Alpina 2501 ELEKTRO

MANUAL

Graupner TANGENT

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Contents:

ALPINA 2501 ELEKTRO - High Performance Model Glider.

Alpina 2501 ELEKTRO ARC	# 40000
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Preface.

Thank you for choosing the **ALPINA 2501 ELEKTRO** high performance electric glider. We wish you much success and enjoyment with your new model.

Your TANGENT model kit from the home of GRAUPNER represents a mature design and the product of many years experience in the manufacturing of high performance model aircraft. However, despite the most scrupulous quality control, small deviations may arise. We ask therefore that all parts be carefully inspected prior to undertaking any assembly work and before flying the model. This is particularly important as any used parts are not subject to repair or replacement. Notwithstanding the above, we are happy to repair or replace parts found to be faulty – subject to approval by the factory. Please therefore return any faulty parts together with a detailed description of the fault.

Our products are the subject of continuous development and as such we reserve the right to make changes to the design, engineering, manufacture and materials supplied without prior notice. As the product is supplied in kit form, no claims will be considered in respect of the assembly or operation of the model.

Caution!

Remote controlled models and model aircraft in particular, are not toys in the normal sense. Building and operation of this model aircraft requires a high degree of technical understanding and care, as well as considerable skill and discipline at the flying field. Errors in the building process and in the operation of this product can result in serious personal injury and damage to property. As kit manufacturer we have no control over the assembly, maintenance and operation of this model aircraft, we therefore take this opportunity to stress the potential hazards and emphasise the personal responsibility on the part of the user.

Kit Contents.

(See Detailed Parts List)

1 **Pair ARC Wings -** with elliptical tips, INTRO-Technik, torsion-rigid and fully integrated Ailerons and Flaps incorporating Elastik Flap Technology. TA-Servolocks and steel wing-joiner.
1 **Fuselage –** in brilliant white, with integrated Bowden cables and pre-installed elevator bell-crank.
1 **Canopy** - Pre-formed Carbon.
1 **Pair Tail-plane** with integrated joiner system, finished leading and trailing edges.
1 **Rudder** in preformed Balsa
1 Set pre-formed wooden parts.
1 Quality hardware accessory pack.
1 Set wire parts.
1 Set Building Instructions.

Technical Data.

Wingspan (mm).....2501
Fuselage length (mm) 1070
Wing area (FAI) (dm^2).....32,1
Weight (gm). ....from 1450
Wing loading (FAI) (g/dm^2) .....from 43,2
Aerofoil .....TA-029 Strak
Horizontal dihedral (deg).....circa1,3
Centre of Gravity (mm - from root leading edge) 60-65

RC functions.

Ailerons	2 DS 3288	(Grp # 5187)
Flaps	2 DS 3288	(Grp # 5187)
Rudder	1 C 341	(Grp # 4093)
Elevator	1 C 341	(Grp # 4093)

Note: It is important that the Receiver Battery be selected to match the intended use. The capacity ought to be sufficiently generous to cope with the on board radio control system (it's always more useful to have more battery capacity than lead nose-weight!). Considering the use of up to 6 servos, we recommend a battery pack of at least 1400 mAhr capacity (C) and of good quality and always well maintained.

For a powered glider we recommend the following a tried and tested drive configuration:

Motor:	Compact 460Z 11,1 V (Grp. #7748)
Spinner:	Precision Spinner (Grp. #6040.4)
Propeller:	Folding Carbon Fibre (Grp. #1336.33.18)
Speed Controller:	Brushless Speed Controller 60A (Grp. #7236)
Battery:	LiPo Battery 3/2600 mAhr (Grp. #7652.3G2)

Important Note regarding Styrofoam wing cores.

For all joints involving Styrofoam wing cores it is essential that you do not use any solvent based adhesives, and in particular avoid use of any form of cyano-acrylate glue. Use of such adhesives will destroy the foam and render the affected parts useless. Use only solvent-free adhesives, such as Epoxy resin and/or Aliphatic Resin (white wood glue) if working anywhere near exposed areas of Styrofoam.

Notes regarding the use of Epoxy Resin.

Epoxy alone is not a viable adhesive! However, the addition of appropriate additives makes for a variety of excellent adhesives. Match the choice of additive to the job at hand:

1. Chopped cotton fibres – produces a tough but flexible joint.
2. Superfine glass fibres - makes a hard joint.
3. Microballoons – produces a highly effective, lightweight filler.

Assembling your ALPINA 2501 ELEKTRO.

The kit you have purchased includes all the parts required to complete the basic airframe (ARC) and covering (ARF), but does not include adhesives or radio control components. You can make a significant contribution towards the ultimate appearance and performance of your model by building carefully and accurately. It is a well known fact that a poorly built model does not fly well and may be difficult to control. A well built and properly trimmed model will reward the pilot and spectators with good performance and accurate handling characteristics. Be patient, take your time; the effort will be well worth while!

The Fuselage and Empennage.

Begin the construction with the Fuselage as this is the point of reference for all other parts.

Fuselage Openings / Wing faring.

Open out all of the openings in the fuselage. Use a 2 mm dia. drill to make a series of small adjacent holes to prepare the openings in the in the area of the wing fairing. Finish the openings using a small file as indicated by the markings in the mould.

Tip. Use a needle file or suitable rotary tool to finish the job.

Compression Struts

Two compression struts are installed inside the fuselage, between the wing roots at both leading and trailing edge positions to prevent damage to the fuselage when the wings swing forward following a heavy landing. The front strut is located in front of the Multilock connector and the rear strut is located just behind the trailing edge wing incidence pins. Take care that the struts do not distort the shape of the fuselage. Check by temporarily installing the wings and adjust the length of the struts to achieve a snug fit between the fuselage sides. Note that once installed, the front compression strut will restrict access to the fuselage opening, so you may wish to

wait until the electrical connections to the wing servos have been installed before finally installing the front strut. The two struts are bonded in using suitably thickened epoxy.

