

# **Folding Power Plant for Sailplane Models**

## **Instructions for installation, operation and maintenance**

### **SAFETY INSTRUCTIONS**

**Dear User**

You have purchased one of our folding (up & go) sailplane powerplants, which are currently available in the following sizes: 5 inch (1:12 scale), 6 inch (1:10 scale), 8 inch (1:8 scale), 9 inch (1:7 scale), 12,5 inch (1:5 scale), 14 inch (1:4,5 scale), 16 inch (1:4 scale), 18 inch (1:3,5 scale), 20-22 inch (1:3 scale) or 26 inch (1:2,5 scale). This way among the others, we offer the smallest, as well as the biggest model sailplane folding powerplant available worldwide. All these power plants are able to motorize model sailplanes in a realistic manner, in their respective scale. All the power plants feature integrated reduction gear, so that large props, as well as efficient brushless motors can be used. Optically the power plants resemble the full scale units from Schleicher and Binder, technically they are unsurpassed in their simplicity. From the uncomplicated design, combined with a long period of testing, a reliable and safe system resulted, which, with proper use and maintenance, and observation of these safety measures, will work trouble-free for a long time.

#### **DISCLAIMER**

**Not heeding the manufacturer's instructions, presented on the following 4 pages, will VOID the warranty. Since we cannot control the operation of each and everyone of our power plants out of our control, we hereby deny any claims for liabilities categorically. With the purchase of the power plant, the buyer accepts the following :**

#### **Above mentioned conditions**

**To follow the manufacturer's instructions for installation, use, maintenance and safe operation, and to pass these on to the next owner, should the power plant ever be sold to a third party, be it alone, or as part of a model.**

**These instructions and regulations are delivered to the buyer with each power plant.**

**Should the buyer decide not to accept these conditions, he has the right to return the unit within one week from the date of purchase and be reimbursed for the whole price of purchase. Purchase of the unit signifies acceptance of these conditions.**

#### **WARNING !**

**SALE AND USE OF THESE POWER PLANTS IS STRICTLY PROHIBITED IN THE UNITED STATES OF AMERICA AND ALL ITS FOREIGN POSSESSIONS, AS WELL AS IN CANADA.**

#### **WARNING !**

#### **Instructions for installation, operation, and maintenance**

##### **1. INSTALLATION + PROGRAMMING**

###### **1.1 INSTALLATION**

The power plant has to be installed in a way that it is sufficiently secured to the model fuselage to be able to transmit the forces resulting in its operation. We can also supply the necessary bulkheads, made from fiberglass panels.

**Please bear in mind that due to the long arm of the powerplant, very strong moments and forces can occur at the points where the unit is fixed to the airframe. Because of this, the bulkheads for installation of the unit have to be glued to the fuselage using only high quality epoxy resins, under strict observation of the manufacturer's instructions. The joints should be made in such a way that they would be able to withstand twice the thrust which will be applied.**

For thrust measuring purposes, a spring-type scale may be fixed to the unit.

All our units have a range of movement of more than 95°, approximately. This way, for almost any fuselage shape the ideal lean-back angle of approx 8° (between thrust line and airfoil chord) can be achieved. In this constellation, even T-tails will be subjected to the propeller stream, which is favorable for ROG (Roll Off Ground) takeoffs.

In models without additional nose wheel ( example : ASK 21), the main gear should be moved forward 30 - to 40 mm

This, in conjunction with the use of the biggest possible wheel, as well as a bearing with the least possible friction, will assure successful ROG takeoffs.

Size and shape of the doors for the powerplant well can be determined using the enclosed sketches.

Please be aware that in the retracted position the short end of the boom of the powerplants extend forward.

When positioning the unit in the fuselage, check and recheck everything several times, so that there will be no interference with the wing joiner system or the retractable landing gear.

Once you have determined that position, establish the location of the forward edge of the doors accordingly, and transfer the outline of the doors from the sketch onto the fuselage with a pencil.

