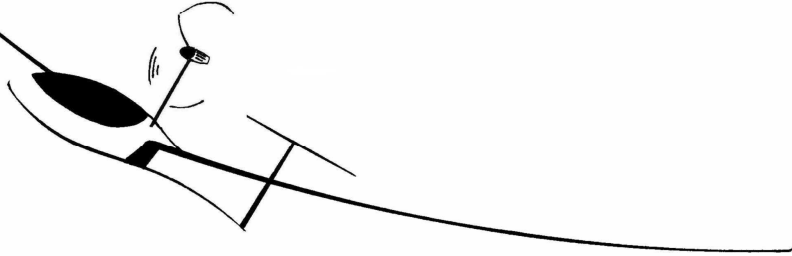



Florian **Schambeck**
Luftsporttechnik

Florian Schambeck
Stadelbachstr. 28
82380 Peißenberg
www.klapptriebwerk.de
distributed by: www.icare-rc.com



AFT 19/25 Operating Manual



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I. Warnings and safety rules:

Congratulation for your purchase of this new generation self launch system (SLS) for gliders. The operation of the AFT unit can be dangerous. With inappropriate treatment, such an engine, which may transfer up to 2 KW to the propeller, can cause substantial damage. You have a very efficient SLS in hand that requires the know-how, discipline, regular service and maintenance. Errors and lack in the assembly or with the operation of a model with a SLS can lead to property damages or body injuries.

Note!

Before you operate a model airplane with this self launch unit, you must inform yourself about the local regulations. A model airplane may be legally considered as an aircraft and is subject to according laws, which must absolutely be respected. Please refer to your local model airplane association or aircraft association, to learn about your local rules and restrictions. The regulations of the respective countries shall accordingly be considered and respected.

Warning!

It lies in your responsibility to protect others against injuries. The minimum distance of populated areas, in order to ensure security for persons, animals and buildings, must be at least 1.5 km (1 mile). Hold off from power lines. Do not fly your the model in bad weather conditions, with low cloud cover or with fog. Never fly against direct sunlight; you could loose otherwise sight contact with your model. In order to avoid any collisions with full sized, manned or unmanned airplanes, land your model immediately, if a full size airplane approaches. People or animals must keep following minimum safety margins between them and the model airplane: In front of the motor: 5 m, besides the motor: 10 m, and behind the motor 2 m

Warning!

The operation of the model and/or the motor under the influence of alcohol, drugs, medicines, etc. are absolutely forbidden. The operation shall only take place with best physical, mental condition and concentration. This is valid both for the operator and for his helper.

Warning!

The AFT unit was exclusively designed for ground take off of the model airplanes under its own power. Other launching methods are not allowed to be undertaken with running motor for safety reasons.

Warning!

We particularly would like, once again, refer to the fact that the AFT unit and its motor controller require a certain cooling time, after a defined runtime. In addition the motor controller shall be set for a motor timing of 0° to 15°. Measure the current draw for proper setup.

As default we specify the following values:

For a ground test run, the switch on time shall not exceeded 60 sec.!

In flight do not exceed 120 sec. continuous runtime. In addition each runtime must be followed by a cool down period of min. 10 min. for the motor and speed controller, as only little air is moving around within the fuselage.

If the ambient temperature exceeds 27°C (80°F) the cooling phase must be extended.

The temperature behavior of the motor can be read off from the 4 dots



temperature sensor. The fourth dots with 71°C shall never get black! If this happen the motor was probably overheated and must sent in for check-up to Schambeck Luftsporttechnik.

It is advisable to provide good airflow within the fuselage, which can help cool down the motor and controller!

In addition it lies on the operator's responsibility to verify if a new battery pack does not exceed the permitted max voltage of the self launch unit

This is particularly important with new batteries, since voltage level is improved and increased by each new generation.

All these recommendation shall also refer to the fact that an AFT unit is **not** a PLUG and PLAY device; with which there is no need to think about it.

Since Schambeck Air Sports Technology Company cannot control the operation, it is the sole responsibility of the end user to make sure that the system is used within its specification and not to overload it.

Warning!

This self launch unit was exclusively designed for model airplanes and is not suitable for any other purpose. In no case it shall be used for persons or goods or any other way of use, except exclusive for model airplanes, since any other intended use can lead to property damages or personal injuries.

Warning!