Fig. 1 Fuselage Compression Struts

Installing the winch hook (if required)

Using a flexible tape-measure, measure and mark a point 300 mm from the nose along the underside of the fuselage. Drill a 2 mm hole to accommodate the winch hook. Cover the hole on the outside with tape to protect the surface and roughen up the inside of the fuselage in the area of the hole. Now glue the winch hook support block into place centrally over the hole using thickened epoxy. Use the self tapping screw, through the hole in the bottom of the fuselage to secure the support block while the epoxy cures. Once cured, drill a 2mm hole in the support block to accommodate the winch hook.

Tip: for additional security, you may wish to finish the job by laminating the support block to the fuselage bottom using 2-3 layers of suitably wetted 120g fibreglass laminating cloth.

Catapult launch hook (if required)

Some may wish to install a launch hook further forward in the nose for use with alternative launch methods such as from a catapult. In this case follow the same procedure as above, but we would recommend a position 100mm from the nose.

Completing the canopy.

The Carbon canopy is supplied ready made, requiring only minimal finishing. Place the canopy on the fuselage opening, carefully check the joint and adjust as necessary for a perfect fit. Minimum gap and good overall appearance will be your just reward for a little extra time and effort at this stage.

Installing the canopy catch.

The forward canopy pin is held in place by the channelled hardwood support. The support is glued to the inside of the canopy at a position such that the tip of the pin is about 1mm inside the edge of the canopy – as shown. The canopy pin is likewise glued into the channel in the hardwood support – such that the pin protrudes sufficiently from the front of the support to engage with the rim of the fuselage opening. Re-check and adjust as necessary to achieve a good fit. Be sure to roughen the inside of the canopy with abrasive paper before gluing to ensure a good bond. Once cured, test fit the canopy, and use a 3mm drill or suitable round file to form a recess in the forward rim of the fuselage opening to accommodate the canopy pin.

The rearward canopy fixing is made using a U-shaped Steel spring fashioned from the supplied length of piano wire. The open ends of spring are glued between the two wooden strips such that the closed end of the spring protrudes about 2mm beyond the rear edge of the canopy – as shown. Once set in place, cover the supporting strips holding the spring with 1 -2 layers of fibre-glass cloth treated with a suitable resin to ensure a strong bond with the inside of the canopy. Again, be sure to

roughen up the inside of the canopy with abrasive paper before bonding the spring in place.

Tip. Work carefully and accurately. Your patience will be rewarded by a tight fitting canopy!

Fig 2. Canopy Catch

Installing the all-flying tail plane.

The elevator bell-crank has been loosely installed at the factory but remains to be permanently bonded into the fin. This system has proved entirely effective in many of our models over a long period of time and ensures a secure connection with no unwanted slop in the control system.

Proceed as follows:

- Open the holes in the fin using a twist drill.
- Prepare the steel wires for the elevator joiner. These should be cut to length (if necessary) and rounded off at the ends.
- Prepare a means to hold the fuselage with the fin at right angles to the work surface. Also prepare something on which to support the two tail-plane halves at right-angles to the fin and at the correct height. (A few carefully selected books might well serve as an adequate jig for this purpose!)

Attach the all-flying tail-plane making sure that the rearward steel wire joiner passes through the hole in the bell-crank installed the fin. Carefully check the alignment of the tail-plane halves with the fin. Now loosen the two Aluminium nuts holding the bell-crank bearing in place and make any adjustment necessary to ensure that that tail-plane halves can be aligned at exactly 90° to the fin. Apply a little thickened epoxy to the inside of the two nuts and carefully tighten, constantly checking that correct alignment between tail-plane and fin is maintained at all times.

Leave the entire tail-plane assembled in the jig described above until the adhesive has fully cured.

Tip: While working with adhesives in this area apply thin parcel tape over the sides of the fin in the area of the bearing and cut through the tape to expose the holes. This will ensure that any excess adhesive does not spoil the finish on the fuselage.

Fig 3 & 4. Installing the all-flying tail plane

Completing the tail-plane halves.

Work on the uncovered tail-plane panels is limited to finishing the root outline to match the profile of the fin. The tail-plane halves are factory finished, but some may wish to achieve an even more accurate match by carefully working the root area using a fine grade abrasive paper.

Note: The joiner tubes installed in the tail-plane halves incorporate the integrated All Moving Tail-Lock mechanism.

Before fitting the joiners into the brass tubes for the first time, check that the wire joiners are perfectly straight and burr free. When pressing the tail-plane halves into place, you will feel a mild mechanical resistance which is sufficient to hold the tail-plane halves securely in-place during flight.

Vertical stabiliser and rudder.

The fin post has been bonded into the trailing edge of the fin at the factory and the rudder supplied in the kit requires only minimal finishing.

Open-up the rudder push-rod shroud at the rear of the fuselage using an 8-10mm dia. round file or similar rotary tool.

Note: Customers building the ARC version may wish to take this opportunity to adjust the profile of the leading edge of the rudder to match the trailing edge of the fin.

Using a small round file; form a small semi-circular recess at the top of the fin post to accommodate the leading edge of the rudder.

Carefully measure and mark the position of the two hinge points located 20mm from the base of the rudder and 200mm apart along the leading edge of the rudder. Transfer the position of the two hinge points onto the fin post and drill a 3mm hole at each point to accommodate the supplied Nylon hinges. Work carefully to determine the correct depth of the hinge points and to ensure equal and adequate rudder throws. Trial fit the rudder and the hinges. Once satisfied with the positioning, glue the hinges into place in the fin post using thickened epoxy. In the same way, glue the protruding hinge points into the leading edge of the rudder.

Tip: Take care to avoid any epoxy finding its way into the hinge mechanism. Apply a very small drop of oil (or suitable release agent) to the hinge-pin and check periodically while the joint is curing. .

Fig 5. Rudder Hinges

Rudder control horn.

Drill a 4mm hole in the base of the rudder to accommodate the eye-bolt which forms the rudder control horn. The hole is to be 6mm from the base and 9mm from the leading edge of the rudder. The hole in the eye-bolt is positioned centrally within the rudder push-rod shroud and at 90° to the rudder itself.

Drill carefully, without piercing the outer skin of the rudder.

Once satisfied, bond the eye-bolt securely into the rudder using thickened epoxy leaving a small bead of thickened epoxy around the base of the eye-bolt.

