Instruction Manual

Composite-ARF INTEGRAL

Instructions for F3A/Pattern Airplane

Thank you very much for purchasing our Composite-ARF INTEGRAL all-composite aircraft, made with the revolutionary Total Area Vacuum Sandwich (TAVS) technology.

Before you get started building and setting-up your aircraft, please make sure you have read this instruction manual several times, and understood it. If you have any questions, please don't hesitate to contact us. Below are the contact details:

Email:	**feedback@composite-arf.com**
or	**techsupport@composite-arf.com**
Telephone:	**Phone your C-ARF Rep!!! He will be there for you.**
Website:	**http://www.composite-arf.com**

Liability Exclusion and Damages

You have acquired a kit, which can be assembled into a fully working R/C model when fitted out with suitable accessories, as described in the instruction manual with the kit.

However, as manufacturers, we at Composite-ARF are not in a position to influence the way you build and operate your model, and we have no control over the methods you use to install, operate and maintain the radio control system components. For this reason we are obliged to deny all liability for loss, damage or costs which are incurred due to the incompetent or incorrect application and operation of our products, or which are connected with such operation in any way. Unless otherwise prescribed by binding law, the obligation of the Composite-ARF company to pay compensation is excluded, regardless of the legal argument employed.

This applies to personal injury, death, damage to buildings, loss of turnover and business, interruption of business or other direct and indirect consequent damages. In all circumstances our total liability is limited to the amount which you actually paid for this model.

BY OPERATING THIS MODEL YOU ASSUME FULL RESPONSIBILITY FOR YOUR ACTIONS.

It is important to understand that Composite-ARF Co., Ltd, is unable to monitor whether you follow the instructions contained in this instruction manual regarding the construction, operation and maintenance of the aircraft, nor whether you install and use the radio control system correctly. For this reason we at Composite-ARF are unable to guarantee, or provide, a contractual agreement with any individual or company that the model you have made will function correctly and safely. You, as operator of the model, must rely upon your own expertise and judgement in acquiring and operating this model.

Supplementary Safety Notes

Pre-flight checking:
Before every session check that all the model's working systems function correctly, and be sure to carry out a range check.

The first time you fly any new model aircraft we strongly recommend that you enlist the help of an experienced modeller to help you check the model and offer advice while you are flying.
He should be capable of detecting potential weak points and errors. Be certain to keep to the recommended CG position and control surface travels. If adjustments are required, carry them out before operating the model. Be aware of any instructions and warnings of other manufactur-

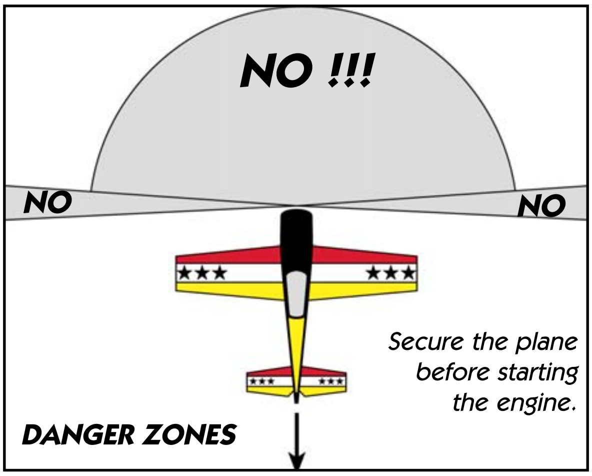
ers, whose product(s) you use to fly this particular aircraft, especially engines & R/C equipment.

Please don't ignore our warnings, or those provided by other manufacturers. They refer to things and processes which, if ignored, could result in permanent damage or fatal injury.

Attention !

This aircraft is a high-end product and can create an enormous risk for both pilot and spectators, if not handled with care, and used according to the instructions. Make sure that you operate your Integral according to the AMA rules, or those laws and regulations governing model flying in the country of use.

The engine, servos and control surfaces have to be attached properly. Please use only the recommended servos, propellers, and accessories. Make sure that the 'Centre of Gravity' is located in the recommended place. Use the nose heavy end of the CG range for your first flights. A tail heavy plane, in a first flight, can be an enormous danger for you and all spectators. Fix any heavy items, like batteries, very securely into the plane. Make sure that the plane is secured properly when you start up the engine. Have a helper hold your plane from the tail end or from behind the wing tips before you start the engine. Make sure that all spectators are behind, or far in front, of the aircraft when running up the engine.



Make sure that you range check your R/C system thoroughly before the 1st flight. It is absolutely necessary to range check your complete R/C installation first WITHOUT the engine running. Leave the transmitter antenna retracted, and check the distance you can walk before 'fail-safe' occurs. Then start up the engine, run it at about half throttle and repeat this range check with the engine running. Make sure that there is no range reduction before 'fail-safe' occurs. Only then make the 1st flight. If the range with engine running is less then with the engine off, please contact the radio supplier/engine manufacturer and DON'T FLY at that time.

Check for vibrations through the whole throttle range. The engine should run smoothly with no unusual vibration. If you think that there are any excessive vibrations at any engine rpm's, DON'T FLY at this time and check your engine, spinner and propeller for proper balancing. The lightweight sandwich composite parts don't like too much vibration and they can suffer damage. The low mass of all the parts results in a low physical inertia, so that any excess vibrations can affect the servos and linkages.

Make sure that your wing and stab spar tubes are not damaged. Check that the anti-rotation pins in the wings and stabiliser are not loose. Check that the plastic wing retaining nuts are tight, that the M3 bolts retaining the horizontal stablisers onto the carbon tube are tight, and that the rudder hinge wire cannot come out.

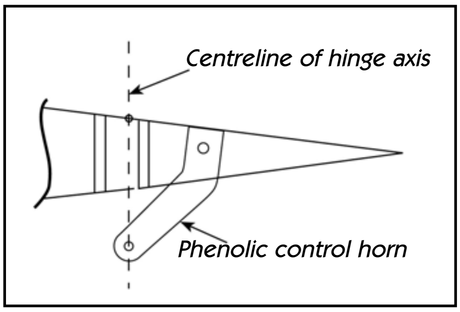
General information about fully-composite aircraft structure and design

All the parts are produced in negative molds, manufactured using vacuum-bagged sandwich construction technology. All parts are painted in the moulds, either single colour or designer colour schemes. Our production method, called TAVS (Total Area Vacuum Sandwich), enables us to present this aircraft with incredible built-in strength, while still being extremely lightweight, and for a price that nobody could even consider some years ago. This production process has huge advantages, but a few disadvantages as well. These facts need to be explained in advance for your better understanding.