Note about the propeller:

This is a single blade propeller which is not comparable to a two blade propeller, it is extremely sensitive about balance. Any changes (even color markings) may not be made under any circumstances. This single blade propeller may only be used with the AFT 25. Occasionally, it is recommended to clean the blade with a damp cloth. Besides that the general safety rules for propellers are valid.

Warning!

Any deviations from the guidelines of these instructions, like the use of different parts or materials, changes in the structure or installation may unfavorably affect the functionality of the SLS and thus must under all circumstances be avoided.

Warning!

The operation of this SLS shall only be undertaken with exact observance of the guidelines in these instructions. Also to be considered are the general radio controls verifications and the CG of the airplane. All control surfaces need to be checked for proper operation/deflection, a full range check shall be made with collapsed antenna. The check shall be repeated with the sls in operation and the model well attached to the ground. Besides that, refer to your radio control safety rules.

Warning recommendation!

- Be aware that the motor will start automatically once driven out from its housing.
- Never operate the motor in closed or restricted area.
- Never put cloths or pads inside the SLS or inside the fuselage, this can lead to faulty operation of the limit switches and unexpected start of the motor within the fuselage.
- When testing or programming the transmitter or motor controller, hook up a nearly empty battery, to avoid by any misshapen that motor runs under full power
- For testing or launching never hold the airplane from the front or the side, as you are within the prohibited safety zone of the SLS
- Connect the battery only just before takeoff, thus even with closed SLS
- Before every launch make a complete control check and an SLS check

Responsibility and damage disclaimer

Since Luftsporttechnik Schambeck can not control the follow up of the guidelines for the installation, operation and maintenance of the components installed in an airplane, therefore Luftsporttechnik Schambeck shall not be responsible for bodily or property damage incurred by proper or improper use of this product. Any damages or liability are the sole civil and/or criminal responsibility of the end user.

The operation of the model and the self launch unit takes place under the sole and unique responsibility of the operator.

You agree that Luftsporttechnik Schambeck cannot supervise and control that all guidelines of these instructions - concerning installation, operation, use of an airplane SLS and the remote control - have been followed. And that no other promises, contract arrangements, warranties or other agreements between persons or companies concerning the operation and functionality of

the model and self launch unit have been made. You, as operator, rely, by the acquisition of this airplane or self launch unit, to your own expertise and faculty of judgment.

II. Guarantee conditions

The warranty consists of the free repair and/or exchange of the needed parts, which exhibit proven productions or material defects during the guarantee period starting from the date of the purchase. Other requirements are excluded. Shipping and packing costs go debited to the buyer. For transport damages no responsibility is taken. When sending to Luftsporttechnik Schambeck or to the local service center, a description of the problem and a copy of original invoice shall be attached. The warranty is void, if the loss of the part or the model is due to an accident, an inappropriate treatment or a misuse.

III. Check list

Check list before the start:

1. Rx battery fully charged
2. Main battery fully charged
3. Control surface check and SLS check without Battery hooked up (arm moves out, move propellers out of zero position, retract arm)
4. Radio range test
5. Check proper operation of prop brake on motor controller
6. Initialize timer for engine runtime control

Check list after the landing:

1. Disconnect main battery
2. Switch off Receiver

IV. AFT 25 Installation instruction

Determine the SLS hole position:

(The wooden framework serves as a template!)