Note: Customers building the ARC version may wish to cover the rudder before gluing the eye-bolt in place.

Customers building the ARF version will need to carefully remove a little of the covering material around the fixing point.

Fig 6 & 7. Rudder Control Horn

Motor installation

Prepare the area where the motor mount is to be bonded to the inside of the fuselage nose with a course abrasive paper (80 Grit) to ensure a good bond. The motor mount should be installed about 1mm behind the edge of the fuselage nose.

> **Tip:** Fit a long nylon bolt through the centre hole in the motor mount and use the protruding part of the bolt as an aid to adjusting the precise amount of down-thrust and side-thrust. The bolt also serves as a useful handle while positioning the motor-mount in place.

With the motor temporally installed, fit the propeller yoke and spinner and check the alignment of the fuselage nose with the spinner. Carefully finish the front of the fuselage nose to match the profile of your chosen spinner.

Now carefully position the motor mount in place and secure with a few drops of instant adhesive before finally bonding in place with a generous bead of suitably thickened epoxy to both sides of the motor mount.

> **Note:** Be sure to make provision for adequate air-intake to cool the drive system. Some customers may prefer to use a so called Turbo-Spinner which provides for intake of air through the spinner itself, but do make sure that adequate cooling is provided.

Only when the motor-mount is fully secure, re-install the motor (remember to use lock washers) and ensure that the drive shaft turns feely and there is adequate clearances for the propeller yoke and spinner assembly. A gap of about 1mm between the spinner and the fuselage nose is recommended. For the sake of safety, don't install the propeller until the model is complete!

> **Note**: Check that the screws used to secure the motor to the motor mount are not too long as they may otherwise foul the internal motor mechanism. You may find it necessary to countersink the mounting screws slightly, to achieve clearance with the propeller yoke/spinner assembly.

Installing the battery & servo frame

Select the battery & servo mounting frame from the wooden parts set. The front of the mounting frame is to be located about 140mm from the rear of the cockpit opening. Make sure that there is sufficient space in front of the servo mounting frame to accommodate your chosen battery pack and adjust to suit.

Fig 8. Battery & Servo Frame

> **Note:** The mounting frame does fit in the fuselage opening! Turn it around carefully and you will find that it will slip neatly into place. Don't be tempted to sand away too much material which will result in a poor fit.

Mark the position carefully with a pencil. Now remove the two protective strips from the inside of the fuselage opening and tack the servo frame in place using an instant

adhesive – before bonding the frame securely into the fuselage with a generous bead of thickened epoxy. Allow to cure.

Tip: Some may wish to complete the job by adding a layer of wetted fibre glass cloth over the entire servo frame allowing about 10mm extra on both sides to bond with the fuselage sides.

Fig 9. Battery & Servo Frame

Install the rudder & elevator Servos.

Test fit and install the rudder and elevator servos in the cut-outs in the servo mounting frame according to the instructions supplied with the servos. Cut the rudder and elevator linkages to length and solder clevis adaptors securely to the wire ends having first thoroughly cleaned and prepared the joint. Fit clevises and lock-nuts and adjust accordingly such that the control surfaces are held at neutral when the servo positions are centred.

Tip. Suitably thickened epoxy may also be used to fix the clevis adaptors to the control linkages (as an alternative to solder). This method is more appropriate in the case of glass fibre push rods. In either case it is good practice to apply a small piece of heat-shrink tubing over the joint.

Finally secure the Bowden cables to the inside of the fuselage side with a little suitably thickened epoxy to ensure slop free control linkages.

The Wings

The wing panels are supplied largely complete and require only the minimum of installation work and finishing.

Wing Joiner

The ALPINA 2501 ELEKTRO features a floating joiner, meaning that the opening is the fuselage is approx. 1 mm larger than the diameter of the wing joiner. This system is widely used in full-size aircraft and has been well proven over many years of model design and manufacture. The main wing joiner consists of a single Ø 10 mm hardened steel wing-joiner which is ample to carry the flight loads. The fuselage is suspended between the wing panels on four steel incidence pins – the combined shear strength of which is more than one ton!

Installation of the wing incidence pins

Work carefully when drilling the holes in the wing roots to accommodate the incidence pins as these determine the incidence (with respect to the fuselage). Using small screw-clamps, carefully fix small 3mm thick pieces of scrap Balsa to the top and bottom surfaces of the wing at both leading and trailing edges. The upper pieces should be positioned to overhang the wing root by a few millimetres - to act as guides along the fuselage wing fairing.

Position one wing panel carefully against the fuselage fairing at the leading and trailing edge, using the small Balsa pieces as guides, and tape it firmly in place. Now mark the position of the holes for incidence pins on the wing root by working through

the holes in the opposite side of the fuselage using a sharpened 3mm steel rod (or similar tool).

Remove the wing and drill the holes in the wing root using a 3mm twist drill. Remember to take account of the wing dihedral; the holes should be drilled parallel to the wing joiner. Once both wings have been marked and drilled, the four incidence pins can be bonded into place using a slow setting thickened epoxy. Be sure to make one pin in each wing a little longer than the other, and round off the end of the pins to facilitate easier assembly at the flying field.

Note! Apply a suitable release agent (floor wax works well) to the holes in the fuselage sides and to the fairing itself before applying the adhesive, then fit the wings to the fuselage, with the steel joiner installed to allow the epoxy to cure overnight.

Fig. 9. Floating Wing Joiner

Installing the Nylon wing locks.

Note: Customers building the ARC version may prefer to wait until after the wings have been covered before completing this step.

The supplied Nylon wing locks are used to secure the wing joints. The sockets have already been installed in the fuselage wing root. The matching plugs are required to be glued into the wing roots to complete the joint.

First check the plugs fit the holes provided in the wing roots and adjust if necessary. Once the holes have been adequately prepared, glue the plugs into the wing roots and with the steel wing joiner installed, engage the wings firmly with the mating sockets and ensure correct alignment. Take due care when completing this step to avoid the effects of any excess epoxy.

Tip. Cover the fuselage wing roots with kitchen film (or similar material) to protect the surface and apply a releasing agent to the locks themselves while the epoxy cures. Once cured, the wing locks are easily separated by applying firm pressure, by hand, along the leading edge of the wing.

