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A4 SKYHAWK
1:45-52 Scale Radio ARF



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ESCAPE



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DEHAVILAND DHC-6 TWIN OTTER



DO 335 Pfeil Arrow



ASSEMBLY & OPERATIONS MANUAL

Please review this manual thoroughly before assembling or operating this model.

Proceeding with assembly and use of this product indicates Agreement With & Acceptance of the following Liability Disclaimer.

Model airplanes, model engines, model engine fuel, propellers and related accessories, tools and equipment can be hazardous if improperly used. Be cautious and follow all safety recommendations when using your VMAR model airplane. Keep hands, tools, clothing and all foreign objects well clear of engines when they are operating. Take particular care to safeguard and protect your eyes and fingers and the eyes and fingers of other persons who may be nearby. Use only a good quality propeller that has no cracks or flaws. Stay clear of the propeller and stay clear of the plane of rotation defined by the propeller. The Manufacturer, Distributor, Retailer and/or other

suppliers of this product expressly disclaim any warranties or representations, either expressed or implied, including but not limited to implied warranties of fitness for the purposes of achieving and sustaining remotely controlled flight. In no event will the Manufacturer, Distributor, Retailer and/or other suppliers of this product have any obligation arising from contract or tort, or for loss of revenue or profit, or for indirect, special, incidental, consequential or other damages arising from the use of this product. In purchasing and/or using this product, the user accepts all responsibility for its use and accepts all liability associated with such use.

CAUTION

A Remote Control Model Aircraft is not a toy. It is a flying model that functions much like a full size airplane. If you do not assemble and operate this product properly you can cause injury to yourself and others and damage property. **DO NOT FLY** this model if you are not qualified. You are entirely responsible for the mechanical,

aeronautical and electrical integrity of this model and it's structure, control surfaces, hinges, linkages, covering, engine, radio, wiring, battery and all other components. Check all components before and after each flight.

Don't fly until it's right!



The Graphics and Detailing are inside the POLYCOTE ECS!

STAGE 1

WING ASSEMBLY - JOINING THE WING HALVES

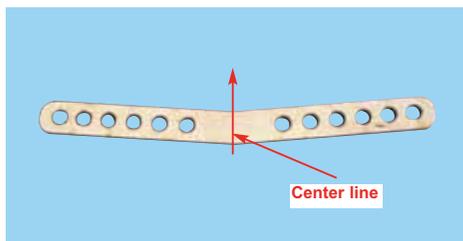
Parts needed

- Right and left wing panels
- Roll of wing joiner tape
- Wing joiner (also called dihedral brace)
- Two short dowel guides

Tools and adhesives needed

- 30 minute epoxy
- Epoxy brush or stir sticks
- Disposable mixing dish for the epoxy
- Sandpaper (coarse 240 grit recommended)
- Low tack masking tape
- Pencil
- Knife
- Ruler
- Paper towels

STEP 1.1 Locate the wing joiner (also called the dihedral brace). Using a ruler, mark a center line on the wing joiner as illustrated in 1A. Also mark a center line on each of the dowel guides..



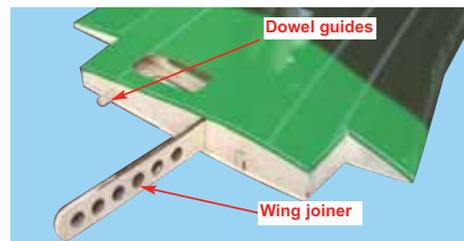
1A - Preparation of wing joiner and dowel guides

Step 1.3 Insert the dowel guides into one of the wing panels all the way to the center line. Apply CA glue to secure the dowels into their places as illustrated 1B and 1C. **Do not apply CA glue to the wing joiner**



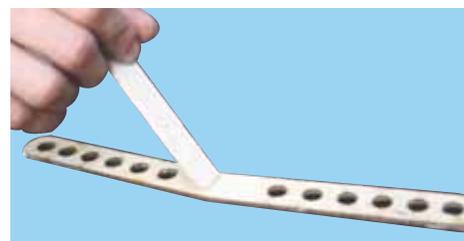
1C - Apply CA glue to secure dowels into their places