Tape the top of the fuselage with some transparent packing tape

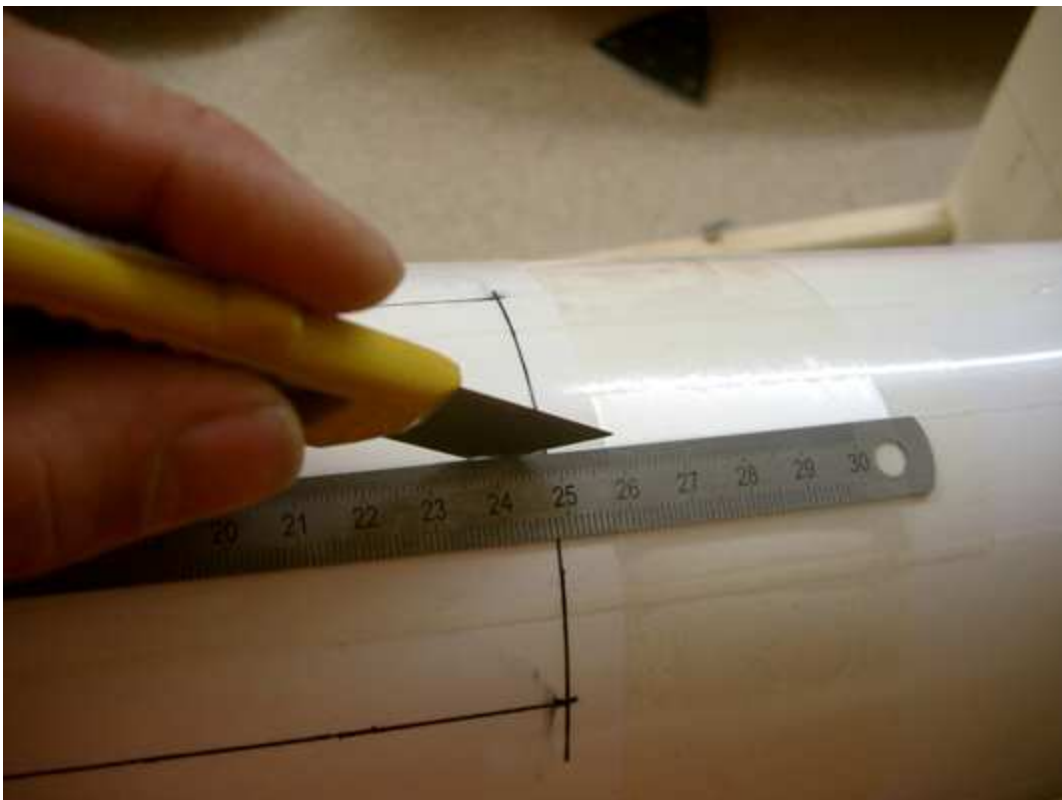
1. Determine the front edge position of the SLS opening and mark it with a water resistant thin foil pen. That dimension is attached or you get it directly from Florian Schambeck. Note: front edge SLS hole is not same as the wooden frame front edge (see Sketch1)
2. Now trace the front edge of the SLS hole. That can be done easily by securing a steel ruler with same tape against the fuselage. Mark the center of the opening. Caution: The fuselage mold seem is not always in the center. The width of the opening is 70mm (AFT 19). To set the width you can also use a caliper, set to 75 mm (AFT 25), or use the wooden frame as gauge. The small notches in front and the back of the frame indicate the center.



3. Next you mark the center line of the hole. It must be 195mm (215 mm) long. Afterwards you can draw the rear edge of the hole, exactly the same way you did with the front edge the front edge made.
4. Present now to the wooden frame centered as in the picture. The lateral notches must be at the same height as the drawn front edge. The frame serves now as guide for the lateral edges. If needed the frame may be reworked so it better fits fuselage curvature. Make sure that the wooden frame sides are really straight, if necessary correct. Attach the frame with tape. Mark the lateral edges with the pen now. Remove the frame and control your drawn lines with the caliper or the steel ruler. Inside width must have 70mm (75 mm) everywhere

Cutting out the doors with a knife

1. There is a possibility to cutout the doors with round corners. This choice does not affect the way it will be cutout. The recommendable and simply way to cut out is by using a sharp cutter. Alternatively you can use miter saw with a thin blade. This is described in a separate chapter. We recommend the method with the cutter, since it is the simplest one and most precise one. To make those round corners, use a large washer, with an inside dia of $\frac{1}{2}$. That you use as a marking guide and later as cutting guide. See picture. The round corners are however only for the optics. You can make regular corner exactly the same way.



2. The cutting out of the door goes as follow:
Identify first the doors arrangement (left, right, front, back). Best to start cutting the centerline. Put the steel ruler along the center line and fix it firmly with tape. The ruler serves as guide for the knife. Turn the knife upside down as shown in the picture, to have the back of the knife lay against the fuselage. Scrape with the knife back edge along the ruler, as many time needed to cut through.
Caution: The sharp side of the knife shows upward. Protect yourselves from the sharp edge. Don't exert too much pressure when cutting. It is recommended not to cut the whole length of a cut at once. Begin always from an edge and cut to the middle, then start from the opposite side to the middle again. I will prevent exceeding the ends. As next you can cut the sides up to the round corners.
Caution: The side edges of the holes are not necessarily straight. You may scrape the cut by section. Try to cut without a ruler by free hand. Afterwards cut the front and rear edge away. Here the steel ruler fixed with tape can be very well used as guide.



