AVIOS

SUPERMARINE

SPITFIRE

MK.1a

1450MM

ASSEMBLY, SETUP, and FLYING MANUAL

AVIOS (PNF) Spitfire Mk.1a w/Retracts, Flaps, & LED Nav Lights

Contents:

SAFETY INSTRUCTIONS

1. Please read this manual carefully and follow the instructions before you use this products.
2. Our airplane is not a toy, it is only suitable for experienced pilots. If you are a novice then please only fly under the guidance of an experienced pilot.
3. Not recommended for children under 14 years old.
4. Please adjust and set up this plane according to the instructions and make sure to keep your body parts out of the rotating propeller all the times or it may cause damage to the plane or serious injuries to yourself.
5. Do not fly in thunderstorms, strong winds or bad weather.
6. Never fly R/C planes where there are overhead power lines, automobiles, near an airport, railway lines or near a highway.
7. Never fly R/C planes where there are crowds of people. Give yourself plenty of room for flying, this plane can fly at a very high speeds. Remember that you are responsible for others safety and the safe conduct of the flight.
8. Do not attempt to catch the plane when you are flying it.
9. The operator should bear full responsibility for the proper operation and usage with regards to this model. We at Hobbyking will not be responsible for any liability or loss due to improper use of this product.

⚠ WARNING:

Read this instruction manual fully so as to become completely familiar with the features of the product before operating. Failure to operate this product correctly could result in damage to the product, personal property and cause serious injury. This is a sophisticated hobby product and is NOT a toy. It must always be operated with caution, common sense and some basic mechanical ability. This manual provides instructions on the assembly, safe operation and maintenance of this hobby product. It is highly recommended that you read and follow fully the instructions and warnings stated in this manual including safety, assembly, set-up and flying guidelines in order to operate this product correctly and avoid damage or serious injury.

INTRODUCTION

The Supermarine Spitfire is the most famous fighter plane from the Second World War, and the Mk.1a defines where its history started. This Avios model represents an early WW2 version that was in service just before the "Battle of Britain". It looks stunning and is possibly the best-looking and best-flying foam Spitfire on the market today. At this point, we would like to give thanks to Tom Hunt, whose drawings the Avios Spitfire Mk.1a is based on, and it is one of the main reasons why this Avios Spitfire (just like its smaller brother from Durafly) flies so well. Being the Mk.1a, it has that truly iconic shape and lines of the Supermarine Spitfire as it was seen through the eyes of its original designer, R.J. Mitchell. The upper surfaces have a brand new, authentic early WW2 camouflage color scheme, with a black and white scheme underneath. This scheme was used from 1938 and during the "Phony War" on RAF fighters to help the observation of friendly aircraft from the ground. It was phased out in June 1940 in favor of the "sky" color to make them less visible during daytime sorties.

Features of the Mk.1a include a sliding canopy and cockpit opening door, with a nicely detailed instrument panel and gunsight. LED navigation lights on wings and tail, and faithfully reproduced scale split flaps with flap down indicators on the topside of the wing. If you have something like the Turnigy X-14 transmitter, you can select "servo slow" so that the flap servos move slowly in a very scale-like manner. Also included are a pair of scale operating retracts with scale doors, and sprung oleos; these make for one of the best ground handling Spitfires available.

The surface finish on the Spitfire Mk1a has been greatly improved over earlier versions of Avios Spitfires, and the scale panel lines are also more authentic. Hidden control surface hinges and linkages finish that scale, realistic look. Decals are supplied, but will need applying, please see our notes towards the end of this manual for the application details. The fit of the parts has also been improved, and the battery hatch cover now has a spring-loaded retaining catch.

This PNF (Plug-N-Fly) model includes a powerful 6S compatible SK3 5055-380KV brushless outrunner motor driving a large 15x10 scale 3-blade prop, and an Aerostar G2 80A brushless ESC. High-quality servos are used throughout, 17g digital for the flaps and ailerons, and 9g digital for the rudder and elevator.
The AVIOS team hopes you enjoy putting together and flying your Spitfire Mk.1a, and they look forward to bringing you more exciting models in the near future.

SPECIFICATIONS

Wingspan: 1450mm (57.5”)
Flying weight: 2640-2750g (92.6 ~ 96.5oz)
Servo: 2 x 9g for flaps, 4 x 17g for aileron elevator and rudder
Motor: SK3 5055-380KV brushless outrunner.
Prop: 3 blades 15X10
Esc: Aerostar G2 80A w/BEC
Battery: 6S 3200 ~ 4500mAh LiPo
Radio: 6 channel required

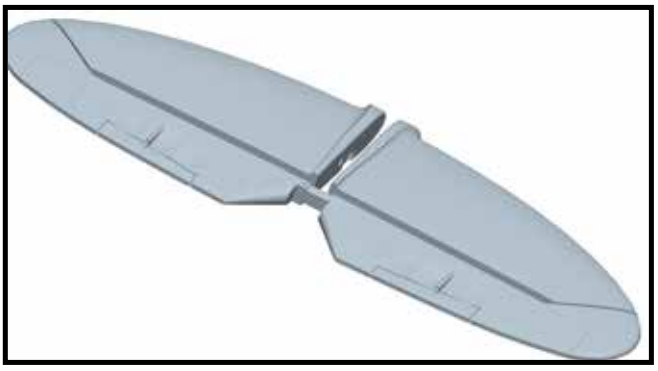
CONTENTS:

1. Fuselage
2. Left wing
3. Right wing
4. Rudder
5. Horizontal stabilizer
6. Exhaust stubs
7. Propeller blades
8. Wing carbon joiners
9. Propeller hub & spinner
10. Scale accessories

Please note: Your Mk.1a Spitfire comes with a set of decals that require applying to the model. We recommend that these decals are applied BEFORE you begin assembly. Please refer to the "Decals Application Guidelines" section on pages 17-19 of this manual for the instructions on how to affix the decals.