Description of Parts

The Wings:

Both wing halves are made in negative moulds, and fully vacuum bagged, using only 2 layers of superlight 2 oz. cloth in combination with a hard 2 mm Herex foam sandwich form a hard and durable outer skin. Each wing panel weighs between 380 and 410 grams, depending on the color scheme.



The ailerons are hinged already for you - laminated in the mould and attached to the wing with a special nylon hinge-cloth, sandwiched between the outer skin and the foam. This nylon hinge is 100% safe and durable. You will never have to worry about breaking it, or wearing it out. There is no gap at all on the top wing surface, and there is a very narrow slot in the bottom surface, where the aileron slides under the main wing skin during down throw. This means that the hinge axis line is on the *top* surface of the wing, *not* in the centre. This is NOT a disadvantage, if you program in up to 10% NEGATIVE aileron differential in your transmitter. This means that the ‘down’ throw could be up to 10% more than the up throw. Why? Because the axis of the hinge is not at the centreline of the aileron, so it moves slightly in and out when operated, and the aileron gets a little "bigger" in surface area when moving up, and "smaller" when moving down.

The bottom slot needs some explanation, too. The cut line is exactly in the correct position so that the aileron slides under the wing skin smoothly. If the cut was a few mm forward or back, it would not work properly. So, make sure that the lip is not damaged, and that the aileron slides under this lip perfectly. It will NOT lock at any time, if lip is not damaged. If damage occurs to the lip, you can cut off 2-3 mm, but you should NEVER need to cut off more than this.

The Fuselage:

The complete fuselage is laminated using a special lightweight cloth and 0.5mm super-light contest grade balsa sandwich, instead of the usual foam sandwich. The complete front of the fuselage is reinforced with an additional layer of carbon cloth, from the LG supports forward to the nose-ring.

A kevlar band is added to each side during the laminating process, which also runs the complete length from the nose to the fin post. In the rear part of the fuselage a horizontal 6mm thick foam/glassfibre sandwich board provides torsional stability, and this is factory-installed with carbon rovings on the perimeter of it. The whole assembly is vacuum-bagged, and when the fuselage halves are joined it results in an torsionally stiff, yet incredibly lightweight, assembly - capable of soaking up loads imposed by 4 stroke motors up to .200 size.

Carbon/ply sandwich landing gear mounts and nose-ring are factory installed for your convenience, but the firewall is not installed - to give you the greatest motor choice. The fibreglass sleeve for the wing tube, and the holes and reinforcements for the wing and stab anti-rotation pins are all set and installed at the factory - ensuring accurate incidences.

The canopy and chin cowl are lightweight fibreglass parts, without foam sandwich.

If you compare the weights of the fuselage with other pattern plane kits, please bear in mind that your Integral has all the formers, stiffeners and mounts installed already.

The Stabilisers:
The stabiliser parts are also vacuum bagged sandwich, molded using lightweight cloth and Herex foam construction. The elevator control surfaces are elastic-hinged, and the rudder is hinged with a 2mm Ø steel wire, fitted through factory-installed bearing plates, for perfect alignment.

The horizontal stabs are mounted on a 12mm carbon tube, with a 6mm Ø carbon anti-rotation pin at the front.

Take Care:
Composite sandwich parts are extremely strong, but fragile at the same time. Always keep in mind that these contest airplanes are designed for minimum weight and maximum strength in flight. Please take care of it, especially during transport, to make sure that none of the critical parts and linkages are damaged. Always handle your airplane with great care, especially on the ground and during transport, so you will have many hours of pleasure with it.

About these Instructions

The Integral is not really a true ‘ARF’, like our other planes. It is not a beginners model, or a trainer. It is a ‘Contest’ plane, aimed at the professional pattern flyer, as well as the people that want to enter this exciting class of competition flying, and these instructions assume that the builder has some experience of this type of F3A/Pattern aircraft and full composite models.

The Integral can be fitted with a wide choice of engines, (2 or 4-stroke glow, gas or electric) and therefore the choice of wood parts/firewalls and motor mounts to fit all these makes it impossible for us to include these items for all options. However, we have included a main firewall and nose ring, which you can use if you wish. There is also a complete set of CNC milled carbon parts to allow installation of a Hacker C50 electric motor, included in the kit.

We also know that most modelers in this class have their own favourite hardware, and the Integral was designed to allow you to use your own choices here. Nevertheless, we have included the main hardware for the flying surfaces and landing gear, and all these items are well proven and properly tested.

Assembly Details

Gluing Preparation

It is most important to prepare all surfaces properly before gluing, to ensure a good bond, with the minimum amount of glue. The inner surface of the laminated sandwich parts must be scuffed with 240 grit sandpaper, and cleaned off with denaturised alcohol, or equivalent, on a paper towel before gluing parts together. Milled carbon or fibreglass sandwich parts also need to be lightly sanded and cleaned before gluing in place. We recommend at least 30 minute epoxy for all structural joints, mixed with a little micro-balloons to give a light weight fillet to all joints.

Landing Gear

The main landing gear legs are laminated from a number of carbon rovings and cloth, in negative molds, and heat cured. This produces a strong, but still flexible and lightweight, structure. Each leg is secured through the underside of the fuselage, at the back of the chin cowl position, into the factory-installed carbon reinforced plywood mount (see photos P1 and P2). Use three M3 x 16mm bolts, washers and T-nuts for each leg, positioned as shown. Cut matching notches in the upper rear flange of the chin cowl to clear the carbon legs all around by about 1mm (see photo P17).

Included in the hardware are two M4 x 40mm hardened steel allen bolts which are used as axles for the main wheels, which should be 56mm/2.25” diameter. Drill a Ø 4mm hole thru’ the bottom of both carbon legs, and also the inner surface of the wheel pants, in the position marked by the small molded dimples. Drill a 7mm Ø hole through the outside surface of the wheelpant, directly opposite the 4mm hole for the axle - to allow the head of the axle bolt to be inserted. Fit your chosen wheels onto the axle bolts, with the plain M4 nut on the inside (against the inside surface of the wheelpant), and use the M4 lock-nut on the inside of the carbon leg to secure it. Add washers or a wheel collar on the axle to centre the wheel as required.

No tailwheel assembly is supplied, but there is a small lite-ply plate already glued into the fuselage floor, in front of the fin-post, to screw a tailwheel bracket into.

