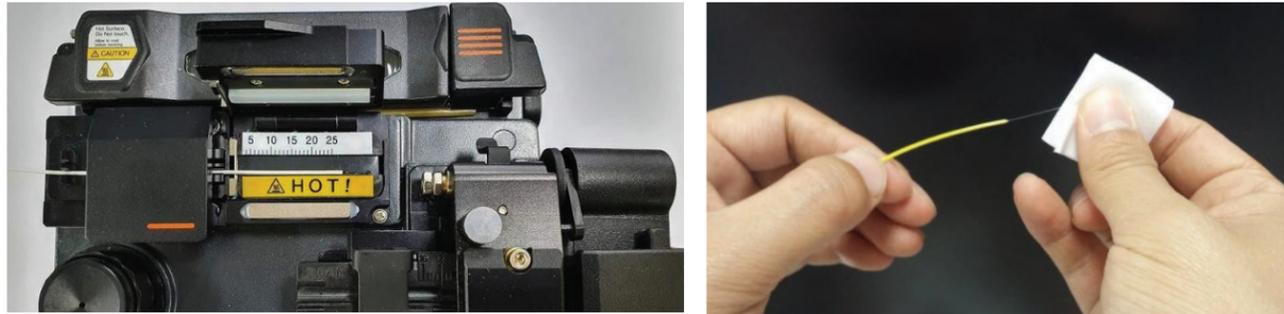
CLEAVING THE FIBER

Install the optical fiber on Cleaver as shown in the figure below and check optical fiber's condition and cleaving length. When the optical fiber is not properly positioned problems may occur during the cleaving process or result in a low quality splice.
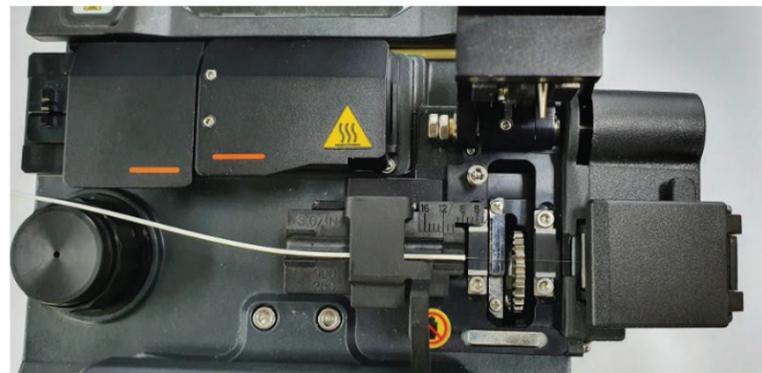
Pull down cover and press the button to cleave the fiber. Lift the cleaving lever and take the optical fiber out.

Remove any fiber fragments that did not drop into the chip bin and dispose them in a proper container.

SPLICING THE CLEAVED FIBERS

Load the fiber to the Swift K33A
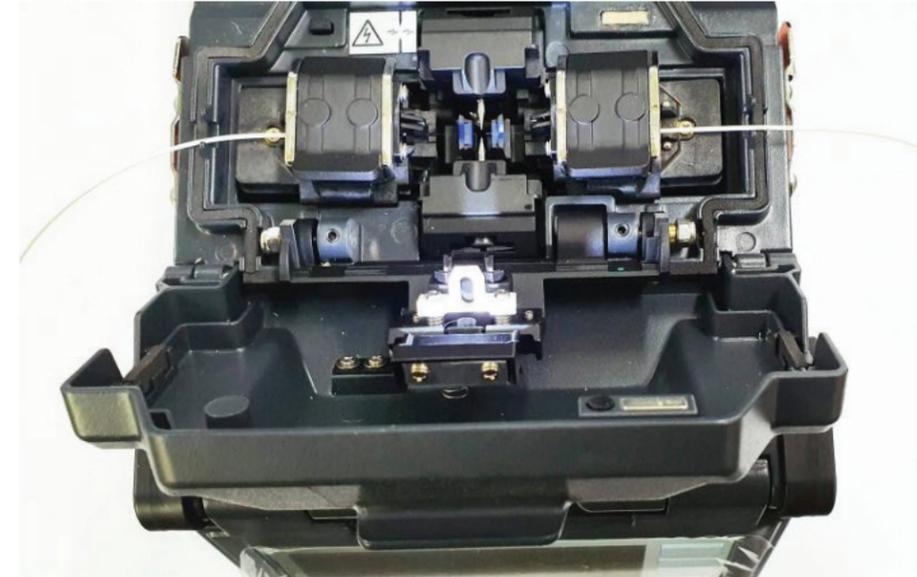
Open the windshield cover and place the optical fiber into the fiber clamps or use a fiber holder. Repeat for the opposite side. SOC's are always placed on the right side of the fusion chamber.

Put the optical fiber between V-Groove and electrode. Be careful not to make contact of the tip of prepared optical fiber with other objects, especially inside the splicer chamber when placing the fiber in position.

Close the windshield cover and press the SET button to initiate the arcing process to fuse the fibers together. WARNING: DO NOT OPEN THE WINDOW COVER DURING THIS PROCESS AND WAIT UNTIL THE PROCESS IS COMPLETE.

❗

Proper fiber preparation and positioning inside the splicing chamber will yield shorter alignment times.

FIBER SPLICING PROCESS AND LCD DISPLAY VALUES

With the splicer set to Auto Mode the splicing process initiates once the fiber is placed in the splicing chamber and the wind cover is closed. The follow-on process below can be monitored by looking at the display screen of the K33A.

The fibers loaded in the splicer move into position for the initial fiber cleaning arc to remove any debris or dirt on the fiber. The splicer will the checks cleaved angle, end-face quality and presence of dust. If the measured cleaved angle is bigger than the preset limit value or any damage of the fiber is discovered, an error message appears on the screen and the splice process stops. Though no error message appears on the screen, visual inspection on cross section is recommended as the process stops.

Optical fibers are then aligned core to core after inspection. Deviation on clad axis and deviation measured on core axis can be displayed on screen.

After the fibers are successfully aligned the arcing process initiates and the fibers are fused together to complete the splicing process.

After splice completes, the estimated loss value is calculated by the software and displayed on screen. Estimated value of splice loss is subject to various factors related to error. These factors related to error affect estimation and calculation of estimated loss value as well. Calculation of estimated loss is based on factors such as MFD. When estimated loss value exceeds the preset limitation, error message is displayed on the screen. The error message is also displayed when the spliced optical fiber is too thick or thin or when bubbles are generated on the splice joint. Even when there is no error message displayed it is recommended arc the splice again when the splice result on screen is not within accepted standards. A splice can be arced up 5 times if needed. Splice results and their associated properties are saved as follows. 10K splice records are stored on the K33A.
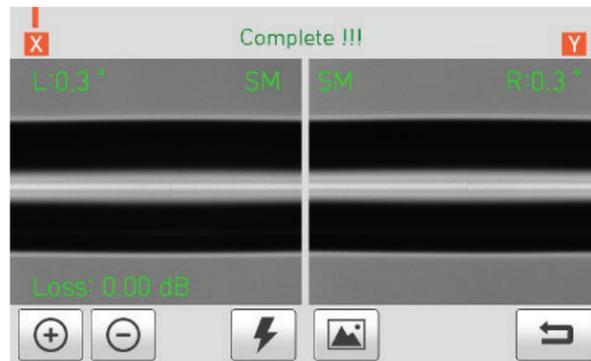
K33A SLEEVE HEATER USE

The sleeve heater is used to shrink an industry standard reinforced shrink sleeve to protect the new fusion splice and ensure that it remains protected once it is placed into service. It is important to properly place the shrink sleeve centered over the new fusion splice into the heating unit in the appropriate location based upon what size shrink sleeve is being used or is a splice on connector is being used. Once the fiber is placed into the heater close the door.

SUBJECT	DESCRIPTION
Applicable Cable Diameter	250um, 900um, 2.0mm~3.0mm
Sleeve Length	20~60mm
Sleeving Timing	5~150 sec
Heat Temp. Range (HEATING TYPE)	130ºC~200ºC

Choose the correct heater mode based on the length of the shrink sleeve or choose the proper connector type if using an SOC. Position the spliced point in the middle of the shrink sleeve tube. Then insert the fiber and shrink sleeve into the heater placing the sleeve tube at the size based corresponding position based on the shrink tube size with the reinforcement member facing downward to it lays on the oven floor. (ie.- 40mm,60mm, SOC).

If the incorrect heater mode is selected the sleeve tube may not shrink properly or the fiber outer jacket may blister. **If using a SOC (Splice-On-Connector) it should be placed on the right-side edge of the heater in order to line up the right end of the sleeve tube to the right-side edge of the heater as shown on the picture below (Right picture).** If SOC is placed in the middle or on the left side, sleeve tube of the SOC does NOT shrink.

OPTICAL FIBER   **SOC CONNECTOR**

After placing the optical fiber on the heater, press [HEAT] button to start the heater. (Operation time: about 20 seconds).
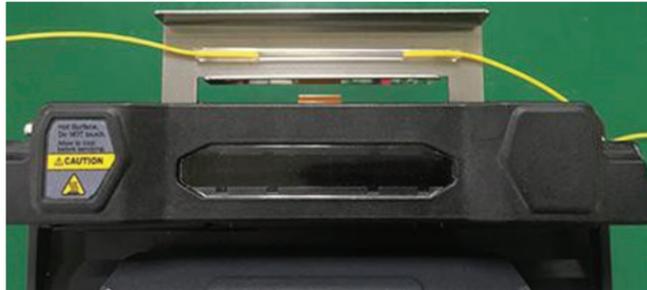
When the heater process is complete open the cover and remove the fiber and place it carefully into the cooling tray . WARNING: THE SHRINK SLEEVE IS HOT AND CAN CAUSE INJURY IT TOUCHED PRIOR TO COOLING. The shrink sleeve can be safely handled approximately 15 seconds after being placed in the cooling tray.

TRANSFERRING THE FUSED FIBER INTO THE SLEEVE HEATER

- Open the cover of sleeve heater

- Open the windshield cover

- Wait for the tensile test to complete (2 seconds)

- Hold the optical fiber on the left side while opening the clamp on the left

- Open the optical fiber clamp on the right

- Hold the both sides of spliced optical fiber and separate optical fiber from Swift K33A with care

HEATING THE PROTECTION SLEEVE

- Slide the shrink sleeve over the splice and center it making sure the strength member of the support sleeve is positioned along the bottom, so it rests on the heater floor.

- Place the protecting sleeve at the proper mark (40mm, 60mm or SOC) in the heater oven.

- Hold both sides of optical fiber and pull downwards as shown in the figure and the heater cover will automatically close, using the hinge on the left side to auto close the heater door.

- Press [HEAT] to initiate the heating process. When the LED goes off the heating process is complete.

- Open the heater cover and remove the optical fiber. Do not touch protecting sleeve or heater right after the heating and place in the cooling tray.

- Upon cooling (15 seconds) conduct a final inspection for bubbles, fragments or dust on sleeve.
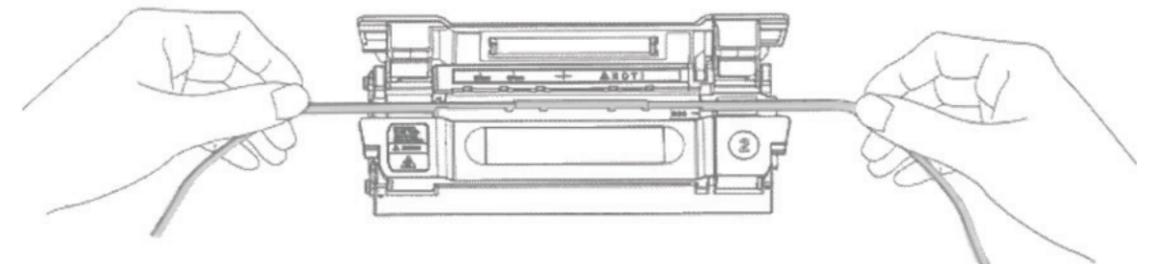
K33A MAINTENANCE AND CLEANING

V-GROOVE CLEANING

When the inside of V-Groove is contaminated the splice quality can be affected. It is important to regularly inspect and clean the V-Grooves as follows.

- Open the windshield cover.

- Clean the V-Groove using cotton swab moistened with alcohol. Remove the alcohol remaining on V-Groove using a clean and dry cotton swab.

- When a foreign substance remains affixed after the above process clean it with the tip of cut optical fiber and then repeat the step above.
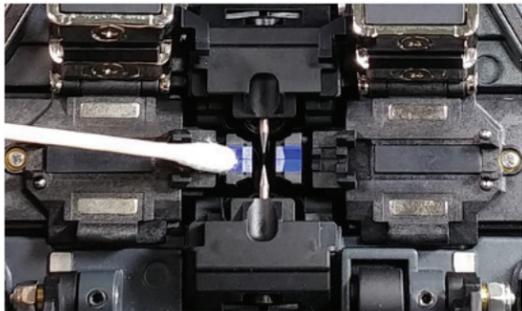
PUSHER BLOCK CLEANING

Contaminates on the Pusher Blocks can diminish the splice quality as well. It is important to frequently inspect and clean the pusher blocks using a cotton sway with alcohol and using the other end to dry it clean.

CLEANING THE CLEAVER

The performance of the fiber cleaver can be diminished if the blade or clamp pads of the cleaver are contaminated. In addition, the contamination of the fiber surface or tip can cause higher splice loss. For this reason, it is important to clean both the blade and clamp pads of the cleaver with a cotton swab soaked in alcohol.
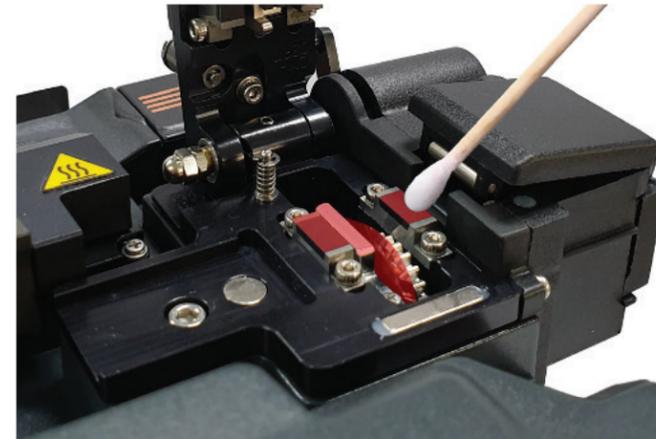
REGULAR CLEANING & INSPECTION

It is crucial to inspect and clean the K33A on a regular basis to maintain quality, consistent results. Review online videos at www.americailisntech.com/videos for assistance.

OPTICAL LENS CLEANING

Contamination and debris on the optical lens surface will diminish splice quality and splicer operation. The optical lenses should be kept clean at all times as the longer dirt and debris rest on the lens the more difficult will be to remove. Below are the steps to clean the optical lenses.

- Turn the power off before cleaning the object lens.

- Separate the electrode.

- Clean it using a soft cotton swab moistened with alcohol making a circle from the center as in the figure on the next page. Remove alcohol remaining on object lens' surface using a clean and dry cotton swab.
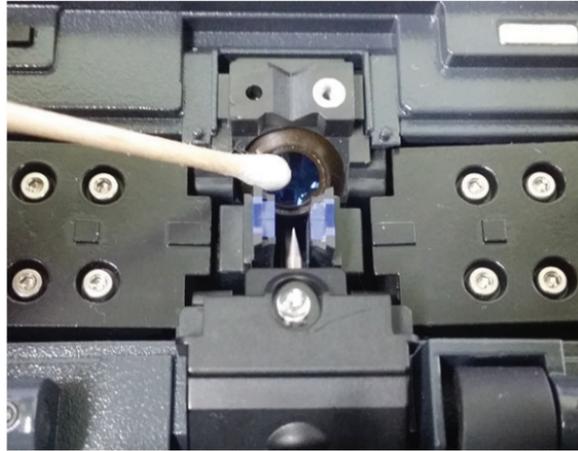
- A properly cleaned optical lens will have not streaks or lines visible.