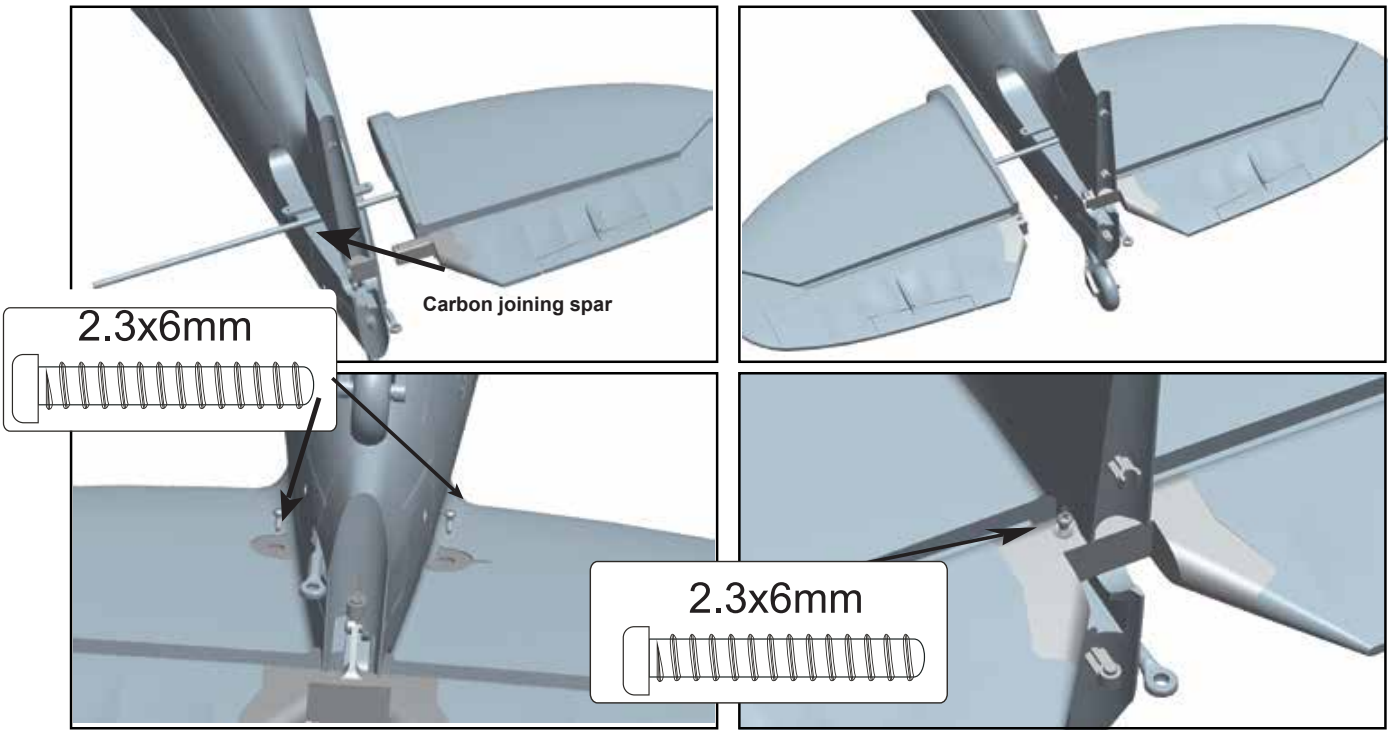
ASSEMBLY

1. Out of the box your Spitfire comes with a reinforced foam hinge for the elevator. However, before assembly can begin, the hinge line must be flexed back and forth 5 to 6 times to reduce the tension and the load on the elevator servo.