3. If you decided to cut round corners. Stick the washer firmly with tape to the corners. And scrape with the back of your knife. The result should look as follows.



4. Remove now the doors from the fuselage and sand carefully the edges with fine sandpaper. Don't sand too much to keep the gap small!

Cutting out the doors with a saw

1. Mark the doors (right, left, back, front).
2. With a small drill (0.6 mm in diameter) drill a row of holes so that a fine saw blade can slide in. (Note: To keep the correct size of the doors, the cut must be made outside of the line given by the wooden frame).
3. In order to prevent door flutter, these shall be fixed with tape.

Installation Angle

(Since every fuselage has a different outline, the rear screw holes must be drilled on site)

1. Drive the SLS out and disconnect it.
2. Unscrew the wooden frame and slide it into the fuselage. Caution! Without its wooden frame the sls arm can fall out of its housing.

3. The wooden frame has a slight camber on top, it must thus, if necessary, be adapted to the fuselage outline.
4. Slide the SLS assembly through the cutout hole into its frame. Or better slide the whole assembly from the front into place.
5. Tape the wooden frames against the upper inside of the fuselage. This is an ideal method to fix framework in place during fitting in. It will allow as well, the arm to move in and out.
6. Now the arm assembly must be screwed to the front screws.



7. Now place the assembly correctly in place with the correct angle (see sketch 3) and then with a sharp pencil trace the upper edge of the arm housing against the wooden frame. Now you have characterized the angle and it can be found easily again after removal of housing.
8. Now you can remove the complete sls from the fuselage.
9. Screw the arm again into its frame with the front screw and hold the back with small fastening clamps, aligning the housing in its frame along the marked line.
10. Now by using the rear holes in the wooden frame as guide, drill 4 mm hole through the housing.
11. Drill out the two 4 mm holes, in the wooden frame with a 5 mm drill, so that the blind nut fit