Stabilisers

The stabs are set at 0 degrees incidence, in relation to the fuselage centreline, at the factory.

The stab tube is a Ø 12mm x 260mm carbon tube which fits in the carbon tube that is already aligned and installed in the fuselage. Each stab also has a matching carbon sleeve inside it, with a blob of epoxy/microballoons on the bottom of it to reinforce the position where you must install the M3 x 12mm stab retaining bolts, approx. 75mm (3”) in from the root rib. Install the stab tube completely into one stab, and drill right thru’ the bottom skin of the stab, the sleeve inside the stab, and the bottom surface of the carbon stab tube with a Ø 2.4mm drill. Tap the holes M3. Open up the hole in the bottom surface of the stab to Ø 5.5mm, so that the head of the bolt fits flush.

Remove the carbon stab tube and glue an M3 T-nut inside for the for the M3 bolt to go into (cut the sides off so that it fits). Wax or oil the M3 bolt first, and insert to ensure perfect alignment with the threaded hole in the carbon tube while the epoxy cures. Refit the stab tube into the stab, and secure with the M3 bolt. With the fuselage upside-down, fit the first stab and tube tightly onto the fuselage, and then fit the other stab on the tube. Hold it tightly against the fuselage, and drill and tap the hole for the other stab retaining bolt in the same way. Fit the T-nut inside as before.

Servo mounting plates (6mm lite-ply) are laminated into the underside of the Stabs during man-

ufacture. These fit servos of 15 x 32mm (eg: Futaba 3002, 9650, 9602/JR 3728, 3241).
Balsa blocks (30mm wide) are glued into the elevators during manufacture, at the control horn position. The centre of the block is 45mm from the root end of the elevator, as indicated by the 2 small milled holes in the leading edge of the elevator.

Phenolic Control Horns: If you use our phenolic horns you can mill slots through the bottom surface of the elevators into the balsa blocks, at least 15mm (5/8") deep, scuff up the gluing-surface of the phenolic horn, and glue them into the slots with epoxy and micro-balloons mixture. The holes in the horn (for the clevise) should be perpendicular to the hinge axis in the neutral elevator position (see photo P3).

If you chose a different type of control horn, that is screwed or bolted to the control surface, then you *must* reinforce these balsa blocks in the positions of the screws. One method is to drill Ø 8mm (3/8") holes into the balsa blocks, at least 15mm deep, and glue good quality hardwood dowels in position with slow epoxy, and screw into these.

Rudder

The rudder is hinged using the Ø 2mm wire provided, which passes thru' the phenolic hinge posts that are factory installed and aligned (see photo P5). Make a short 90 degree bend in the bottom end, and tape this to the base of the rudder to prevent it coming out in flight.

A balsa block (10mm high) is glued inside the rudder during manufacture, exactly at the control horn position. The centre of the block is 152mm from the bottom of the rudder, which is the correct position for the horn if using the supplied rudder servo mounting plate. Mill a slot for the rudder horn right thru' the rudder and the block. The front of the slot should be approx. 25mm from the leading edge of the rudder (see P6). Prepare gluing surface of phenolic horn and glue in with epoxy and micro-balloon mixture. Make sure that horn is exactly symmetrical in the rudder, and that the holes for the clevises are exactly in line with the hinge wire, *not* the leading edge of the rudder.

Provided in the wood pack is a milled carbon/balsa sandwich rudder servo mounting tray, which should be securely glued into position as shown (photo P7). The servo cut-out fits a standard sized servo (approx 20 x 40mm). The front corners of the tray fit into the milled notches in the bulkhead at the back of the cockpit opening. Glue small strips of the 3mm ply sheet underneath the tray to reinforce where the servo screws are fitted.

The dimension between the clevise holes in your chosen rudder servo output arm should be exactly the same as those in the phenolic rudder horn (58mm/2.3") for a closed-loop rudder linkage. Therefore it is also simple to locate the small holes needed in the fuselage for the pull-pull cables to exit - as it will be where the fuselage is exactly that wide.

Suitable servos include Futaba 9151, 9155, or JR 8611.

Wings

The wing spar is a Ø 30mm x 575mm carbon/foam sandwich tube, specially produced for the Integral. Each wing has a pair of 10mm diameter carbon tube anti-rotation dowels, factory-installed and aligned. Each wing is retained onto the fuselage by a single M6 plastic nut, which screws onto a 6mm plastic bolt that is factory installed inside the root rib (photo P8). A plywood reinforcing plate is factory-fitted inside the fuselage for the nut to pull up against.

Balsa blocks (30mm wide) are glued into the ailerons during manufacture, at the control horn position. The centre of the block is 50mm from the root end of the aileron. If using our phenolic control horns, mill the slots as described in the stabiliser section, but make the slots at least 20mm (7/8") deep. The holes in the horn (for the clevise) should be perpendicular to the hinge axis in the 'neutral' aileron position.

Servo mounting plates (6mm lite-ply) are laminated into the underside of the wings during manufacture (photo P9). These mounts fit 'standard' sized servos of approx. 20 x 40mm (eg: JR 8411, 8611/Futaba 9151, 9155)

Cockpit Canopy

The standard canopy is a one-piece lightweight fiberglass moulding, but cockpit bases and clear canopies are also available as options. The canopy *must* be securely fixed, especially if using a glow or gas motor, because of its large size, and it needs at least a 4-point fixing to maintain the torsional stiffness of the fuselage. Included are phenolic hooks, 1.5mm ply for the tongues/hook, M3 bolts with T-nuts, and enough 3mm lite-ply sheet to make your choice of fixing.

There are several ways to fix this successfully, but we used a similar system to that used on our large aerobatic planes because it is secure, and rattle-free. It is fixed with a plywood hook at the front, that slides under the lip on the fuselage, a pair of plywood tongues with M3 bolts and T-nuts in both sides about 50mm (2") from the back, and a small phenolic tab that locates the centre of the canopy into a slot in the fuselage at the upper back position.