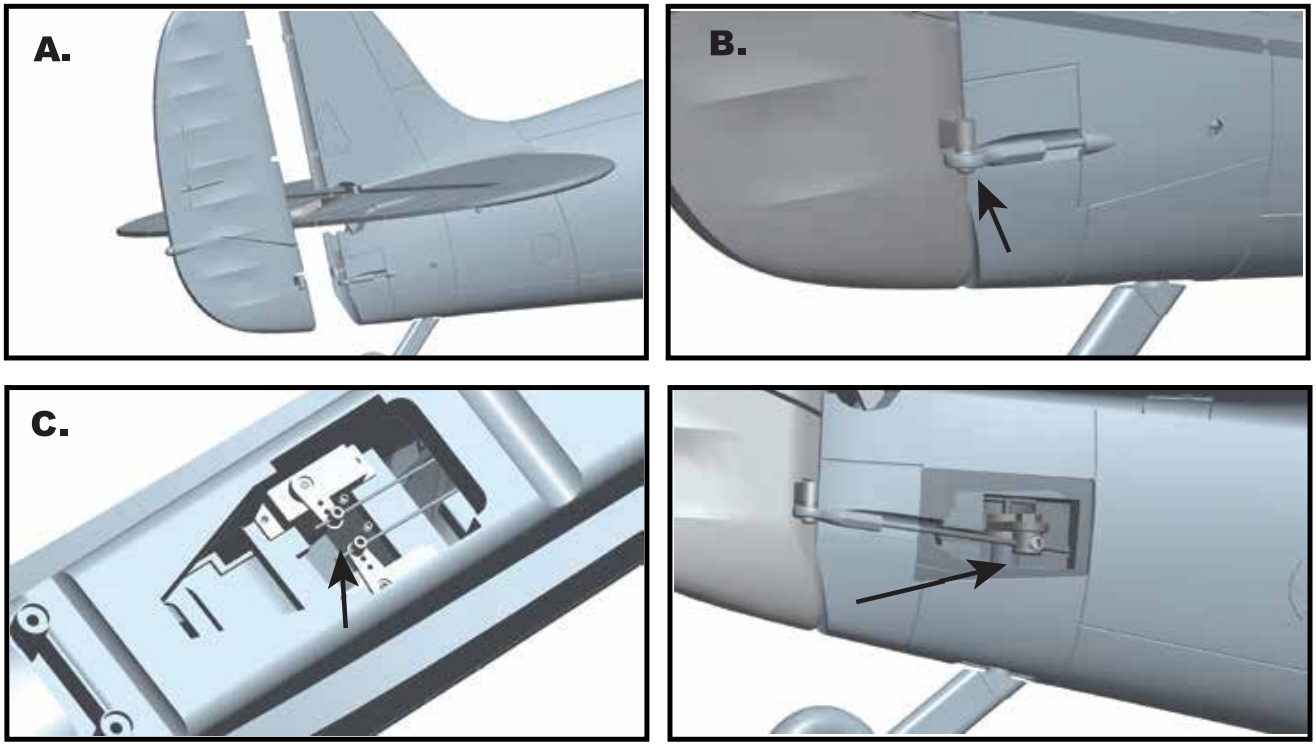


2. Insert one half of the carbon tail joining spar into the starboard horizontal stabilizer (A). Before sliding this into the slot of the fuselage, be sure to insert the elevator joiner into the elevator driving assembly which will drive both elevators. Now install the remaining port side stabilizer (B). Secure both halves, and the elevator joiner with the supplied 2.3x6mm screws. This installation is self aligning, but do double-check to ensure alignment to the vertical stabilizer and wing seat.

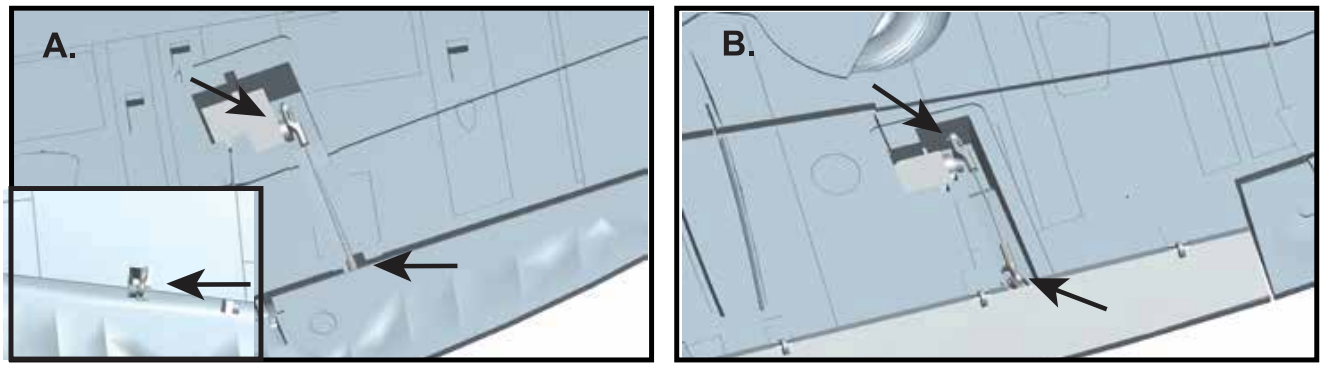
A. **B.**



3. Insert the rudder and connect the rudder LED light connector to the extension lead in the tail. Pull the extension lead from the battery hatch end gently until it stops, then snap the rudder hinge halves to the fuselage hinge halves. The bottom hinge is the key to securing the rudder. Please check to make sure that the rudder moves freely with no binding or resistance.
Using a pair of the pliers (ball link pliers preferably), connect the rudder push rod to the rudder control horn. To ensure the rudder is neutral (with the servo centered), loosen the grub screw of the servo connector and slide the piano wire until the rudder is neutral. Repeat this process to ensure the elevator is neutral. The steerable tail wheel can be adjusted in the same way, tighten all the grub screws firmly once done.