- Reassemble the electrode.

- Turn the power on; check whether there is any line or stain on the monitor and; navigate to the menu and conduct a Self-test.

BLADE REPLACEMENT AND BLADE MODE (ROTATING/LOCKING) BLADE CHANGE

If the cleaver does not properly cleave the fiber, rotate the blade as follow the instructions. On the blade gear, the channel (cleaving position) from 1 to 24 is marked. When it does not cleave the fiber properly, clean the surface of rubber pad with the alcohol-soaked cotton swab. (But when clean the rubber pad, do not use acetone or solvent.) And if cleaver still does not cleave properly, it means the blade is fully used, operators are required to change the cleaving position by the following order.

BLADE REPLACEMENT

In order to replace blade, disassemble chip collector assembly and rear pusher. Open the cover as shown picture and press the pusher pin to move slider to forward.
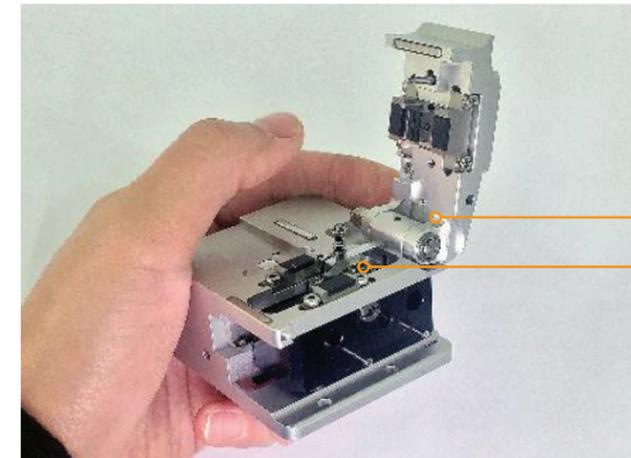
Rear Pusher

Remove blade pin completely using (-) driver.

Remove old blade with blade gear from body and replace new blade with blade gear. In here reassembling should be done in a reverse order of disassembling. At this time, especially be careful not to damage the blade. Check the blade operating condition with cleaver cover.
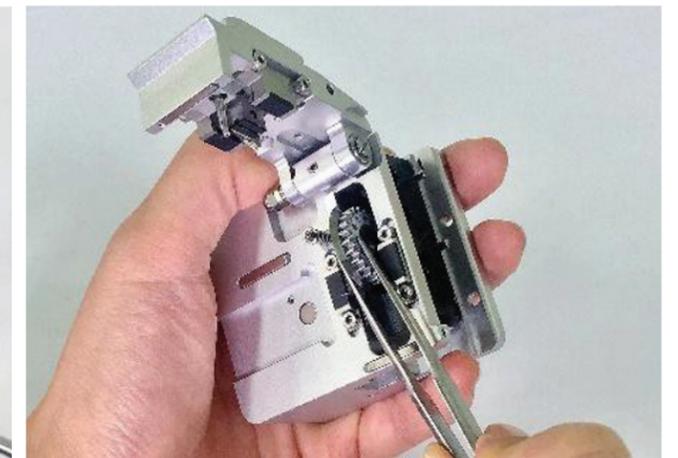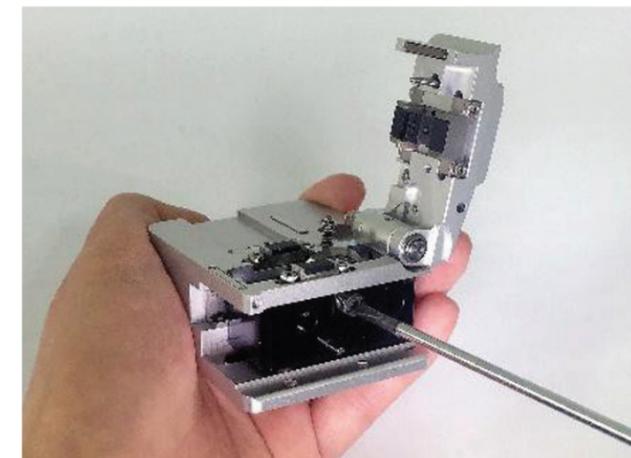
ROTATING/LOCKING THE CLEAVER BLADE

Blade rotating mode.
Initial setting mode will be set as shown picture (Rotation mode).
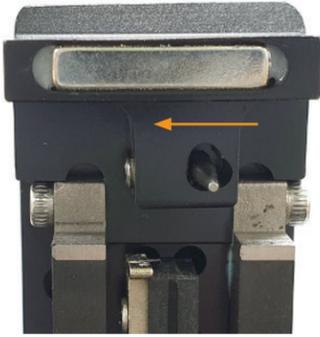
Adjust gear pusher position after loosening Setscrew as shown picture.
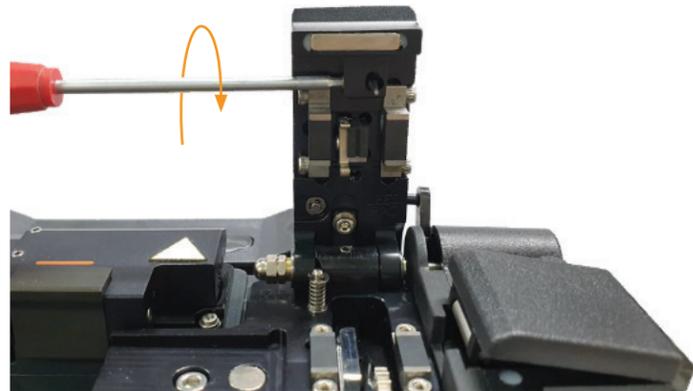
Blade locking mode.
When the blade is used without rotating.
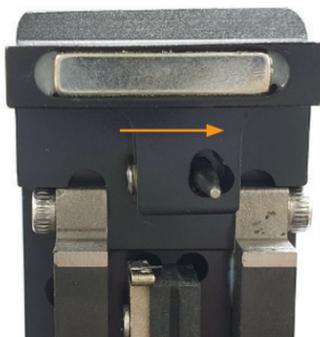
ELECTRODE REPLACEMENT

The K33A electrodes are designed to last for 18,000 arc cycles. Once 18,000 arc cycles are reached the a "Replace Electrodes" message will be displayed. Once the number of arc discharges exceeds the threshold the results could lead to higher splice loss and weaker tensile force at the splicing point. Each new K33A comes with a spare pair of the EI-23 electrodes included in the standard kit.

Turn the power off when replacing electrode.
Remove the electrode block and the electrode.
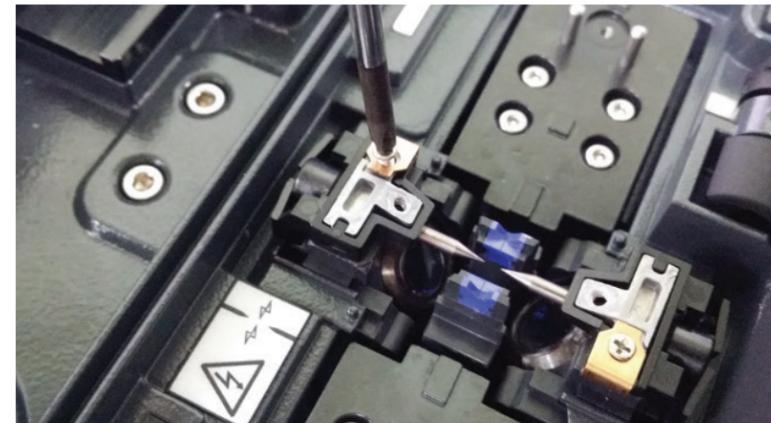
Clean the electrode carefully using soft cotton swab moistened with alcohol and then install them into the electrode blocks per illustration below.

Replace the electrode blocks into the fusion K33A.
Turn the power on and conduct electrode stabilizing.

K33A MENU SETTINGS

There are 9 sub menus in the main menu. To display the main menu, press **MENU** either on the K33A or on the touch screen. The display will appear per the picture below.
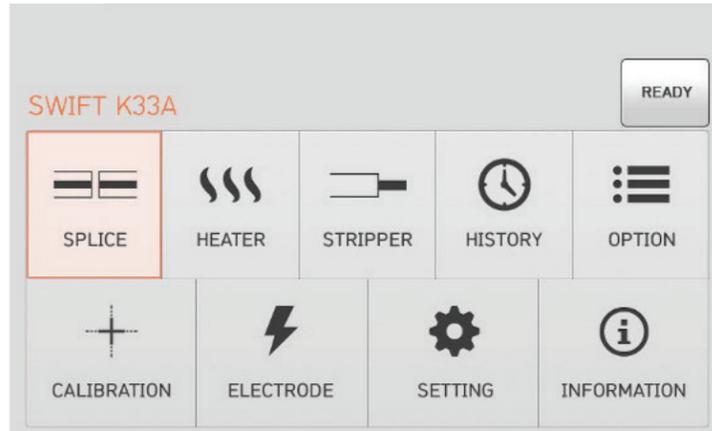
SPLICE

DEL: delete a preset splice mode

REPLACE: select a splice mode from the database and replace it.

NEW: create a new custom mode to be added to the list of existing splice modes

EDIT: edit the specific splice parameters (i.e. temperature-time etc.)

SELECT: select a splice mode for the current operation.

CANCEL: close menu window.

HEATER

DEL: delete a preset splice mode

REPLACE: select a splice mode from the database and replace it.

NEW: create a new custom mode to be added to the list of existing splice modes

EDIT: edit the specific splice parameters (i.e. temperature-time etc.)

SELECT: select a splice mode for the current operation.

CANCEL: close menu window.

AUTO STRIPPER

DEL: delete and existing Stripper mode.

REPLACE: select a Stripper mode from database replace it.

NEW: Create a new custom mode to be added to the existing stripper modes

EDIT: edit the specific parameters of an existing Stripper mode (i.e. heat-time etc.)

SELECT: select a Stripper mode for the current operation.

CANCEL: close menu window.

HISTORY

DISPLAY MEMORY: display a splicing data and image.

CLEAR MEMORY: erase the whole data.

OPTION

DEFAULT: Auto, Pause, Auto Heater

LOCK: Splice Lock, Heat Lock, Clear memory Lock, Password Query

PASSWORD: change a password.

CALIBRATION

ARC CALIBRATION: calibrate an arc power.

DIAGNOSTIC TEST: test the status of the K33A components

DUST TEST: test the optical path for dust impairment

LED TEST: test a LED brightness.

MOTOR DRIVE: Test the K33A system motors manually.

ELECTRODE

ELECTRODE CAUTION: set a caution message for replacement

ELECTRODE USED: display an arc count number.

ELECTRODE REPLACE: display warning message.

ELECTRODE STABILIZE: stabilize an arc discharge current.

CLEAR ARC COUNT: erase an arc count number.

SETTING

LANGUAGE: select the display language.

DATE: set the current date & time.

POWER SAVE: set a sleep function of the Swift K33A to conserve the battery

BUZZER: change a buzzer volume.

LCD BRIGHTNESS changes the monitor brightness.

INFORMATION

MAINTENANCE INFO: display a date for maintenance.

SENSOR VALUE: display a temperature, pressure and humidity.

PROGRAM VER: display the version.

HELP: display the help contents as below.

THE NAMES OF PARTS

CLEAN AND INSPECT

WARNINGS

A/S CONTACT LIST

POPUP MENU

The pop-up menu is new feature on the Swift K33A. The purpose of the pop-up menu is to allow quick access to frequently used modes for the Thermal Stripper, Sleeve Heater and Splice Chamber. The user can quickly change setting without having to navigate into the main menu. The user can access the pop-up menu in various ways.

NOTE:
The following procedure will provide instructions on how to assign and delete a setting to the Heater Popup buttons. For the Thermal Stripper and Splice popup buttons the same process outlined below is used but instead of selecting Heater from the display screen select either Stripper or Splice to program the desired buttons.

PROGRAMMING THE HEATER POPUP BUTTONS

Adding A Heater Mode Setting to a Popup Button

To Navigate to the Heater Pop-Up Menu select "Heater" on the LCD Display main screen (below) in the Ready state.

This will bring up the Heater Popup Menu showing the 8 programmable shortcut buttons as well the trash (delete) and previous menu buttons.

Select an Empty Button That Has No Setting
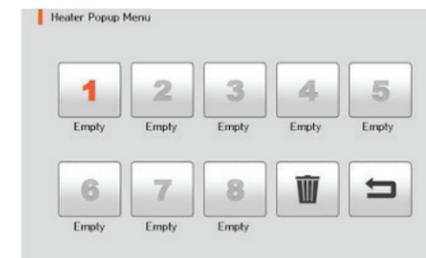
Select the desired heat mode and that mode will be now be assigned to the selected button.

Press the Previous Menu Button [icon] to return the home screen or repeat the above process to program another popup button.

DELETE A HEATER MODE SETTING FROM A POPUP BUTTON

Navigate to the Heater Pop-Up Menu select "Heater" on the LCD Display main screen (below) in the Ready state.
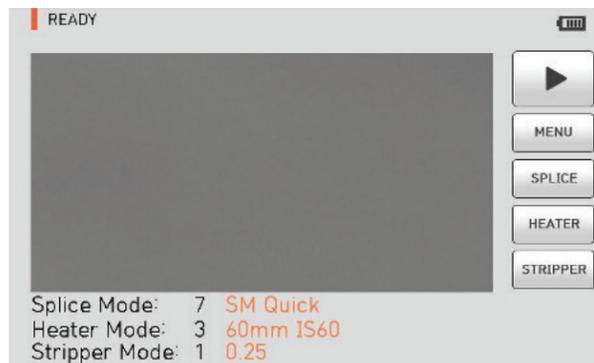
This will bring up the Heater Popup Menu showing the 8 programmable shortcut buttons as well the (delete) [icon] and previous [icon] menu buttons.

Select the Button that needs to have the assigned setting deleted and press the [icon] button and the setting will be deleted.
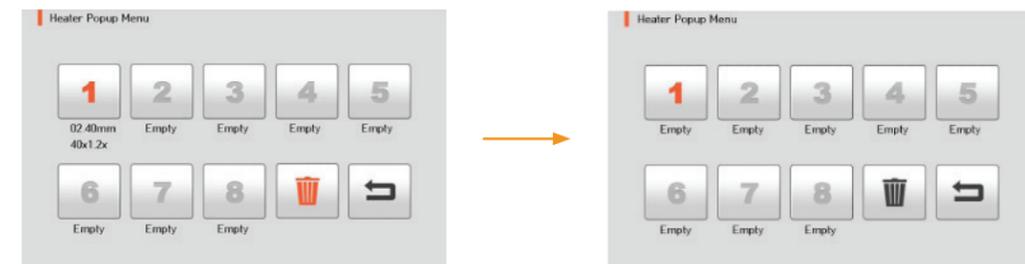
Press the Previous Menu Button [icon] to return the Ready screen.
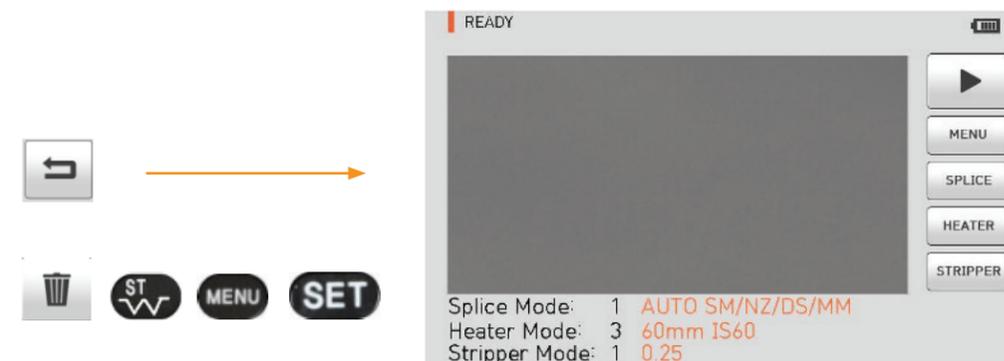
SPLICE MODE SETTINGS

PRESET SPLICE MODES

The Splice Mode Setting is set by the user to select what type of fiber the fiber technician will be using so the K33A will perform an accurate high-quality fusion splice. There are 35 pre-programmed splice modes based on fiber types in the K33A to select from and the user can create 265 additional splice modes that can be stored in the system memory.

