GOING FUTURE TODAY.

AFS-GS41

Compact fusion splicer

Operating Manual

Version 09-2023A

Contents

Before starting operation of the device

HINWEIS: Read this operating manual attentively! It contains important information about installation, ambient conditions and maintenance of the device. Keep this operating manual for future use and for handover in the event of a change of owner. A PDF version of this manual is available to download on the ASTRO website (there may be a more recent version).
The ASTRO company confirms that the information in this manual was correct at the time of printing, but it reserves the right to make changes, without prior notice, to the specifications, the operation of the device and the operating manual.

Symbols and conventions used

Symbols used in these instructions

Pictograms are visual symbols with specific meanings. You will encounter the following pictograms in this installation and operating manual:

Warning about situations in which electrical voltage and non-observance of the instructions in this manual pose a risk of fatal injuries.

Warning about various dangers to health, the environment and material.

Warning about thermal dangers (risk of burns).

Warning about high laser radiation emitted from a device, connector or adapter (risk of eye damage).

Recycling symbol: indicates components or packaging materials which can be recycled (cardboard, inserts, plastic film and bags). Used batteries must be disposed of at approved recycling points. Batteries must be completely discharged before being disposed of.

This symbol indicates components which must not be disposed of with household rubbish.

Proper use

The splicer has been designed for splicing Silica-based optical fibers for telecommunications. Do not attempt to use this machine for other applications. Misuse of the machine may result in electric shock, fire and/or serious personal injury. Modification of the devices or use for any other purpose is not permitted, and will immediately void any guarantee provided by the manufacturer.

Target group of this manual

The target group for installation and starting operation of the ASTRO optical transmission technology are qualified experts who have training enabling them to perform the work required in accordance with EN 60728-11 and EN 62368-1. Unqualified person are not allowed to install and start operation of the device.

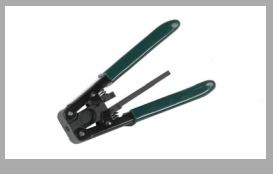












Device description

Scope of delivery

- ☐ Strap for splicer
- ☐ Lithium battery
- ☐ Power supply unit
- ☐ Power cord
- ☐ Cooling tray
- ☐ Case
- ☐ Strap for case
- ☐ Replacement electrodes
- ☐ Brush
- ☐ fiber stripper
- ☐ Dropcable Stripper
- ☐ Leaflet

About splicing

The AFS-GS41 Fusion Splicer is built for fiber fusion with low splice loss and ensures splice long-time stabilization. Splice loss depends on certain conditions like fiber preparation, splicing parameters, fiber condition, variation after splicing etc.

The standard principle of splicing is not complicated. Firstly the splicer finds the fiber core and aligns it correctly and then it splices the fiber with the arc generated by the electrodes. There are two major technologies to ensure high-quality splice, LID (Local Injection and Detection) and CDS (Core Detection System), which is also widely known as PAS (Profile Alignment System).

The AFS-GS41 with PAS technology is designed for splicing many types of optical fibers. It is small in size and light in weight, making it suitable for any operating environment. It is easy to operate and it splices fast while maintaining low splice loss.

Splice modes

Use SM splice mode for standard SM fiber (ITU-TG.652) splicing. It completes in 9 seconds and is the quickest mode for SM fiber splicing.

Use AUTO splice mode if fiber type is not identified. Splice takes longer but it covers most conventional fibers splicing for the following reasons:

- ☐ AUTO mode first identifies fiber type by analyzing fiber profile, and then unique splicing condition is chosen for the type of fiber. The types of fibers covered by AUTO are all the conventional fibers, such as SMF (G652), NZDSF (G655), MMF (G651), etc. The AUTO modes takes longer for the above processes but is recommended if fiber type is not sure.
- ☐ AUTO mode comes with automatic arc calibration function, which observes the splicing process and feedback adequate heat power information to the next splice.

Automatic arc calibration function

This function calibrates the arc power at every splice. When the automatic arc calibration function is enabled, performing the Arc calibration function before a splice operation is not necessary. The automatic arc calibration function works in AUTO modes only. It doesn't work in the standard splice modes. When using those modes, performing arc calibration before splicing is strongly recommended.

HINWEIS: You will find more information on how to choose the right splice mode in chapter „Configuring the device via the LCD screen".

AFS-GS41 splicer

Front:
[1] TFT screen

[2] USB jack [3] Locking of Lithium battery compartment
[4] Battery
[5] DC input (10-12 V)

Upper side:
[6] Heating compartment for shrinking of splice protection
[7] Wind protection
[12] Control panel (see figure 3)
[9] Strap locks

Figure 1: AFS-GS41

[14] Electrode cover
[15] Ocular
[16] V-rooves

Elements beneath the wind protection

Figure 2: AFS-GS41, wind protection opened

Elements of the control panel

[A] Power on/off button and control LED
[B] Arrow buttons, Menu button
[C] ARC button
[D] Heat button and control LED
[E] Reset button
[F] Set button (set splice)
[G] X/Y button button
[H] Enter button

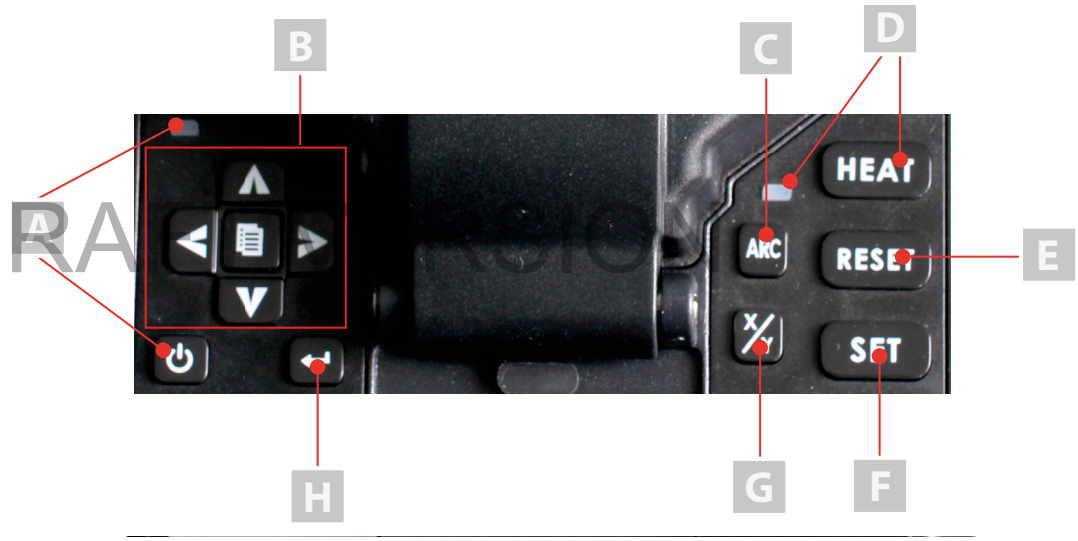


Figure 3: AFS-GS41, control panel

HINWEIS: The screen of the AFS-GS41 is touch sensitive. Thus it is possible to execute the functions of the control panel's buttons also by pushing the relevant screen buttons.

The AFS-GS41 features a CE marking. This confirms that the product conforms to the relevant CE directives and adheres to the requirements specified therein.

Important safety information

To avoid any hazardous situations to the extent possible, you must adhere to the following safety information:

ACHTUNG: Failure to observe this safety information may result in personal injury due to electrical and thermal dangers!

Proper use

- ☐ Only use the device at the approved operating sites and in the ambient conditions allowed (as described in the following), and only for the purpose described in the section “Proper use”.

Before starting operation of the device

HINWEIS: Read this operating manual attentively! It contains important information about installation, ambient conditions and maintenance of the device. Keep this operating manual for future use and for handover in the event of a change of owner or operator. A PDF version of this manual is available to download on the ASTRO website (there may be a more recent version).

- ☐ Check the packaging and the device for transport damage immediately. Do not start operation of a device that has been damaged.
- ☐ Transporting the device by the power cable may damage the mains cable or the strain relief, and is therefore not permitted.

Installation, operation, maintenance

- ☐ The electrical connection conditions must correspond to the specifications on the device type plate.
- ☐ The ambient temperatures specified in the technical data must be complied with, even when climatic conditions change (e.g. due to sunlight). If the device overheats, the insulation used to isolate the mains voltage may be damaged.
- ☐ The device and its cable may only be operated away from radiant heat and other sources of heat.
- ☐ To avoid trapped heat, ensure there is good ventilation on all sides.
- ☐ No objects may be placed on the device.

- ☐ The device does not feature protection against water and may therefore only be operated and connected in dry rooms. It must not be exposed to spraying or dripping water, to condensation, or to similar sources of moisture.
- ☐ All adhere to all applicable national safety regulations and standards.

- ☐ The device is operational when connected to the mains power or if the provided Lithium battery is charged and inserted into the battery compartment of the device.
- ☐ Excess mechanical loads (e.g. falling, impacts, vibrations) may damage insulation used to provide protection from mains voltage.
- ☐ High excess currents (lightning strike, surges in the power utility grid) may damage insulation used to provide protection from mains voltage.
- ☐ If there is no information about intended use (e.g. operating site, ambient conditions), or the operating manual does not include the corresponding information, then you must consult the manufacturer of this device to ensure that the device may be installed. If you do not receive any information on this from the manufacturer, do not start operating the device.
- ☐ Verify that the product is set to match the available line voltage, the correct fuse is installed, and all safety precautions are taken.
- ☐ Do not operate the instrument in the presence of flammable gases or fumes.
- ☐ Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel.
- ☐ Stop using the device when it malfunctions. (See section „Maintenance and repair“).