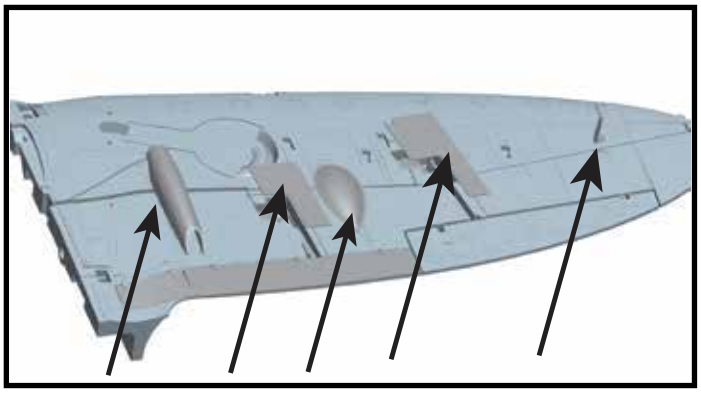


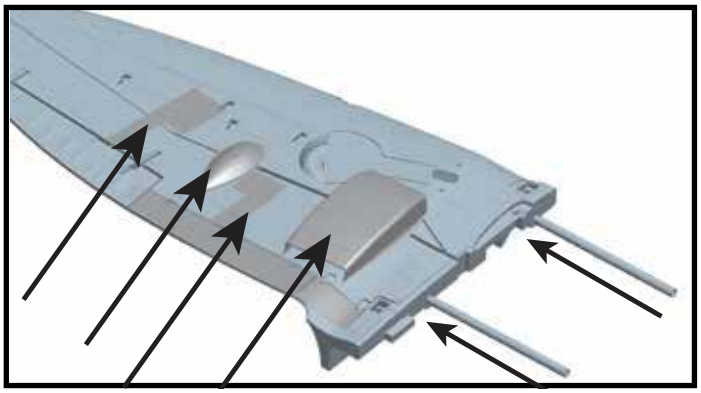
Note: Each ball link has a faint circle molded on one side. This denotes the side that should be connected to the ball joint.



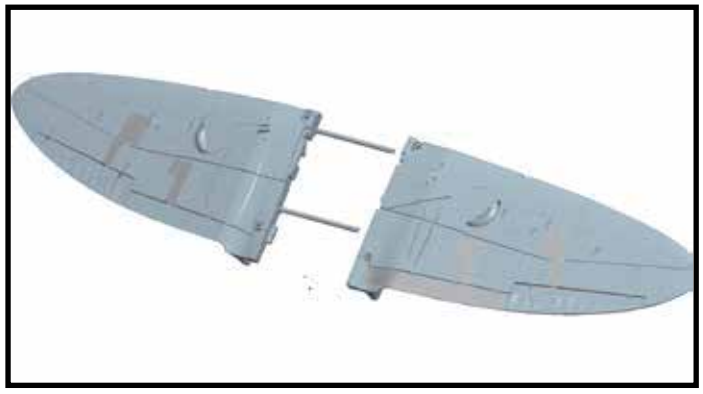
4. Connect the ball links to the balls on the control horns first. With the aileron control horn at 90° to the wing surface (neutral) insert the aileron push rod into the top hole of the servo control horn, adjust the length of the push rod as necessary so that the aileron remains neutral by turning the pushrod clockwise, or anti-clockwise. When the aileron is neutral, secure the push rod to the servo horn with the supplied plastic keeper. Repeat this process for the flaps, the only exception is that the flap servo horns must be positioned as far forward as possible. This will ensure the flaps are up when the push rods are connected.

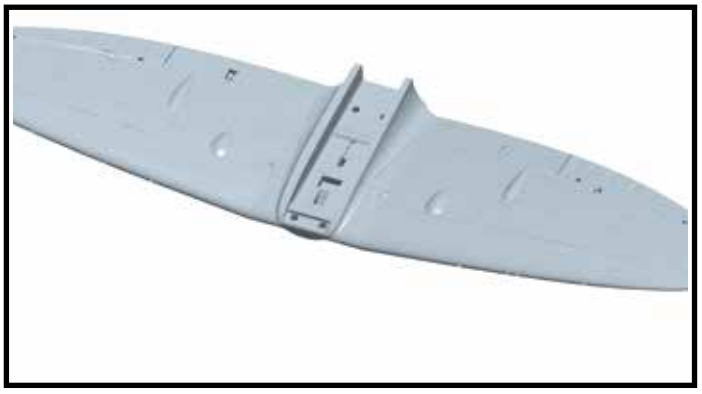
5. Using a small amount of contact glue, glue the under wing radiators, servo covers, machine gun magazine blisters (use the 2 small holes to center) and the pitot tube. Check the fit first, and adjust if necessary before gluing into place. Also at this point, insert the 2 main wing spars into one wing half.