SPLICE MODE ABBREVIATIONS AND DEFINITIONS

SPLICE MODE	DESCRIPTION
SM	It is a mode for basic SM optical fiber. MFD of single mode optical fiber is about 8~10um at 1310nm wavelength.
NZ	It is a mode for NZDS optical fiber. MFD of NZDS optical fiber is about 9~10um at 1550nm wavelength. WDM optical fiber can also be spliced on this mode.
DS	It is a mode for DS optical fiber. MFD of DS optical fiber is about 7~9um at 1550nm wavelength.
MM	It is a mode for MM optical fiber. Core diameter of MM optical fiber is about 50~62.5um.
Other	Other splice modes are saved in the database of Swift K33A. New splice modes are currently being added. Therefore, we recommend that users keep upgrading their software regularly by contacting UCLSWIFT.

SELECT A SPLICE MODE TO USE ON THE K33A

To select a splice mode, select Menu from the LCD display or MENU from the K33A. Next select "Splice" menu using the touch screen. The Splice screen will list the pre-programed splice modes that are specific to what fiber type is being spliced. These splice modes are classified into general mode and user mode.
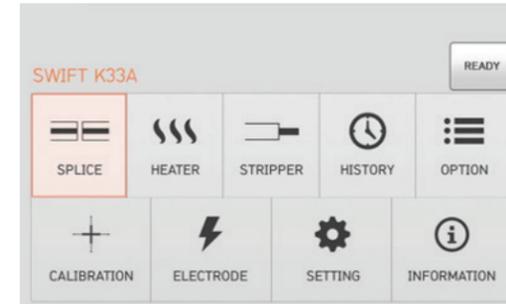
The user can scroll through the pre-programmed Splice modes by using the left and right arrow buttons on the top right of the LCD screen. **Scroll though the list of pre-programmed Splice modes and press the Select button to enable that setting to be the current setting on the K33A.** You should now see the splice mode selection in orange at the top of the LCD screen which indicates it is now the active setting.

Select the Cancel button to return to the Ready Screen where you should now see the updated setting.

NOTE:
Pre-programmed splice mode are numbered 1-35 and cannot be deleted. User splice modes are numbered 36 – 300 and can be added and deleted. New Splice modes created will be assigned the next available Splice mode number automatically.

DELETE A SPLICE MODE SETTING

To select a splice mode, select Menu from the LCD display or **MENU** from the K33A. Next select "Splice" menu using the touch screen. The Splice screen will list the pre-programed splice modes that are specific to what fiber type is being spliced.

Select the splice mode to be deleted and select the DEL button on the LCD display and the setting will be removed from the list. Press Cancel to return to the Ready Menu.

NOTE:
Splice modes No.1 thru No. 35 cannot be deleted.

CREATE A NEW SPLICE MODE SETTING

The K33A enables users to create custom splice modes for applications when the pre-programmed splice modes are not sufficient. Custom splice modes enable the user to define splice parameter values on up to 32 unique splice attributes in situations where standard splice modes need to be adjusted due to fiber type, environmental conditions etc. First create a new splice mode then see the edit a Splice Mode to customize the settings as desired.

To program a New splice mode select Menu from the LCD display or **MENU** from the K33A. Next select "Splice" menu using the touch screen. Click "New" to display the pre-programmed splice modes. Select the fiber type for the new Splice Mode. Select the splice mode, click "OK". The selected splice mode is added the last blank mode.
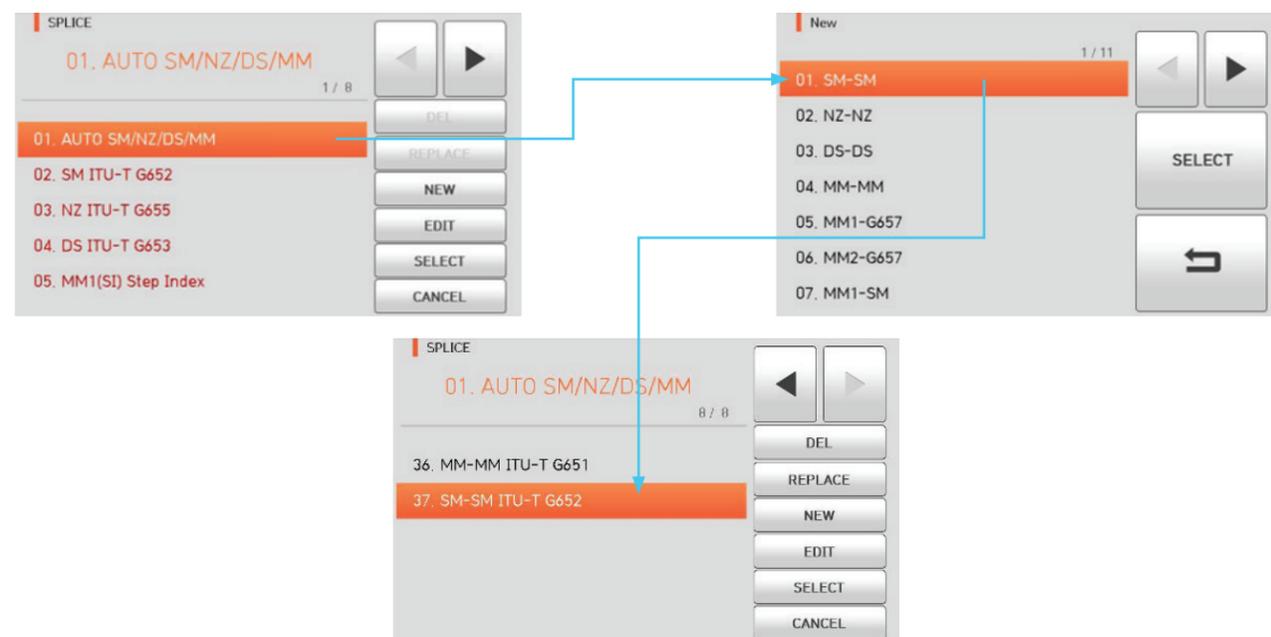
Select Cancel to return to the Ready Menu.

NOTE:
Up to 265 New Splice modes can be added and will be numbered from 36 – 300.

REPLACE A SPLICE MODE SETTING

Users can only Replace a user created splice mode. This function gives the ability to replace a user defined setting with up to 75 stored splicing configurations of fiber stored in the K33A memory.

To replace a user defined setting select Menu from the LCD display or **MENU** from the K33A. Next select "Splice" menu using the touch screen. Using the arrows on the LCD screen scroll to page that lists the setting that to be replaced and select it on the LCD screen, select "Replace". The splice modes stored in memory are displayed on the screen, select the desired splice mode to be replaced and select "OK". The selected splice mode replaces the last blank entry in the splicer menu.
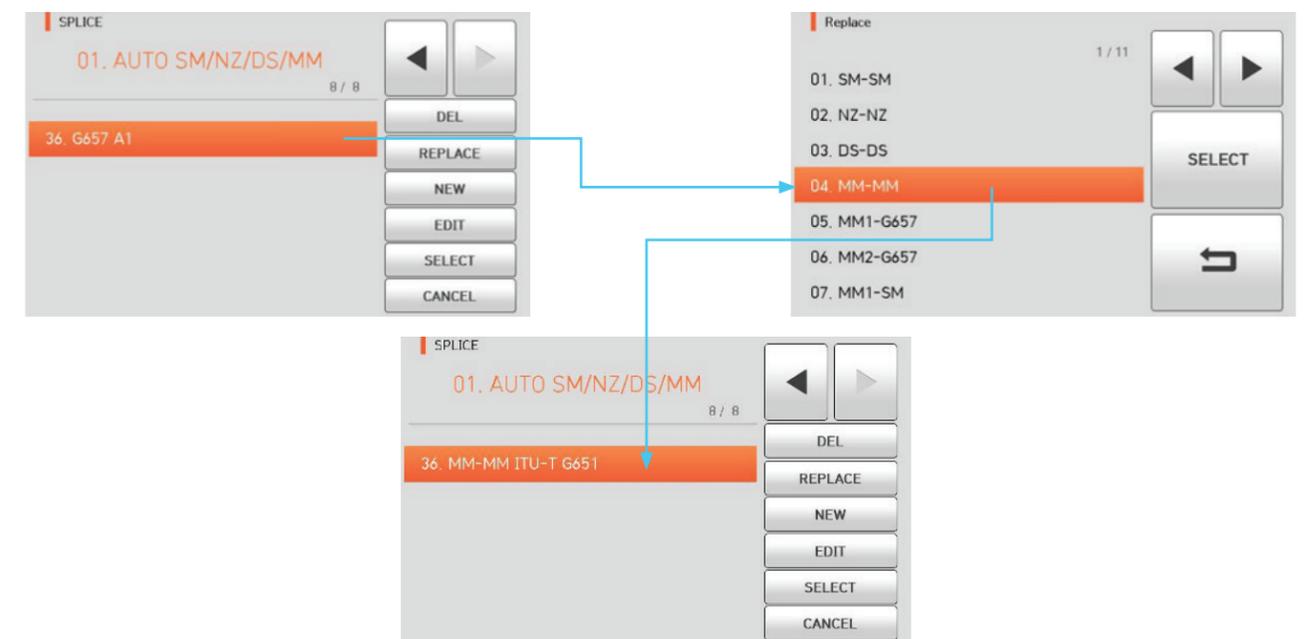
Select Cancel to return to the Splice Menu then Ready to return to the Ready Menu.

NOTE:
Splice modes from No.1 to No.35 cannot be replaced.

EDIT A SPLICE MODE SETTING

The K33A enables users to create edit the specific parameters splice modes for both pre-programmed and user created splice settings. The 35 pre-programmed Splice settings enable the user to edit some but not all of the Splice attributes. User created Splice settings enable the user to define splice parameter values on up to 32 unique splice attributes in situations where standard splice modes need to be adjusted due to fiber type, environmental conditions etc. A user must first create a new splice mode to be able to utilize the full capabilities to create the most complex Splice Mode. See How to Create a New splice mode to if needed and then utilize the Edit function to complete this process.

To Edit a splice mode, select Menu from the LCD display or [MENU] from the K33A. Next select "Splice" menu using the touch screen. Using arrow icon on the LCD display scroll to the page that displays the setting to Edit. Select it on the LCD display and then select Edit from the LCD display. This will display the settings on the LCD display. Select the setting to Edit and the screen will display the options that can be changed.
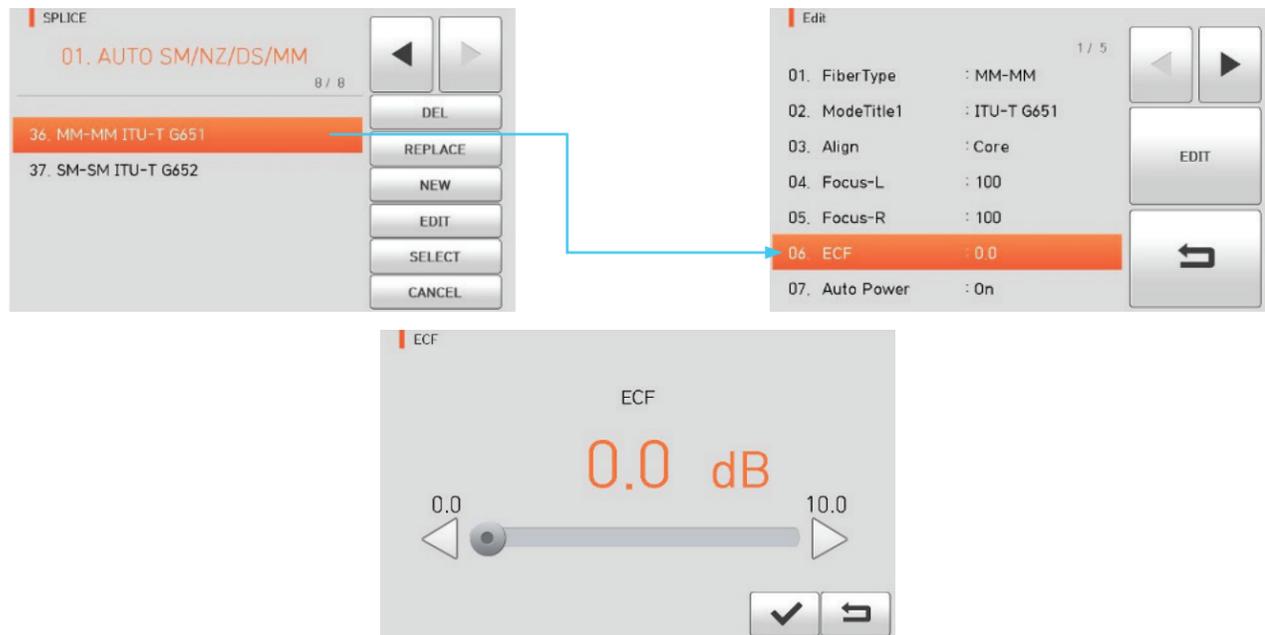
Set the new value then select the "Check Mark" icon to confirm the change. Select the back button to return to the main menu.

SPLICE MODE PARAMETER DEFINITIONS AND EDITABLE MODE STATUS CHART

NOTE:
System default splice modes have limited parameters that can be edited. User created Splice Modes have the ability to program up to 32 Splice Mode settings.

SET VALUE	DESCRIPTION	GENERAL MODE	USER MODE
Optical Fiber Type	Displays the list of splice modes saved in the K33A database to facilitate the selection of a proper mode to use. These parameters are the default parameters for new settings and can be adjusted as needed for custom settings.	Editable	Editable
Mode title 1	Mode title 1 enables custom labels on settings up to 11 letters maximum.		
Eccentricity Adjustment Function	When aligning the optical fibers by using eccentricity adjustment function, it sets offset ratio of axis.		
Automatic power	The closer it is arrayed to the core center with fewer errors, the quicker and better the discharge is done.	Non-Editable	
Tensile Force Test	It conducts tensile force test after splice.		
Cutting Angle Limit	Sets Cleve angle's error alert limit.	Editable	
	When either of the cleave angles on the optical fibers are above the default setting message is displayed.		
Limit on Estimated Loss Value	It sets estimated loss value's error bound.		
	When estimated loss is higher than the bound, error message is displayed.		
Limit on Optical	When the bending of 2 spliced optical fibers exceeds the set bound, error message is displayed.	Non-Editable	

SET VALUE	DESCRIPTION	GENERAL MODE	USER MODE
Cleaning Discharge Amount	A short cleaning discharge is conducted to remove fine dust on optical fiber's surface upon initial stage of optical fiber arrayal. It sets intensity of cleaning discharge.	Editable	
Cleaning Discahrge	It sets time for cleaning discharge.		
Clearance	Upon final alignment it examines the gap sets between both optical fibers.		
Clearance Location	It sets location of optical fiber spliced at the center of discharge.		Editable
	When MFD of both optical fibers differ the fusion should apply more arc to the smaller MFD optical fiber To heat the smaller MFD optical fiber more, splice loss can be lowered by moving the clearance location toward the bigger MFD optical fiber at the center of discharge.		
Initial Discharge Amount	Sets the initial flash burn discharge level to clean the fibers prior to the final optical alignment. If the value of initial discharge amount is too low the cleave angle of the fiber is poor an offset error can occur. If the discharge level is too high the fiber ends can be burned too much or made round and Consequently the splice loss value can be high.	Editable	
Initial Discharge Time	It sets initial time from the beginning of discharge prior to the final alignment. The initial discharge time relates to the amount of time the flash burn to clean the fiber will discharge.		