Once you have established the final position, we recommend you make some type of guide from plastic and fix it to the fuselage with doubled tape, and use these guides when cutting out the doors. Cut out the doors with the method of your choice.

Once the doors are cut out, we recommend to laminate one layer carbon cloth and an angle of 45 deg onto the back (inner) side of the doors and a layer of light glass cloth on top of the carbon, to increase their stiffness.

To restore the torsional rigidity of the fuselage, lengthwise walls made of balsa-glass or foam-glass laminate have to be fabricated, fit, and installed, also using high quality epoxy resins.

For a perfect fit, install the bulkheads in the fuselage with the unit fixed to them. Check for proper alignment of the unit by sighting along the fuselage looking towards the tail.

Once the unit is installed, the first extensions and retractions can be made.

Check for extension/retraction without interference to any of the other airframe components, as well as proper alignment and tension of the drive belt. There should be no „flutter“ of the drive belt during operation, if it flutters, the tension has to be increased.

Check for correct tracking of the propeller blades, this can be checked by observing that both blades hit the same spot on the rubber stopper, which aligns the propeller during retraction.

Should vibrations become apparent during operation of the unit, check that the propeller is properly balanced, if so reduce drive belt tension, to the point that it has just enough tension to ensure that there is no flutter of the belt when running the power plant.

If there still are vibrations apparent after all the above mentioned checks, please send the unit back to us for inspection.

Do NOT attempt to fly the model before you have achieved a smooth, vibration-free operation.

The whole unit must be adequately protected from dirt and water. Foreign objects can damage the drive train or the motor. Make sure of adequate cooling of the motor, to minimize fire hazard. Obviously, a fire generated by overheating of the drive unit may lead to loss of the model, and/or material or personal damages.

Do not operate the electric drive, especially the ones with high power ratings, in the vicinity of computers and medical equipment, such as pacemakers.

Always follow the motor and electronic speed controller manufacturer's installation and operation instructions.

When starting the unit, do it in a slow, continuous manner, until full power is reached, never increase power abruptly.

Slow, steady power increases will assure long life of all the drive train components.

Bear in mind that brushed motors produce carbon dust, take appropriate measure to protect the r/c receiver and motor speed controller from the carbon dust, since this dust is electrically conductive.

Do not attempt to operate the unit in closed rooms.

#### **NOTE!**

**Each unit incorporates a safety switch, which only has continuity when the boom is in its fully extended position. This switch has to be wired into the positive lead of the electronic speed controller for the electric motor, in order to make sure that the electric motor cannot run with the boom retracted or only partially extended.**

Every unit also has a small plaque installed, on which the serial number is stamped.

It is the operators responsibility to make sure that the serial number is always legible, and that the plaque is securely fastened to the unit.

**Electronic speed controllers for brushless motores should be positioned as close as possible to the drive battery. The 3 wires running from the controller to the motor should be twisted , in order to avoid radio interference. The best position for the receiver is as far away from the controller as possible.**

**Preferred receivers are PCM receivers, with the fail safe position as follows : everything on hold, but motor OFF**

**Modifications, alterations, or repairs on the unit are NOT allowed.**

## **1.2 PROGRAMMING**

### **Warning !**

**Depending on the type of radio control used, on some r/c units, the motor will start running, if the boom is extended and the safety switch closed, and the lever for the motor control on the TX is in the 0 – 30 % range. The motor will not start to run if the lever is above 30 %, but will start to run, once it is brought into the 0 – 30 % range. For this reason, we recommend to always make sure that the motor control is in the 0 % position, when extending the boom.**

**If for some reason you have to extend the power plant boom with the motor control in the 0 – 30 % range, you should do so only after making sure that no persons or objects are in the danger zone of the spinning propeller.**

Generally, the unit will be controlled by a 3 position switch on the TX.

1st end switch position : Unit retracted, retract/extend servo in end position.

2nd end switch position : Unit extended, retract/extend servo in the opposite end position

Middle switch position : This is the „braking“ position.

The unit is in its braking position, when the stopping mechanism is fully engaged, but the propeller tips are not yet at the level of the well doors.