Step 1.2 Trial fit the wing joiner into the wing panels. It should insert smoothly up to the center line as illustrated in 1B. Now slide the other wing panel onto the wing joiner until the wing panels meet. If the fit is overly tight, sand the wing joiner slightly and try again. Mark the joiner to indicate which way is **UP** as illustrated in 1A



1B - Trial fit the wing joiner and dowel guides

Step 1.4 Apply plenty of 30 minute epoxy to one end of the wing joiner using a stir stick or epoxy brush. Carefully insert the joiner into the first wing panel as illustrated in 1D, 1E and 1F, then wipe off the excess epoxy that squeezes out of the joint with a cloth or tissue. Repeat this process several times to ensure that the wing joiner and cavity are well coated in epoxy. When the wing joiner and cavity are well coated with 30 minute epoxy, insert the joiner to the center line, wipe away any excess epoxy and let dry. **(Note. Do not use 5 minute epoxy or CA to join the wings)**



1D - Apply plenty of 30 minute epoxy to the wing joiner

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TIGER II**



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PHANTOM II F4



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F 18 HORNET

MiG21



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MUSTANG P51D EP



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L19 BIRDOG USAF



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L19 BIRDOG ARMY

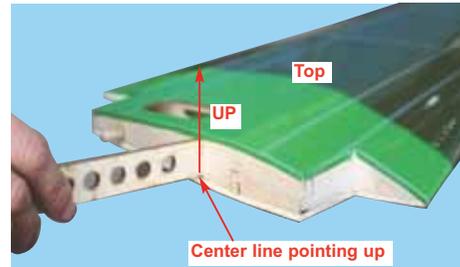


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JUNKERS 52 OLYMPIADE



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1E- Carefully insert the joiner all the way to the center line



1F-Wipe off the excess epoxy then allow to cure

STAGE 2 WING ASSEMBLY - JOINING THE WING HALVES (Cont.)

Step 2.1 When the epoxy has cured in stage 1, trial fit the second wing panel onto the wing joiner first to ensure that the two panels fit without an excessive gap

Step 2.2 Now apply plenty of epoxy to the wing joiner and wing roots ribs of both wing pannels. See 2A Use only 30 minute epoxy to ensure a strong bond and give yourself plenty of working time

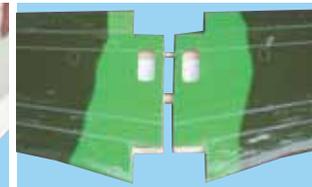
Step 2.3 As described in Step 1.4, repeatedly apply 30 minute epoxy to the wing joiner and insert into the wing joiner cavity

Step 2.4 When the epoxy has been plentifully applied, align and mate the wing halves. See 2B. Ensure the wing roots are firmly in contact with each other. Clean off any excess epoxy seeping from the joint before it cures.

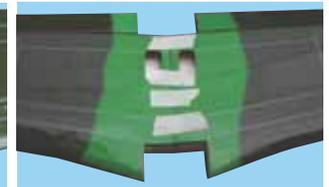
Step 2.5 Use low tack masking tape to hold the wing panels together until the epoxy cures. See 2C



2A- Apply plenty of 30 minute epoxy to all surfaces



2B - Align the wing panels and slowly close the gap until the wing roots are firmly in contact with each other.



2C- Use low tack masking tape to hold tightly together

STAGE 3 WING ASSEMBLY - JOINING THE WING HALVES (Cont.)

Step 3.1 When the epoxy has cured completely (allow several hours at least), the tape can be carefully removed from the wing panels. Peel the tape back on itself.... do not pull upright away from the wing. To seal and finish the joint in the wings, a roll of wing joiner tape has been supplied. Starting on the bottom side of the wing, stick the tape centrally over the joint ensuring that it is pressed down firmly as you work around the wing. Wrap the tape all the way around the wing in one piece, starting and finishing at the wiring harness cavities at the top of the wing



3A - Straddle the wing joint tape over the wing joint starting here on the bottom of the wing.



3B - Continue around the wing. Ensure the tape straddles the joint.