Make the hook at the front first, using the 3mm and 1.5mm plywood sheet as shown. First glue a 3mm plate inside the front of the canopy, then use a spacer of 1.5mm ply - and finally make the hook from 1.5mm ply with the grain running longitudinally. 2 scrap balsa strips, glued inside the fuselage, keep the hook is exactly centred, and the excess length is sanded off afterwards (see inset photo). Work thru' the bottom of the engine bay, with the fuselage upside-down. Lastly secure the plywood plates together with 2 very small sheetmetal screws as shown, for safety. Then make the small phenolic tab at the upper back of the canopy, which must fit tightly into a slot filed in the fuselage. Reinforce the joint between the tab and the canopy with 3mm lite-ply, and also glue a small piece of lite-ply inside the fuselage to reinforce the slot. (See photos P10, 11, 12 and 13)

Finally make the 2 tongues for the M3 bolts and T-nuts in the sides as follows: File 2 narrow slots, 35mm long and 3mm wide, in the flanges of the cockpit opening - with the front of the slots about 60mm from the back corner. The outside edge of the slots should be about 3mm from the outside surface of the fuselage. Cut 2 squares of the 1.5mm plywood sheet, 15 x 15mm, and glue them to the inside the fuselage, under the flanges, with epoxy and microballoons, at the front of the slots. The inside surface of the ply squares should be flush with the outside edge of the slots.

Cut 4 pieces of 1.5mm ply 30 x 15mm and laminate together with thin CA to make the 2 tongues. Align the tongues with the squares and drill thru' the centre of each and right thru' the fuselage sides, 3mm diameter. Open up the holes on the tongues only to Ø 4.5mm, and glue an M3 T-nut to each. Bolt the tongues in place with M3 bolts, with the extra length projecting up through the slots in the fuselage flanges (see P14, 15 and 16). File small slots in the bottom flanges of the canopy to accept the tongues. Apply a *little* thick epoxy and microballoon mixture to the inside surface of the canopy, where the tongues will be, and then quickly install the canopy onto the fuselage. When cured, remove the canopy and reinforce the glue joints properly with more epoxy. Fine adjustment of the canopy alignment can be done by sanding or shimming the outer surface of the tongues or inner surface of plywood squares. Counterbore the holes in the outside surface of the fuselage a little so that the bolt heads sit nearly flush (photo P16).

* Dont forget to extend the slots in the fuselage flanges at least 15mm backwards, *before* gluing

the tongues in place, so that the canopy can slide backwards to dis-engage the front hook !

You can also use this same method if you have chosen to use the optional fibreglass cockpit base and clear canopy, but the tongues will need to be shortened.

When fitting the clear cockpit canopy it is very important that it is fixed to the fiberglass base securely all around the perimeter to maintain the torsional stiffness of the fuselage. You can either fix them together with glue all around, or many very small sheetmetal screws into tiny plywood reinforcements glued under the fibreglass base.

Chin Cowl

This must be very securely fixed in place, especially if using a glow or gas motor, because of the additional vibration. You can fit 2 short carbon pins (6mm Ø) into the back edges to secure it into 2 short carbon tubes glued into the flange of the fuselage with epoxy and microballoon mixture, as shown in P17 and P20. This is secure and rattle-free method, and the parts for this are included in the hardware pack.

The front of the chin cowl can be held in position with a single M3 x 12mm allen bolt, thru' small 3mm lite-ply reinforcing plates, into a T-nut glued inside the fuselage (see P18). Alternatively, if using a glow engine with a front mounted carburettor, then you can use 2 bolts (1 on either side) to give clearance. Access to the bolt is easy with a ball-ended hex wrench (see P19).

The sides of the cowl should be aligned with the fuselage using small tabs, cut from the phenolic strip provided, glued into the flanges of the cowl (P17 inset). File matching slots in the flanges of the fuselage, and reinforce underneath the slots with scrap 1.5mm thick plywood as needed.

Motor mounting

There are so many options and choices of motor that it not possible to mention, or show, them all here. However we have shown a couple of typical set-ups here, including an OS200 (photo P19) and YS160 installation from Jason Shulman, and Jean-Pierre Zardini's electric version with a Hacker C50XL (photos P28 - P31 inclusive).

If fitting a gas or glow motor with a short header and muffler (without tuned pipe) it is most likely that the completed aircraft will be nose-heavy, so plan to mount all the other items (batteries , Receiver etc) as far back as possible.

Included in the kit is a carbon/plywood sandwich firewall for gas/glow motors, for you to install to suit your motor. Also in the kit is a set of milled carbon sheet parts to suit a Hacker C50 14XL motor, with both 'flexible' and 'hard' type mounts included. Several photos here show the installation of this motor, with the speed controller secured immediately below and behind the motor in the cooling airflow.

Normally glow motors are installed on a 'Hyde' type mount (P26), with a separate nose-ring to fit your motor - which is screwed to the carbon-ply nose-ring that is factory bonded into the fuselage. A milled 1.5mm thick carbon nose-ring is also included in the kit, and the hole diameter can be adjusted to suit your motor.

The front outer surface of the fuselage is set at the correct side/down thrust in the molds. Therefore, whatever motor you install (electric or gas/glow) you should start by aligning the thrust line, and spinner backplate, exactly parallel to this face. The small milled hole in the centre of the gas/glow firewall marks the centre of the thrustline/centre of the engine mount - just make sure you glue it in place the correct way around (with the hole towards the pilots left side!)

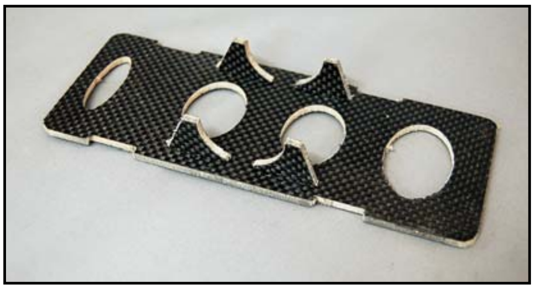
Included in the kit is a 2 part pipe-floor, milled from foam/glass sandwich, which can be used to form a tuned-pipe tunnel. There are small strips of balsa already factory installed on the fuselage sides to support this. It must be inserted as 2 separate pieces, and the longitudinal joint can then be glued, or taped, together. Also included are extra 5 x 5mm balsa strips which can be used to provide extra supports and stiffening for the pipe-floor.

You will need a spinner with a diameter of 82mm/3.25” (FAI shape) to match the fuselage shape (eg: Tru-Turn TT-3262-B-120)

Early flights by Jason Shulman used these combinations of motor, propeller and fuel:
YS140FZ, APC 15 x 12”, 30% heli fuel.
YS160DZ, APC 16.5 x 12”, 30% heli fuel.
OS200, APC 17 x 13”, 20/20 fuel.