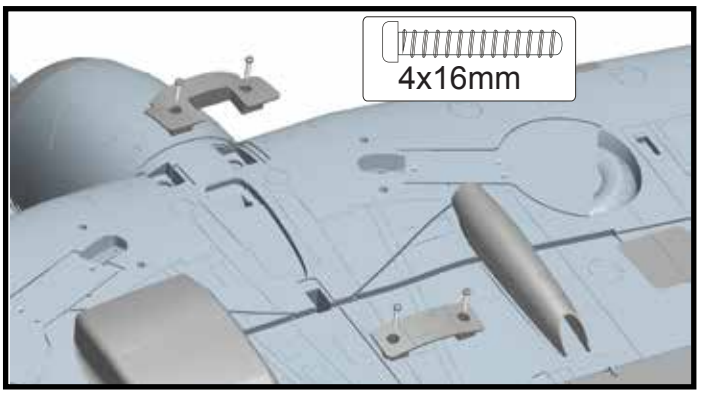


6. Connect the 2 wing halves together, we recommend applying glue to the roots for improved strength and security.

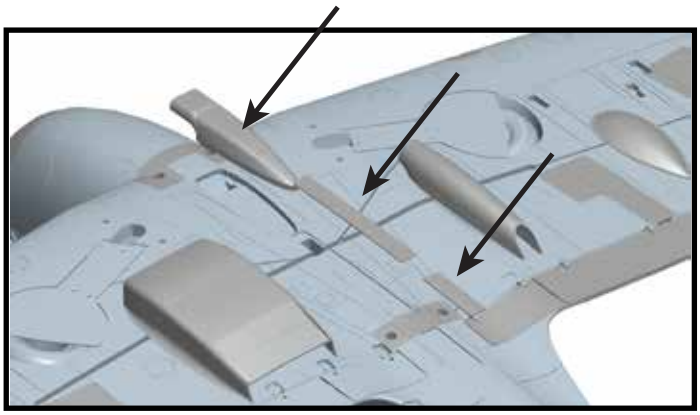




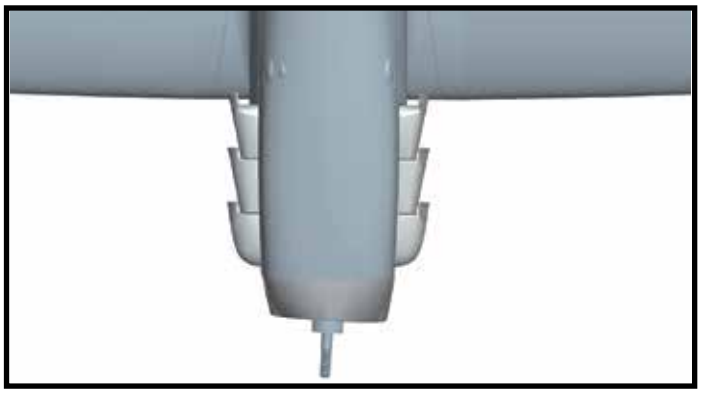
7. Offer the wing up to the fuselage and ensure the servo wires pass through into the battery/RC area of the fuselage. Check that no servo wires are trapped between the wing and the fuselage before securing the wing in place using the four 4x16mm bolts supplied.

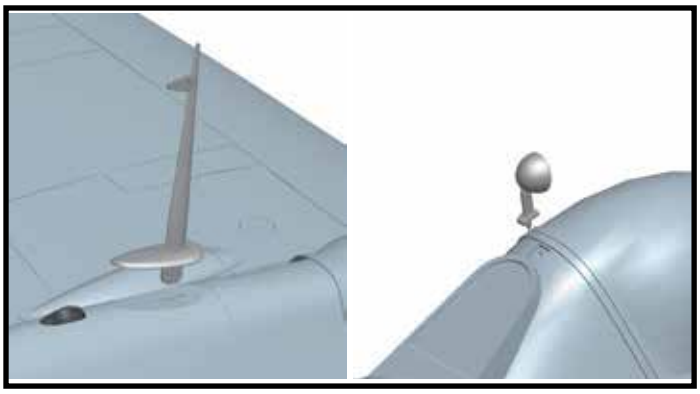


8. We recommend you seal the join between the wing panels using the supplied plastic strips. Then you can glue the air scoop into position, and secure the cowl using the 2.3x10mm screw supplied.



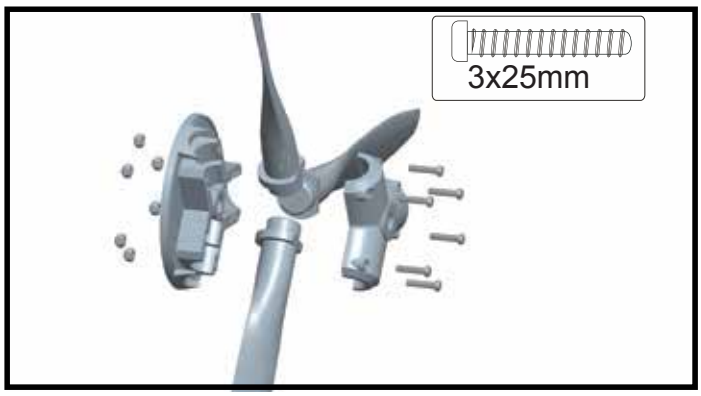
9. Glue into place the exhaust stacks , the fuselage aerial and the rear view mirror.

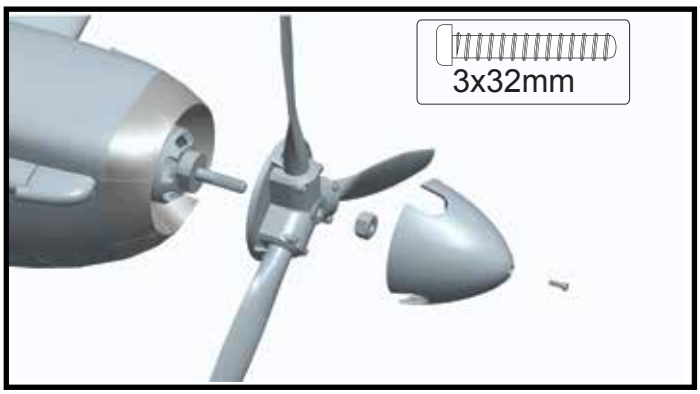




10. Install your choice of 6ch receiver ensuring all the wires are clear and held away from the servo horns. The chosen battery should be fitted into the battery compartment as far forward as possible to achieve the correct C of G as shown on Page 11.

11. Assemble the propeller as shown using the supplied 3x25mm screws, pull these screws up evenly. Once assembled, slide the spinner backplate and prop assembly onto the motor shaft, make sure the hex cutout at the rear fits over the hex at the base of the shaft. Then fit the prop nut and tighten firmly, finally fit the spinner using the supplied 3x32mm screw.