SET VALUE	DESCRIPTION	GENERAL MODE	USER MODE
Overlap	It sets duplication of optical fiber on optical fiber's advance amount. If [initial discharge amount] is weak or [initial discharge time] is short, set the [overlap] somewhat small and if discharge amount is strong and the time is long, set it somewhat big.	Non-Editable	Editable
Discharge Amount 1	Main discharge can be adjusted in 2 levels. The first level of discharge is [discharge amount 1] and the second is [discharge amount 2]. [Discharge amount] 1 is set in this area.		
Discharge Time 1	It sets time for [discharge amount 1].		
Discharge Amount 2	[Discharge amount 2] is the second level of discharge. [Discharge amount 2] is set in this area.		
	It sets time for [discharge amount 2].		
Discharge Time 2	It sets time for [discharge amount 2]. [Discharge time 2] is generally set as "OFF." It can set the discharge time as a very long time period but when [discharge time 1] and [discharge time 2] exceed 30 seconds, electrode can be damaged.		
Time Period for Discharge 2 Being On	While [discharge amount 2] is on discharge, you can set the discharge amount as ON and OFF in turn. Time period for [discharge amount 2] being on is set in this area. For re-discharge, set the discharge time as "ON" at all times.		
Time Period for Discharge 2 Being Off	It sets time period for discharge of [discharge amount 2] is turned off. When [discharge amount 2] is occasionally stopped, re-discharge can also be stopped. When re-discharge is continuously required, set as "OFF."		

SET VALUE	DESCRIPTION	GENERAL MODE	USER MODE
Re-Discharge Time	It sets re-discharge time.	Editable	Editable
	Within [splice mode edition], it automatically sets to discharge the re-discharge amount with the same intensity as that of [discharge amount 2]. If [discharge amount 2] is set as ON/OFF, re-discharge is automatically changed.		
Pulling Splice	When optical fiber is made thin, splice loss is sometimes increased. This pulling function is set as "OFF." The following 3 parameters decide the pulling shape.	Non-Editable	
Pulling Standby	It designates time period from the last of optical fiber advance amount to the beginning of pulling.		
Pulling Speed	It sets optical fiber's pulling speed.		
Pulling Length	It sets optical fiber's pulling time.		
Minimum loss	It is the sum of initially measured splice loss value and the increased loss. When splicing a special optical fiber or other optical fibers, high loss may be incurred in spite of the optimum discharge conditions. To match the estimated splice loss and the actual splice loss, the minimum value of actual splice loss should be set.		
MFD Left	Mode field diameter Left		
MFD Right	Mode field diameter Right		

SLEEVE HEATER SETTINGS & ADJUSTMENTS

Heater settings are pre-programmed in the K33A for industry standard shrink sleeve sizes and Splice on Connectors (SOC's). Users can select a setting, Edit the parameters of a setting, create a new setting, replace a setting or delete a setting. The settings determine which area of the heater is activated so it is important to have the setting correctly set to avoid damage to the fiber, splice or connector.

NOTE:
System default heater settings 1-40 cannot be deleted.

PRESET HEATER SETTINGS & DESCRIPTIONS

SET VALUE	DESCRIPTION	OTHERS
60mm	Standard 60mm micro sleeve	
60mm IS-60	60mm micro sleeve	
45mm IS-45	45mm micro sleeve	
40mm	Standard 40mm micro sleeve	
S09	45mm sleeve	
S09-C	22mm sleeve for SOC(SC-0.9mm)	Sleeve type, mode title 1 and mode title 2 cannot be edited.
S20	45mm sleeve for2.0mm optical cable	
S30	45mm sleeve for3.0mm optical cable	
S30-C	32mm sleeve for SOC(SC-3.0mm)	
LC09/20-C	25mm sleeve for SOC(LC-0.9 and 2.0mm)	
ST09-C	28mm sleeve for SOC(ST-0.9mm)	
ST30-C	36mm sleeve for SOC(ST-3.0mm)	

Be sure to choose the correct mode for each sleeve tube type and SOC otherwise sleeve tubes may not shrink properly of the fiber can be damaged.

NOTE:
For the SOC's the settings are defaulted for the use of Swift brand splice on connectors. Other Brands of sleeve tubes may not shrink properly.

PROGRAMMING A HEATER SETTING

From the main menu press [MENU] on either the K33A or its touch screen. Next press the "Heater" icon on the touch screen. This will display the pre-programmed heater menu options. Use the arrows on the LCD display to scroll through the available settings and Select the desired setting from LCD Screen and the setting Number and Name will be displayed on the top of the LCD screen.

Select Cancel to return to the Swift K33A menu screen, then ready to return to the Ready Screen.

DELETE A HEATER SETTING

Heater Settings 1-40 are system default settings and cannot be deleted.

User Settings 40-300 can be deleted. To Delete a user setting from the main menu press [MENU] on either the K33A or its touch screen. Next press the "Heater" icon on the touch screen. This will display the pre-programmed heater menu options. Use the arrows on the LCD display to scroll through the available settings and Select the desired setting to be deleted from LCD Screen and the setting Number and Name will be displayed on the top of the LCD screen. Select the DEL option and the setting will be deleted. Select cancel to return to the Heater Menu and be sure to select an appropriate Heater Mode option as the K33A will default to Option 1.

REPLACE A HEATER SETTING

Users can only Replace a user created Heater mode setting. This function gives the ability to replace a user defined setting with up to 40 stored splicing configurations of fiber stored in the K33A memory.

To replace a user defined setting select Menu from the LCD display or [MENU] from the K33A. Next select "Heater" menu using the touch screen. Using the arrows on the LCD screen scroll to page that lists the setting that needs to replace and select it on the LCD screen and the select "Replace". The splice modes stored in memory are displayed on the screen, select the desired Heater mode to be replaced and select "OK". The selected Heater mode replaces the last blank entry in the splicer menu.
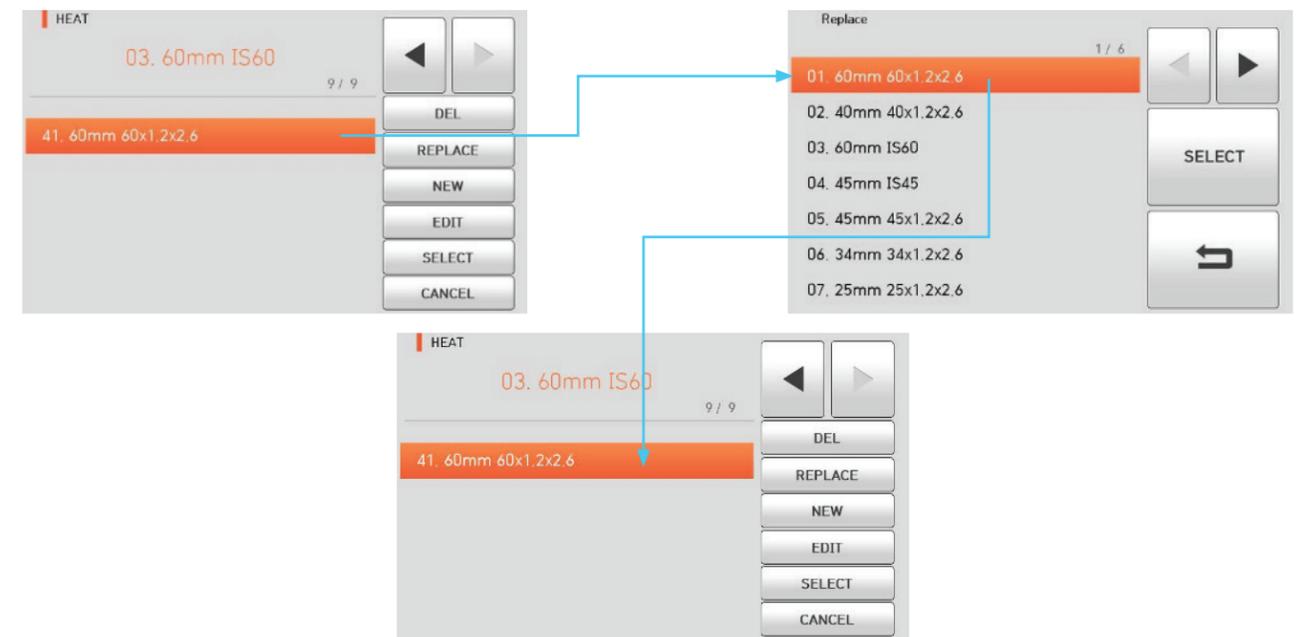
NOTE:
Heater modes from 1 - 40 cannot be replaced.

CREATE A NEW HEATER MODE SETTING

Create a new heater mode setting when you want to customize a setting and store it for use in addition to your default settings. Environmental or equipment deviations would cause a user to create a new Heater Mode setting. Factors like extreme cold that effect the heater performance is an example when a user might need to add time or temperature to default setting. Note you must first create a new setting and then Edit that setting (see next section) to change the values as needed.

To create a new Heater Mode select Menu from the LCD display or [MENU] from the K33A. Next select "Heater" menu using the touch screen. Select New from the LCD screen and using the arrows scroll to page that lists the type of sleeve/connector you want to create a new setting for and select it. The Heater modes stored in memory are displayed on the screen, select the desired Heater mode to be replaced and select "OK". The selected Heater mode replaces the last blank entry in the splicer menu.
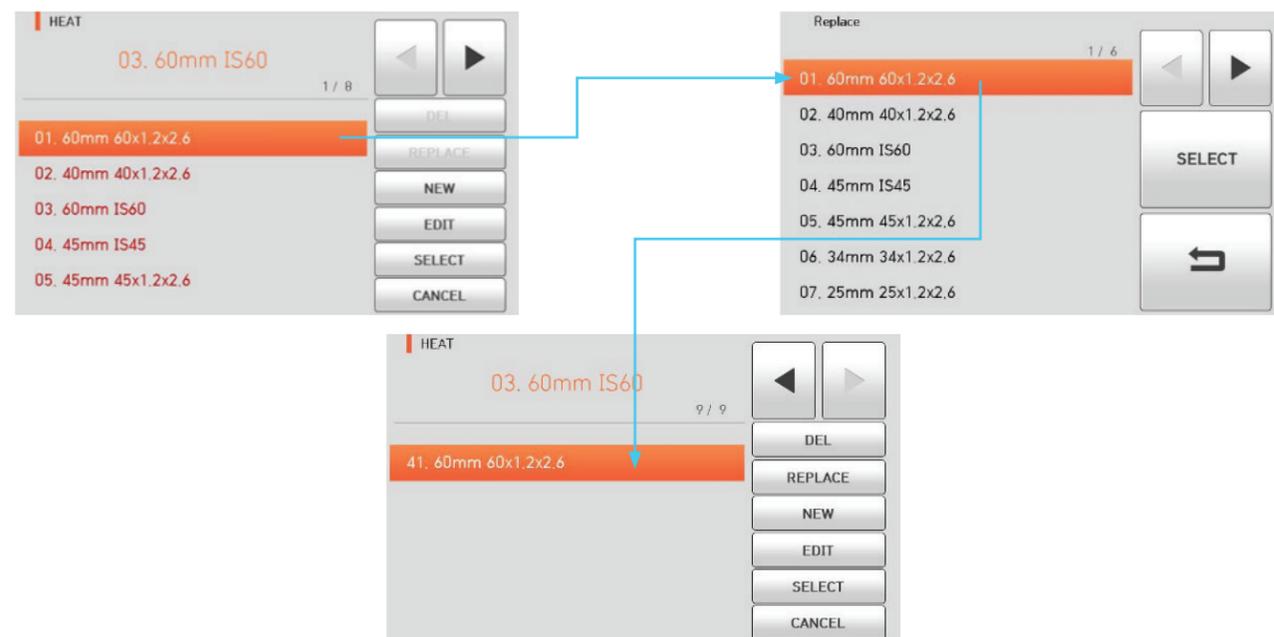
NOTE:

Heater modes from 1 - 40 are system defaults. New Heater Modes start are considered user modes and start at number 41.

EDIT A HEATER SETTING MODE

Users can Edit specific values like time and temperature for Heater Mode settings. It is suggested if you change a default setting (1-40) that you change it back after you have completed your project. If you are going to use an amended Heater Mode setting often it is recommended that you create a new setting (see previous section) then use Edit Mode to create a new user setting.

To Edit a Heater Mode setting select Menu from the LCD display or [MENU] from the K33A. Next select "Heater" menu using the touch screen. Select the setting you want to Edit from the LCD screen using the arrows on the LCD display to scroll to the page that lists the setting you want to Edit and select it on the LCD display. Next select Edit, then select the setting you want to change then edit again to show the current setting. Enter the new value for the setting and then select the check mark to confirm the updated setting.
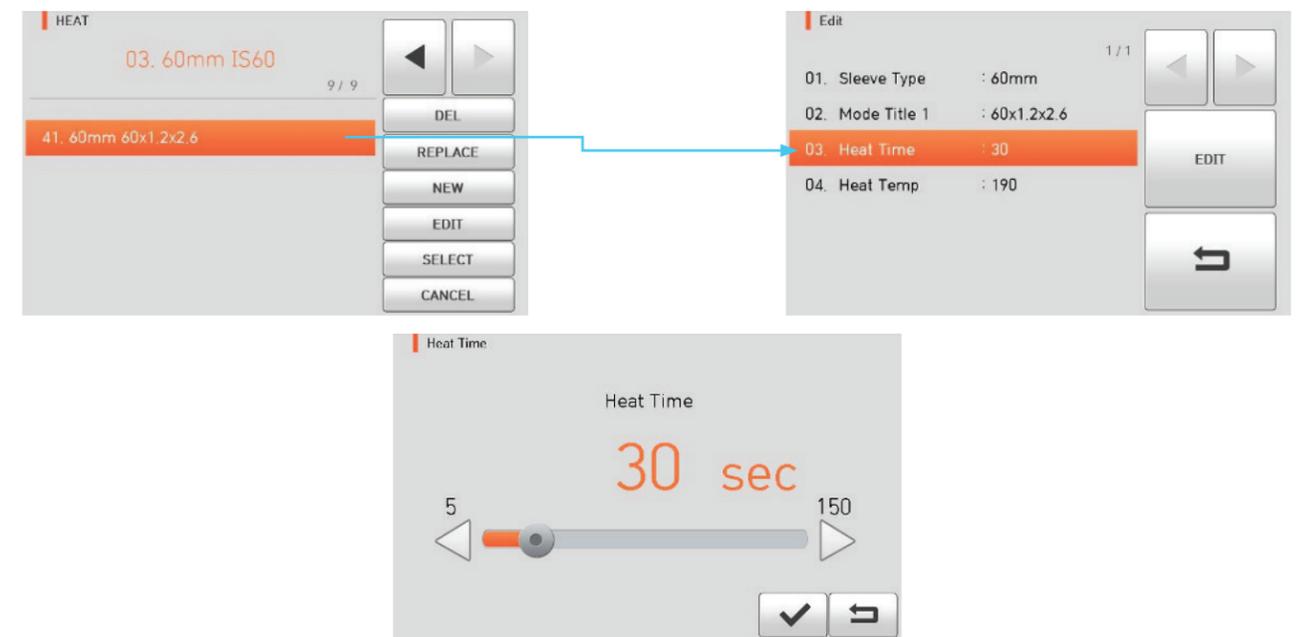
Set the new value then select the "Check Mark" icon to confirm the change. Select the return button to return to the Heater Mode Menu then ready to return to the ready menu.