Jean-Pierre Zardini’s electric set-up is:
Hacker C50 14XL, APC 21 x 13E, Hacker MASTER 90 controller, Flight-Power F3A battery 10S1P (5350mAh)

Fuel tank/Tank base



The carbon/balsa sandwich milled tank base is glued on top of the fibreglass tube sleeve for the wing tube, held in place with 4 small milled tabs that must be glued to the bottom of the base. Dubro fuel tanks Pt. No. 420 or 424 (20/24 oz) fit it perfectly, and can be secured with Velcro straps. See photo P7.

If fitting an electric motor, you may be able modify and /or extend the tank tray and reposition it as necessary, to support the flight battery. See also photos of J.P.Zardini’s set-up which show a larger (custom) carbon tray fitted accross the landing gear support bulkheads to support the flight battery.

Control Throws and Centre of Gravity

Of course control throws and Exponential settings are always a matter of personal preference, but below we have shown the the settings that Jason Shulman has been using on his plane for the first flights and contests.

Centre of Gravity

205mm back from the Leading Edge at the wing root. Up to 6mm backwards or forwards from this position can be used, depending on your personal preferences.

Aileron

High rate: 28mm @ root, with 50% Exponential
Low rate: 21mm @ root, with 30% Exponential

Elevator

High rate: 26mm ‘up’ and 26mm ‘down’ @ root, with 60% Exponential
Low rate: 15mm ‘up’ and 16mm ‘down’ @ root, with 20% Exponential

Rudder
High rate: 50mm @ top, with 60% Exponential
Low rate: 42mm @ top, with 40% Exponential

Mixing
Rudder > Elevator mix: 5% ‘up’ elevator mixed with rudder.
Throttle > Elevator mix: 1% ‘down’ elevator with low throttle.a

Appendix:

Packing List - INTEGRAL

Kit Contents

Quantity	*Description English*
1	Fuselage
1	Right wing
1	Left wing
1	Right stabiliser
1	Left stabiliser
1	Rudder
1	Chin Cowl
1	Canopy
1	Right wheel pant
1	Left wheel pant
1	Right landing gear, carbon
1	Left landing gear, carbon
1	Wing tube, carbon sandwich, Ø 30 x 575mm
1	Stab tube, carbon, Ø 12mm x 260mm
1	Hardware bag
1	Milled wood parts bag
1	Instruction manual (English)

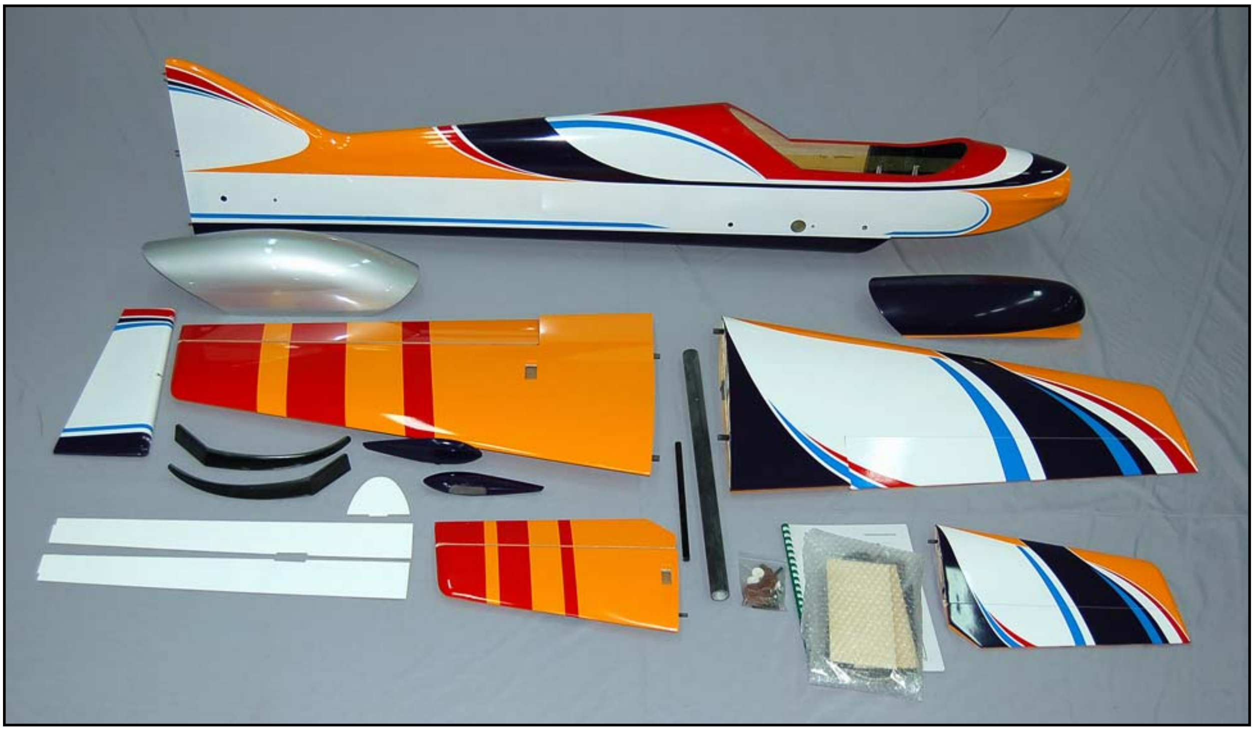
Hardware pack

Quantity	*Description English*
3	M6 Plastic Nuts (wing retention + spare)
6	Allen bolt, M3 x 16mm (landing gear mounting)
6	T-Nut M3 (landing gear mounting)
6	Washer, M3 (landing gear mounting)
2	Allen bolt, M4 x 40mm (wheel axle)
2	Lock-Nut, M4 (axle/wheelpant mounting)
4	Nut, M4 axle (axle/wheelpant mounting)
1	Carbon rod Ø 6mm x 150mm (canopy/chin cowl mounting)
4	Carbon tube, I.D.6mm x 25mm (canopy/chin cowl mounting)
6	Allen Bolt, M3 x 12 (canopy and chin fixing, stab retention +1 spare)
6	T-nut M3 (canopy and chin fixing, stab retention + 1 spare)
1	Hinge wire, Ø 2 x 420mm (rudder hinge pin)
1	Rudder horn, 2mm phenolic sheet