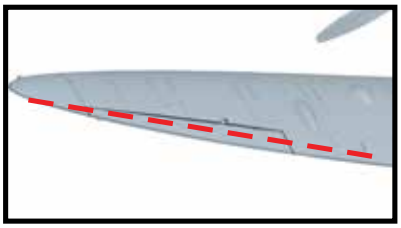




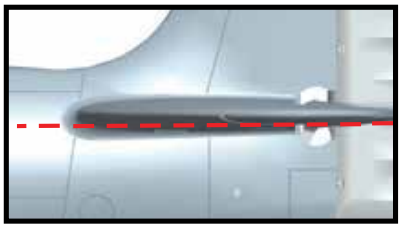
SETTING UP YOUR MODEL:

1. With your receiver installed and the servos plugged into their correct channels you can connect the flight battery to the ESC and power up the electronics (see page 11 for Aerostar ESC setup). Once the model is armed ensure all the servos are centered correctly and all control surfaces are neutral. If not then adjust the push rod lengths until the control surface is neutral.

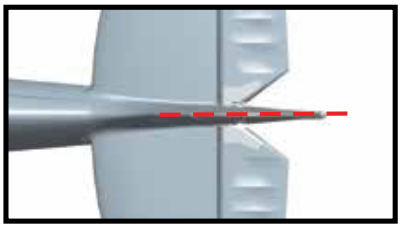
Note: For safety reasons, it is advised that this is done with the prop removed from the model.



Ailerons



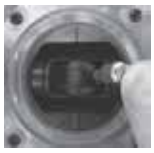
Elevator



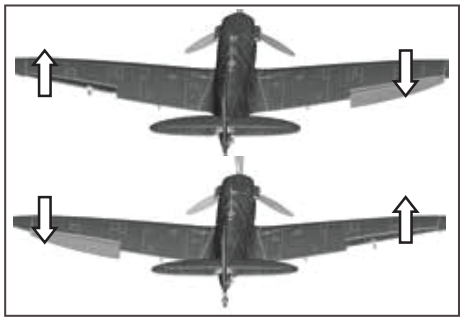
Rudder

2. Check all control surfaces are moving in the correct direction with the applicable stick input (see below)

Roll left



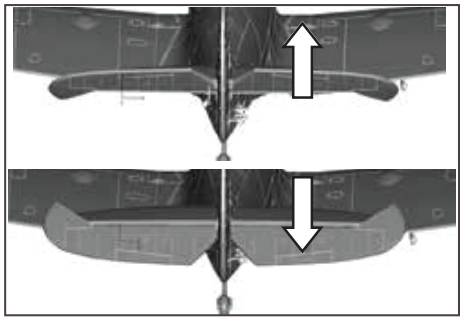
Roll right



Aileron (Roll)

Pitch up

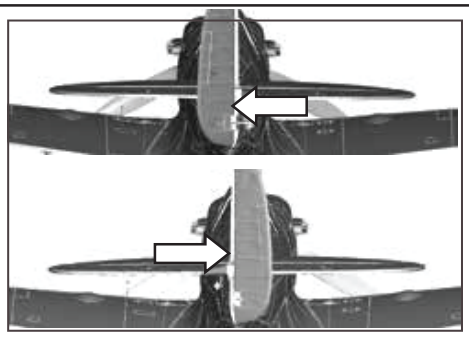
Pitch down



Elevator (Pitch)

Yaw left

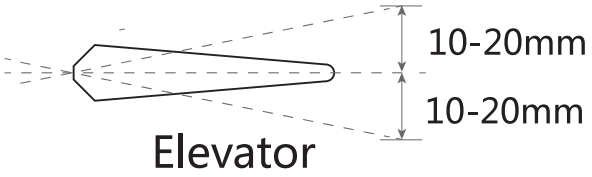
Yaw right

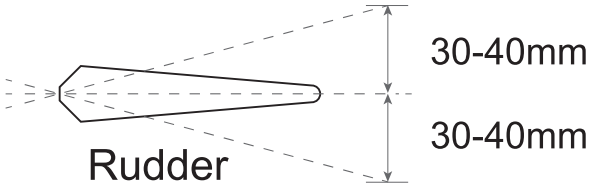


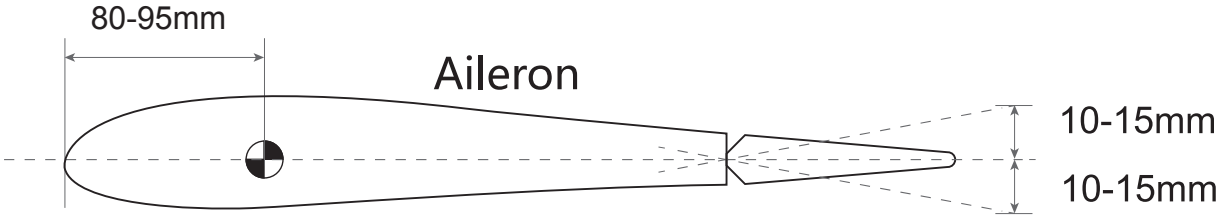
Rudder (Yaw)

3. The Spitfire Mk.1a handles very well in flight, and that is not down to a good design alone, but a good pre-flight setup too. Before you fly your Spitfire, please follow the recommended settings below for the optimum handling and performance.