- ☐ Users must disconnect the AC power cord from the AC adapter inlet or the wall socket (outlet) immediately if they observe the following or if the splicer receives the following faults: Fumes, bad smell, noise, or overheat. Liquid or foreign matter falls into cabinet. Splicer is damaged or dropped. If this occurs, ask our service center for repair. Leaving the splicer in a damaged state may cause equipment failure, electric shock or fire and may result in personal injury, death or fire.

- Use only the AC adapter / battery charger designed for this splicer. Using an improper AC power source may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire.
- Do not disassemble or modify the splicer, AC adapter or battery. In particular, do not remove or bypass any electrical or mechanical device (e.g. a fuse or safety switch) incorporated into the design and manufacturing of this equipment. Modification could cause damage that may result in personal injury, death, electric shock or fire.
- Never operate the splicer in an environment where flammable liquids or vapors exist. Risk of dangerous fire or explosion could result from the splicer's electrical arc in such an environment.
- Do not use compressed gas or canned air to clean the splicer. They may contain flammable materials that could ignite during the electrical discharge.
- Do not touch the electrodes when the splicer is on and power is supplied to the unit. The electrodes generate high voltage and high temperatures that may cause a severe shock or burn. NOTE: Arc discharge stops when the wind protector is opened.
- Safety glasses should always be worn during fiber preparation and splicing operation. fiber fragments can be extremely dangerous if it comes into contact with the eye, skin or is ingested.
- Check the AC power source before use: Proper AC power source is AC 100-240 V, 50-60 Hz. Proper DC power source is DC10-12V. Improper AC or DC power source may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire.
- AC generators commonly produce abnormally high AC output voltage or irregular frequencies. Measure the output AC voltage with a circuit tester before connecting the AC power cord. Such abnormally high voltage or frequency from a generator may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire. Make sure the generator is regularly checked and serviced.
- Do not modify, abuse, heat or excessively pull on the supplied AC cord. The use of a damaged cord may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire.
- The AFS-GS41 uses a three-prong (core) AC cord that contains an earthed ground safety mechanism. The splicer MUST be grounded. Use only the supplied three-prong (core) AC power cord. NEVER use a two-prong (core) power cord, extension cable or plug.
- Connect AC power cord properly to the splicer (inlet) and wall socket (outlet). When inserting the AC plug, make sure there is no dust or dirt on the terminals. Engage by pressing the female plug into the splicer (inlet) and the male plug into the wall socket (outlet) until both plugs are fully seated. Incomplete engagement may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire.
- Do not short-circuit the terminals of AC adapter and optional battery. Excessive electrical current may cause personal injury due to fumes, electric shock and equipment damage.
- Do not touch the splicer, AC power cord and AC plugs with wet hands. This may result in electric shock.
- Do not operate splicer near hot objects, in hot temperature environments, in dusty/humid atmospheres or when water-condensation is present on the splicer. This may result in electric shock, splicer malfunction or poor splicing performance.
- When using Li-ion battery, follow the instructions below. Failure to follow these may result in explosion or personal injury.
  Do not charge battery with other methods than instructed.
  Do not discard battery into an incinerator or fire.
  Do not charge or discharge battery near a flame or under direct sunlight.
  Do not excessively shake or jar the battery.
  If battery leaks of liquid residue, be careful handling the battery so the liquid does not get in skin or eye contact. If it reaches contact, immediately wash skin or eyes thoroughly and see the doctor.
  Dispose of the battery and call the service center for replacement.
  If charge did not complete in four hours or the Charge LED is constantly on, immediately stop charging and call the service center for repair.
- Do not store splicer in any area where temperature and humidity are extremely high. Possible equipment failure may result.
- Do not touch protection sleeve or tube-heater during heating or immediately after completion of heating. Their surfaces are very hot and touching these may result in skin burn.
- Do not place the splicer in an unstable or unbalanced position. The splicer may shift or lose balance, causing the unit to fall. Possible personal injury or equipment damage may result.

- ☐ The splicer is precision adjusted and aligned. Do not allow the unit to receive a strong shock or impact. Possible equipment failure may result. Use supplied carrying case for transportation and storage. The carrying case protects the splicer from damage, moisture, vibration and shock during storage and transportation.
- ☐ Operating personnel is not allowed to remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel.
- ☐ Fiber residues resulting from connector assembly or splicing work should be collected in separate containers and disposed of. Fine fibers can penetrate the eyes and skin and cause inflammation.
- ☐ To prevent possible oral ingestion of fiber residues, no food or beverages should be consumed in the areas where splicing work is performed.

Maintenance

- ☐ Turn the splicer off and disconnect the AC power cord before replacing electrodes.
- ☐ Follow the below listed instructions for handling electrodes.
  Use only specified electrodes.
  Set the new electrodes in the correct position.
  Replace the electrodes as a pair.
  Failure to follow the above instructions may cause abnormal arc discharge. It can result in equipment damage or degradation in splicing performance.
- ☐ Do not use any chemical other than pure alcohol (99% or greater) to clean the objective lens, V-groove, mirror, LCD monitor, etc., of the splicer. Otherwise blurring, discoloration, damage or deterioration may result.
- ☐ The splicer requires no lubrication. Oil or grease may degrade the splicing performance and damage the splicer.

- ☐ The operating display only shows whether the DC current, which supplies the device components, has been disconnected. However, operating displays (on the power supply unit or the device) that are not lit up in no way indicate that the device is completely disconnected from the mains.
- ☐ Read carefully: EN 60728 - Part 1 Safety requirements: No service work during thunderstorms.

Repair

- ☐ Repairs may only be performed by the manufacturer. Improperly performed repairs may result in considerable dangers for the user.
- ☐ If malfunctions occur, the device must be disconnected from the mains and authorized experts must be consulted. The device may need to be sent to the manufacturer.

Description of performance

The optical fusion splicer AFS-GS41 has been designed for splicing silica-based optical fibers for telecommunications. It has the following characteristics:

- 4,3 inch TFT Monitor touch screen
- 4 motor core alignment, used for FTTH and FO backbone splicing
- suitable for fiber types: MMF/G.651, SMF/G.652, NZ-DSF/G.655, BIF/G.657, erbium-doped fiber (EDF)
- Either conventional sheathe clamping system or “fiber holder system (optional)” can be selected.
- multi-in-one fiber clamp for bare fiber
- crimp shrink protection heating
- automatic splice control
- battery time 180-200 splices with heating
- 4000 splice records in CSV format
- The top cover of the case can be used as a working table.

HINWEIS: The splicer is equipped with an LCD monitor, manufactured in a high quality-controlled factory environment. However, some black dots may appear, or red/blue/green dots may remain on the screen. The screen brightness may not appear uniformly depending on viewing angle. Note that these symptoms are not defects, but are nature of LCD.

HINWEIS: In the future software updates for the device may be available. Contact the ASTRO customer service for further information or visit the service section on the ASTRO website.

Warranty conditions

The general terms and conditions of ASTRO Strobel GmbH apply. You will find these in the current catalogue or on the Internet under “www.astro-kom.de”.

Disposal

All of our packaging material (cardboard boxes, inserts, plastic film and bags) is completely recyclable. Electronic devices must not be disposed of with household waste, but rather – according to DIRECTIVE 2012/19/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL from 4 July 2012, on waste electrical and electronic equipment – must be properly disposed of. When it is no longer of use, please bring the device for disposal to one of the public collection points for this purpose.

ASTRO Strobel is a member of the Electro system solution for the disposal of packaging materials. Our contract number is 80395.

The splice procedure

To achieve a stable low splice loss, please consider the following steps during the splice procedure.

Daily cleaning before splicing
Clean the V-grooves. You may do so by using a cotton bud.

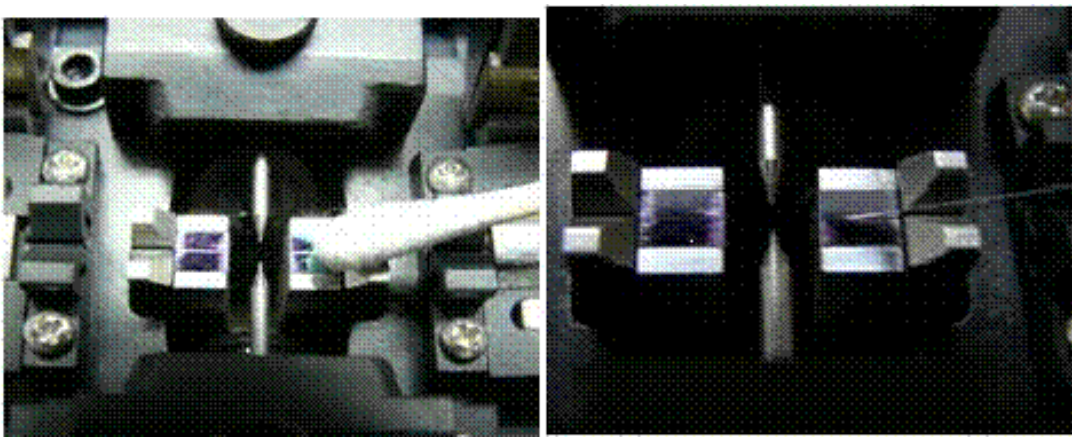


Figure 4: Cleaning the V-grooves

HINWEIS: Sometimes you may need a stripped fiber to clean the V-grooves.