THERMAL STRIPPER MENU

The K33A has an onboard thermal stripper that provides the most efficient, consistent and damage free process to strip the protective fiber jacket from the fiber it protects. Fiber jacket types vary by manufacturer and the K33A has default setting for the most common fiber types in the market today. We constantly update our data base with new fiber types but on occasion settings need to edited due to new technologies and environmental factors.

SELECTING A THERMAL STRIPPER SETTING

From the main menu press [MENU] on either the K33A or its touch screen. Next select stripper from the touchscreen menu. This will display the preset Stripper settings where the user can select the required setting. Up to 100 unique Auto Stripper settings can be programmed into the K33A. Please note that settings 1-13 cannot be Deleted or Replaced but can be Edited. New customized settings can be created.

DELETE A THERMAL STRIPPER SETTING

Only user created thermal stripper settings can be deleted. To delete a user setting from the ready menu press [MENU] on either the K33A or its touch screen. Using the arrows on the LCD screen sroll unitl the setting to be deleted is on the LCD screen. Select the stripper mode to be deleted on the LCD screen and press the DEL button and the setting is deleted. Select the return icon to return to the Stripper menu then Ready to return to the ready screen.

REPLACE A THERMAL STRIPPER SETTING

Only a user created Thermal Stripper setting can be replaced. To replace a Thermal Stripper setting from the ready menu press [MENU] on either the K33A or its touch screen. Using the arrows on the LCD screen scroll until the setting to be deleted is on the LCD screen. Select the stripper mode to be replaced on the LCD screen and press the REPLACE button and the default Thermal Stripper settings are displayed. Select the desired thermal stripper setting and the setting replaces the old setting. Press the icon to return to the Stripper menu then Ready to return to the ready screen.

The REPLACED Stripper mode replaces the last blank mode.
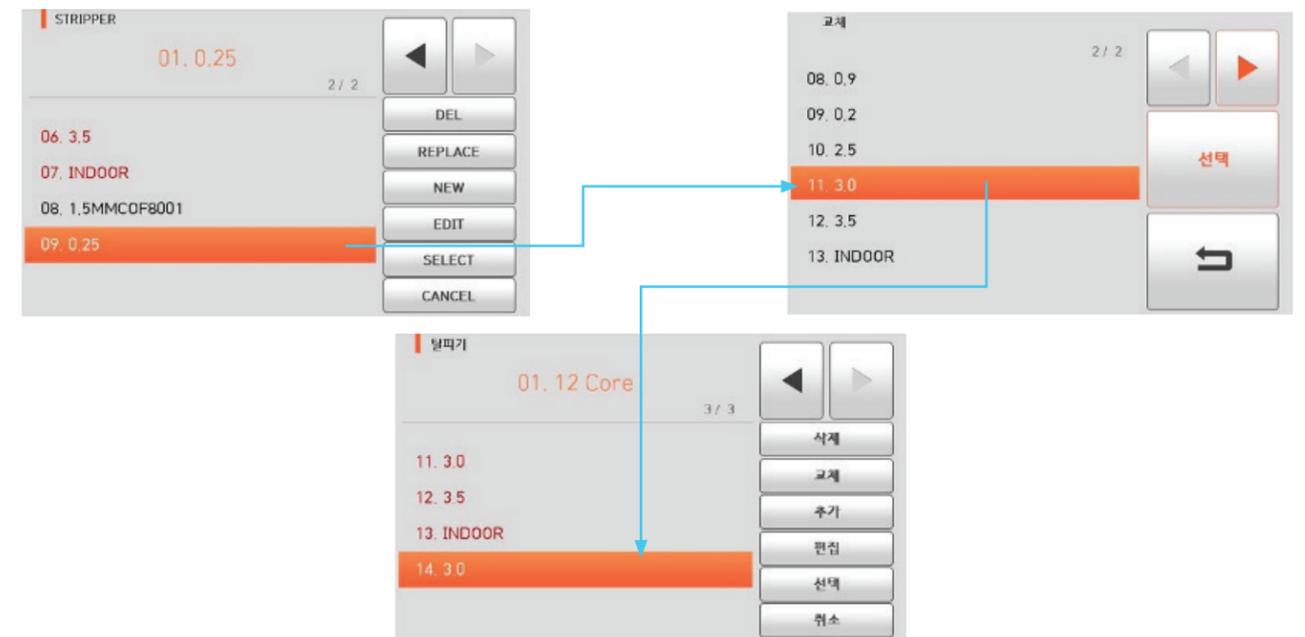
NOTE:
Thermal Stripper modes from 1-13 cannot be replaced.

CREATE A NEW THERMAL STRIPPER SETTING

Create a new Thermal Stripper setting when you want to customize a setting and store it for use in addition to your default settings. Environmental or equipment deviations would cause a user to create a new Heater Mode setting. Factors like extreme cold that effect the Thermal Stripper performance is an example when a user might need to add time or temperature to a default setting.

NOTE:
You must first create a new setting and then Edit that setting (see next section) to change the values as needed.

Select "New" from the Thermal Stripper main menu. This will display the pre-programmed Stripper mode stored in the K33A memory on the screen. Select the desired Stripper mode and select "OK". The selected Stripper mode is added to the menu at the end of stored selections.
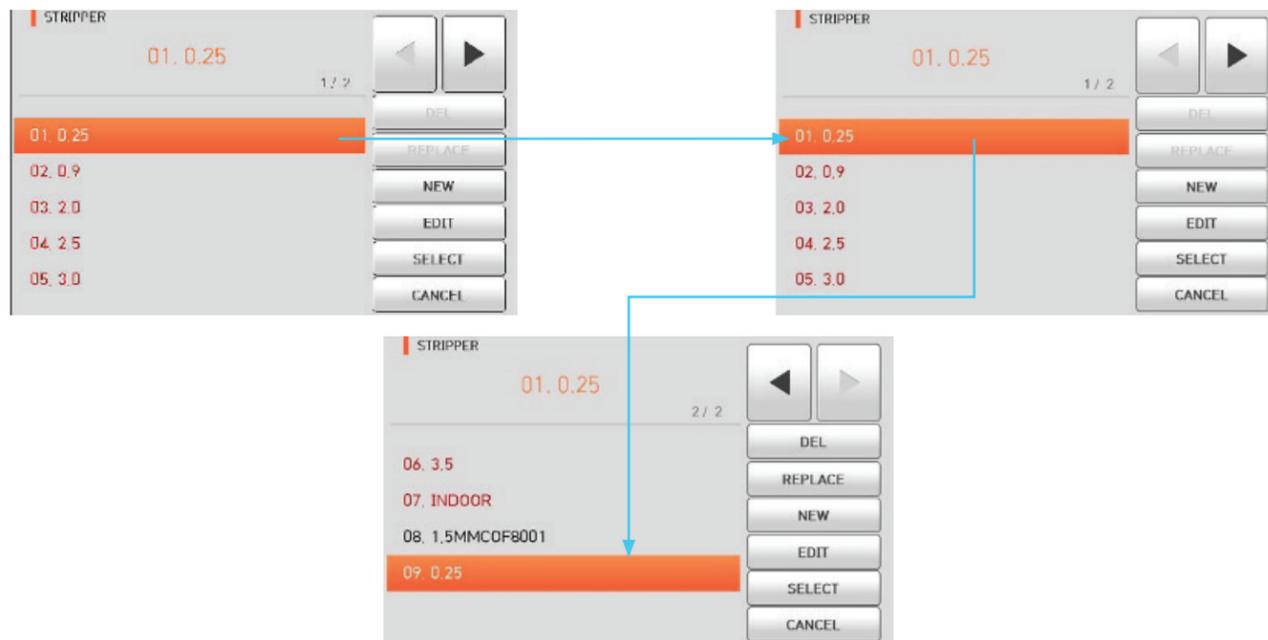
NOTE:
Thermal Stripper modes from No 1-13 cannot be added.

EDIT A THERMAL STRIPPER SETTING

Edit a new Thermal Stripper setting when you want to customize a setting in the K33A menu. Environmental or equipment deviations would cause a user to Edit a Thermal Stripper Mode setting. Factors like extreme cold that effect the Thermal Stripper performance is an example when a user might need to add time or temperature to a default setting.

NOTE:
You must first create a new setting and then Edit that setting (see previous section) to add a new setting as needed.

To Edit a Thermal Stripper Mode setting select Menu from the LCD display or MENU from the K33A. Next select Stripper from the menu using the touch screen. Using the arrows on the LCD display to scroll to the page that lists the setting you want to Edit and select it on the LCD display. Next select Edit, then select the setting you want to change then edit again to show the current setting. Enter the new value for the setting and then select the check mark to confirm the updated setting.
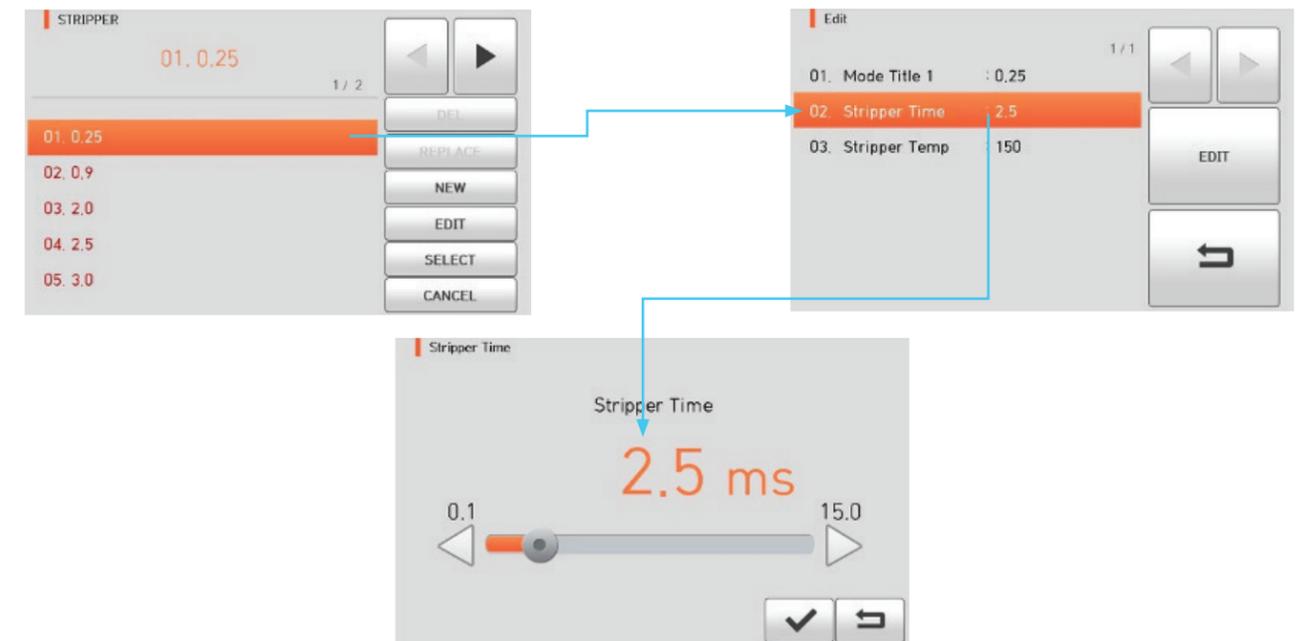
Select return to go back to the Thermal stripper menu and then ready to return to the Ready Screen.

HISTORY MENU

The History Menu has 2 sub menus as follows.

To navigate to the History Menu from the ready screen select Menu from the LCD display or [MENU] from the K33A. Next select History from the menu using the touch screen.

DISPLAY MEMORY

Display memory shows splice details for up to the last 10K splice records. Data stored is the day/date/time of the splice as well as fiber type, estimated splice loss, barometric pressure and left and right cleave angles. If the image icon was selected upon splice completion a picture of the splice will be recorded as well and can be viewed along with the splice record details.

From the Ready Screen In normal operation mode, to call the history menu, press [MENU] from the K33A button or from the touch screen display. This will display the History menu screen.
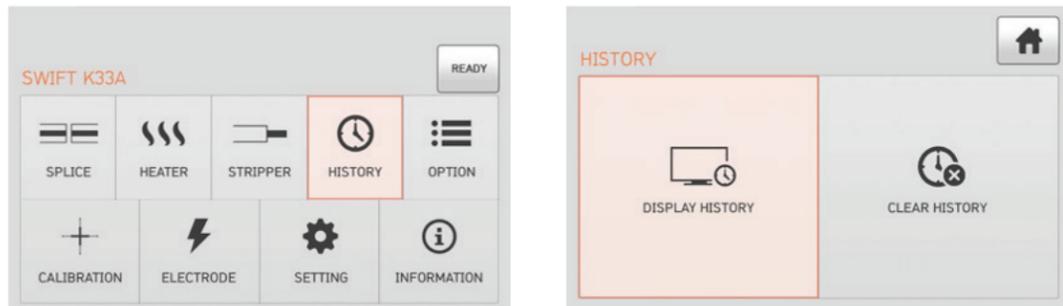
Select display history to see the splices saved in the K33A history. Splices are saved most recent splice will be in the first position. Highlight the splice that you want to view the details of and select VIEW.

Select return to close the detail screen and again to return to the Main History menu. Press the Ready to return to the main menu.

CLEAR MENU

Clear memory erases all the saved splice records in memory. This function cannot be undone.

From the Ready Screen in normal operation mode, press [MENU] from the K33A button or from the touch screen display. This will display the History menu screen. Select history to display Clear History Option and select. Select X to clear the history menu.

Select the return to go back to the history menu and then the home icon to return to the ready screen.

OPTION MENU SETTINGS

The option sub menu has 3 options where a user can customize the K33A settings to optimize and work in a more efficient manner.

From the main menu press the [MENU] button on either the K33A or its touch screen. Select the Option menu to take you to the options that the user can program to customize the settings to be user specific.
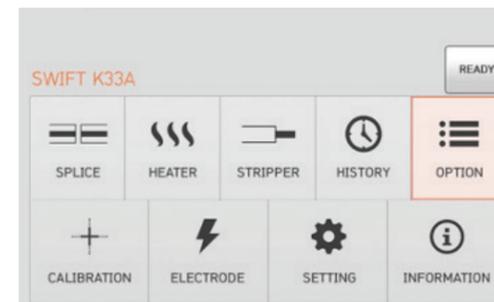
DEFAULT SETTINGS MENU

There are 4 specific Default options. See the chart below for and explanation of each unique function. To activate a Default option, enable a check in the box next to the option and to disable an option remove the check in the box next to the option. Select the check mark to save your changes.

PARAMETERS	DESCRIPTION
Auto Splice	Performs the splice process automatically upon closing with wind cover with no pause after the final alignment.
Pause 1	Stops after initial flash clean process completes. Press **SET** and it goes to the next step.
Pause 2	Stops after final alignment completes. Press **SET** to perform the final splice.
Auto Heat	Powers on the sleeve heater automatically once the wind cover is opened after splicing a successful splice.

MENU LOCK

Menu Lock enables the user settings for Splice, Heat, Memory and Password to be locked/enabled to minimize the ability of these features to inadvertently be changed. To activate the protection of these settings, place a check in the box next to the feature and to disable remove the check next to the feature. You have to remember the password, if you forget or lose the password the K33A will need to send it in for service to resolve this issue.
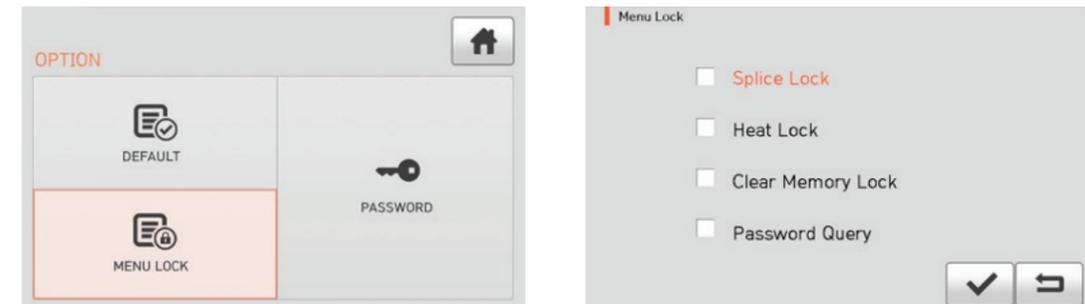
	TEST ITEM	DESCRIPTION
1	Splice Lock	Locks the ability to change the splice mode settings
2	Heat Lock	Locks the ability to change the heat mode settings
3	Clear memory Lock	Lock the ability to change or delete the memory data
4	Password Query	Initiates a password menu, the default password is "1234".