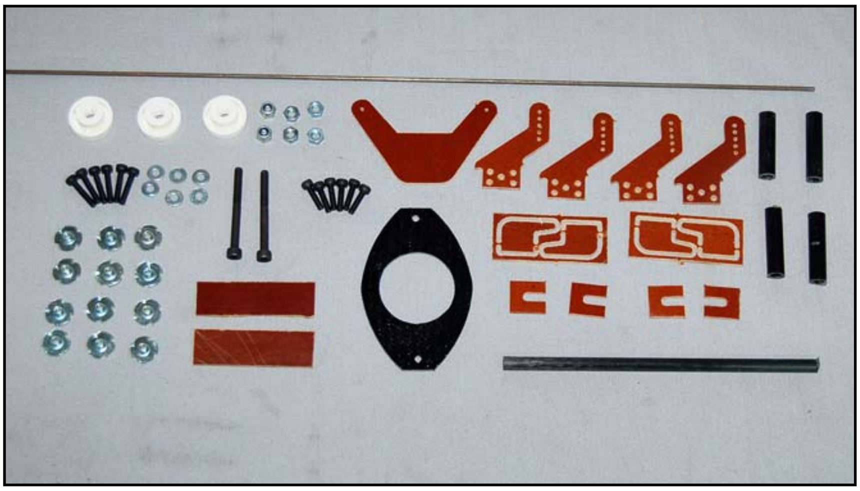
4	Control horns, 2mm phenolic sheet (elevators/ailerons)
4	Phenolic hooks (optional canopy/chin fixing)
4	Phenolic 'U' plates (for phenolic hooks)
2	Phenolic strip, 15 x 50mm (for chin cowl & canopy alignment tabs)
1	Nose ring, milled carbon, 2mm thick

Wood pack

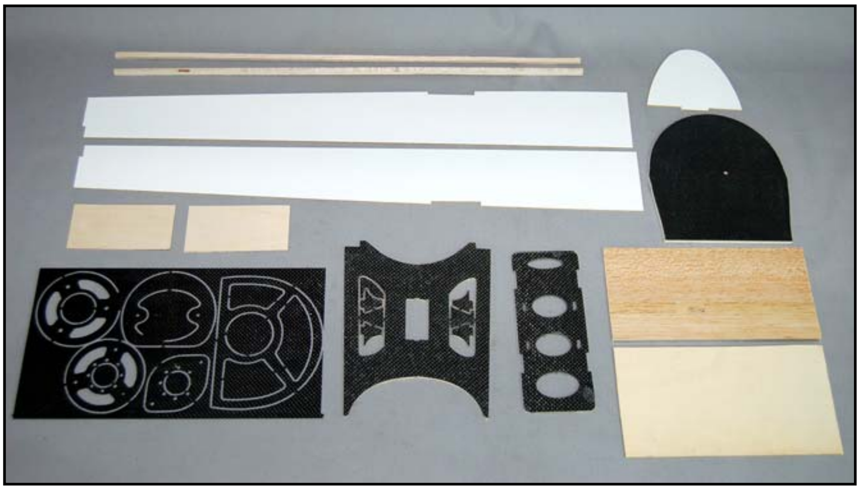
Quantity	*Description English*
1	Firewall (6mm carbon/liteply sandwich)
1	Tank base and 4 fixing tabs (3mm carbon/balsa sandwich)
1	Rudder servo tray (3mm carbon/balsa sandwich)
1	Hacker motor installation sheet, 5 parts (1.5mm carbon sheet)
2	Balsa strip, 5 x 5 x 500mm
1	Pipe floor, milled foam/fibreglass sandwich (3 pieces)
1	Lite-ply sheet, 3 x 100 x 200mm
1	Balsa/fibreglass sandwich sheet, 3 x 100 x 200mm
1	Plywood sheet, 1.5mm, 100 x100mm.



Integral complete kit, C-ARF scheme (#701000)