Pay particular attention to the programming and adjustment of this position, since it is very important for proper retraction of the unit during flight.

**As a general rule, adjust the braking feature only as much as necessary, but as little as possibly.**

When programming the extend/retract servo, proceed in the following manner :

Select the middle position of the switch.

Program the TX, so that the extend/retract servo will only have 50% of its complete travel, also program the slow-function ( 3-4 sec. for extension, 10 sec. for retraction )

If your TX allows it, program it so that the process is very slow until the stopping mechanism has stopped the propeller in its correct position, after that, it can proceed faster.

Now connect the servo to the receiver.

**Bear in mind that you will be working in the immediate vicinity of the propeller, so make sure the motor drive battery is disconnected !**

Now adjust the stopping mechanism, as described previously.

Next, select the extended position on the switch, and adjust the servo travel & end point, until the unit reaches it's fully extended position.

Finally, select the retract position on the switch, and adjust the travel and end point for the extend/retract servo accordingly.

An integrated servo sequencer for extension/retraction, motor on/off is available, details on our website : [www.modellklaptriebwerke.de](http://www.modellklaptriebwerke.de)

## 2. OPERATION + FLYING

### 2.1 OPERATION

The units always have to be operated in accordance with local laws and regulations..

#### **Operational Limits:**

Never exceed the power rating for your particular unit.

The below listed ratings result from thorough safety Inspections and tests, and may not be exceeded under any circumstances:

Maximum motor output in watts :

5 and 6 inch unit	=	60 Watts
8 inch unit	=	150 Watts
9 inch unit	=	200 Watts
12,5 inch unit	=	300 Watts
14 inch unit	=	400 Watts
16 inch unit	=	700 Watts
18 inch unit	=	800 Watts
20-22 inch unit	=	1000 Watts
26 inch unit	=	1200 Watts

#### **Operation of the unit :**

**NEVER attempt to run the unit on self made test stands or holding it in your hand !**

**DO NOT attempt to use it in full-size airplanes.**

**This unit is intended ONLY to be used in model sailplanes, always using the correct size and scale unit for the particular application, under strict observation of the above listed power limitations and flying in the same manner as the full size sailplanes.**

**This means a steady, continuous climb.**

**Aerobatics and high speed flight with the unit not fully retracted are PROHIBITED.**

**Again, failure to observe these limitations, will VOID the warranty.**

The unit has to be protected from bumps, if the model will be used on uneven runways, springed landing gear has to be used.

**Modifications, alterations, or repairs on the unit are NOT allowed.**

### 2.2 FLYING

#### 2.2.1 PREFLIGHT CHECKS

**As a general rule, always keep your hands and other objects out of the propeller area, even with the motor stopped.**

**If you have to work in that area, always make absolutely sure that the motor drive battery is disconnected, to avoid unadvertent starting of the motor and possible injury.**

**As a general safety rule, always maintain the motor drive battery disconnected until immediately before takeoff. Connect the battery, once you have performed all your usual preflight checks, especially check that all the components of the drive train are securely fastened.**

**Once these checks are performed satisfactorily, and the sailplane is in takeoff position, the motor drive battery may be connected. When connecting the motor drive battery, the unit must be in its RETRACTED position, this way, due to the safety switch, an inadvertent start of the motor is avoided.**

**You are now ready to extend the unit, but before doing so, the area around the sailplane has to be cleared, make sure that no persons or loose objects are in an area of 40 m in front or sideways of the sailplane, and no closer than 10m on the rear.**

**Be aware that with the unit extended, the safety switch is closed, and the motor can start.**

### **2.2.2 TAKEOFF**

The model can now take off, under observation of the general safety rules.

On some models, the elevator does not have sufficient authority to compensate for the nose down moment generated by the power plant.

In the case of small models, this can be overcome by handlaunching it, with the unit extended, but the motor OFF. Once the model is gliding and has sufficient airspeed, the motor can be turned on and power increased progressively.

However, for this launch method, a strong and experienced person has to perform the handlaunch.