Installation of the wing servos.

The TA Servo LOCK system supplied with your ALPINA 2501ELEKTRO kit provides a universal wing servo mounting mechanism which is both simple and very secure.

Remove sufficient polystyrene to the inside the factory prepared servo-wells to accommodate your chosen servos up to the inside of the upper wing skin. Reinforce the area of the upper wing skin with a small piece of 100 g./dm ² glass cloth and epoxy resin. This prevents stress points in the upper wing skin as a result of installing the servos. Finally glue the plywood servo mounting frames to servo openings in the wings.

Note: In the case of the ARF version, the plywood servo frames are pre-installed at the factory.

The servos themselves are simply bonded to the inside of the servo cover scoop using suitably thickened epoxy and screwed onto the plywood frames (see also the

installation note supplied with the TA servo LOCK set). Be sure to roughen the surface of the servo cover to ensure a good bond.

> **Tip:** Protect the servos with heat shrink sleeve. This makes for easy removal and replacement of the servo, but care should be taken so as not to overheat the servos while applying the sleeve.

Installation of the wing control horns.

> **Note:** ARF customers will need to remove a little of the covering material while those building the ARC version may prefer to wait until after the wings have been covered before bonding the control horns in place.

Ailerons: Mark out the position of the aileron control horns on the lower surface of the aileron. The horn should be positioned directly opposite the scoop in the servo cover and about 3 mm from the aileron leading edge.

Drill a series of 2mm diameter holes and cut away the excess to form a neat slot to accommodate the supplied GRP control horns. Take care not to cut through to the upper surface of the aileron and undercut a little of the material inside the slot to allow for additional adhesive.

Locate the aileron control horn such that the eye is at 90° to the hinge line and about 13mm above the lower surface of the aileron.

Flaps: Similarly locate the slots to accommodate the supplied GRP control horns about 3mm behind the leading edge of the flap such that the eye is located about 10mm behind the flap leading edge and about 12mm above the lower surface of the flap.

Once satisfied with the position, bond the GRP control horns into place using thickened epoxy and allow to cure.

Fig 10 & 11. Wing Servo & Control Horns

Wing servos wiring.

Prepare two cable harnesses to connect the wing mounted aileron and flap servos to the receiver system. The connectors may be either fixed into the wing and fuselage wing fairing roots, or left on flying leads. However you choose to proceed, be sure to use good quality twisted servo leads, with a wire diameter of no less than 0.25 mm ² and polarised connectors, preferably with Gold contacts capable of delivering adequate current for the 4 wing servos under load.

> **Note**: Quality cable sets, including connectors and separation filters are available via the specialist model trade; choose high quality components for optimum reliability. In the case where flying leads are used, take care always to handle the leads only by the connectors. Don't pull on the leads!

ARF customers should now move to installation of the radio control equipment while those building the ARC version should now begin the finishing stage.

Finishing.

Film covering – all the wooden surfaces are supplied pre-sanded, but will benefit from further fine finishing prior to covering. Follow the instructions provided with the covering materials, always taking care to make all joins in the direction of the air-flow.

As an alternative to our own high stable decorative vinyl based covering material, we can also recommend Oracover (Profilm) covering materials.

NOTE: Take care to avoid excessive heat when using heat-shrink covering films on the wings as the polystyrene cores will be destroyed (polystyrene starts to melt at 70°C). Use low temperature heat-shrink covering films and make every effort to avoid prolonged exposure to heat.

Fibre-glass finish – for the ultimate finish to your ALPINA 2501 ELEKTRO, cover the wings and tail-plane with a lightweight glass-fibre cloth and treat with a suitable finishing resin. This involves a specialist process which is well documented in the popular model trade. Choose good quality materials and follow the manufacturer's instructions. Take care not to add excessive weight!

DESIGN Models.

Our DESIGN range of models are supplied with pre-printed graphics which are both lightweight and durable. Please observe the following simple steps to maintain the appearance:

- TA-Film is stable up to a nominal temperature of 70^0C so care should be taken not to expose the surfaces to excess heat. The use of a normal hairdryer is all that is required to soften the material should it eventually become necessary.
- The graphics are waterproof but are not resistant to solvents. Clean your model with a mild solution of soapy water applied with a soft sponge and dry carefully to restore the fine finish.
- Do not under any circumstances use cleaning products which contain concentrated alcohol or acetone as a solvent.

Radio Control Equipment Installation.

Fuselage servo installation - Install the servos in the servo mounting tray, following instructions supplied with your radio control equipment. Connect the servo output horns and clevises and check full and free movement – using the full range of the servo. Also check for any slop in the push-rods and secure the Bowden cable carriers always keeping mind to minimise the length of unsupported control linkage.

Note: Depending on your choice of servos, you may find that you will have to remove a little material in the area of the fuselage opening to accommodate the servo output horns. Do so carefully, removing only the minimum amount of material necessary to install and operate the servos.

Wing servo installation - Ensure that the servo output arms are set at 90° with the servo electrically centred. Prepare the linkages, using threaded rod, clevises and lock-nuts remembering to apply a drop of thread-lock to the lock nuts or apply a short length of heat-shrink over the joint.

Secure the servo covers in place using the four small screws provided. Use a countersink tool to recess the screw heads into the servo covers to improve both the appearance and the aerodynamic performance.

Receiver installation - The receiver is best installed to the rear of the fuselage cockpit opening, a good quality Velcro Hook & Loop material is quite adequate for this purpose. The receiver antenna is ideally inserted into a suitable antenna tube (or plastic Bowden cable carrier) and inserted down the length of the fuselage

Although there is a certain amount of Carbon used in the construction of the fuselage, we would suggest that there is no problem running the antenna down the inside of the fuselage boom (we fly all our models this way). However, ALWAYS carry out a thorough range test before flying the model and if any doubt whatsoever then allow the antenna to hang freely.

> **Tip:** Never install the antenna taut, but allow some slack in the wire to allow for small movements within the fuselage.

The model is now largely complete, but some very important work remains to be done while still in the workshop.

Balancing & Adjusting.

The correct centre of gravity and longitudinal dihedral are first determined theoretically, and then confirmed in practice by test flying model.