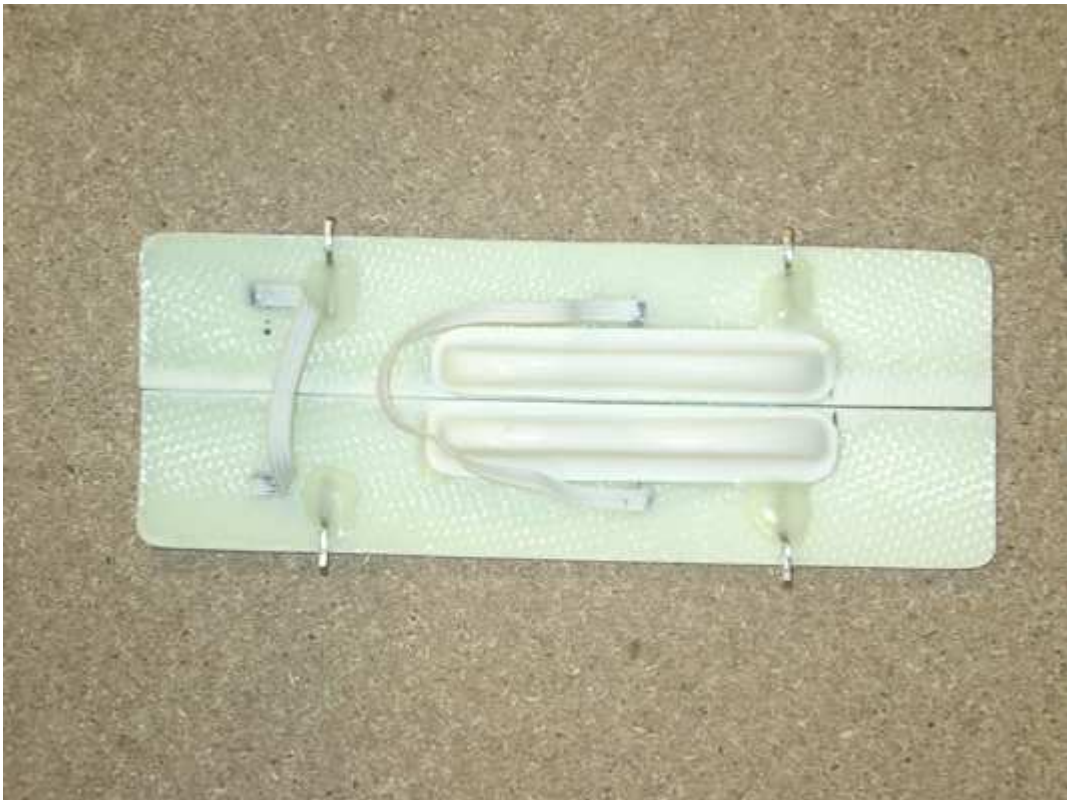
Installation of the wooden frame

1. Sand well the inside of the fuselage.
2. To epoxy the frame in place we recommend to install the fuselage upside down. Using a chair or even by hanging it from the roof.
3. Make sure that the arm; driven out, is aligned with the fin and point to it.
4. Make sure that the notches from the wooden frame align with the front edge (see sketch 1)!
5. Attach first the frame alone with some tape to the fuselage, like how you did it when determining the angle. (Note: If you acquired the installation set accessories for fastening the doors, you must now fix the bowden tube with some CA into the groove. Block tubes end to avoid later the resin to penetrate during the bonding procedure). Take care to well apply the tape against the fuselage to avoid the resin running underneath that tape. To bond the assembly in place the arm assembly must be screwed onto its wooden frame and the arm must be driven out. The tape shall not be removed as it will result in the necessary gap to the arm to move freely within the frame.
6. Front and rear of cutout can be strengthened with fiberglass (e.g. 6oz/ft²) and resins.
7. Wet out the bonding area with thin epoxy, place the wooden frame to its exact position. Then use thickened epoxy (chopped fiberglass and micro balloon). If you don't feel safe, you may just as a first step, secure the frame with some resin (approx. 5g) to hold it in place. The next day you may drive test the assembly and if satisfied you can finalize the bonding, make sure to sand again well the bonding surface!

V. SLS unit installation

Hinging the doors with the installation set.

1. First you will need to slice the bowden tubes at the four hinge location.
2. Now you can insert the supplied hinges and the steel wire in place, the frame must be slightly reworked on those places to give the hinges free movement.
3. Now remove the SLS assembly from its frame.
4. Now place the door in their proper arrangement and tape them down. Make sure to have an equal gap around the doors.
5. Turn the fuselage again upside down on its back and bong the hinges against the doors from the inside. Make sure that the long part of the hinge nicely mates the door shape. If necessary bend accordingly. I recommend tacking first the hinges in place with some CA. Now you can verify the functionality. If all is fine, remove the hinges and finalize the bonding of the hinges against the doors withy thickened epoxy.
6. Now you can cut out deflector guides and glue them accurately in place as shown in Sketch 5 against the doors. Pay attention to the installation direction so that the large roundness is in the center
7. As the latter you can bond the two rubber bands as in sketch 5 against the doors.



VI. Electrical wiring schematics (see sketch 4)

Sketch + shield + ground connection

Current supply

- The current supply for the SLS control can take place from the receiver battery.
- The receiver battery must be as usual in large scale models, sufficiently dimensioned, like 2 x 5 cells or 2s-LiPos with voltage regulator.
- The SLS units needs about 5mAh to drive once in and out, while the max current may reach up to 2.4 A.
- In rest condition it only will draw 10 mA
- The main drive battery shall not exceed the maximum voltage indicated on the AFT identification plate.
- A shielded cable tree extension from the motor cable to the controller is offered (made to measure).

VII. Operating description

1. As shown in the wiring schematic (see Sketch 4) hook up all components except main drive battery.
2. Toggle SLS switch on TX to OFF position and switch Rx on. During power on, the red and green light of the sequencing unit will flash a couple of seconds. SLS is then ready.
3. To drive arm out, toggle SLS switch to ON (+100%), then the arm shall drive out. When the arm has reached its upper position, the prop locking mechanism will disengage. The motor will then be released for free operation. This means that if a drive battery was hooked up the motor will start running!
4. Within the first two seconds the automatic startup is active (see also description of the SLS sequencing unit).

VIII. Remote control and sequencing unit installation

1. Installation of electronics
Electronic components shall be installed with the same care as a receiver. Install the sls sequencing unit with double-sided foam tape or with Velcro tape at least 10 cm away from the receiver.
2. Programming of the transmitter
The signal values to operate the sls unit are typically as follow on the transmitter (JR)
 - - 100% for tow release closed position
 - 0% for tow release open and closing sls unit
 - + 100% to drive sls unit up ``.
3. Programming the sequencing unit (only for individual adjustments)
The sequencing unit stores all adjusted values in its internal memory.