ASSIGN A PASSWORD

Set up a new password as follows
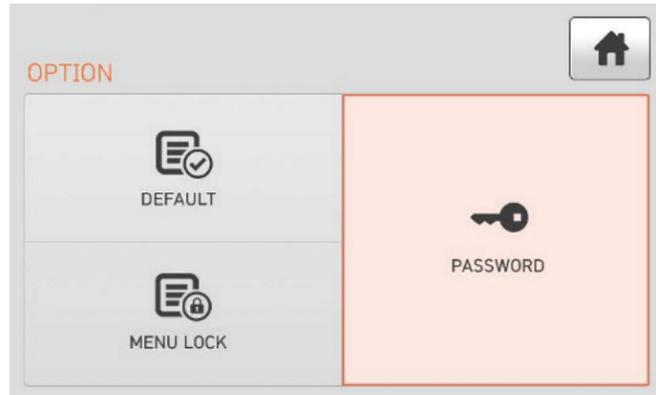
Enter a current password. The default password is "1234".

Enter a new password. The new password can be between 4 ~ 12 digits

Confirm a new password

If an incorrect password is entered or you press a wrong button the screen moves to upper level.
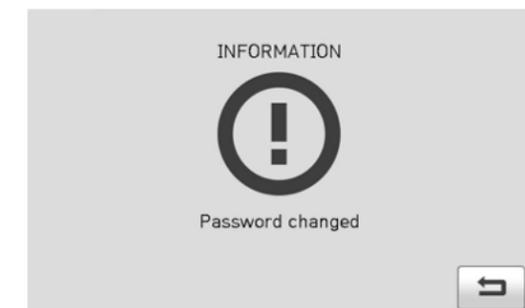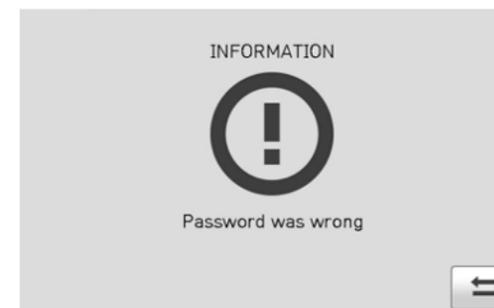
NOTE:
You must remember the password, if you forget the password the K33A has to be sent to a factory authorized service location.

CALIBRATION MENU

The calibration menu has 4 sub menus that enable the user to perform factory diagnostic tools to ensure the K33A operates at a consistently high-quality level. Arc Calibration, Diagnostic Test, Motor Drive Calibration and Motor Calibration.

From the main menu press the button on either the K33A or its touch screen. Select the Calibration menu to take you to the options that the user can perform to make sure the K33A is best acclimated for its specific working environment.
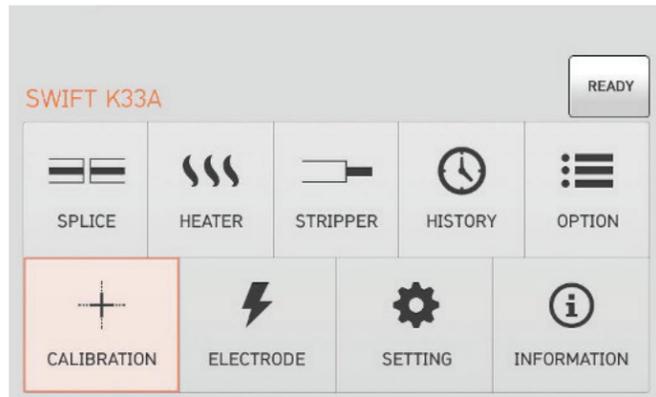
ARC CALIBRATION

Swift K33A continuously checks change the temperature, humidity and attitude through its on-board sensors. Based on this data the arc discharge is automatically calibrated. Changes in the amount of required arc discharge due to electrode abrasion or the optical fiber's splice properties is not automatically calibrated. The central axis of discharge can also be move left or right of center based on external environmental factors resulting in diminished splice results. In this case, an arc calibration is required to recalibrate all the sensors to the current conditions. (Similar to Restarting your cell phone)

Arc calibration is a function used to reset the value of arc discharge voltage. It is used as the baseline computation program for splicing. The calibration value of the arc discharge cannot be changed in the splice mode and it is recommended that an Arc Calibration be performed at the start of each day and/or if there are any temperature, humidity or altitude changes to the K33A.

NOTE:
When performing an arc calibration single mode (SM) Must be used

Strip, clean and cleave SM fiber and place in the fusion chamber of the

Click to initiate the calibration process.

Below is what the screen will display while the arc calibration is being performed. The Arc Calibration will arc multiple times during this procedure so be sure to wait for the "Calibration Completed" message as seen below.
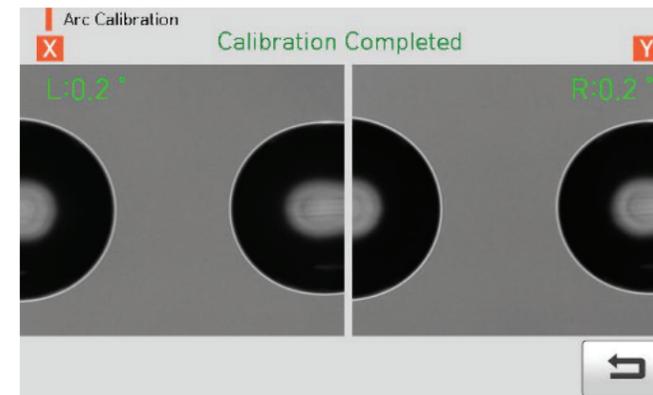
The calibration can be stopped by pressing even if it has not completed.

DIAGNOSTIC TEST

The Diagnostic Test is an on-board testing of the different systems used by the K33A. The chart below identifies what each test checks.
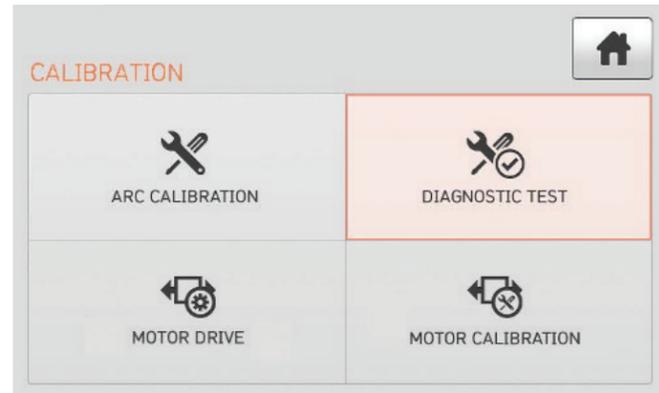
	TEST ITEM	DESCRIPTION
1	Dust test	Dust Test for impairments on the optical lenses
2	LED test	Checks the LED functions on the K33A
3	Motor test	Checks the functions of the Motors on the K33A
4	Heater test	Checks the Heater Function on the K33A

MOTOR DRIVE TESTING

Selecting Motor Drive enables the user to manually test the motors on the K33A and ensure they are working properly. Motor Drive test requires the user to place fiber in the splicer.

Select Motor Drive from the Calibration Screen. Place the fiber in the splicer. Click "Motor Drive"

Use the Touch screen to change motor selection. The name of the selected motor is displayed at the top left on the screen.

Operate the motor in a direction wanted by touching arrow icons at the bottom.

MOTOR	←	→
ZL/ZR	ZL/ZR Move forward	ZL/ZR Move backward
S	Move step by step press a button.	
M	Move while pressing a button.	

MOTOR CALIBRATION

Improper fiber cleaning and poor splicer maintenance can lead to a slowdown in fiber alignment times. If either/both of these conditions are present Motor Calibration will reset the alignment process to the factory setting. Prior to performing a Motor Calibration, it is imperative to thoroughly clean the K33A including the optical lenses. Upon completion of thorough cleaning follow the steps below.
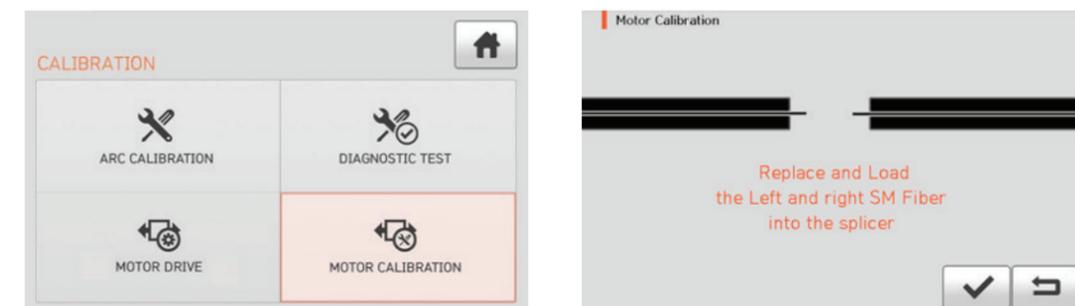
From the Calibration Screen select Motor Calibration. Select "Motor Calibration"

Place Single Mode (SM) fiber in either the fiber clamps or holders depending on how your K33A is setup. Press the check mark to initiate the Motor Calibration process. If an error message is displayed after testing, contact America Ilsintech immediately.

Exit to the previous screen by pressing RESET

ELECTRODE MENU
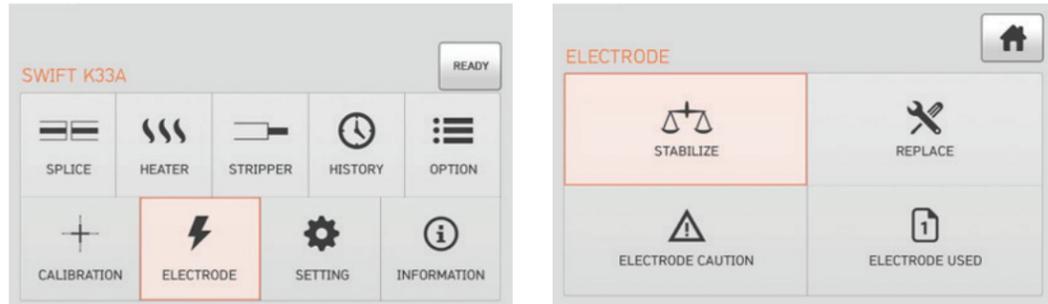
ELECTRODE STABILIZE

Electrode Stabilization is done when the electrodes are replaced with a new set of EI-23 electrodes or if the K33A is actively used in extreme altitude conditions and a degradation of splice quality is occurs. If the electrodes need to be stabilized initiate the process as stated below.

Place SM fiber in the K33A using fiber holders or fiber clamps. Select "Electrode Stabilize".

Click
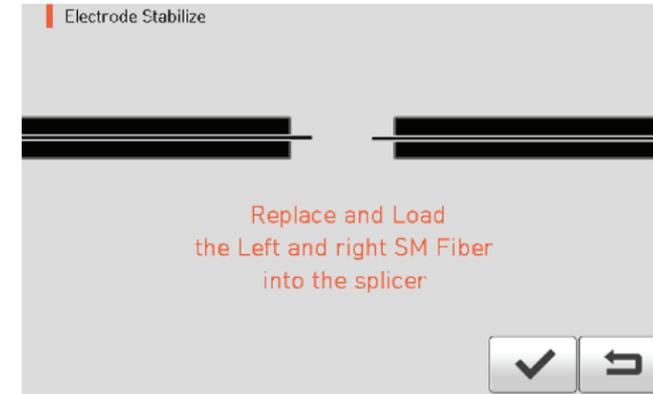
The K33A will perform 60 arc cycles to calibrate the electrodes and the display will count them down from 60 to zero.

Upon successful completion the message below will be displayed on the touch screen.
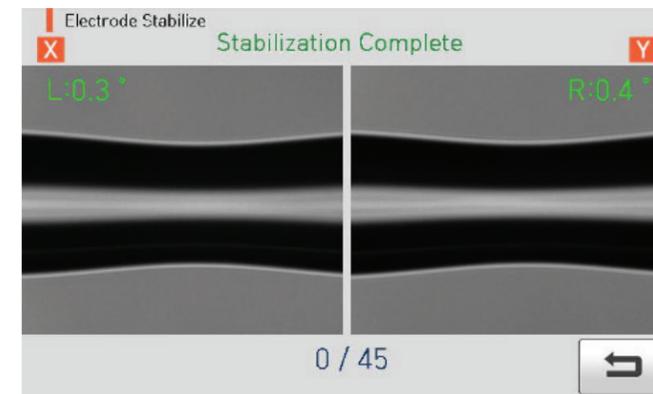
NOTE:
Upon successful completion to the Electrode Stabilization a5rn ARC Calibration should immediately be performed to complete the process see Section 6.6 for instructions.

ELECTRODE REPLACE

The recommended replacement cycle of an electrode is after 18,000 arcs/splices. When the threshold is reached a message to replace the electrode appears on the screen.
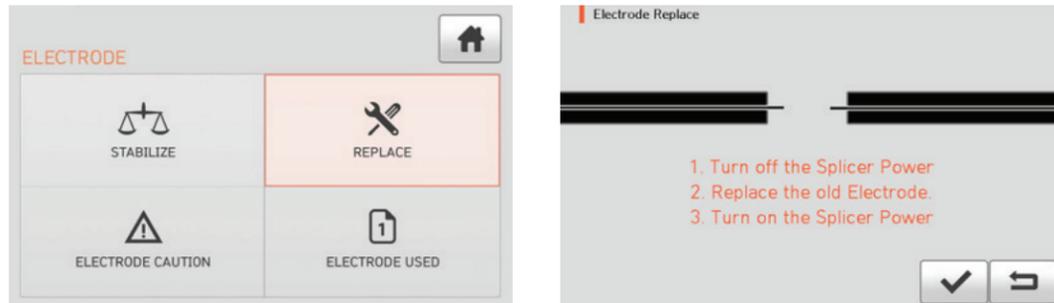
ELECTRODE CAUTION

Electrode Caution allows the user to manually set an alert once a particular number of arcs/splices is achieved up to 4K. The recommended replacement cycle of an electrode is 18,000 arcs/splices.

ELECTRODE USED

This feature allows the K33A user to see how many arcs/splices are on the current electrodes. Selecting the trash can icon will reset this to zero. The cumulative total will remain on the machine and can be viewed in the Information Menu- See section 6.9.