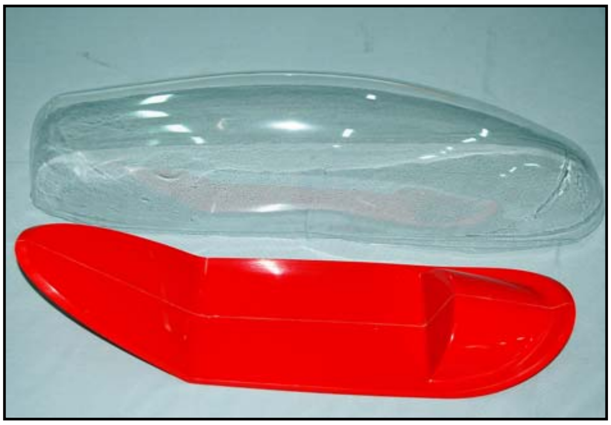


Contents of hardware pack

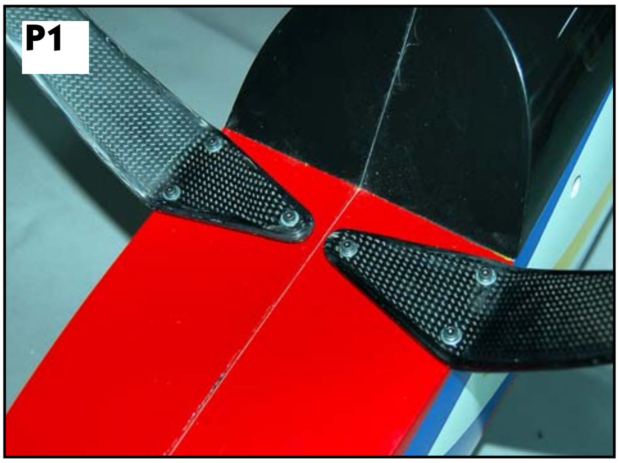


Contents of Milled Wood pack

Optional carbon canopy.
700410



Optional cockpit base (#701103) and
clear canopy. (#700104)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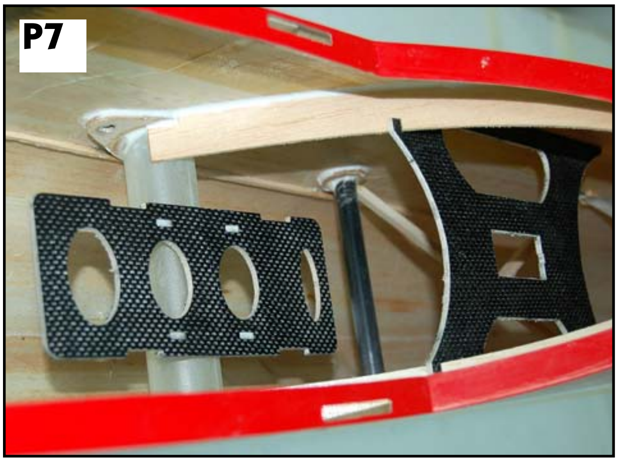
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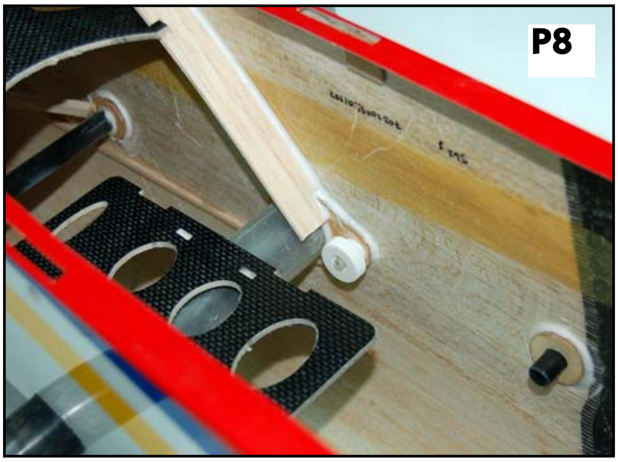
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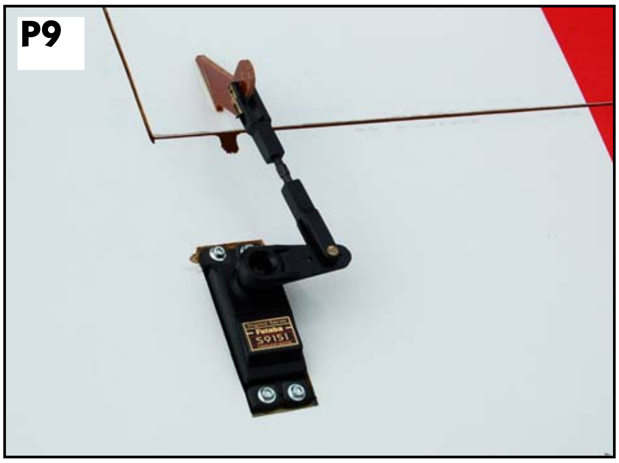
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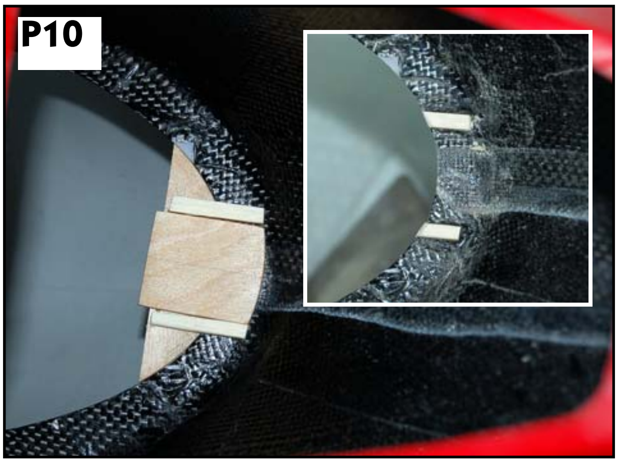
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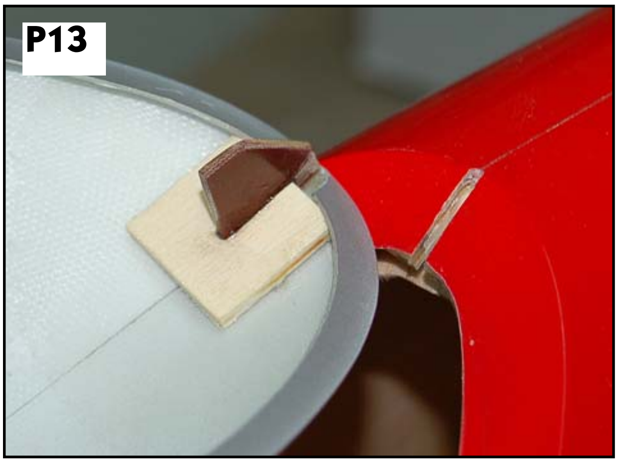
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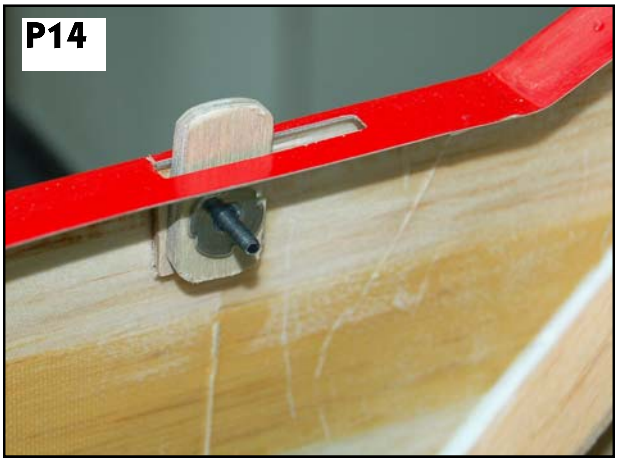