A successful first test flight is invariably a matter of good preparation!

Centre of gravity and longitudinal dihedral.

Start with the centre of gravity between 60 and 65 mm behind the root wing leading edge – this has been found to be ideal in test flights. You ought to be able to achieve the required balance point by careful location of the flight battery. Be sure all batteries are secure as any movement whilst in flight will impact the correct centre of gravity and adversely affect the proper flying characteristics of the model.

The correct longitudinal dihedral (decelage) is +1.3°. This is the angle of the elevator (at the neutral position) with respect to the wing and is best measured using an incidence meter.

Recommended control throws.

The following recommended control throws have been determined following several test flights, confirmed by several different model pilots. We strongly recommend that you begin with the recommended throws and only change them with experience.

The throws are measured at the point of maximum deflection – in millimetres:

Normal Flight

	Up	Down	Left/Right
Rudder			**30 / 30**
Elevator	**9**	**9**	
Ailerons	**10**	**5**	
Flaps	**0**	**0**	

We recommend about 20% exponential in the elevator channel. The flaps may be set to move upwards, half the travel of the ailerons for full control of the trailing edge

Thermal Setting

	Up	Down
Ailerons (Camber)		**1,5**
Flaps (Camber)		**1,5**

The flaps should not move with the ailerons, but some model pilots prefer to mix the flaps with elevator (Snap-Flap) in this mode.

Speed Setting

	Up	Down
Aileron (Reflex)	**1,5**	
Flap (Reflex)	**1,5**	

In this mode the flaps may be set to move both up and down, about half the travel of the ailerons.

Landing Setting

	Up	Down	Comment
Flaps		**20**	**Butterfly**
Aileron	**8**		**Butterfly**
Elevator		**40%**	**Reach**

Your ALPINA 2501 ELEKTRO is now ready for the first test flight.

First Flights.

Experienced model flyers will now be waiting for the first opportunity to test fly the ALPINA 2501 ELEKTRO and fine-tune the setup to best suit their individual style of flying. The following advice is intended to help those with less experience to carry out the test flight and successfully trim the model:

Every flying machine, from the most humble chuck glider to the full size aircraft, must be test flown and trimmed after completion and your ALPINA 2501 ELEKTRO is no exception. The slightest deviation in manufacture or construction can lead to minor variations in flying characteristics and control responses. Test flying is the means to optimise the centre of gravity and generally fine-tuning the control response.

Avoid repeated low altitude hand launches on a flat site as this is the most likely opportunity for damage to occur as there is little time to made adequate corrections when the model is flying close to the ground.

Ensure that both transmitter and receiver batteries are fully charged and carry out a thorough range test in accordance with the instructions supplied with your radio control equipment. Do not fly the model if you are in any doubt about the integrity of the radio control system – seek further assistance.

Faults do not cure themselves!

Test flights can be carried out in several ways depending on the version of the model you have chosen; at a slope site from a hand launch, at a flat-field site using a winch, or from an aero-tow. In all cases always launch the model into wind with the wings level and adjust the trims as necessary to achieve straight and level flight.

Check the centre of gravity once the model is flying at a safe height and comfortably above the stall speed. Apply down elevator to place the model in a steep dive and then allow the elevator to return to neutral and observe the flight path:

- If it recovers in a gentle upward arc, without any further control inputs and without ballooning up above the horizontal, then the CoG can be considered to be about right.

- If the model bounces quickly out of the dive and climbs strongly, the CoG is too far forward. Readjust the battery position, or remove a little lead from the nose and repeat the test.

- If however the model shows no tendency to recover, or indeed if it shows signs of tucking under, the CoG is too far back. Readjust the battery position, or add a little lead from the nose and repeat the test.

Safety.

Our hobby is very important to us and as such it is essential that we recognise the responsibilities associated with the building and flying of model aircraft:

- Carefully built models exhibit outstanding flying characteristics and the highest levels of reliability and safety.
- Always carry out thorough pre-flight checks – observing structural integrity of the model as well as correct movement and sense of all the flying surfaces.
- Always carry out a through range check on all new models or following any change of RC components.
- Always check that your channel is free before switching on your transmitter.
- Adequate third-party insurance is essential. Check the local laws governing model flying in your region before flying your model.
- Give due consideration to others when flying aerobatic manoeuvres and never fly low and/or fast over other people.
- Always be aware of the vulnerability of each individual component of your RC system and maintain it responsibly.
- Always give due consideration to other model flyers, provide ample air-space and observe the local system of channel allocation.

If in doubt – please ask. If you are unsure about any aspect of flying your model safely, please seek the advice of an experienced aero-modeller or contact your dealer.

Parts List.

Qty	Description	Purpose	Material	Dimension
1	Building Instructions			DIN A4
1	Fuselage		GRP white	Ready made
1	Pair wing panels		Foam/Obechi	Ready made
1	Pair tail-plane panels		Foam / Obechi	Ready made
1	Rudder		Balsa	Ready made
1	Wire set		Metal	Various
1	Hardware accessory pack	Various	Various	
1	Wing joiner		Steel	D10*240
	Wire Set			
1	Piano wire	Elevator linkage	Spring Steel	D1.2*900
1	Piano wire	Rudder linkage	Spring Steel	D1.2*900
	Wooden Parts			
1	Servo frame	Fuselage	Plywood	Pre-cut
1	Compression strut	Fuselage Forward	Abachi	8 * 8 * 45
1	Compression strut	Fuselage Rear	Abachi	6 * 6 * 45
1	Battery tray		Plywood	Pre-cut
1	Motor mount		Plywood	Pre-cut
	Canopy Parts			
1	Canopy	Canopy	Carbon	Ready made
1	Spring support strip	Canopy catch	Wood	30 * 20 * 3
1	Spring support strip	Canopy catch	Wood	30 * 10 * 1.2
1	Grooved support block	Canopy catch	Wood	
1	Canopy pin	Canopy catch	Steel	D3 * 50
1	Canopy spring	Canopy catch	Spring Steel	D1.2 * 200
	Accessories			
6	Metal clevis	Control linkages	Steel	M 2
6	Lock nut	Control linkages	Brass	M 2
1	Bell-crank	Elevator	GRP	Installed
2	Lock nuts	Elevator bearing	Aluminium	Installed
1	Threaded bush	Elevator bearing	Brass	Installed
2	Threaded Steel push-rods	Aileron linkages	Steel	M2 * 200
2	Threaded Steel push-rods	Flap linkages	Steel	M2 * 200
2	Aileron control horns	Aileron linkage	GRP	Ready made
2	Flap control horns	Flap linkage	GRP	Ready made
2	Wing lock socket	Wing lock	Nylon	
2	Wing lock plug	Wing lock	Nylon	
1	Eye bolt	Rudder horn	Alu	M 4 (Ø 2)
4	Incidence pins	Wings	Steel	Ø 3*40 (50)
1	Tow hook	Winch hook	Steel	
1	Self-taping screw (temp)	Winch hook	Steel	3,5
	Servolock Set			
4	Servo frames	Wings	Plywood	Ready made
2	Servo covers (scoop left)	Wings	Plastic	Ready made
2	Servo covers (scoop right)	Wings	Plastic	Ready made
16	Self tapping screws	Wings	Steel	M2*10
1	Installation notes	Wings	Paper	DIN A5