In the case of ROG takeoff, at the beginning of the takeoff run the model usually requires full up elevator, in order to avoid nosing over. During the takeoff run, the up elevator has to be progressively decreased with increasing airspeed.

After takeoff, do not reduce the elevator input abruptly.

Once airborne, establish a slow, steady climb, in accordance with the flight characteristics of the particular model and the available power.

If the climb is too steep and/or too slow, it can happen that the nose down moment generated by the powerplant overcomes the elevator authority, and the model will drop the nose abruptly !

At low altitude, in this case the only way to save the model is to SHUT OFF the motor IMMEDIATELY.

### **2.2.3 RETRACTION OF THE UNIT**

Once the model has reached altitude, and you are ready for the transition to soaring, to retract the unit, proceed in the following manner :

Shut off the motor.

Wait for approximately 4 seconds, this allows the propeller to spin down,

Now, the unit can be retracted.

The retraction process has to be done with a slow function, this is necessary, so the stopper can stop the propeller in the correct position, also to avoid overloading the stopping mechanism.

The slow function should be programmed in such way, that the whole process takes approximately 10 seconds.

**Analogue to the full size counterparts, the extension/retraction process should always be done at the lowest possible airspeed, in order to reduce the forces required to extend /retract.**

### **2.2.4 POSTFLIGHT**

**After landing, approach the model only with the unit retracted, and before carrying it back to the pit area, disconnect the motor drive battery.**

## **3. Maintenance Instructions**

### **Inspection intervals / Total life time**

To assure safety of the operation, each unit has to be inspected by the manufacturer at periodic intervals, established by the manufacturer. These inspections will be performed by the manufacturer, and the unit has to be sent in for them.

It is mandatory to maintain the records of these inspections.

The inspection schedule for all units is as follows :

1st inspection : 1 month after date of purchase.

2nd inspection : 6 months after date of purchase

3rd inspection : 12 months after date of purchase.

The following inspections shall be performed at 12 month intervals after the first 3 inspections.

As all aeronautical products, the power plant has a definite total life time.

The total life time for all our units is 6 years from date of purchase.

Please include the attached inspection record form when sending in the unit for inspection :

Inspections (Include this sheet when sending in the unit)

1	6	12	2
3	4	5	6

**Maintenance and Checks by the owner**

**Do not attempt to disassemble the unit as a whole or partially.**  
**All the fasteners employed on the propeller shaft have a safety, which will loose its properties even when loosened only once.**  
**Please do not attempt to retighten these fasteners, or any fasteners on the unit.**  
**Retightening of any of the fasteners may lead to binding.**

All units are certified by the german authorities for sufficient strength in their respective flight envelope.

**After any unusual event ( hard landings, crashes, etc. ) the whole unit and its associated bulkheads have to be thoroughly inspected, for cracks or other damage.**  
**Check that the boom will withstand twice the thrust generated during operation.**

If you are in doubt about any possible damage, send the unit to the manufacturer for inspection.

Before delivery of the unit, the propeller is dynamically balanced and checked for proper tracking.  
 Replacement of the propeller can only be performed by the manufacturer.  
 Only propellers approved by the manufacturer shall be used.

Even minor damage on a propeller represents an uncalculable risk, which can lead to damage of the unit and/or loss of the model and therefore require immediate replacement.

**4. Legal issues**

All legal disputes will be handled by the responsible courts in Neunkirchen/Saar – Federal Republic of Germany.  
 Only german laws apply.

**5. Unit S/N and Date of purchase**

Power plant S/N \_\_\_\_\_ Date of purchase \_\_\_\_\_

**6. Upon signing this contract, the buyer accepts all of the above listed terms and Instructions for Installation, Operation and Maintenance of the purchased unit, and is obliged to follow them.**  
**Futhermore, should the uit be sold, he is obliged to inform the buyer of all of these terms and conditions.**

\_\_\_\_\_  
 Location Date

\_\_\_\_\_  
 \_\_\_\_\_  
 Address of buyer  
 \_\_\_\_\_  
 Signature of buyer