Clean the clamp chips of the wind protector.

Figure 5: Cleaning the clamp chips

Clean the lens every week or when it‘s dirty.

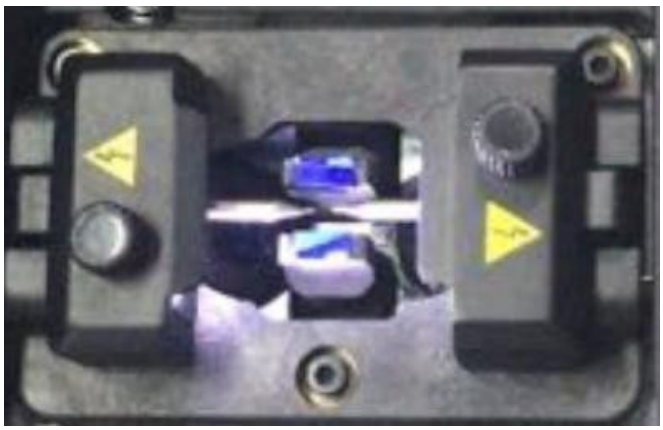


Figure 6: Cleaning the lens

HINWEIS: *Do not touch the electrode tips (in this case electrodes do not remove from the splicer).*

Clean the equipment before every splicing: Clean the blade of the stripper. Clean the cleaver pads and blade and rubber anvil.

Select the suitable splice mode

- ☐ When splicing only standard SM fibers (ITU-T G.652), “SM AUTO” mode is recommended.
- ☐ When splicing many types of fibers, “AUTO” mode is recommended, but splice speed is slow.
- ☐ Splicing speed of “SM FAST” mode is fast, but periodical Arc calibration is required.

Splicing procedure

Make sure the stripped fiber is free of coating debris or contamination.
Use only 99% or better pure alcohol.
Do not allow the cleaved fiber ends to touch anything or become contaminated.

Figure 7: Cleaning the stripped fiber

Place the fiber end face between the V-groove edge and the electrode center.

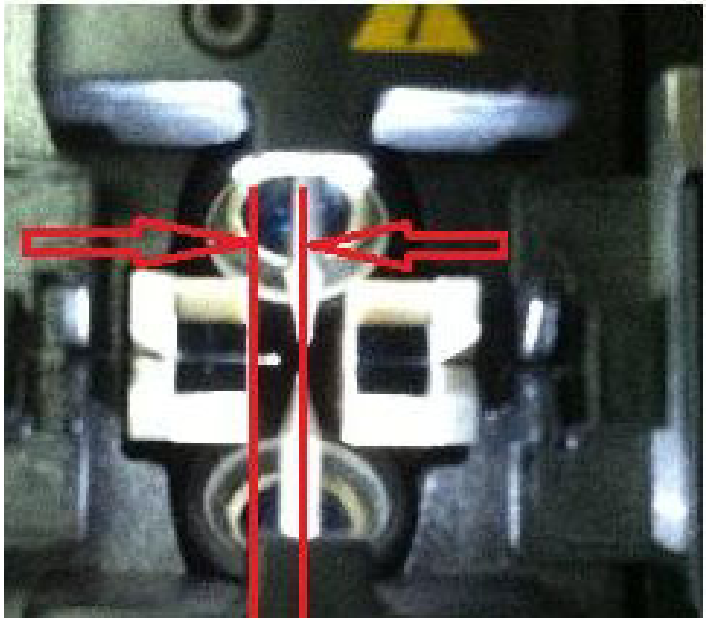


Figure 8: Placing the fiber

Figure 9 shows the right position of the fiber.

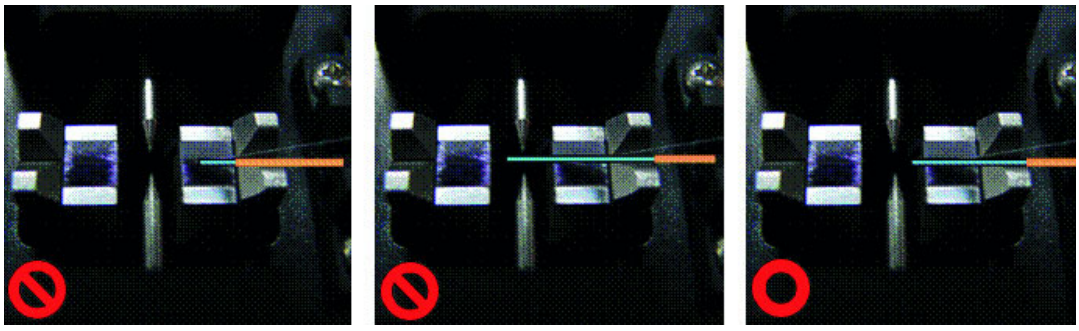


Figure 9: Placing the fiber

Place the fiber in the bottom of the V-groove for successful splicing. Make sure if the cleave length is correct. The fiber coating edge may hit the V-groove in case with shorter cleave length, and then the fibers may not be stuffing each other during arc discharge which results in worse splice loss.
Figure 8 shows the correct cleave length in the right picture. Figure 10 shows a too short cleave length.

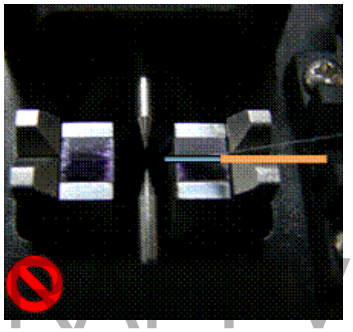


Figure 10: Too short cleave length

Do not put tension to the fibers, or the they may not be stuffed to each other during arc discharge and result in worse splice loss. Check the fiber angle and cleave shape. The fibers cleave angle affects splicing quality. Large cleave angles worsen splice loss.

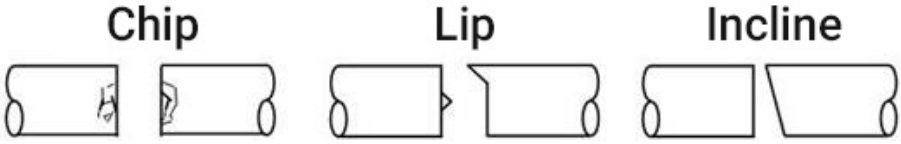
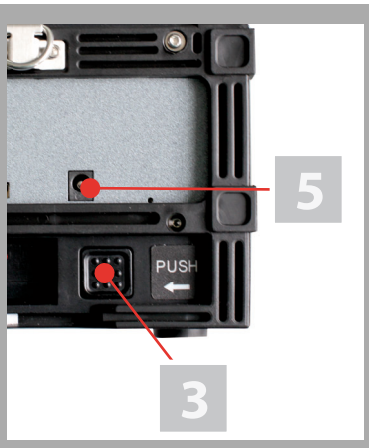


Figure 11: fiber angles

Visually check the arc discharge with the monitor. In case the arc discharge is observed “wobbling” or “brightness changes”, arc discharge may be unstable and the heat distribution to the fibers as well resulting in worsened splice loss. Perform “Stabilize Electrodes”.
When the splicer indicates the following message „splice loss may be high“ arc discharge is not stable. Electrodes should be stabilized to reform the arc discharge. Load prepared SM fibers onto the splicer in order to stabilize the electrodes. After completing it, re-splice the fibers.

Heating

Select the heater mode most suitable for the protection sleeve to be used. Each tube-heating mode is optimized for a type of protection sleeve. Other manufacturer’s fiber protection sleeves may not shrink completely. At that time extend the heating time. Center the protection sleeve in the tube heater.



Basic operation

Mains power and battery operation

Mains power operation

The AFS-GS41 can be powered by using a power cord and the power adapter. To do so put the plug of the power adapter into the input jack [5]. Then connect the mains cable to the adapter and a wall outlet. Before detaching the power adapter from the splicer, turn off the device by clicking the power button. Use only the supplied AC power cord. Connect to ground with the ground terminal of the AC power cord.

Battery operation

HINWEIS: Check and make sure the remaining battery capacity is 20% or more before operation. Otherwise only few splices can be made!

If the battery is already inserted in the splicer, turn splicer on by clicking on the red power button. The Power source "Battery" is automatically identified and the remaining battery capacity is displayed on the "READY" screen.

To detach the battery from the device do the following:
Push the Lock/Unlock button [3] on the right side of the AFS-GS41 to unlock the battery compartment. You can now pull the battery out the compartment (see figure 4 below).

Figure 12: Pulling the battery out of the compartment

The capacity of the battery gradually decreases as nature even if it is not used. If the battery discharges completely, the battery may no longer be able to be recharged. Charge the battery before long time storage and after use. If a battery must be be stored for a long time, periodical charge of every six months is recommended regardless of battery charge level of the battery.
Follow below conditions for operation/charge/long time storage (1 week or longer).

Operation: -10 °C..+50 °C

Charge: 0 °C...+40 °C

Long time storage: -20 °C...+30 °C

HINWEIS: *The battery can be charged while the AC adapter is in power unit dock of the device, regardless if under operation or not.*

Turning the splicer on

Press the Power on button and hold it until the green LED on the keypad lights up. The self test screen is displayed after all the motors reset to their initial positions. The power source type is automatically identified. If the battery is used, the remaining battery capacity is displayed.