Note: Contents and technical details subject to change without notice.

Pictures

Fig. 1

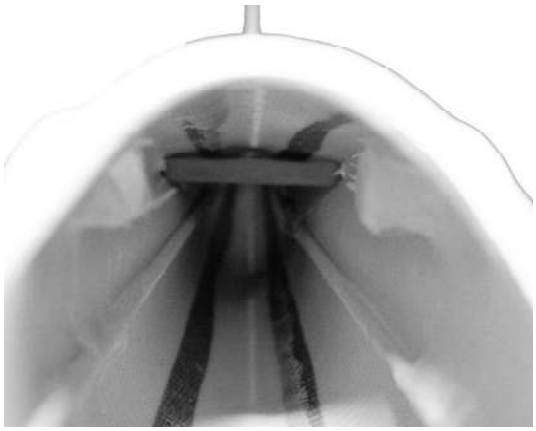


Fig. 2

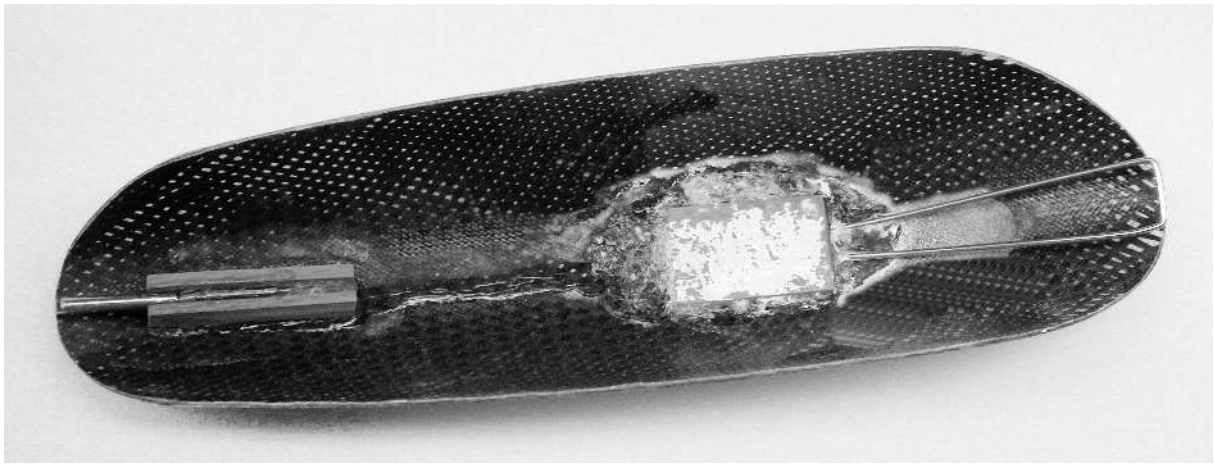


Fig. 3+4

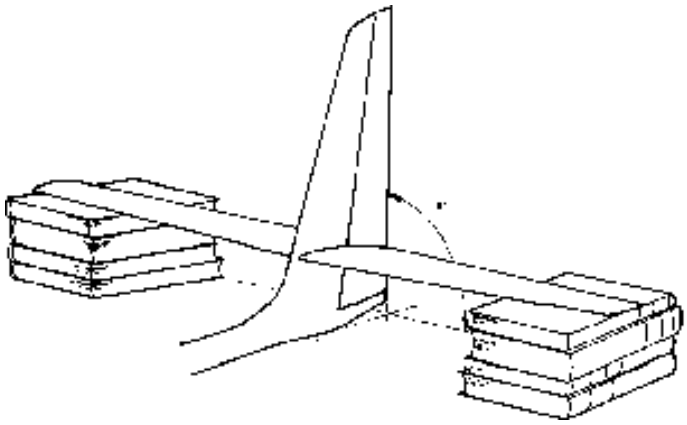


Fig. 5+6

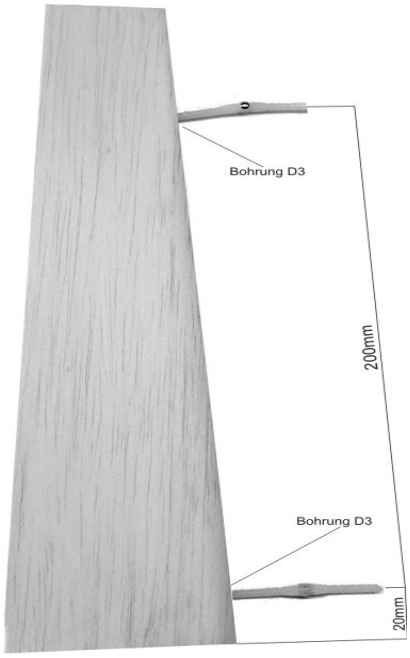


Fig. 7