CONTROL THROWS:



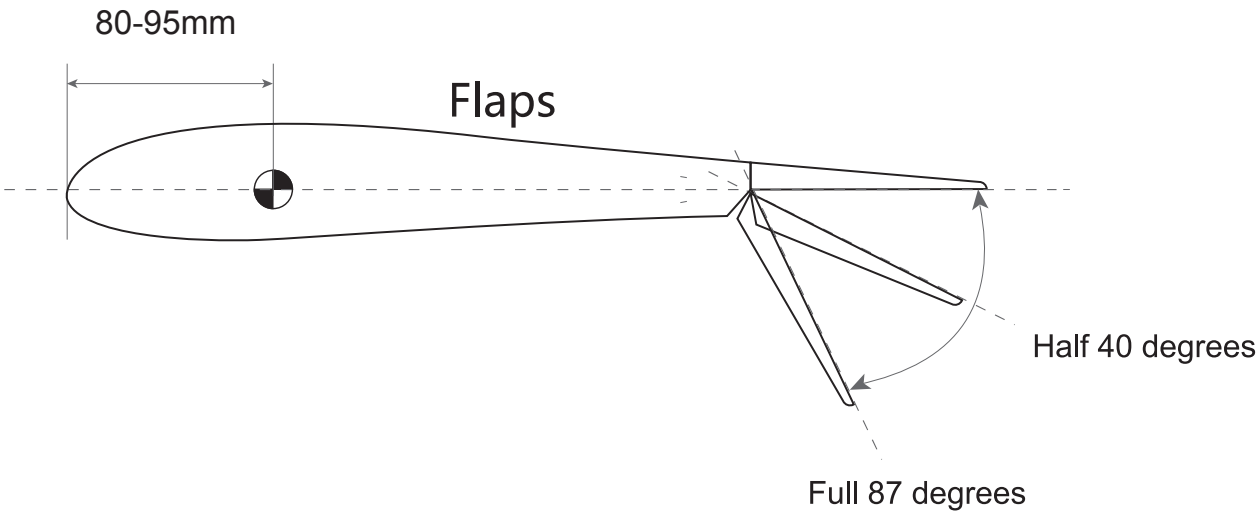




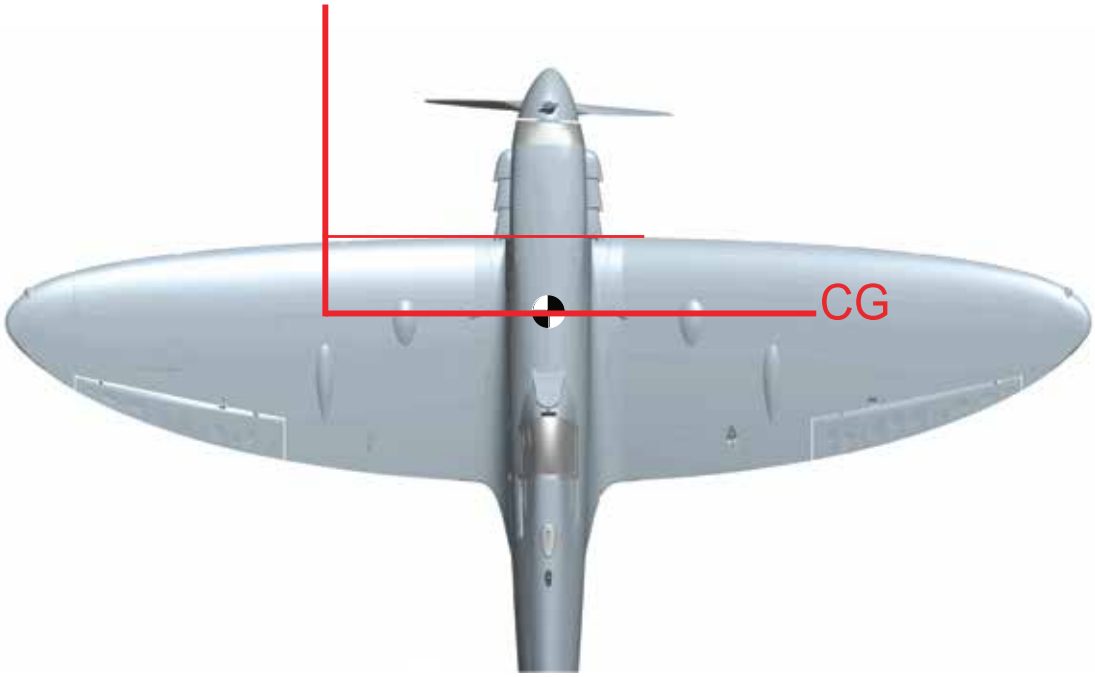
- Elevator: "Low Rates" 10mm "High Rates" 20mm each direction from neutral.
- Rudder: "Low Rates" 30mm "High Rates" 40mm each direction from neutral.
- Ailerons: "Low Rates" 10mm "High Rates" 15mm each direction from neutral.

The above are recommendations for your first flights. Once you have test flown the model you can adjust to suit your particular flying style.

4. Flaps on the Spitfire should be set for 3 stages (up/no flap, mid flap and full flap).Set these either mechanically by adjusting the clevises or by using your computer radio. Set the mid flap position to 40° and full flaps to approximately 87° as shown. In the up/no flap position ensure the flaps are closed fully but without straining the servo. Also check that both sets of flaps deploy the same amount at every stage.