3C- Continue over the top of the wing and trim off the excess tape

STAGE 4 INSTALLING THE AILERON & FLAP SERVOS INTO THE WING

To install the aileron and flap servos into the wing you will need the following items

- Servos
- Servo mounting screws and grommets as supplied with the servos
- Servo control arms as supplied with the radio
- Two aileron control rod assemblies supplied with the kit.
- Two flap control rod assemblies supplied with the kit.
- Low tack masking tape
- 2 aileron control horn assemblies
- 2 flap control horn assemblies

Step 4.1 Trial fit the aileron servo into the servo mounting cavity. You may have to modify the cavity slightly to fit the servo

Step 4.2 Consult your radio manual to fit the grommets and ferrules correctly. Secure the servo into place with the screws.



4A- Prepare the servo by fitting the rubber grommets & ferrules supplied with your radio



4B - Location of aileron, aileron servo, flap and flap servo



BULLDOG SK 61 RAF



Order Item #VMA-BULLDOG RAF

BULLDOG SK 61 SWEE



STAGE 5 INSTALLING THE AILERON CONTROL SYSTEM

Step 5.1 Consult your radio instruction manual and center the aileron servo by plugging it into the aileron channel in the receiver. Turn on the transmitter then the receiver. Center the aileron trim lever on the transmitter. Remove the servo arm mounting screw and the servo arm

Step 5.2 Mount the servo arm back on the servo. Position the arm parallel with the back edge of the wing. Screw the arm into place with the servo arm mounting screw supplied with the servo. Locate the two aileron control rod in the hardware bag. Ensure the clevises are screwed well onto the threaded portion of the rod. Rotate and tug aggressively on the clevises and ensure that they are not loose on the rods. Tape the ailerons into their neutral position so that they are even with the trailing edge of the wing and not pointing up or down

Step 5.3 Ensure that the aileron control horns are screwed onto the threaded aileron control horn bolts and that both control horns are in approximately the same their respective bolts

Step 5.4 Connect the aileron servo rods to the aileron control horns. Connect the control rod to the servo output arm using a clevis.



5A- Aileron control rod assembly



5B- Aileron control horn and servo installed



5C- Aileron control rod installed

L39 ALBATROS

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Step 5.5 Connect the other end of the control rod to the control horn using the second clevis

Step 5.6 Remove the masking tape holding the aileron.

Step 5.7 In the case of computer radios couple the servos together electronically by connecting them to the appropriate receiver channels. In the case of analog radios couple the servos together using a Y harness.

Step 5.8 Turn on your radio and activate the ailerons, using the aileron stick and ensure a smooth full motion can be achieved.

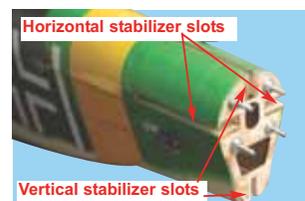
Step 5.9 With the wing top side up and viewed from the back, ensure that moving the transmitter aileron stick to the left raises the left aileron and lowers the right aileron. Movement of the stick to the left will roll the aircraft to the left. (Counterclockwise roll of the wing when viewed from the back).

Step 5.10 With the wing top side up and viewed from the back, ensure that moving the transmitter aileron stick to the right raises the right aileron and lowers the left aileron. Movement of the stick to the right will roll the aircraft to the right.

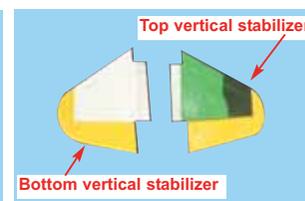
STAGE 6 FITTING THE HORIZONTAL AND VERTICAL STABILIZERS

To install the stabilizer into the fuselage you will need:

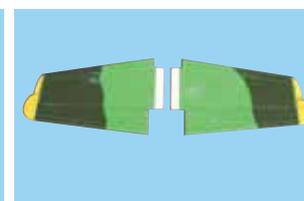
- Fuselage
- Top vertical stabilizer with pre-install rudder
- Bottom vertical stabilizer
- Right and left horizontal stabilizers with pre-installed elevators



6A- The fuselage slots for the vertical & horizontal stabilizer



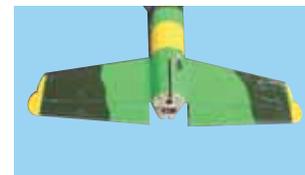
6B- Top and bottom vertical stabilizer



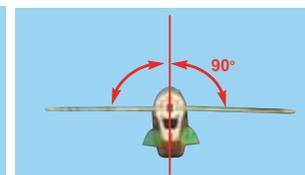
6C- Right and left horizontal stabilizer with pre-installed elevators

STAGE 7 INSTALL THE HORIZONTAL STABILIZER

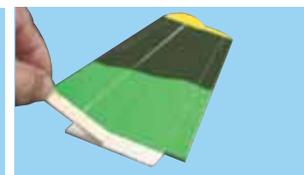
Mount the wing onto the fuselage first. The wing will be used as a reference point to align the horizontal stabilizer.