Fig. 8

Fig. 9

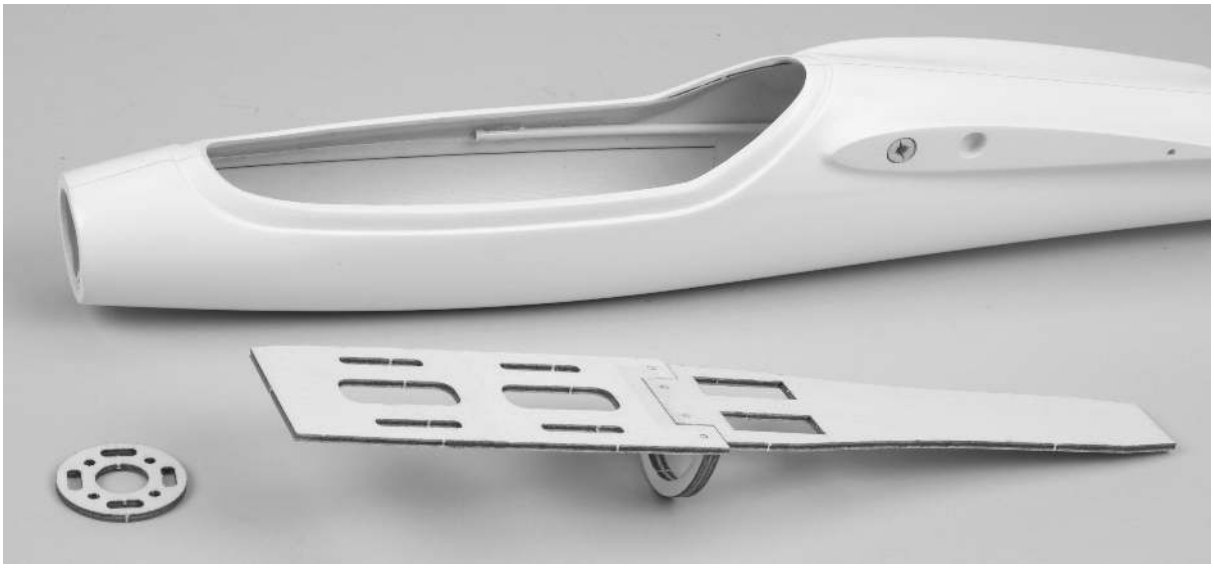


Fig. 10

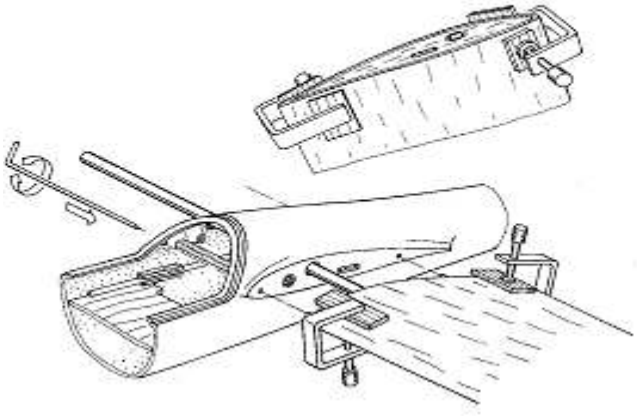
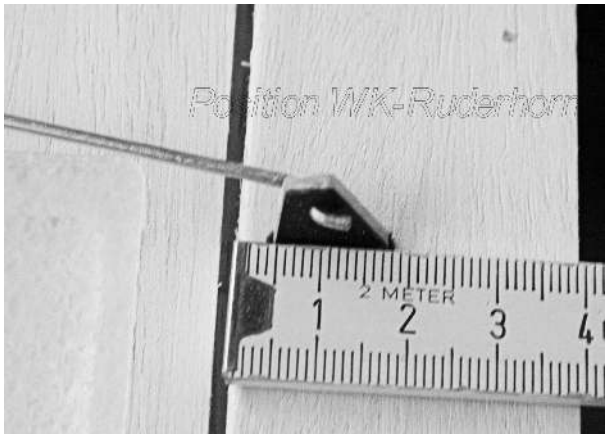


Fig. 11 + 12



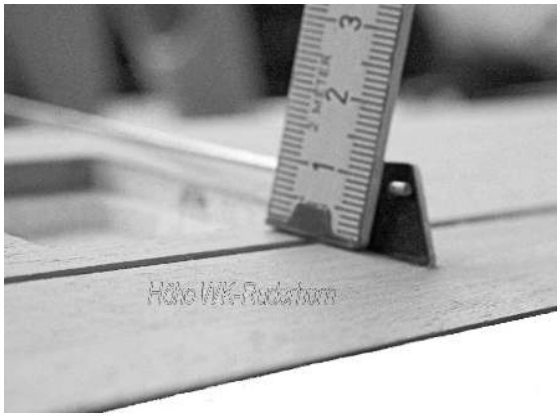
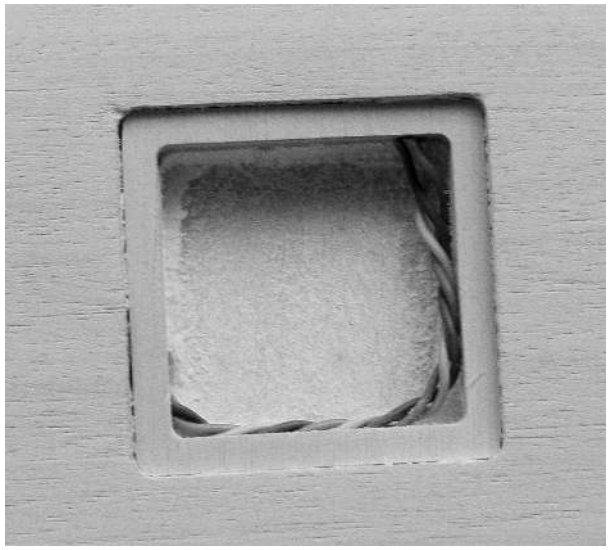
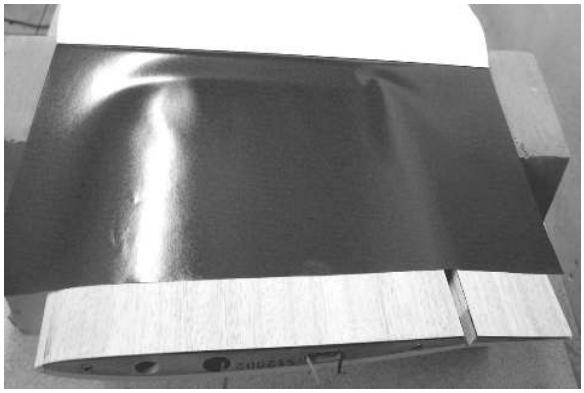