Fiber preparation

Placing a protection sleeve over a fiber

First clean the optical fiber with alcohol-impregnated gauze or lint-free tissue approximately 100 mm from the tip. Then place the protection sleeve over the fiber.

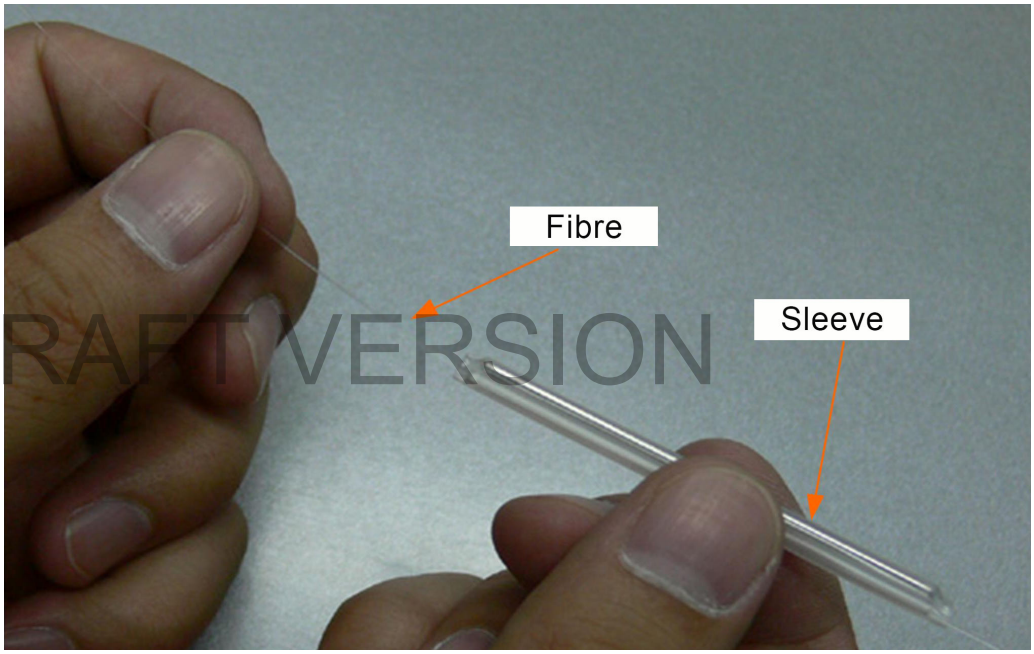


Figure 13: Placing a protection sleeve over the fiber

HINWEIS: Dust particulates can enter inside the protection sleeve and might result in a future fiber break or attenuation increase.
Make sure the fiber is passed into the protection sleeve.
When the protection sleeve core tube is longer than the length of the outer sheath, the excess part should be cut off to avoid micro bend after heating.

Stripping and cleaning the fiber

Strip the different parts of the fiber as shown below by using a stripping tool. The numbers in the illustration correspond to the three holes in the stripping tool, which are used one after another to strip the different parts of the fiber. The protection sleeve will later be placed over the core glass, the glas coating and the primary coating.
Clean the fiber with alcohol (Purity ≥ 99 %) impregnated gauze or lint-free tissue thoroughly.

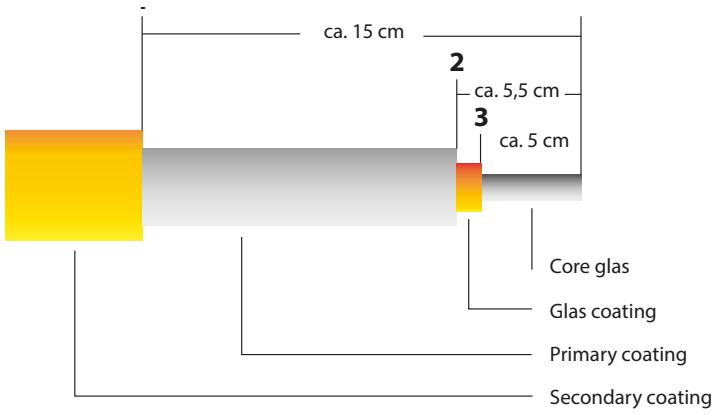


Figure 14: Stripping the fiber's outer coat

fiber cleaving

To cleave the fiber you may use the ASTRO cleaver AFC-GW750.

- ☐ Open the magnetic locking mechanisms and the black bin of the cleaver.
- ☐ Place the stripped fiber into the black and close the magnetic locking mechanisms.
- ☐ Push the slider with the blade. The cleaved fiber ends are collected in the small bin on the right side of the cleaver.

HINWEIS: Clean the bin immediately after cleaving. fiber ends may otherwise find their way into the operators eyes and can result in personal injury!

HINWEIS: Do not let the fiber end-face touch anything.
Do not put fingers in the driving area of the slide button as personal injury may result.
After pushing it half way down, releasing the pressure on the cutting lever may result in bad cleaving quality.

Loading fiber into the splicer

Open the wind protector and sheath clamps. Place the prepared fiber onto the V-grooves so that the fiber tip is located between the v-groove edge and tip of electrode.
Hold the fiber with fingers and close the sheath clamp so that the fiber does not move. Make sure the fiber is placed in the bottom of the V-grooves. If the fiber is not placed properly, reload it.

Figure 15: Loading fiber into the splicer

Load another fiber in the same manner as described above. Close the wind protector.

HINWEIS: If the fiber coating has some memory curl, place it in a way that the curve of memory is turned upwards. Be careful to not bump the prepared fiber tips into anything to maintain fiber end-face quality.

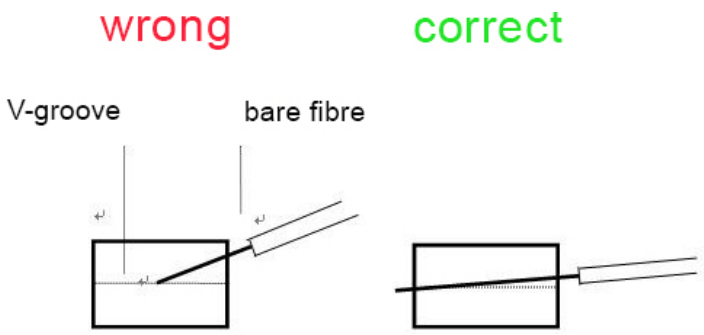


Figure 16: fiber cleaving

HINWEIS: Keep the prepared fiber out of other stuff, in case of breaking the end face of fiber. After this step, the preparation steps are done. Close the windshield at last.

The splicing procedure

To assure a good splice, the optical fiber is observed with the image processing system of the AFS-GS41. However, there are some cases when the image processing system cannot detect a faulty splice. Visual inspection with the monitor is often necessary for better splicing yield. The standard operating procedure is described below.

HINWEIS: If the SET button is pressed while the wind protector remains open the splicing procedure should not be startet by the device.
However it is strongly recommended to close the wind protector before starting the splicing process to avoid personal injury caused by the arc that is used to splice the fibers!

- After loading the fibers into the splicer, press the SET button and the fibers will move forward towards each other. The fiber motion stops at a certain position shortly after the cleaning arc is performed. Next, the cleave angle and end-face quality are checked. If the measured cleave angle is greater than its set threshold or fiber chipping is detected, the buzzer will sound and an error message warns the operator. The splicing procedure pauses. If no error message is displayed, the below stated end-face conditions are used for visual inspection. If observed, remove the fiber from the splicer and repeat the fiber preparation. These visual defects may cause a faulty splice.

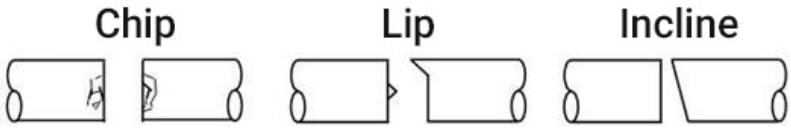
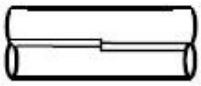
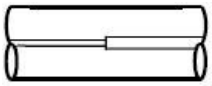
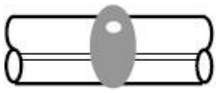
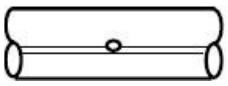


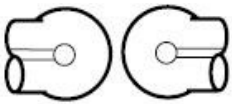
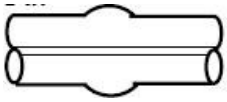
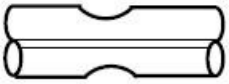
Figure 17: End-face conditions

- After fiber inspection, the fibers are aligned core-to-core or cladding-to-cladding. Cladding axis offset and core axis offset measurements can be displayed.
- After completion of the fiber alignment, arc discharge is performed to splice the fibers.
- Estimated splice loss is displayed upon completion of splicing. Splice loss is affected by certain factors stated in next page. These factors are taken into account to calculate, or estimate, splice loss. The calculation is based on certain dimensional parameters, such as MFD. If either the cleave angle measured or the estimated splice loss exceeds its set threshold, an error message is displayed. If the spliced fiber is detected as abnormal, such as "Fat", "Thin" or "Bubble", an error message is displayed. If no error message is displayed but the splice looks poor by visual inspection through the monitor, it is strongly recommended to repeat the splice from the beginning.