7A- Trail fit the 2 horizontal stabilizer joiners into the fuselage.



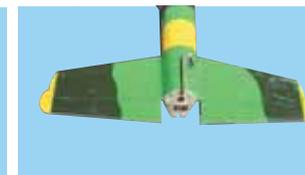
7B- Before gluing anything, dry (test) fit the horizontal stabilizers and ensure they align parallel to the wing and at 90 degrees to the fuselage.



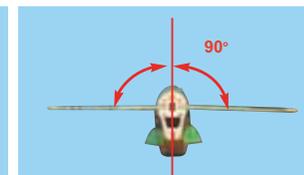
7C- Apply sufficient 30 minute epoxy to the exposed wood on both horizontal stabilizers.



7D- Apply sufficient 30 minute epoxy to the exposed wood on the horizontal slots



7E- Slide both horizontal stabilizer into the slots

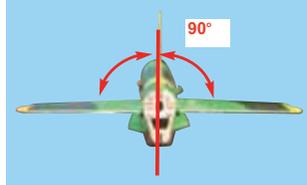


7F- Make sure the both horizontal stabilizers are align and square to the fuselage

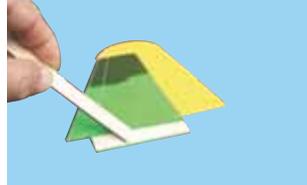
STAGE 8 INSTALLING THE VERTICAL STABILIZER



8A- Trial fit the top vertical stabilizer into the slot in the top of the fuselage.



8B- confirm the vertical stabilizer is at 90 degrees with respect to the horizontal stabilizer



8C- Apply sufficient 30 minute epoxy to the exposed wood in the top vertical exposed wood area



8D- Apply sufficient 30 minute epoxy to the exposed wood in the top vertical slot



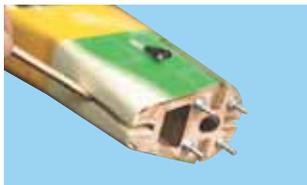
8E- Insert the top vertical stabilizer to the top vertical slot



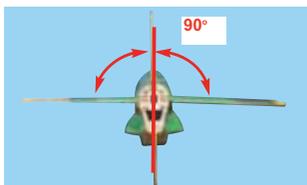
8F- Trial fit the bottom vertical stabilizer into bottom slot



8G- Apply sufficient 30 minute epoxy to the exposed wood in the bottom vertical exposed wood area



8H- Apply sufficient 30 minute epoxy to the exposed wood in the bottom vertical slot



8F- Before the epoxy cures, confirm the both vertical stabilizer is at 90 degrees with respect to the horizontal stabilizer

STAGE 9 INSTALL THE LANDING GEAR

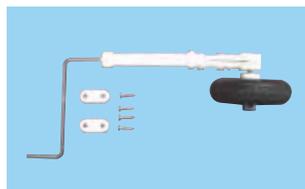
The DO 335 has a trike gear configuration using a nose wheel and main landing gear. Identify the main landing gear components show below

- 2 Pre-bent main landing gear sets pre-assembled
- 8 sheet metal screws (2 x 10 mm)
- 4 Plastic landing gear straps

Step 9.1 Turn over the wing to locate the pre-drilled main landing gear mounting location See 9B

Step 9.2 Insert one of the Pre-assembled main landing gear into place. Use 4 sheet metal screws to attach the landing gear to the wing. See 9C

Step 9.3 Repeat step 9.2 to attach the second main landing gear to the wing



9A- Components of one main landing gear

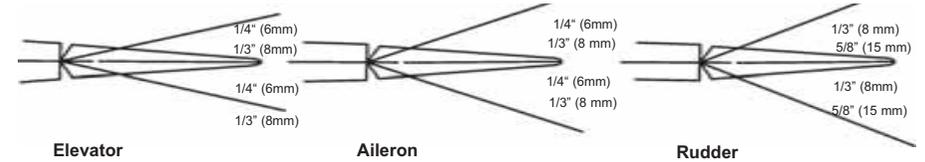


9B- Main landing gear location



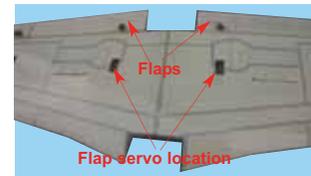
9C- Both main landing gear mounted to the wing