K33A PART NAMES

The Setting Menu allows the K33A user the ability to set the language seen on the display screen, set the time and date, set the power save options to extend battery life, set the volume of the alerts on the K33A and to adjust the LCD brightness level. To access the Setting menu, select the MENU button from the K33A or its touchscreen. Next select Setting from the display.
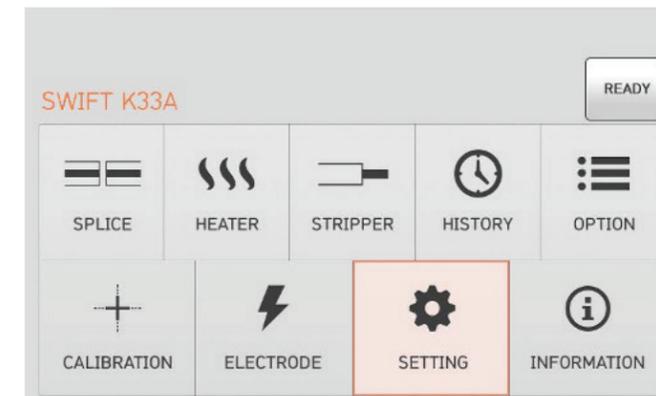
LANGUAGE

Allows the K33A user to select the language displayed on the LCD screen during use of either English, Spanish or French. If you need additional language support, contact your America Ilsintech representative.
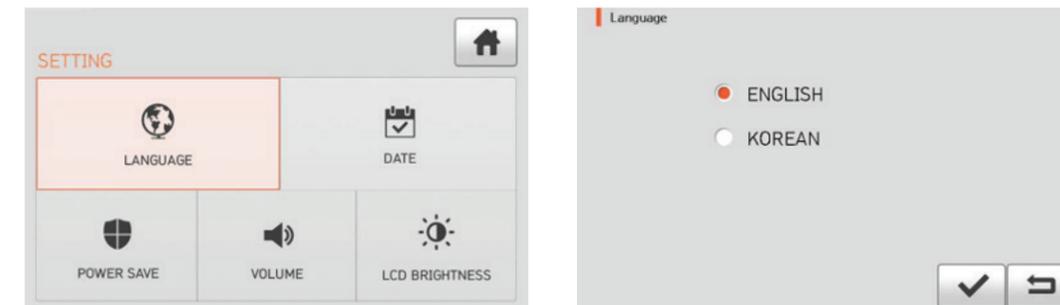
DATE

This allows the user to set the year/month/day as well as the time of day.

POWER SAVE

It is an important function in terms of energy efficiency. When the Swift K33A operates with a battery, we recommend activate this function to increase your working time. Selecting the Power Save option will let the user to set in seconds the amount of time that will pass prior to shutting of either the display screen or the splicer.
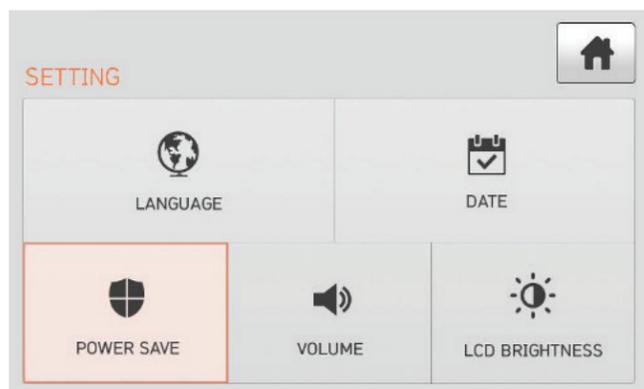
MONITOR

The LCD will be automatically turned off, if you don't operate the Swift K33A for a setting time. The monitor is turned on again when you press any button or touch the LCD screen.
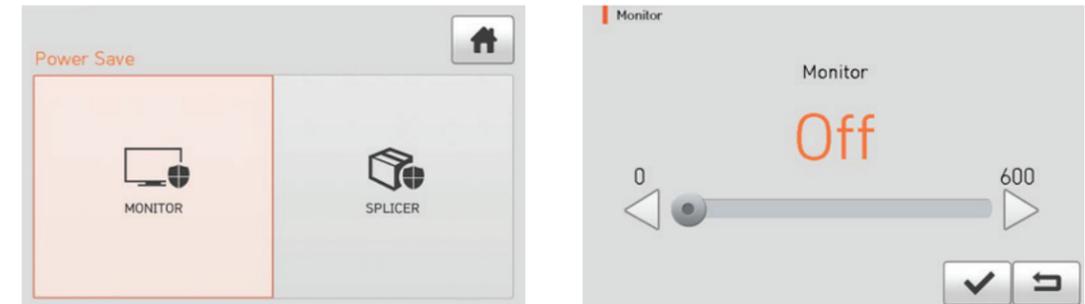
SPLICER

The Swift K33A will be automatically turned off, if you don't operate it for a time set. The Swift K33A is turned on again only when you press
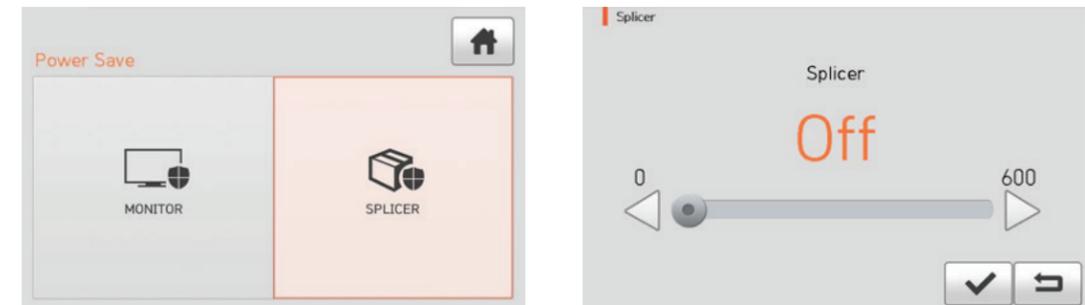
VOLUME

The Volume setting allows the user to adjust the alert tone volume.
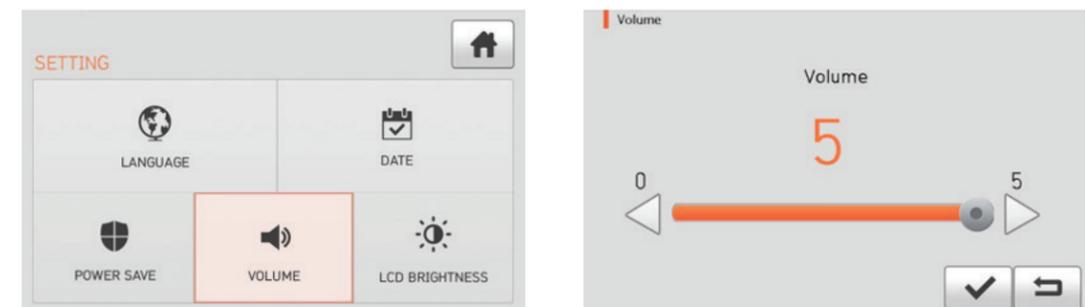
LCD BRIGHTNESS

The LCD Brightness adjustment allows the user to raise or lower the LCD brightness on the display screen.

INFORMATION

The Information menu allows the user to access the Maintenance Information, the Version Menu, the Sensor Menu and the Help Menu. To access the Maintenance menu, select the MENU button from the K33A or its touchscreen. Next select Maintenance from the display.

MAINTENANCE INFO

Select the Maintenance option to view the following information.
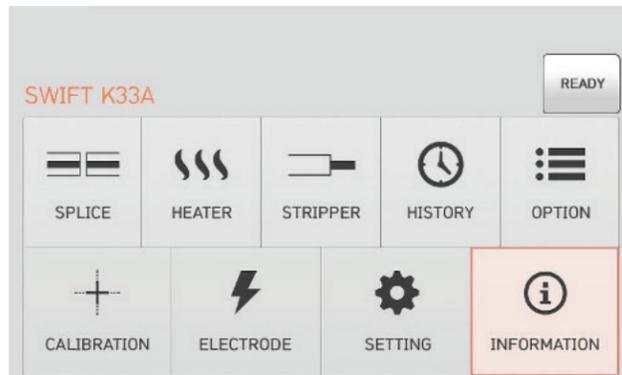
ITEM	DESCRIPTION
Produce Date	The date when equipment was manufactured. (year, month and date).
Electric Number	Arc discharge count since the replacement of the electrode.
Total Electric Number	Cumulative total number of arc/splice discharges since the K33A has been in service.
Last Maintenance	The last date the device had factory service.
Next Maintenance	Date of next recommended service/maintenance.
Serial Number	The unique serial number given to this device.

SENSOR

Select Sensor and the current temperature, barometric pressure and voltage are displayed indicating that all the sensors in the K33A are working properly. The splicer consists of various sensors including temperature, pressure and humidity.
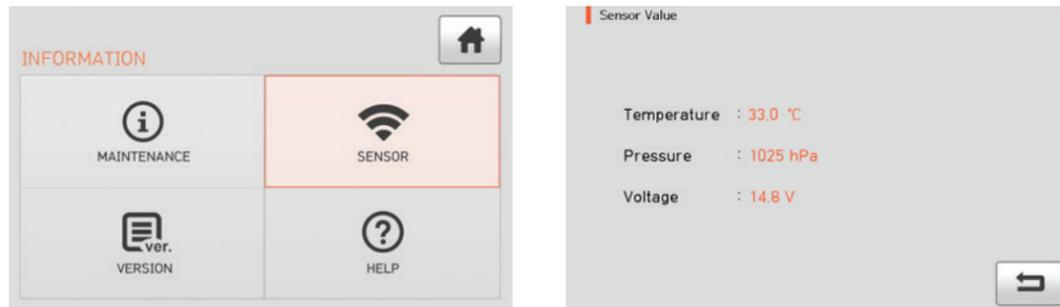
VERSION

Select Version and the model number and current software version are displayed.
The software version can be easily upgraded sending the K33A in for service (covered by the 36-month warranty at n/c) or by connecting to PC and using Data Sync program (PC Program) and downloading it from our website.

HELP

The Help function has helpful information about the K33A fusion splicer. It has a Name of Parts selection which helps identify the individual parts and their names, warnings that help extend the life of your K33A splicer, instructions on how to clean and inspect your K33A and a list of phone numbers in case you need support with your K33A.

To access the Help menu, select the MENU button from the K33A or its touchscreen. Next select Help from the display.

Select "HELP", following help is displayed.
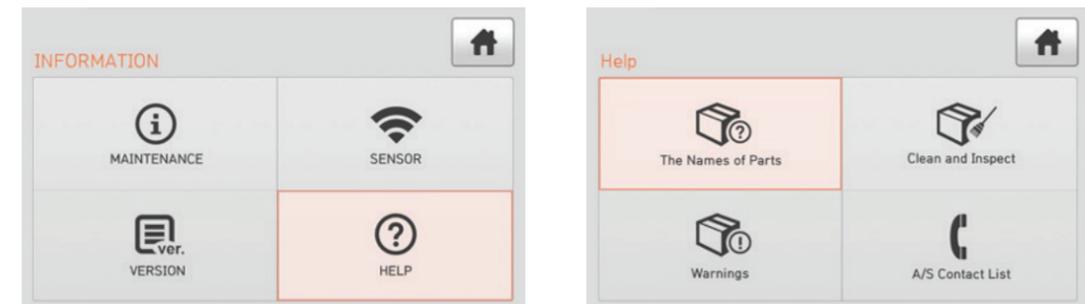
ITEM	DESCRIPTION
The Name of Parts	Identifies the main parts of the Swift K33A.
Clean and Inspect	How to clean and inspect the K33A.
Warnings	Warnings of what NOT to do to your K33A.
A/S Contact List	Service contact list by country.

ERROR MESSAGES

TOO DIRTY FIBER

Displayed when the optical system determines the prepped fiber is contaminated and will inhibit the ability of the K33A to perform a quality splice. To remedy open the wind cover, remove the dirty fiber, clean, cleave and then replace it into the splice chamber.

Replace the optical fiber. This message is displayed when the fiber is not correctly situated in the middle of the electrodes and V- groove or the optical lenses are dirty or obstructed.

To clear this message, press the **RESET** remove the fiber and place it in the fusion chamber. If this error continues clean the optical lenses.
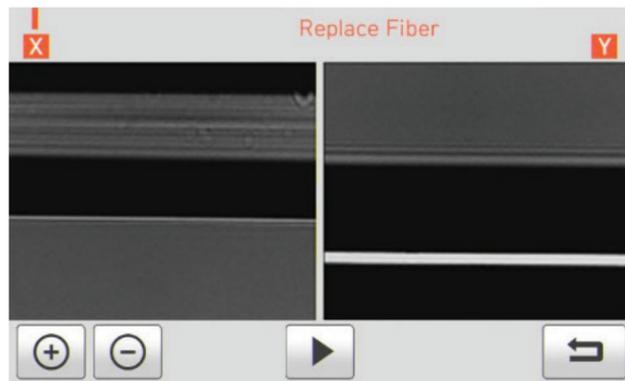
TOO LONG FIBER

The Too Long Fiber error message is displayed with the fiber end is placed too close to the electrodes or the cleave length is too long and the tip of the fiber extends beyond the default limit. A dirty lens or weak LED light can also cause this error, but most instances are attributed to the fiber length. Call your representative if this problem persists.

To Clear this error Press **RESET** and place the fiber in the fusion chamber. If error persist remove dust and dirt from the lenses. Conduct an LED test. If an error occurs, contact UCLSWIFT Co., Ltd.
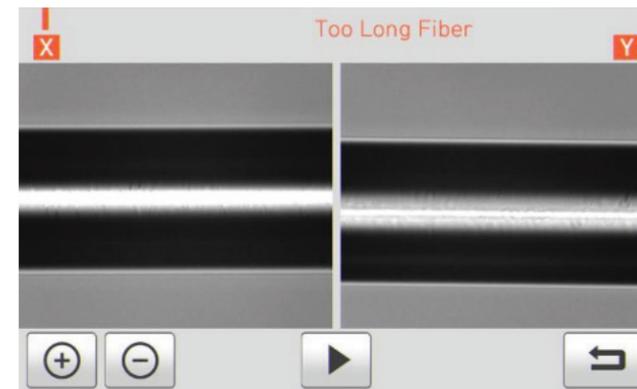
FIBER OVER ANGLE

Fiber over Angle error is displayed when the measured cleaving angle of the fiber is greater than the limit. This error will be displayed and the faulty cleave angle value will be displayed in Red. Green values displayed are within acceptable limits. The default cleave angle is set for 2.0- higher values will appear and red and lower values will appear in green. To clear this error, remove the fiber with the high value and strip, clean and cleave it again. Be sure that the cleaver is clean and free of debris prior to cleaving the fiber. If this condition persists, contact your sales representative.
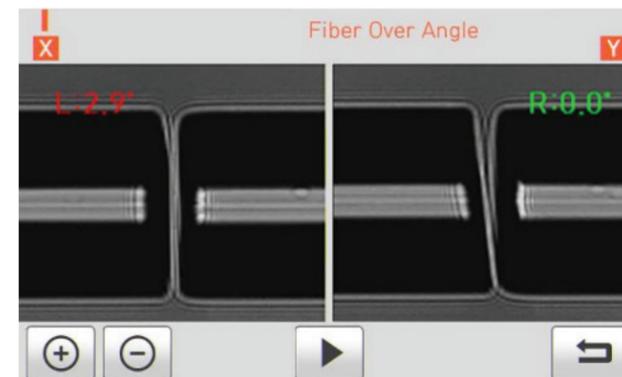
SPLICE LOSS IS TOO HIGH

This error message is displayed when a competed splice has an estimated loss value above the default setting 0.20 db. An acceptable value will be displayed in Green and an over limit value will be displayed in red. The default value can be changed is needed in the splicing menu.

If the splice loss value is too high the user can hit the Set button up to 5 times to re-arc the splice to try and improve the value before removing the fiber and starting over.

OPTICAL FIBER IS THIN

The Optical Fiber is Thin error message is generated when the optical imaging system of the K33A determines the fiber diameter has been altered and is thinner as a result of the fusion splicing process. The fiber will need to be removed and prepped so a new acceptable fusion splice can be performed. If this condition persists, contact your sales representative.

OPTICAL FIBER IS THICK

The Optical Fiber is Thick error message is generated when the optical imaging system of the K33A determines the fiber diameter has been altered and is thicker as a result of the fusion splicing process. The fiber will need to be removed and prepped so a new acceptable fusion splice can be performed. If this condition persists, contact your sales representative.