The values are stored not immediately during the adjustment, but only once the end of the programming sequence is reached. If you should have made an error, you can switch the sequencing unit simply off and start over the programming.

Adjustments are made with a programming adapter. This is connected onto the sequencing unit into a little black socket opposite the lead. The plug is pole-protected by a missing pin. Adjustment can be made to the tow release, the prop drive (shall not be changed) and the automatic start up. The remaining positions such as doors, etc. are not needed for the AFT and cannot be left over.

The signal values for the motor control output, to which the esc is connected, are factory set. They correspond to - 100% travel on a typical JR transmitter for motor off and +100% for motor ON (= pulse width of 1100 μ s to 1900 μ s).

That means: The motor control must be programmed before on a free Rx output with these values on the transmitter. Alternatively you may use a servo tester to program your esc to these values. Follow also the instructions of your esc!

Caution: If you should program the esc on a different Tx like a Futaba, the end point values may not correspond. For that reason you may not have full power or the esc may not initialize. So for security please refer to the above given values for esc end point adjustment.

Does the esc not reach 100% of power, it may be destroyed!

Does the controller not reach 100% braking then propeller mechanism will be destroyed.

Always adjust the motor controller for security please to the above JR end point values. (See also No. IX Motor controller).

For that reason you need to check the motor brake effectiveness before every start.

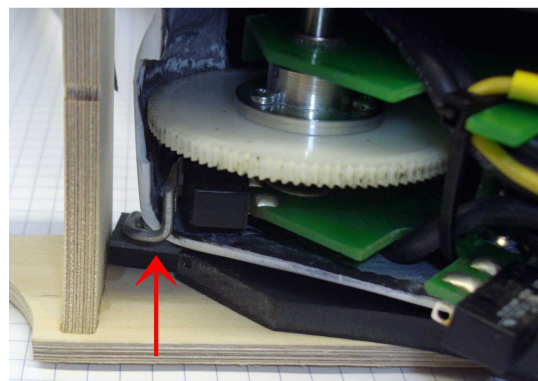
If you want to reset all values back top factory settings, follow the RESET (see 5.) instructions.

4. Limit switch verification

Special attention must also been taken on the small limit switch giver (bent steel wire). For the recognition of the driven out condition of the AFT. It must be ensured that the limit switch remains always closed (also with air drag). If this is not the case it



can lead to a serious malfunctioning of the AFT. The correct operation of the switch is examined as follows: Drive AFT out (without power battery hooked up) in the last 1/3 travel out, apply some resistance against the arm with



your hand, to simulate the wind drag, but let the AFT drive fully up to the end. Now the switch must be pressed and thus the propellers.
- Mechanism shall release the propeller.

Then the arm shall be moved in all directions, make sure that the switch remains always closed.

By easy re-bend the switch lever or by sliding a thin hose over the switch giver to increase its dia. In any case do not try to bend the switch giver wire as it is only glued into the carbon housing and may brake if bent.

5. The programming mode

To adjust the servo values, the programming adapter must be connected to the sequencing unit.

The sequencing unit is connected to the proper channel on the receiver. This is usually the channel, which was intended for the tow release, since the sequencing unit takes over also the control of the tow release.

Activation of the programming mode:

To activate the programming mode the "selection key" must be pressed on the programming adapter during receiver switch on (naturally with already switched on transmitter). The green LED on the sequencing unit lights up. After switching on release the selection key and a double, long beep confirms the programming mode activation:

⇒ °° programming mode

With „the selection "key you can now select the desired servo. The Servos are numbered as printed on the label and the selected servo number is confirmed by the number of bleeps. According to the servo number the green LED also flashes

The arm servo (no adjustment needed here, as this is a worm screw servo) is directly active after entering the programming mode.

Arm (not adjustable)

Right door (not needed)

Left door (not needed)

Motor Soft Startup

Tow release

Prop stop (no adjustment are allowed here!)

Under normal conditions nothing must be adjusted by the user, since all values are already factory programmed. However the adjustment for the motor controller and the motor take-off power can be changed.

As first example, adjust the engine take-off power:

- Depress de selection key so often, till the quadruple beep is reached.

□□□□ **Motor Soft Startup**

Here you can adjust with minus and plus keys, the motor power level during the first 2 seconds of the start. The standard adjustment is 80%. This can be changed in 5% steps (beep) between 60% and 100%. By simultaneous pressing of the plus and minus key the value is reset to 80%.