HINWEIS: *The splice point sometimes looks a bit fatter than other parts. This is considered a normal splice, and does not affect splice loss.*
To change threshold for estimated splice loss or cleave angle, see [Splice Mode] for details.
Splice loss may be improved in some cases by additional arc discharges. Press the ARC button for an additional arc discharge (re-arc). Splice loss estimate and splice check are now performed again. Splice loss may be worsened in some cases by additional arc discharges (re-arcs). Additional arc discharge can be set to "disabled", or the number of additional arcs can be limited. The splicing result is automatically saved in the splicer memory.

Splice loss increase - cause and remedy

Symptom	Cause	Remedy
Core axial offset 	Dust on V-groove or fibre clamp chip	Clean V-groove and fibre clamp chip.
Core angle 	Dust on V-groove or fibre clamp chip	Clean V-groove and fibre clamp chip.
	Bad fiber end-face quality	Check if fibre cleaver is well conditioned.
Core step 	Dust on V-groove or fibre clamp chip	Clean V-groove and fibre clamp chip.
Core Curve 	Bad fibre end-face quality	Check if fibre cleaver is well conditioned.
	Prefuse power too low or prefuse time too short	Increase Prefuse Power and/or Prefuse Time.
MFD Mismatch 	Arc power too low	Increase Arc Power and/or Arc Time.
Combustion 	Bad fibre end-face quality	Check the cleaver.
	Dust still present after cleaning fibre or cleaning arc	Clean fibre thoroughly or increase Cleaning Arc Time.
Bubbles 	Bad fibre end-face quality	Check if fibre cleaver is well conditioned.
	Prefuse power too low or prefuse time too short	Increase Prefuse Power and/or Prefuse Time.

Separation 	Fibre stuffing too small	Perform Motor Calibration.
	Prefuse power too high or prefuse time too long	Decrease Prefuse Power and/or Prefuse Time.
Fat 	Too much fibre stuffing	Decrease Overlap and perform Motor Calibration.
Thin 	Arc power not adequate	Perform Arc Calibration.
	Some arc parameters not adequate	Adjust Prefuse Power, Prefuse Time or Overlap.
Line 	Some arc parameters not adequate	Adjust Prefuse Power, Prefuse Time or Overlap.

HINWEIS: A vertical line sometimes appears at the splice point when MM fibers or dissimilar fibers (different diameters) are spliced. This does not affect splice quality, such as splice loss or tensile strength.

Removing the spliced fiber

To remove the spliced fiber from the device, proceed as described below:

- ☐ Open the lids of the tube heater.
- ☐ Open the wind protector.
- ☐ Hold the left fiber with your left hand at the edge of the wind protector and open the left sheath clamp or fiber holder lid.
- ☐ Open the right sheath clamp or fiber holder lid.
- ☐ Hold the right fiber with your right hand and remove the spliced fiber from the splicer.

HINWEIS: Keep on holding the fiber until it is completely transferred to the tube heater.

Heating the protection sleeve

To heat the protection sleeve do the following:

- ☐ Transfer the fiber with the protection sleeve to the tube heater. Protection sleeve is placed in the center of the tube heater.
- ☐ Place the fiber with the protection sleeve in the middle of the tube heater. While placing it in the tube heater, apply some tension on the fiber, so the tube heater lids automatically close. Then press the HEAT button to start the heating process.

HINWEIS: Make sure the splice point is located at the center of the protection sleeve.
Make sure the strength member in the protection sleeve is placed downwards.
Then red HEAT LED turns on. The buzzer beeps and the HEAT LED turn off when tube heating is completed.
Open tube heater lids and remove protected fiber from the tube heater. Apply some tension to the fiber while removing it from the tube heater.

HINWEIS: The protection sleeve may stick to bottom plate of the heater. Use a cotton swab to help remove the sleeve from heater.
Visually inspect the finished sleeve to verify no bubbles or debris/dust is present in the sleeve.
Attach the Cooling Tray onto the splicer. Then remove the protected fiber from the splicer.

HINWEIS: Do not touch the shrunken sleeve after removing the fiber from the tube heater. It may be hot. Place the removed fiber into the cooling tray. Leave the fiber in the cooling tray until the shrunken sleeve is cooled down.

Maintaining a high splice quality

Cleaning and checking before splicing

Critical cleaning points and maintenance checks are described below.
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Cleaning the V-grooves

If contaminants are present in the V-grooves, proper clamping may not occur, resulting in higher splice loss. The V-grooves should be frequently inspected and periodically cleaned during normal operation. To clean the V-grooves proceed as described below:

- ☐ Open the wind protector.
- ☐ Clean the bottom of the V-groove with an alcohol-impregnated thin cotton swab. Remove excess alcohol from the V-groove with a clean dry swab.
- ☐ If the contaminants in the V-groove cannot be removed with an alcohol-impregnated thin cotton swab, use a cleaved fiber end-face to dislodge contaminants from the bottom of the V-groove. Repeat the last step after this procedure.

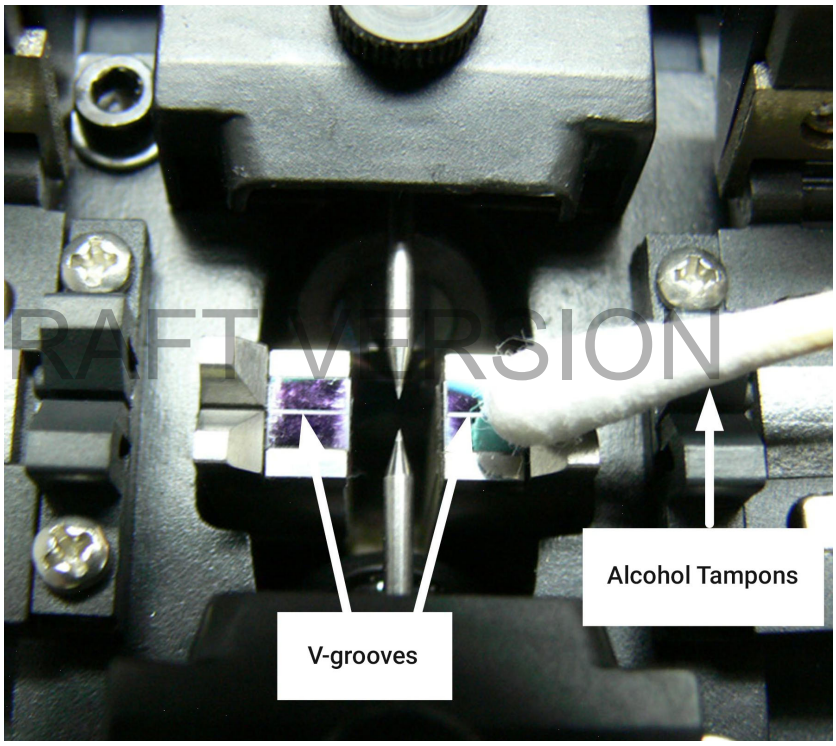

Figure 19: Cleaning the V-grooves

HINWEIS: Be careful to not contact the electrode tips. Do not use excessive force when cleaning the V-grooves. The V-groove arm may get damaged.

Cleaning the fiber clamp chips

If contaminants are present on the clamp chips, proper clamping may not occur, resulting in poor quality splices. The fiber clamp chips should be frequently inspected and periodically cleaned during normal operation. To clean the clamp chips do the following:

- ☐ Open the wind protector.
- ☐ Clean the surface of the chip clamp with an alcohol-impregnated thin cotton swab. Remove excess alcohol from the chip clamp with a clean dry swab.

Cleaning the fiber Cleaver

If the circular blade or clamp pads of the fiber cleaver become contaminated, the cleaving quality could degrade. This may lead to fiber surface or end-face contamination, resulting in higher splice loss. Clean the circular blade or clamp pads with a cotton swab soaked with alcohol.

Periodical cleaning and checking

In order to maintain the splicing quality of the splicer, periodical inspection and cleaning are recommended.

Cleaning the lenses

If the lens's surface becomes dirty, normal observation of the core position may be incorrect, resulting in higher splice loss or poor splicer operation. Therefore, clean both of them at regular intervals. Otherwise, dirt may accumulate and become impossible to remove.
To clean the lenses do the following:

- ☐ Before cleaning the objective lenses, always turn off the splicer.
- ☐ Gently clean the lenses' (X-axis and Y-axis) surface with a dry and thin cotton swab. Using the cotton swab, start at the center of the lens and move the swab in a circular motion until you spiral out to the edge of the lens surface.
  The lens surface should now be clean and free of streaks or smudges.
- ☐ Turn on the power and make sure no smudges or streaks are visible on the monitor screen. Press the X/Y button to change the screen and check the state of the lens surface on both the X- and Y-screens. Perform a dust check.

HINWEIS: Do not hit or touch the tip of the electrode when cleaning it or remove the electrode before cleaning the lenses. It is recommended to clean the lenses when replace the electrodes.

Rotating the cleaver blade

If cleaving quality drops (usually after 1000 to 1500 cleaves), the blade may be worn. In this case the worn part of the blade can be rotated. Please follow the steps to adjust the blade angle:

- ☐ Use a 1,5 mm hex wrench to loosen the compression screw of the blade.
- ☐ Rotate the blade to the next scale number (generally there are 16 or 24 two types of blade).
- ☐ Hold the side-face of the blade and relock the screw to complete the adjustment.

Replacing the blade

HINWEIS: During replacement, be careful not to touch the blades sharp edges to avoid personal injury!