	Low rate	High rate
ELEVATOR	1/4" (6mm) up 1/4" (6mm) down	1/3" (8 mm) up 1/3" (8 mm) down
AILERON	1/4" (6 mm) up 1/4" (6 mm) down	1/2" (12 mm) up 1/2" (12 mm) down
RUDDER	1/3" (8 mm) right 1/3" (8 mm) left	5/8" (15 mm) right 5/8" (15 mm) left

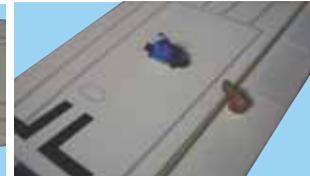


STAGE 21 INSTALL THE FLAPS

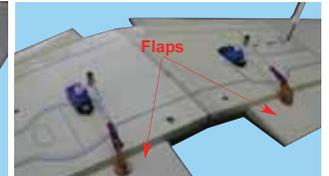
This VMAR model comes with flaps. If you do not plan on using the flaps, secure them in their neutral positions. To activate the flaps, install the control linkages and servos as shown in 21A, 21B & 21C



21A- Flaps and flap servo cavity locations



21B- Install the flap servos and flap control horns



21C- Install the flap control rods between the servos and the horns.

STAGE 22 BATTERY LOCATION



22A- Battery locations



22A- Battery in its locations



22A- Battery hatch installed



STAGE 18 CONFIRM RADIO OPERATION

Step 18.1 Consult your radio manual for instructions about testing and operating your radio system.

Step 18.2 Pay particular attention to charging your batteries and range testing your system before and after each

flight.

Step 18.3 Check that all controls are working correctly before and after each flight.

STAGE 19 BALANCING THE AIRCRAFT

Step 19.1 The CG for your DO 335 is located at 3.1/2 in to 4 in (87mm - 102mm) back from the leading edge of the wing when the wing has been attached to the fuselage as per illustration 20A.

Step 19.2 For the initial flight, the CG should be located at 3.1/2 (87mm) back from the leading edge of the wing when the wing has been attached to the fuselage.

Step 26.3 The CG is measured with the engine, radio gear and all other components installed

Step 26.4 Set up the CG as it will be when you fly it.

Step 26.5 It is very important to have the CG correct. Flying your model with the CG too far back will likely lead to loss of control and a crash. If you discover that after you have

assembled your model and installed your radio, motor and battery that the CG of your model is incorrect you must bring the CG to the correct location by doing the following BEFORE FLYING :

- Move the battery pack fore or aft
- Move other components fore or aft
- Change engine to a lighter or heavier model
- Add weight to the nose or tail. If adding it to the nose, try to make it useful by going to a heavier duty engine or adding a spinner with a heavy metal backing plate. As a last resort, add stick on "dead" weight where appropriate

STAGE 20 CONFIRM MECHANICAL INTEGRITY

Step 20.1 Once you have confirmed that the CG is correct, you should do a thorough review of the entire model before your first flight. Check everything twice! Every hook up, every coupling, everything! Do it twice!!

Step 20.2 Before your first flight, have an experienced flyer review your work. Do not fly your model until it has been checked out by a third party who knows how to fly and how to set up a model aircraft. Do not fly alone. Seek experienced help.

Step 20.3 Once you have completed your first flight, get in the habit of checking your model over before and after each flight! Don't fly if you find something that is not right!



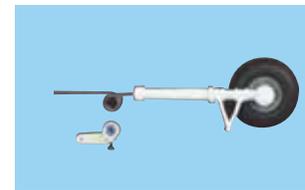
27A - CG location

CONTROL SURFACE THROW SPECIFICATIONS:

The throws are measured at the widest part of the control surface. Adjust the position of the pushrods at the control and/or servo horns to control the amount of throw. You may

also use ATV's if your radio has them but the mechanical linkages should still be set so that the ATV's are near 100% for best servo resolution.