CORE BUBBLE ERROR

The Core Bubble Error message is displayed when bubbles or dots are detected by the optical system of the K33A upon completion of the splice. Common causes of bubble errors are bad cleave angles or a damaged cleaver blade, dirty V-Grooves, electrode degradation and poor-quality fiber. The splice will need to be redone as a core bubble effects performance. If this condition persists, contact your sales representative.

CLEAVE ANGLE ERROR

This error message is generated when the cleaved end of optical fiber is of poor quality. Strip clean and cleave the fiber to eliminate this error.

TROUBLE SHOOTING YOUR K33A

SPLICE LOSS IS TOO HIGH

This can be caused by dirt or dust on the surface of fibers. Carefully clean the surface of the fibers.

- **DO NOT** clean the optical fiber after cleaving to prevent dust from being introduced onto a cleaved fiber

- **DO NOT** push the optical fiber when placing it on the V-Groove. The optical fiber should be gently placed from the front to the back of the V-Groove.

  The alignment of the fibers can be negatively affected by dirt in the V- grooves. Keep the V-grooves clean at all times.

BAD ELECTRODES

Replace the electrodes if the tips are bent or contaminated or if they are worn out.

IMPROPER ARC DISCHARGE OR ARC DISCHARGE TIME

Check the set values of arc discharge amount and arc discharge time and reset them, if necessary. The machine is delivered after being set to the most optimized values from the factory.

INAPPROPRIATE SPLICE MODE

Confirm the proper splice mode for the specific type of fiber has been selected.

K33A DOES NOT WORK PROPERLY

The alignment function continues and cannot stabilize.

- Open and close the windshield cover again.
- Rest the system by pressing **RESET** when an error occurs by opening the windshield cover.
- Turn off the power and contact UCLSWIFT Co., Ltd.

THE ERROR MESSAGE OF "TOO LONG FIBER" APPEARS REPEATEDLY

Reset and turn off the power. Contact UCLSWIFT Co., Ltd.

FREQUENTLY ASKED QUESTIONS

POWER

The User is unable to turn off the power by pressing
Press the switch and hold it for about 1 second and release the button when the monitor is turned off.

The Battery life seems to be diminished and does not perform as long as it used to.
Try using the power saving mode to limit the battery use during idle time for the LCD display and the K33A. Please refer to [Setting Menu] for more information. If the battery has not been used for an extended period of time, charge it until it is fully charged.

Battery life is affected by extreme hot and cold weather and will deplete faster. Using power saving mode can help elongate battery life. Older well used batteries could need replacement. Many high capacity users order a spare battery as a back-up. If you cannot charge the battery fully, do as instructed below.

LED is not turned on while charging the battery.
Disconnect the AC power cord from the charger and connect the DC cord to the charging jack. Connect the AC power cord in 10 to 15 seconds. The LED of the battery is turned on red and charging begins.

Remaining battery is not indicated.
Charge the battery.

Remaining battery life is not well displayed.
When the battery gets low the display values could be affected. Use the indicator on the battery itself to determine remaining battery life.

Splice Errors
When an error message appears on the screen. Refer to the Error message list for detailed information.

Irregular or higher splice loss.
Clean V-Groove, V-Block and optical lenses by referring to [Maintenance of splice quality]. Replace electrodes by referring to [Electrode replacement]. Refer to the "High estimated loss" from [Error message list].

If optical fiber warps or is bent, place the optical fiber's bent direction to face the bottom. Splice loss varies depending on cleave angle, discharge condition and cleanliness level of optical fiber.

If splice loss is still high or irregular even after implementing the above recovery measures, contact to UCLSWIFT. Annual maintenance is required to keep splice quality.

Monitor is turned off suddenly.
Press any key and check [Monitor Power Save].

The power of the splicer is turned off suddenly.
Turn on the splicer again and check [Splicer Power Save].

On SM, NZ, MM or AUTO mode, either discharge amount or discharge time cannot be changed.
Implement [discharge amount calibration], and the discharge amount on these modes is properly maintained. When used on another mode, discharge amount and discharge time are automatically set to prevent changing their preset values.

How to set pause.
Refer to [Option Menu].

How to indicate cleave angle, optical fiber's angle and core/clad deviation.
Refer to [Option menu].

Difference between estimated splice loss and measured splice loss.
The estimated splice loss is just a result from a statistical calculation and to be used for reference only.

SLEEVE HEATER

The sleeve heater does not sufficiently shrink the protection sleeve
Increase the duration of heating time. Refer to [Heat Menu] for more information.

The sleeve heater is overheated.
Stop the operation of the heater by pressing HEAT *. Turn off the power and contact UCLSWIFT Co., Ltd.*

When the sleeve is not separated from the heating plate, use a cotton swab or a similar object to this to push or remove the sleeve.

How to initialize the heating condition in the heat mode.
Refer to [Heat Menu] for more information.

How to cancel the heating process.
You cannot cancel the heating process by pressing RESET *. Press* HEAT *one more time to cancel it.*

MISCELLANEOUS CONDITIONS

How to lock "Splice", "Edit" or heat mode.
Refer to Lock Menu for more detailed information.

Arc amount is not changed after performing [Arc Calibration].
The internal standard discharge amount is calibrated. Therefore, discharge amount of each splice mode does not change.

If you forget the password.
Contact UCLSWIFT Co., Ltd.

TRANSPORTING YOUR K33A

The Swift K33A is high precision equipment and is required to be transported it in a safe case to protect it from humidity, vibration and physical shock. In the case of repair, it must be shipped in the protective case along with its parts during its transport.

REPAIR

Any data saved in the memory including splice results and splice modes may be deleted as a result of repair.

WARRANTY TERMS & CONDITIONS

1. **Definitions:** The term "Ilsintech" means America Ilsintech or any company that is a subsidiary of, an affiliate of, or otherwise related to America Ilsintech. The term "Customer" means any individual, corporation or other entity purchasing goods or services from America Ilsintech.

2. **Warranty.** Ilsintech warrants (a) that the goods warranted here will conform to the applicable catalog descriptions and performance claims; (b) that it will convey good title to the goods supplied hereunder; and (c) that such goods will be free from defects in material and workmanship, provided that such warranty of freedom from defects in material and workmanship shall extend only for a period of time for the following classifications in Section 3, from the date of shipment, and that Customer gives Ilsintech notice of any such defect within thirty days after Customer discovers or should have discovered any such defect. Ilsintech's warranties will not apply to any goods that are improperly installed, that are used for purposes other than the purpose for which they were designed, that have had parts attached or removed or altered, that have been modified or repaired by anyone other than Ilsintech or an authorized Ilsintech-certified associate, or that have suffered any abuse, misuse, neglect or accident. **THE WARRANTIES CONTAINED IN THIS DOCUMENT ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. EXCEPT FOR THE WARRANTIES CONTAINED IN THIS DOCUMENT, ILSINTECH MAKES NO WARRANTY, WRITTEN OR ORAL, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, AND ANY SUCH WARRANTIES ARE HEREBY DISCLAIMED AND EXPRESSLY EXCLUDED.** Ilsintech's liability and Customer's exclusive remedy is expressly limited to Ilsintech's choice of (a) the repair of defective goods, (b) the replacement thereof with conforming goods, and (c) the repayment of the purchase price (exclusive of shipping). Replacement of defective goods or repayment of the purchase price will be made only upon return of the defective goods returned at the cost of Customer. **THE REMEDIES SET FORTH IN THIS DOCUMENT WILL BE CUSTOMER'S SOLE AND EXCLUSIVE REMEDY AND ILSINTECH'S SOLE AND EXCLUSIVE LIABILITY WITH RESPECT TO ANY BREACH OF THE WARRANTIES CONTAINED IN THIS DOCUMENT. NO LIABILITY UNDER THE WARRANTIES CONTAINED IN THIS DOCUMENT WILL BE GREATER IN AMOUNT THAN THE PURCHASE PRICE OF THE GOODS OR SERVICES IN RESPECT OF WHICH DAMAGES ARE CLAIMED PLUS COSTS OF TRANSPORTATION, PACKING AND HANDLING, AND ILSINTECH'S LIABILITY WILL BE LIMITED TO SUCH AMOUNT.**

3. **Classifications.**
   a. **Splicer operations contained in equipment (either all-in-one or stand-alone).** That portion of the equipment used to perform or display operations pertaining to direct arc splicing of fiber or fiber connectors shall be subject to a 3 year warranty from the date of shipment or date of purchase, unless an Extended Warranty is purchased. Ilsintech, or an authorized and Ilsintech-certified and approved alternate, will provide Annual Factory Cleaning, Calibration and Reset provided registration of the splicer with Ilsintech is performed at the time of purchase.

   b. **Stripping, cleaving and oven operations contained in equipment (either all-in-one or stand-alone).** That portion of the equipment used to perform or display operations pertaining to stripping or cleaving of fiber or fiber connectors, or perform or display oven operations, shall be subject to a 3 year warranty from the date of shipment or date of purchase.

   c. **Fixtures and holders.** That portion of the equipment used to perform or display operations pertaining to holding of fiber or connectors shall be subject to a 3 year warranty from the date of shipment or date of purchase.

   d. **Consumable equipment.** Electrodes, cleaver blades, power supplies, batteries, cleaning supplies, and other consumable equipment and supplies shall not be covered under warranty except for obvious manufacturing defects.

   e. **Connectors.** Splice-on connectors shall be subject to a 1 year warranty from the date of shipment or date of purchase, unless the installation is performed by an Ilsintech-Certified Installer (CI). If installed by a CI, the warranty shall be 25 years.

   f. **Extended Warranty.** An extended warranty of up to 25 years on the Splice-on-Connectors will be offered subject to 1) use of an Ilsintech-approved contractor; 2) project registration; 3) testing documentation of successfully-installed components; 4) Installation Certification upon completion of project; and 5) approval of partnering solution provider. Contact your local Ilsintech representative for details.

4. **Patents.** If Customer receives a third party allegation that non-customized goods made generally commercially available for sale by Ilsintech at the time Ilsintech ships these products and supplies such goods to Customer that infringe a United States patent and (x) Customer immediately notifies Ilsintech in writing upon learning of any such allegation of infringement and (y) Customer provides Ilsintech full opportunity, authority and assistance (at Ilsintech's option and expense) to defend, settle, and/or dispose of such infringement claim, and (z) the allegation results in a final, non-appealable judgment of patent infringement enjoining Customer from using the goods, Ilsintech's sole liability and Customer's exclusive remedy is expressly limited to Ilsintech's option to (a) obtain for Customer the right to continue using such goods, or (b) replace the goods with non-infringing goods, or (c) modify the goods so that they become non-infringing, or (d) remove the goods and refund the purchase price. Under no circumstances will Ilsintech have the obligation to provide the foregoing remedy or to otherwise indemnify, defend, settle, or otherwise dispose of any third

party claim of patent infringement: (i) if such claim is based in whole or in part on customization of the goods (as required by the Customer), on compliance with Customer's specifications or instructions, or on inclusion of material provided to Ilsintech by Customer; (ii) if such claim is based in whole or in part on Customer's marketing, advertising, promotion, or sale of any product containing the goods; (iii) if the infringement claim is based on Customer's use of the goods or use of the goods in combination with any products, materials, or equipment supplied by someone other than Ilsintech; (iv) if Customer or a third party modified or changed the goods and infringement would have been avoided without such modification or change; (v) if the infringement claim arises out of products or assemblies manufactured or designed by Customer in whole or in part; or (vi) to the extent the claim pertains to Customer's continued use of the goods after Ilsintech demands that Customer discontinue such use. **THE FOREGOING STATES THE ENTIRE LIABILITY OF ILSINTECH TO CUSTOMER AND CUSTOMER'S EXCLUSIVE REMEDY FOR INTELLECTUAL PROPERTY INFRINGEMENT.**

5. **No License; Limited Right of Resale.** The sale of the goods covered by this order shall not grant to Customer any right or license of any kind under any patent, trademark, copyright, any other interest in intellectual property or other proprietary right owned or controlled by Ilsintech or its affiliates or under which Ilsintech or its affiliates are licensed, although Customer shall have the right to use such goods or other items for the purpose for which they are sold. Customer shall not resell any goods or items sold hereunder unless it is an authorized distributor of Ilsintech's products.

6. **Export and Trade Compliance.** Customer agrees not to export, transfer, or transmit such goods or items except in compliance with all U.S. or other export laws and regulations. Customer shall at all times comply with Ilsintech's US Export and Trade Compliance terms and conditions.

7. **Waiver.** No provision hereof and no breach of any provision shall be deemed waived by reason of any previous waiver of such provision or of any breach thereof. All waivers must be in writing and signed by Ilsintech.

8. **Indemnity.** Customer shall indemnify, reimburse, release, hold harmless, and defend Ilsintech and its affiliates and their respective successors and assigns and their respective directors, officers, agents and representatives, from and against any loss, liability, claims, judgments, settlement amounts, damages, liabilities, deficiencies, expenses (including reasonable attorneys' fees and disbursements of counsel), suits and costs, directly or indirectly, caused by, arising out of or relating to the application or the use to which goods provided hereunder are put by Customer or others.

9. LIMITATION OF DAMAGES AND LIABILITY. ILSINTECH SHALL NOT IN ANY EVENT BE LIABLE FOR ANY SPECIAL, INDIRECT, PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY KIND OR NATURE, INCLUDING WITHOUT LIMITATION, ENVIRONMENTAL CLAIMS OR LOSS OF REVENUES, BUSINESS OR PROFITS, REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT, STRICT PRODUCT LIABILITY, OR OTHERWISE, EVEN IF ILSINTECH HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL ILSINTECH'S TOTAL LIABILITY FOR ANY CLAIM IN RESPECT OF ANY GOODS OR ITEMS COVERED BY THIS WARRANTY, WHETHER IN CONTRACT, WARRANTY, STRICT LIABILITY OR OTHERWISE, EXCEED THE PURCHASE PRICE OF THE GOODS OR OTHER ITEMS GIVING RISE TO SUCH CLAIM.

10. **Remedies; Performance and Enforcement By Affiliates.** In addition to the remedies set forth in these Terms and Conditions, Ilsintech shall have all the rights of a seller under the Uniform Commercial Code as enacted in Texas. All rights and remedies hereunder are cumulative and not alternative, and are in addition to all other rights and remedies available at law or in equity. This order may be performed and all rights hereunder against Customer, including but not limited to injunctive relief, may be enforced by Ilsintech or any one or more of Ilsintech's affiliates.

11. **Confidentiality.** Ilsintech and Customer agree to keep the confidentiality of information received from each other (excluding information publicly known or independently developed) and not to disclose it to unaffiliated third party (ies) or use it for purposes other than in connection with the goods purchased by Customer from Ilsintech and covered by this warranty.

12. **Governing Law.** The purchase and sale of the goods described herein and the relationship of Ilsintech and Customer shall be governed by the law of the State of Texas (excluding its rules of conflicts of laws). Any litigation relating to this order must be brought in state or federal district court in such state. The Convention for the International Sale of Goods shall not apply to the sales of goods or other items hereunder.

13. **Inconsistent Terms.** Ilsintech's performance in respect of this Warranty is subject to these Terms and Conditions set forth in this document. Ilsintech's warranty performance is expressly made conditional on Customer's assent to these Terms and Conditions whether or not in addition to or different from the terms of Customer's purchase order or terms and conditions or other Customer documents. Unless Ilsintech otherwise agrees in writing, Ilsintech expressly rejects any inconsistent terms in any of Customer's purchase order or terms and conditions or other Customer documents. For the avoidance of doubt, these terms and conditions prevail over all terms and conditions of Customer (even if they form a part of Customer's purchase order), and can only be varied by written agreement of Ilsintech.

14. **Amendment.** Ilsintech may amend these terms and conditions at any time.