You will only need this adjustment during the first launch attempts with your model. You can of course familiarize your self during the installation phase of SLS. It is advisable though to replace the controller with a regular servo to see the behavior.

Adjust the startup power level such a way that the model begins to roll straight without tipping over the nose. After 2 seconds, throttle will automatically and slowly increase to full power.

This sequence works only once, after the control has been switched on. After the take-off, throttle will go full power directly. Is considered as start the first time full power is achieved after switching on the sequencing unit. Thus you can briefly test the unit by switching it on an off. As long as you interrupt the sequence before full power is achieve, you will have the normal first start-up procedure.

By pressing "the selection "key an other time, you activate the tow release servo adjustment:

□□□□□ **tow release**

- With switch in pos. 1: the tow release shall be in closed position
⇒ adjust servo travel with the "plus" and "minus "keys
HINT: Adjust first the servo direction, and if necessary change by simultaneously pressing the "plus" and "minus" buttons

- With switch in pos. 2 and 3 the tow release shall be open
⇒ adjust servo travel with the "plus" and "minus "keys

Now to store those values you need to scroll through the selection with the selection key till you reach the end. When you reach the arm selection again, only then the values will be stored permanently.

6. Default values (RESET)

You can set all values back to factory setting (default), by pressing the selection button during 10 sec and power on of the sequencing unit. Five long beeps will confirm the reset

□□□□□ ⇒ RESET, all values have been set back to default

IX. Motor controller

We recommend the use of speed controller of types YGE 100/120 HV, since these are pre-adjusted for the AFT.

Follow instructions of your speed controller.

Provide plenty of cooling to the speed controller.

Verify the direction of rotation first; however don't let the motor wind up!

Motor of rotation can be changed by switching two of the three connecting wires.

It is important that when the motor is in operation the esc operates at 100% full throttle and when stopping the motor 100% of the brake is acting. See also the esc instructions. When programming and testing, it is recommended to use a battery pack with lower voltage. A 4 or 5 cells LiPo is well suited as test battery pack.

Hook-up and adjustment of the speed controller:

The travel for the motor control cannot be adjusted in the sequencing unit. It is factory set at 1100 μ s pulse for motor off (-100% at the transmitter) and 1900 μ s pulse for motor on (+100% at the transmitter). Thus the motor controller must be set to meet those values.

Proceed as follow (adjust only with JR transmitter or appropriate servo tester). In a free model memory verify first travel direction of throttle, this should be -100% switch in pos 2 and +100% in pos. 3. Correct of needed. Connect the esc to that channel and program it so it has motor off when switch in Pos. 2 or -100%, and motor full on when switch in Pos.3 or +100%. To do so, refer to your esc manual.

Verify the operation of the self launch sequencing unit with a power pack (max. 4-5 Li cells), please pay attention to motor direction of rotation. When moving the switch in Pos.3, the motor shall throttle up progressively after the arm has moved out. When you move the switch back to Pos. 2, the motor will throttle down progressively and the brake shall get active to 100%. You can recognize if motor brake is active as follow:

After turning off the motor, it takes approx. 1 second after the propeller has stopped, till the propeller mechanism brings the propeller into the retract position. If the brake is not active, there is no recognizable delay time between deceleration and propeller stop. Without the propeller brake, the propeller keeps rotating even without motor. In that case the propeller mechanism will get damaged when trying to engage the prop. The 100% brake function is very important, as without the prop mechanism that brings the prop back into the zero position will be damaged.

This must be verified each time the radio is switched on again!

X. Maintenance

- The guides in the housing shall be never greased or oiled.
- After long period of operation or once ar year, if necessary, clean the guides and teeth in the housing with brush and cloth.
- The large white gear from servo (at the lower end of the SLS arm) can be lubricated, if the AFT drive has difficulty to drive out, with some teflon - or silicone oil.
- The propeller should regularly be cleaned from dirt with a damp cloth (see however the warning reference „notes for to the propeller “).
- After the first 20 starts the self launch unit shall be sent in to Schambeck air sports technology or its authorized partners for check up and readjustment.
- The maximum life span of a AFT ´s amounts to six years
- Prescribed maintenance interval are:
 - o Once a year
 - o After in each 50 flights

Luftsporttechnik _____ Florian Schambeck Stadelbachstrasse 28
82380 Peißenberg
Schambeck@klaptriebwerk.de, Fax 08803 489664, Tel. 08803 4899064
www.klaptriebwerk.de