When the blade circulation is used and you cannot improve the cleaving quality by changing the angle of the blade and adjusting the height of the stud, the blade needs to be replaced.
To replace the blade do the following:

- ☐ Use a 1,5 mm hex wrench to remove the screw and gasket of the blade.
- ☐ Turn the blade to the tool holder side, then hold the side faces of the blade and take it out.
- ☐ Replace the used blade by a new one, and then screw the gasket and screw on.

HINWEIS: Avoid collisions of the blade with anything to prevent damage.

Configuring the device via the LCD interface

After powering up the device you will see the Fusion menu:

Figure 20: Fusion menu

Here you will find the following information from top to bottom:

- the time bar, showing the current time
- the status bar, showing the status and splicing process information
- the battery bar, showing the battery level
- the fusion mode; touch this button to enter the operation mode menu, where you can set the welding process
- the current splice parameters; touch this button to quickly modify the parameters of the welding group
- the temperature of the heater; touch this button to quickly modify the heating parameters
- the total number of splices
- heater ON/OFF button: touch this button to turn on or off the heater
- X7Y view button: touch this button to toggle between X and Y view
- main menu button: touch this button to navigate to the main menu
- start button: touch this button to start the fiber splicing

Press the menu button on the control panel of the device or press the start button on the start screen to enter the splicer‘s main menu. You will then see the following screen:

Figure 21: Main menu

To select one of the main menu items, press the corresponding icon on the touch screen.
If you want to leave the main menu. Press the little cross in the upper right of the screen or press the menu key on the top of the device again.

Parameter Menu

The "Parameter" menu is used to select and set the operation mode, fiber splicing parameters, heating etc..

Figure 22: Parameter menu

Operation mode

The operation mode is the process method of the fusion splicer. Press this button to show up the parameters:

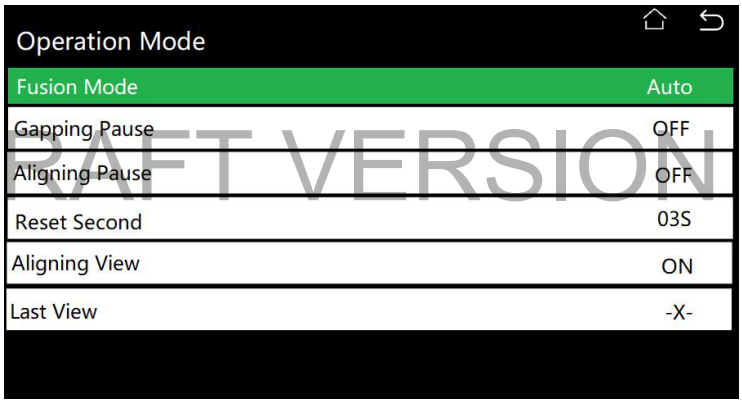

Figure 23: Operation mode

- Fusion Mode: There are automatic and manual modes. In automatic mode, the fusion splicer starts to run the fiber splicing program automatically, after closing the windshield in the standby interface. In manual mode, the user needs to press the "SET" button or touch the start button before the fusion splicer starts to splice the fiber. Press the „Fusion Mode“ button to switch between "Auto" and "Manual".
- Gapping Pause: Thist means that during fiber splicing, after the optical fiber is forwarded to meet the gap condition, the program suspends operation and waits for further operation by the user. To continue splicing, press the SET button on the control panel. To interrupt splicing, press the RESET button. Press the „Gapping Pause“ button to switch the gapping ”ON”or “OFF”.
- Aligning Pause: This means the fiber suspends the running at the end of the subsequent process of aligning. To continue splicing, press the SET button. Press the „Aligning Pause“ button to switch aligning pause ” ON” or “OFF”.
- Reset Second: After the optical fiber is spliced, open the windshield and wait for a period of time for the motors to go back to the initial position. The waiting time is “reset second”. Select this menu to change the parameter values.
- Aligning View: When this parameter is set to ” ON”, the fiber is aligned and the fiber is centered during the aligning process; when it is set to “OFF”, the fiber is not aligned, and it may not be centered. Press the „Aligning View“ button to switch between” ON” and “OFF”.

- Last View: This function is used to switch the last view mode when the splice is completed. Touch the „Last View“ button to switch the fiber image view mode.

Select Paras Group

Press this button to select between different splicing parameters as shown below.

Figure 24: Select paras group

Each sub-menu is a group of splicing parameters, and the menu is composed by 4 parts with the number, file name, mode and status. Numbered from 1 to 40, a total of 40 groups of parameters can be used. There are three modes: Auto, Calibrate and Normal. The Auto parameters are optimized by the manufacturer and cannot be modified. It is recommended for new users. The data of the Calibrate parameters can be modified except the prefuse time and fusion time. All values in “Normal group” parameters can be modified.

SM, MM, DS, and NZ represent the parameters of a group for single-mode fiber, multi-mode fiber, dispersion-shifted fiber, and non-zero dispersion-shifted fiber, which must be consistent with the type to be spliced. Status indicates whether the group of parameters are currently in usage, ON/OFF means in use/unused.

Press the aoorow buttons on the control panel to change the current splicing parameter group. Touch the desired option to enter the parameter setting menu as shown below:

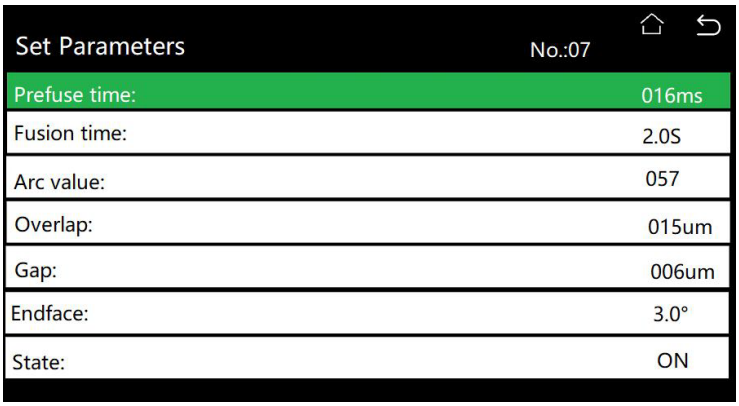

Figure 25: Set parameters

This subenu consists of the following items:

- Prefuse time: After the fiber is forwarded to the fusion splicing position and aligned, the fiber is preheated by short-term discharge. This is the prefuse time. The single-mode time is 16 ms, and the multi-mode time is 25 ms. It is not recommended for new users to modify this parameter value. Touch this option and then touch the arrow buttons to increase or decrease the parameter value.
- Fuse time: After the pre-discharge, the fusion splicer starts the fusion discharge. The discharge lasts for a long time which is called fuse time. The length of this period is 2.0 seconds for both single-mode fiber and multi-mode fiber. It is not recommended for new users to modify this parameter value. Touch this option and then touch the arrow buttons to increase or decrease the para-

meter value.

- Arc value: This parameter refers to the current intensity of the discharge arc when the device starts to splice. A higher current value corresponds to a stronger arc, resulting in higher temperature and more serious fiber ablation. Touch this option and then touch the arrow buttons to increase or decrease the parameter value.
- Overlap: When the optical fiber is spliced, the high temperature generated by the arc melts the optical fiber and the optical fiber needs to be pushed forward to make the optical fiber contact and fuse. The forward advance distance of the optical fiber is the overlap. Touch this option and then touch the arrow buttons to increase or decrease the parameter value.
- Gap: Before the fiber is spliced and the arc is released, the two fibers need to run to a relatively close position. The distance between the end faces of the two fibers is the gap between the left and right fiber. Touch this option and then touch the arrow buttons to increase or decrease the parameter value.
- Endface: It is the angle between the end face of the left and right fiber and the vertical direction in the X and Y two-way fiber images. The maximum end face angle refers to the maximum allowable end face angle when judging the fiber end face. If the face angle judgment always fails, the value of this parameter can be appropriately increased, but the splicing loss may be increased.
- State: It refers to whether the parameter group is the current splicing parameter group. Touch this option to change the parameter.

Temperature

Touch this option and then touch the arrow buttons to increase or decrease the temperature value.

Heating Time

Touch this option and then touch the arrow buttons to increase or decrease the heating time.

Pre-Heat

Touch this option to toggle between „Normal“ and „Rapid“ mode.

Tension

When this option is turned on, once the fiber is spliced, a pulling force of 2 N will be applied to the fiber to test the quality of the splicing. If the fiber is pulled and broken, it indicates that the splicing has failed. Touch this option to change the state between „ON“ or „OFF“,

Setup Menu

The “Setup” menu is used to set the data including the camera brightness, language, Flashligh, Beep sound etc., as shown below:

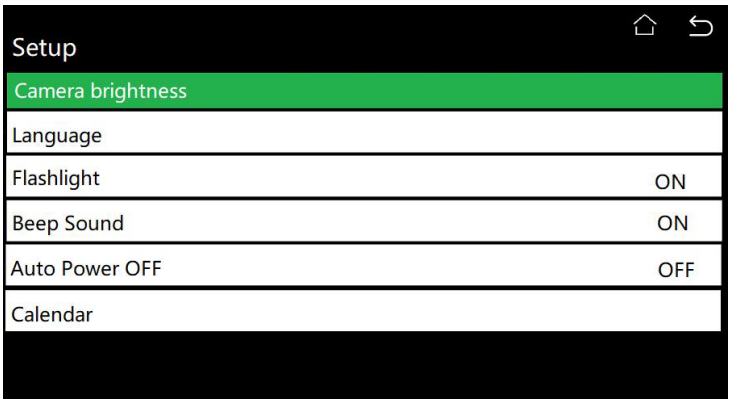

Figure 26: Setup menu

Camera Brightness

The camera brightness menu sets the value of the CMOS sensor in the camera, increasing the gain will increase the image brightness Press the key or touch the option to enter the interface of camera

brightness, as shown in Figure 4.8. Under this interface, press the key or or touch or icon on the screen to modify the value of CMOS. Press the key or touch X/Y on the screen to switch the CMOS camera sensor between X and Y.