STAGE 10 INSTALL THE NOSE GEAR



10A- Nose gear assembly



10B- Insert the nose gear steering control arm to the EZ connector then insert the nose gear assembly into the nose gear bearing then tighteng the control arm screw

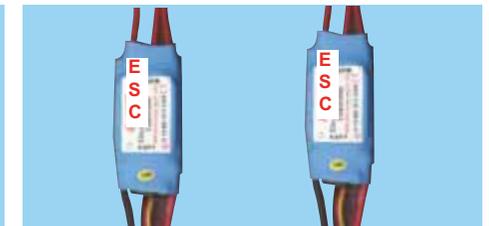


10C- Nose gear assembly installed to the fuselage (side view)

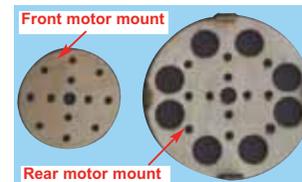
STAGE 11 INSTALLING THE ELECTRIC MOTOR AND ESC



11A- Front and rear brushless motors are same 150 watts brushless motor recommended



11B- The pair of the suitable ESC come with motor



11C- Front and rear motor mount



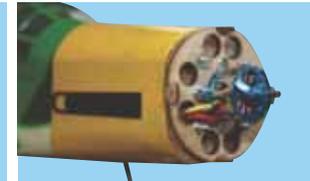
11D- Front motor location



11E- Rear motor mount location



11F- Mount the brushless motor to the front motor mount



11G-The front motor mount with the motor install to the nose



11H- Cowl,propeller and spinner are installed to the nose



11I- Mount the brushless motor to the rear motor mount

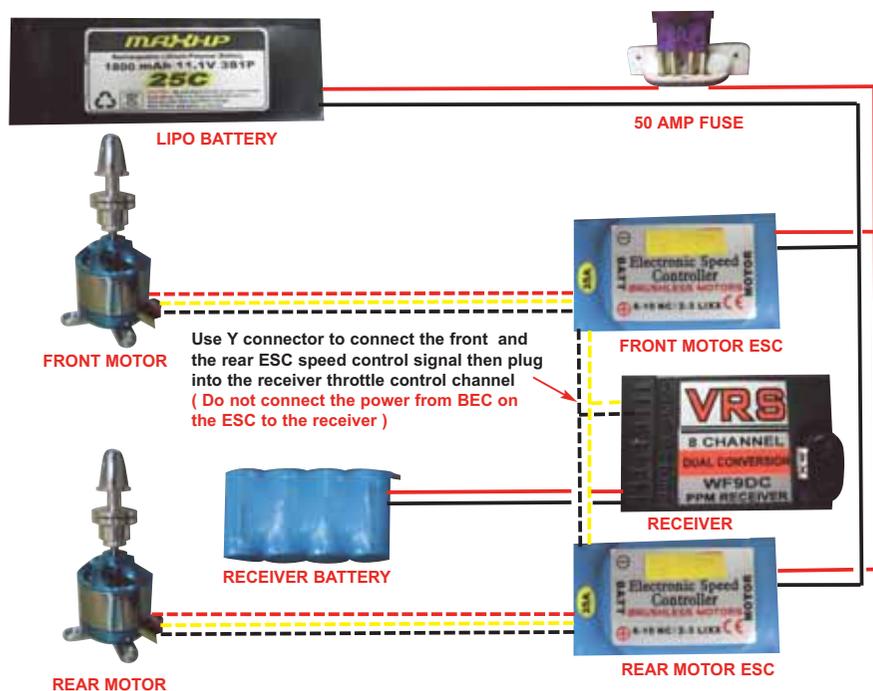


11G-The rear motor mount with the motor install to the rear end

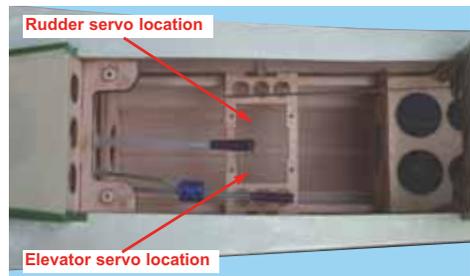


11H- Cowl,propeller and spinner installed to the rear end

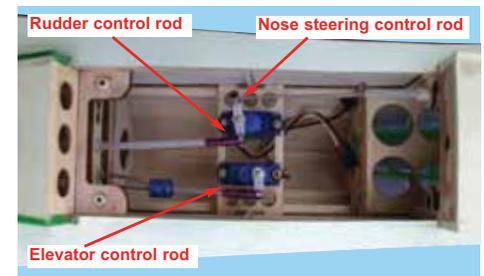
STAGE 13 INSTALL THE RUDDER AND ELEVATOR SERVOS