Fig. 13+14



Pictures for Finish

Fig. Finish 1+2



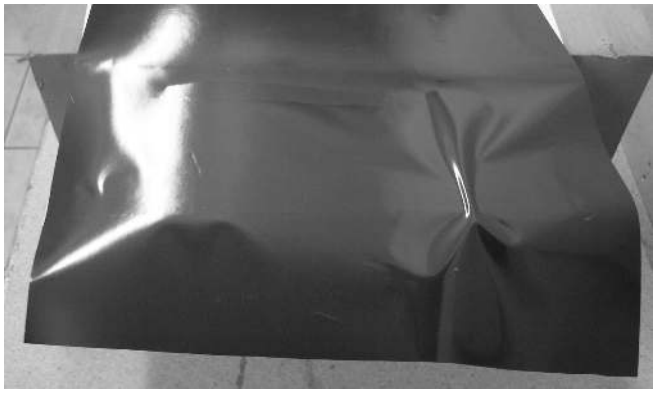


Fig. Finish 3+4

Fig. Finish 5

Fig. Finish 6+7

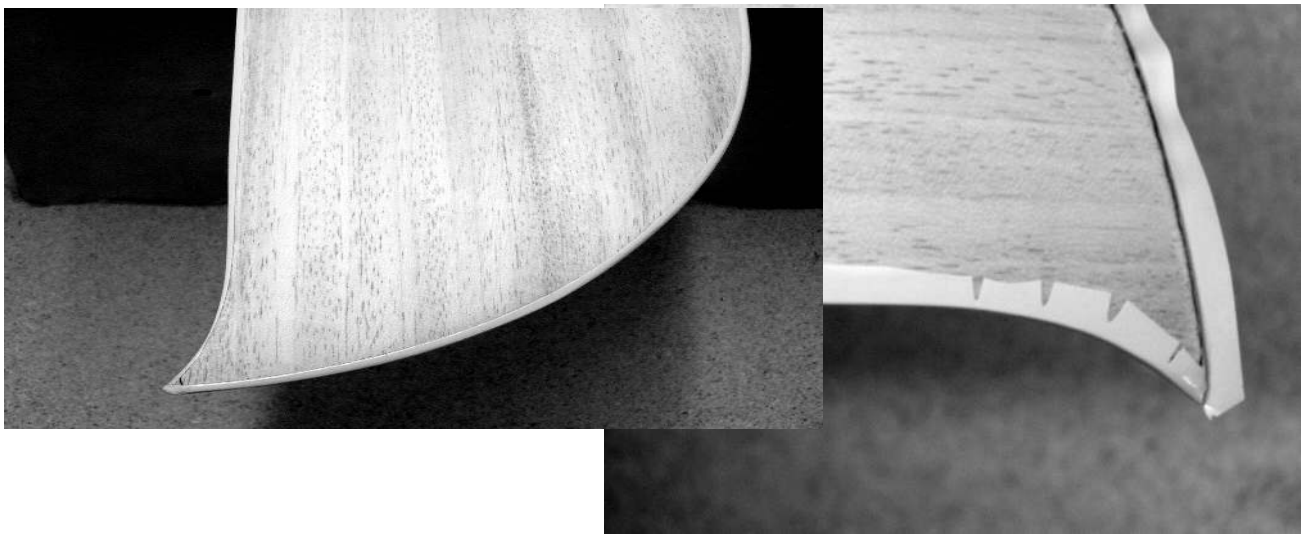
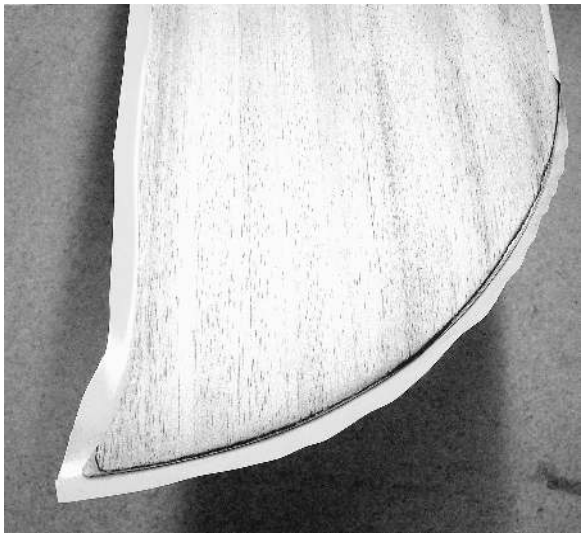


Fig. Finish 8



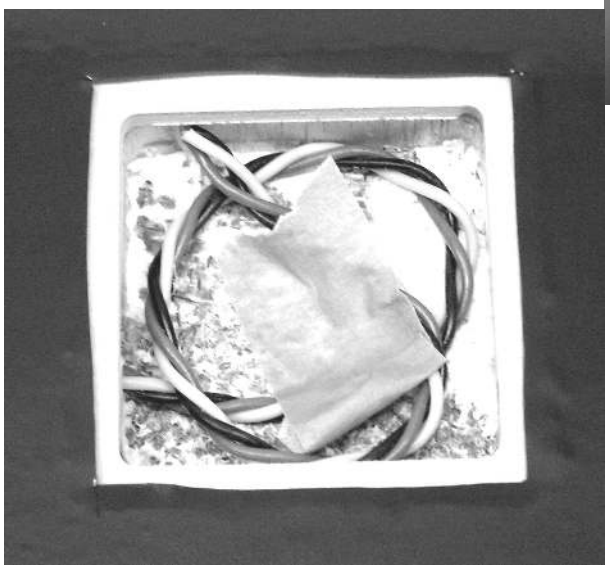


Fig. Finish 9+10