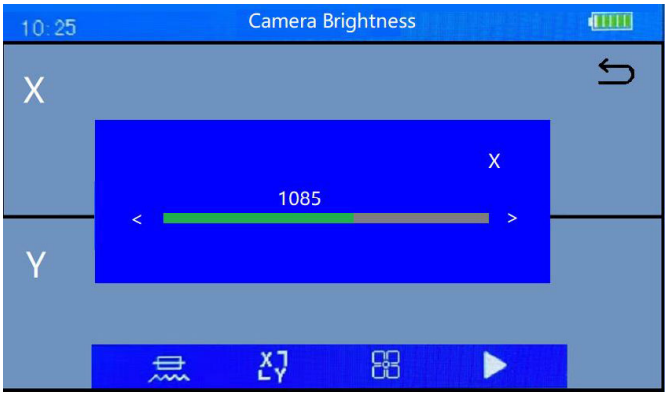

Figure 27: Camera brightness

Language

Language shows the display language currently used. If there are more than one language available, users can change the language via this menu.

Figure 28: Language menu

Flashlight

This function is used to switch the LED light on/off. When flipping the screen to splice fiber, users can turn off the LED light to avoid the light shining directly into the eyes.

Beep Sound

When the beep sound is on, when pressing a button or touch the screen, there will be a beep sound. When it is off, there will be no sound.

Auto power off

When the option is turned on, the device will automatically turn off if there is no operation within 10 minutes.

Calender

This function is used to set the time and date of the device. Touch the option to enter the interface of Date/Time as shown below. Touch this option to enter the menu and then use the arrow keys on the

control panel to move the selection cursor, and then use the arrow buttons to modify the value.

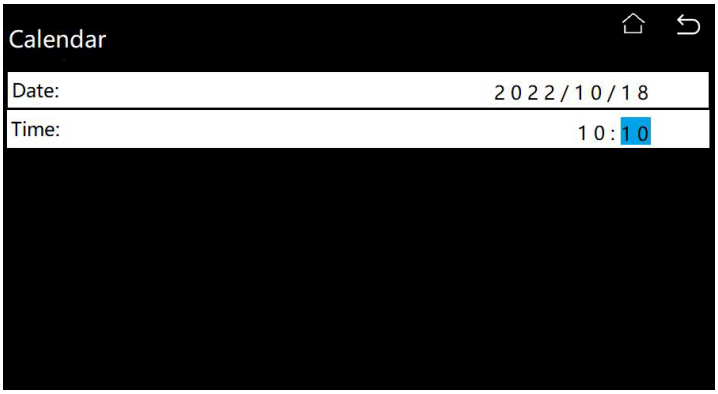

Figure 29: Calender menu

Function Menu

The function menu lists some functions, such as Motor push test, Screen flip,etc..

Figure 30: Function menu

Motor push test

The motor push test simulates the distance of the push motor moving forward during the automatic splicing process. Select this option to enter the test interface, completely follow the steps of splicing the optical fiber, cut and clamp the optical fiber, and press the ENTER button to start the test. The results will be shown after the testing has finished, which means the forward distance of the fiber during the pushing process (see below).

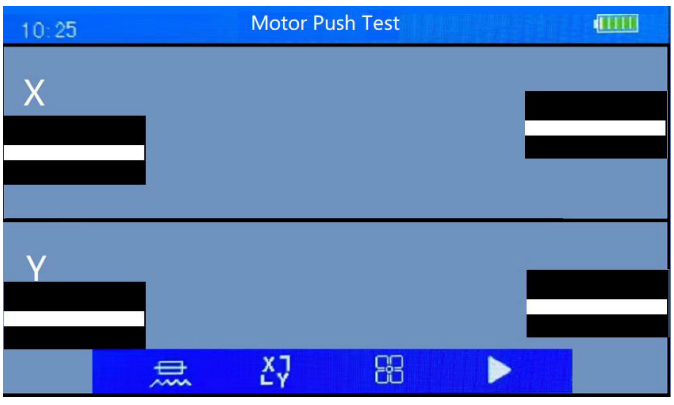

Figure 31: Motor push test

Screen flip

Press this option to flip the screen by 180° when you want to operate the device from the back side.

Figure 32: Screen flip

Adjust CMOS View

Press the direction buttons to adjust the fiber's position in the display, press key or touch the X/Y icon on the screen to change the X/Y view (see below).

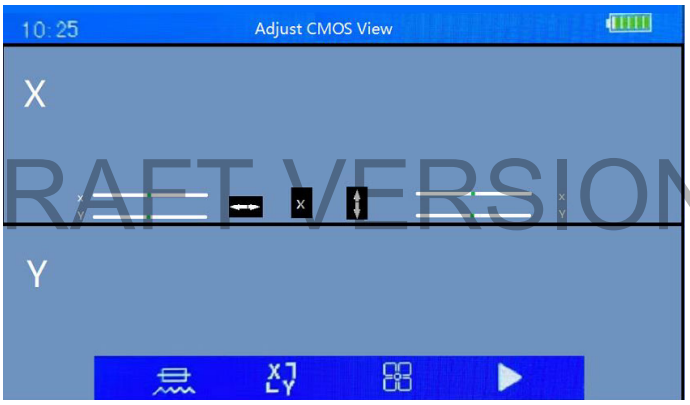

Figure 33: Adjust CMOS view

Software Updating

This function is used to upgrade the software of the device. After the USB stickk with the upgrade file is inserted into the USB port, choose this option to upgrade. After upgrading you must restart the fusion splicer.

Password

This function is used to set the password. After the password is set, users need to input the password every time to turn on the device.

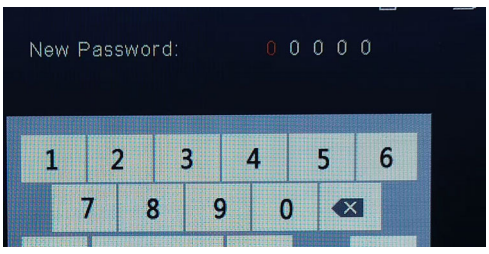

Figure 34: Password

Maintenance Menu

The Maintenance menu consists of the submenus Rapid diagnosis, Motor adjust, Arc, Fusion records. Last maintain date and Debug entry as shown below:

Figure 35: Maintenance menu

Rapid diagnosis

Rapid diagnosis is used to check the fusion splicer camera brightness, LED brightness, ARC value etc.. Press the ENTER button and the device will start checking automatically. This will make the common maintaining work more simply for end users, as shown below:

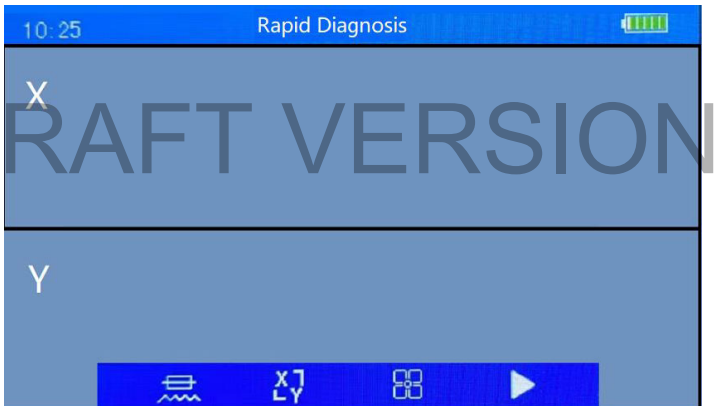

Figure 36: Rapid diagnosis

Motor adjust

Motor adjust is used to check the motor performance or change the motor position manually. It includes left and right pushing motors and left and right aligning motors. Press the ENTER button to enter the menu as shown below. Press the ENTER button again to switch the left and right motors. The align motor will move up or down by pressing the arrow buttons on the control panel. For left pushing motor, press the arrow buttons to move it back or forward, while the right pushing motor is opposite. If the direction of the up and down adjustment is not correct, keep moving until it is in the

correct position.

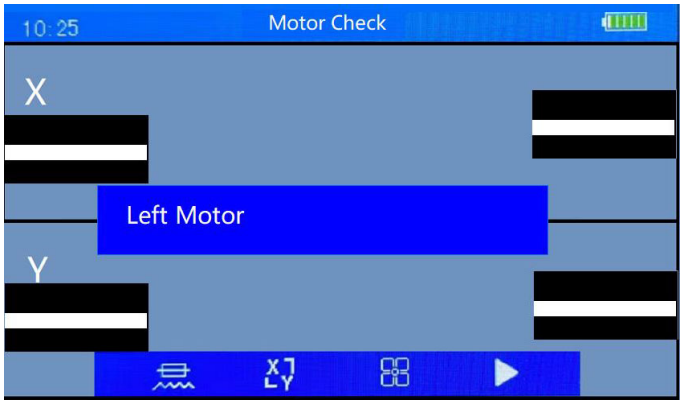

Figure 37: Motor adjust

Arc

Arc includes the submenus Arc test, Arc calibration, Replace electrodes and Electrodes aging (see below).