Typical wiring diagram of the brushless motor systems for DO 335 EP model



13A- Elevator and rudder servos location



13B- Elevator servo connected to the elevator control rod, rudder servo connected to the rudder and gear steering control rod

STAGE 14 ADJUST CONTROL SURFACE THROW LIMITS

Adjust the deflection of the control surfaces to match the specifications on page 8. You can reduce the amount of throw by doing either or both of the following:
 - From the control horn end, move the control rod/clevis further out on the horn (away from the control surface).
 - From the servo end, move the clevis to a hole in the servo arm that is closer to the servo output shaft.

- From the control horn end, move the control rod/clevis further out on the horn (away from the control surface). Always confirm that the clevis is firmly attached after making any adjustment.

STAGE 15 FINAL RC SET-UP

Before starting the final set-up of the model, switch on the radio and ensure that all trims are in their neutral positions. Check that the ailerons, elevator and rudder are centered. If any adjustments are needed, do these by uncoupling the relevant clevis and turning it clockwise to shorten the linkage or counter-clockwise to lengthen it. Only when each control surface has been centered mechanically in this way should you begin adjusting the surface movement (or throw)

Now confirm that the control surfaces are moving in the correct direction. Use the servo reversing switches on your transmitter to reverse the direction of a servo if necessary. The most popular transmitter mode (with the throttle on the left, with ailerons and elevator on the right) is shown here.

STAGE 16 INSTALLING THE RECEIVER BATTERY

Step 16.1 Consult your radio manual for instructions about hooking up your receiver battery, receiver and switch harness
Step 16.2 Wrap the battery pack securely in foam suitable for RC equipment and wrap the foam insulated pack in a plastic bag or cling wrap.

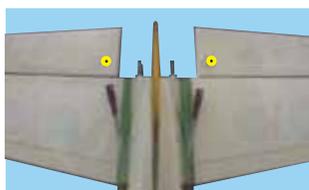
Step 16.3 Thread the battery pack connector forward in preparation for connecting to your switch harness
Step 16.4 Connect the battery pack connector to your switch harness according to your radio manual
 We recommended to use separate receiver battery do not use BEC from ESC

STAGE 17 INSTALLING THE RECEIVER

Step 17.1 Consult your radio manual for instructions about hooking up your receiver.
Step 17.2 Plan where you are going to put the receiver with consideration for routing the antenna safely.
Step 17.3 Wrap the receiver securely in foam suitable for RC equipment and wrap the foam insulated receiver in a

plastic bag or cling wrap.
Step 17.4 Generally in the absence of specific instructions from the radio manufacturer, it is recommended that the receiver should be placed where it is least likely to have impact during a crash. Keep the battery pack and other heavy loose items ahead of the receiver.

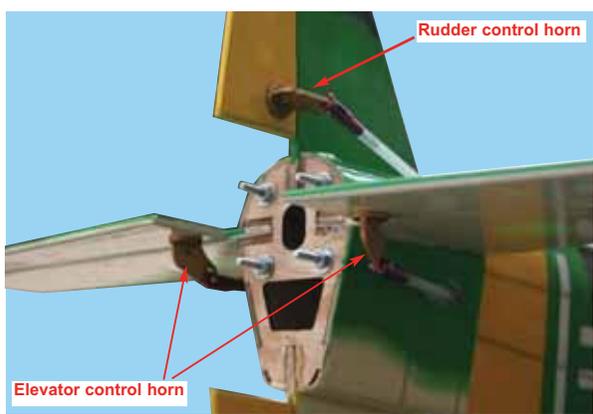
STAGE 12 FITTING THE ELEVATOR AND RUDDER CONTROL HORN



12A- Elevator control horn location



12B- Rudder control horn location



12C- Elevator control horns and rudder control horn installed in its location and connected to the clevises