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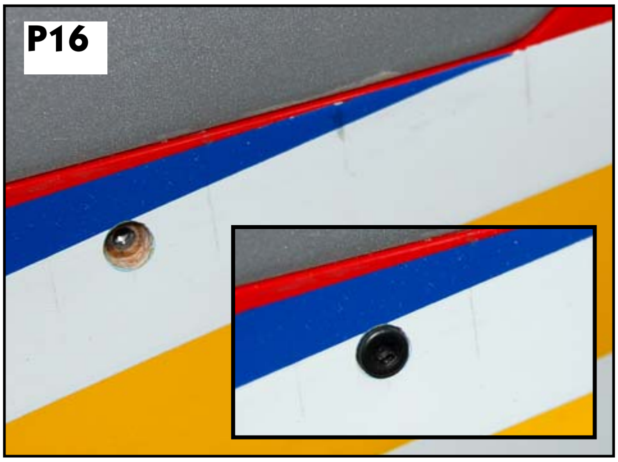
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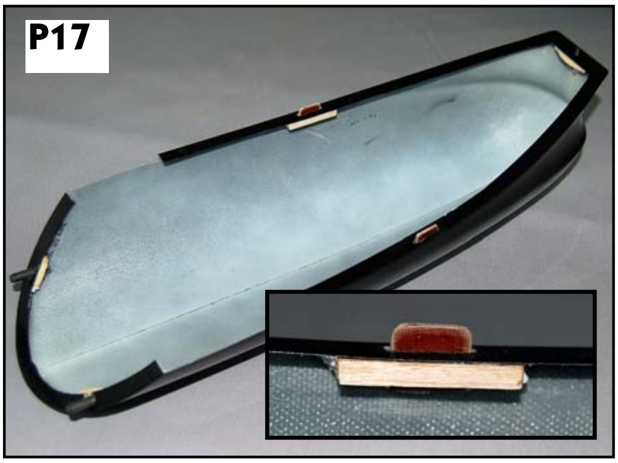
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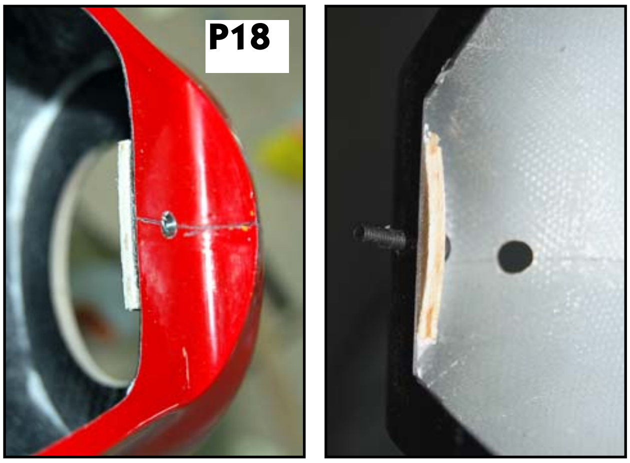
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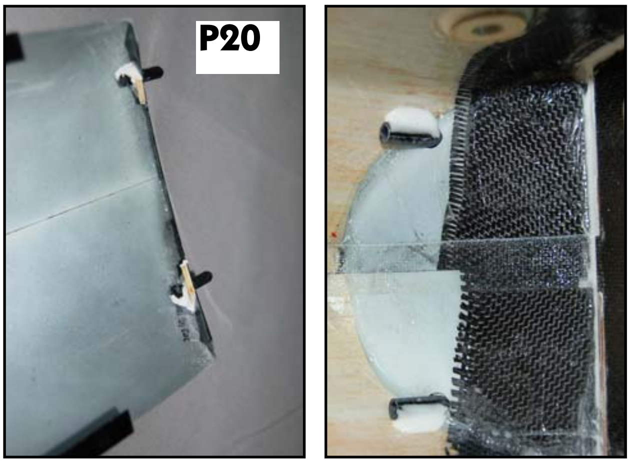
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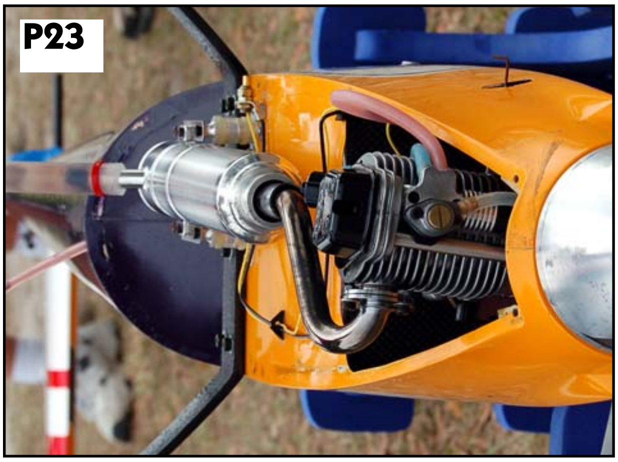
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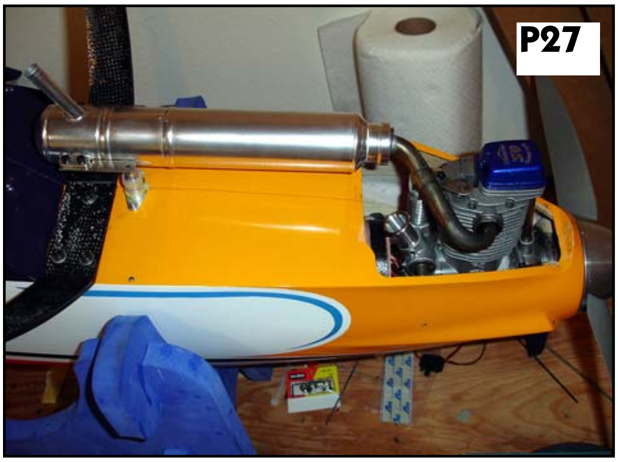
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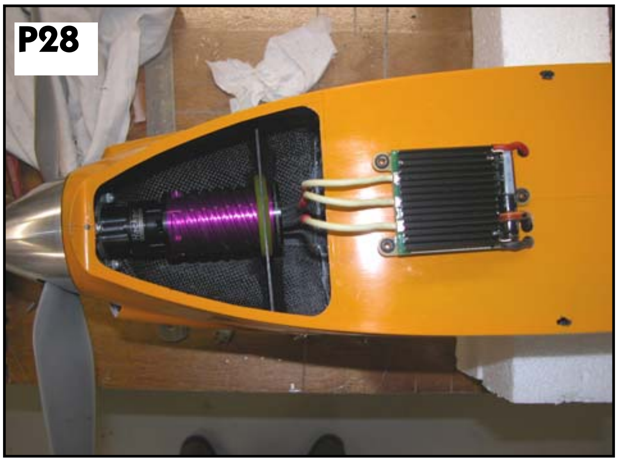
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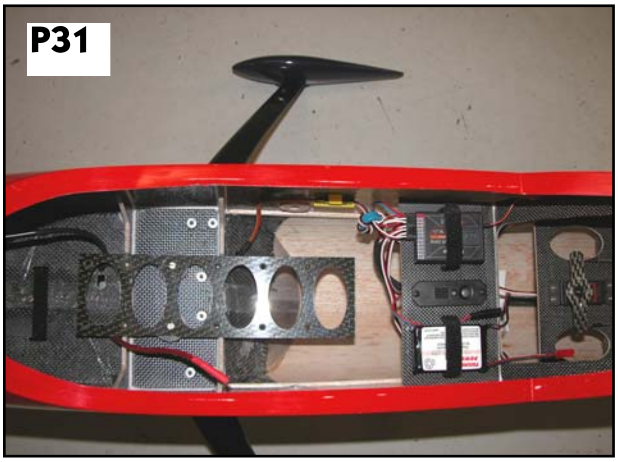
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