Figure 38: Arc menu

- Arc Test: According to the splicing procedure, cleave and clamp the fiber and then press the ENTER button. The calibration program starts to run and gives test results. According to the test results, set the arc value in the splicing parameter group. Repeat the above steps until the test results meet the requirements. Parameter modification requirements: the default value is between 8 and 10.
- Arc Calibration: Cleave and clamp the fiber according to the steps of splicing fiber, touch the start button at the bottom of the screen. The calibration program starts to run and the test result is given. The automatic calibration will automatically change the discharge current in the welding parameters according to the test results. If it shows "Arc calibration complete", the current value is an appropriate current value. If it displays "Arc is too large or arc is too small", then restart to prepare the fiber and test again until the test result shows "Arc Calibration Complete".
- Replace Electrodes: When replacing electrodes, press the ENTER button to start. The device will power off automatically. Replace the electrodes, restart the device. The Current Arc Count will be cleared to 0000000.
- Electrodes Aging: Due to the instability of new electrodes, it needs to discharge several times to stabilize the arc. This process is called electrode aging. When a new electrode is replaced, select this menu and then press the ENTER button to start aging the electrode. Do not open windproof cover during the process.

Fusion Records

This menu shows the current fusion, fusion numbers, fusion records and export records, as shown below:

Figure 39: Fusion records

- Current Fusion. This option shows the current total Arc discharge number since the last replacing of electrodes.
- Fusion Numbers: This option shows the total number of arc discharges.
- Fusion Records: This option records working parameters, fiber end face, environmental parameters and date in each splicing. The device can store 4000 groups of fusion records. Press this option to enter the page of fusion records as shown below. Each page displays 6 records in turn, sequence from top to bottom by the latest fusion time as shown above. Press the arrow buttons to navigate to the next or previous page. Press the ENTER button to select the record and view the detailed parameters.
- Export Records: This option is used to export the fusion records memories in the device. After the USB Stick is inserted into the USB port, choose this option and press the ENTER button to confirm fusion records export. The program starts to detect whether there is a USB stick inserted in the USB port, and then starts to write the record content into it after finding the record file. If there is no record file, the program will prompt an error. Note: The file format of the USB stick must be FAT32. Create a non-empty RXXXXX.txt file in the root directory of the USB stick.

Information Menu

In the information menu, users can query the machine software version, serial number, temperature, battery remaining capacity and manufacture date, as shown below:

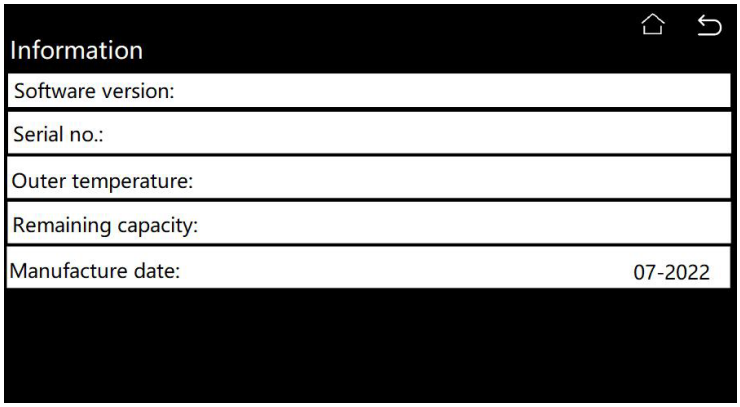

Figure 40: Information

Troubleshooting

If the device is not functioning correctly, please perform the following checks:

Error message	Reason	Solution
Please check fiber	1. The fibre is broken 2. No fiber is loaded 3. The fiber is far away from the electrodes: more tahn 2 mm	Shift the fibre image into the range of the screen.
Please reload fiber	The fiber is not completely loaded into the V groove.	Press the RESET key and reload the fiber in correct position.
Fusion failed	Fusion loss is very big or fusion broken.	Clean the V groove and fiber press foot. Check the fusion parameter an the motor overlap.
Electrodes do not discharge	The electrodes are dirty or damaged. Or the high-voltage board is fault.	Clean or replace the electrodes.
Please check L(R) end face	The end face of the fiber is bad, or the fibre is polluted, or the image is unclear.	Recut the fiber or clean the V groove, or increase the maximum endface value of the fusion parameters
Resetting push motors	The motor exceeds the range of operation reset to the original position.	Reload the fibre in correct position when resetting is completed.
Please close cover	The cover is opened.	Operate when the cover is closed.
X(Y) Image Light Error	Display lamp does not light or some other reasons.	Check the mirror lens or the image light.
(L,R) Fiber on Error position	The fiber is not completely loaded into the V groove or the fiber is dirty.	Reload or recut the fibre.

If the problem cannot be resolved, please contact the ASTRO customer service.

Replace electrodes

Repalcing an electrode

Arc produces high temperatures, melting the fiber, which will produce silicon oxide vapour and some deposite on the electrodes, causing arc instability. Therefore, users are recommended to replace electrodes when discharge has reached 3000 times.
Please replace the electrodes according to the following steps:

- ☐ Shut down the power.
- ☐ Loosen the setscrews of the electrodes cover (see left).
- ☐ Take out the electrode from the electrode holder.
- ☐ Clean the new electrode with tissue paper dipped in alcohol.
- ☐ Install the new electrode into the original position.
- ☐ Close the electrodes cover and tighten the screws.
- ☐ Close the windproof cover and power on the device.
- ☐ Perform an electrode aging (see chapter „Configuring the device, Electrodes).
- ☐ Run 3 times fiber fusion if the current fusion parameter is Auto mode. Otherwise run Arc Test or Arc Calibrate if the current fusion parameter is normal or calibrate.

HINWEIS: The replacement of the electrode should be performed gentle to avoid damage of the device!

Electrode aging

The electrodes arc begins to become unstable when the external environment such as the temperature and pressure change, especially when moving the device from low altitude to high altitude. When this happes, you should perform an electrode aging to stabilize the electrodes arc.

HINWEIS: Do not open the cover during electrode aging!

Software Update

Insert the USB stick with the upgrade file into the USB interface of the device before software upgrade. When the software upgrade menu is selected and pressed, the device will automatically complete the upgrading. After upgrading you should restart the device.
To perform the upgrade proceed as described below:

- ☐ Copy the upgrade file named “boot.dat” to a USB stick, whose capacity must be more than 2 GB.
- ☐ Insert the USB stick into the USB interface of the device.
- ☐ Power on the device.
- ☐ Press the Menu Button on the control panel of the device.
- ☐ Select „Shortcut“ and then „Software Update“. Press the ENTER button. The upgrade process starts now.
- ☐ After the upgrade is finished, pull out the USB stick from the device.

Maintenance and repair

HINWEIS: The device must only be operated with the original power supply unit!

ACHTUNG: The following safety information must be observed when performing maintenance and repair work. Failure to observe this safety information may result in personal injury due to electrical and thermal dangers!

- ☐ The operating display only shows whether the DC current, which supplies the device components, has been disconnected from the mains voltage. If the operating display (for the power supply unit or the device) does not light up, this does not mean that the device has been fully disconnected from the mains voltage. There may still be voltages in the device that are dangerous to touch. You may therefore not open the device.
- ☐ The cover for the power supply unit is designed to prevent accidental contact with voltages that are dangerous to touch, and must not be removed.
- ☐ Read carefully: EN 60728 - Part 1 Safety requirements: No service work during thunderstorms.
- ☐ A defective device may only be repaired by the manufacturer to ensure that components with the original specification are used (e.g. power cable, fuse). Improperly performed repairs may result in considerable dangers for the user or installer. If malfunctions occur, the device must therefore be disconnected from the mains and authorized experts must be consulted. The device may need to be sent to the manufacturer.

Technical data

Type		AFS-GS41
Order number		212 218
EAN-Code		4026187270971
Alignment		4 motors core alignment
Fibre type		SMF (G.652), MMF (G.651), DSF (G.653), NZ-DSF (G.655), BIF (G.657), EDF Cladding: 80~150 µm, Coating: 160~3000 µm
Cleave length	[mm]	8-16
Display	[inch]	4,3, touch screen
Splice loss	[dB]	MMF ≤ 0.01(typical) SMF/BIF DSF/NZDSF/EDF ≤ 0,02 (typical) DSF/NZDSF/EDF ≤ 0,04 (typical)
Splice time	[s]	≤ 7 (SM fast mode)
Heating time	[s]	26, adjustable
Return loss	[dB]	≥ 60
Data storage		4000 splice records
Tension test	[N]	2
Protection sleeve	[mm]	40 - 60
Electrode life		5000 splices
Imaging system		Dual CMOS cameras, 250x (X or Y), 125x (X and Y)
Power supply	[mAh]	5200, Lithium battery
Battery life		≥ 350 splicing cycles
Data port		USB
Dimensions (L x W x H)	[mm]	149 x 120 x 127
Weight	[kg]	1,9 (with battery)
Ambient temperature	[°C]	-25 - +50 (operation) / -30 - +70 (storage)
Humidity	[%]	≤ 90
Altitude	[m]	0 - 5000
Wind speed	[m/s]	≤ 15

DRAFT VERSION

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