5. The center of gravity for the Spitfire is between 80-95mm from the leading edge of the wing. If you use a 3200mAh pack or similar then a balance point within the range will be achieved by simply having the battery towards the front of the battery compartment. If using a heavier battery or you prefer a more rearward C of G then slide the battery rearwards in the battery compartment.



C of G is between 80-95mm when measured from the leading edge of the wing at the root. Carry out this check with the gear retracted, and balance the model with your finger tips on the top of the wing with the model inverted.

Aerostar ESC Setup:

The Spitfire Mk.1a is fitted with the Aerostar 80A G2 electronic speed controller. Please follow these steps to setup the ESC before flying.

1. It is important that you manually calibrate the throttle range when using the ESC for the first time, this should always be done with the propeller removed. Move the throttle stick to the full throttle position and switch on the transmitter (ensure the end points are set to 100%, and the throttle trim is in the middle). Connect your battery pack to the ESC and wait for 2 seconds, your motor will now give 2 quick beeps (Beep-Beep), as soon as you hear these beeps, lower your throttle to the fully closed position, the ESC is now calibrated and ready for use.

2. When you switch on your transmitter each time to fly, you need to make sure the throttle stick is in the low/off position, then when you connect the flight battery the motor will emit a series of beeps. When using a 6S pack, 6 beeps with the same tune means the ESC has detected the 6 cells of the battery. The motor is now armed and will start when the throttle is opened.

With the assembly and the set-up of your Avios Mk.1a Spitfire complete you should be ready for your first flight. However we recommend that you read and follow the advice given in the following pages of this manual before flying.

MODEL FLYING PRECAUTIONS

• Select your flying area carefully. Always choose an open space that is clear of trees and buildings and is away from crowded areas. Avoid flying near roads, electric/telephone poles and wires, water or close to a full-size active airfield.

• Do not fly the model in poor weather, high winds or low visibility. Rain and storms should also be avoided.

• Never attempt to catch the model whilst flying, even a slow moving model can cause injury. Not only to yourself but also to others and can damage your model.

• This model is recommended for children of 14 years of age upwards. All children no matter what age should always be supervised by a responsible adult at all times when operating this model.

• Always unplug the battery when not using the model, never leave the battery installed in the model.

• Remember to keep clear of the propeller at all times when the battery is connected.

• Before flying always turn on your transmitter first, and only when your transmitter is confirmed as transmitting do you plug in your flight battery.

• Once you have finished flying, disconnect the battery first and only then switch off your transmitter.

• Exercise caution when charging your batteries. Follow the battery manufacturers safety guidelines when doing so.

PRE-FLIGHT CHECKS

1. Always range check your model before any flight, especially when flying it for the first time. Follow your radio manufacturers guidelines for carrying out this check.

2. Check that all the screws, bolts and mounting points are secure, including the control horns and clevises.

3. Only fly with fully charged batteries, both in the model and transmitter. Failure to do so could result in a loss of control, damage to your model or persons/property around you.

4. Inspect the model and propeller for any damage that may have been caused in transit, if in doubt, do not fly.

5. If this is your first flight then double check that the C of G is correct, if not then adjust the position of the battery accordingly.

6. Switch on your transmitter and connect the flight battery in the model. Check all the control surfaces are working correctly and in the correct direction. Listen for any unusual sounds when the servos are operated.

7. With the model held securely and the propeller free of any obstructions increase the throttle slightly to confirm the correct rotation. The model should want to pull forward if the rotation is correct.

8. If you are an inexperienced model pilot then please seek the help and assistance of an experieced pilot to perform the final checks and to test fly the model for you.

FLYING YOUR SPITFIRE

Before flying make sure you have followed closely the set-up guidelines on pages 6 to 9. Start by taxying around a little to get used to the ground handling. Always make sure you use full up elevator when taxying to avoid nosing over and to keep pressure on the tailwheel, keep the flaps up and use the throttle gently. This will keep the model tracking steady and true, plus it has the added bonus of looking more scale like.

For take-off you will want to hold some right rudder to counter the rotational torque on the initial roll out. Slowly advance the throttle and ease of a little of the full up elevator but keep enough to still hold the tail on the ground, correct with the rudder as necessary to keep the Spitfire running straight and true. As the speed builds ease of the amount of up elevator so that the tail lifts and keep increasing the throttle. At about 3/4 throttle the Spitfire should start to lift off the ground and begin the climb out.

Once airborne retract the landing gear as soon as you are comfortable and start enjoying the thrill of flying a Spitfire. With the power of the 6S set-up you will find you can cruise happily on around 50-60% throttle which is more than sufficient for a scale speed to be achieved. Opening the throttle up to full is very exciting but generally is not necessary. A full airshow routine can be performed including loops, rolls, low banked passes, split S's etc and all the large and vertical manoeuvres are possible. An average flight time with mixed throttle settings is approximately 7-8 minutes. Your Spitfire may drop a wing if really pushed near the stall, that said the stall is quite benign and any wing drop can be picked up easily by the rudder, do not attempt to pick the wing up with ailerons as this will only exaggerate the problem, a small amount of down elevator then a small application of power will get you flying properly once more, explore the stall characteristics and recovery at a reasonable altitude.

Landing the Spitfire Mk.1a is a real pleasure and a treat for those who like to practice scale type approaches, as the Spitfire needs to be flown onto the ground through a powered descent. Bringing the wheels down and selecting mid flap gives no noticeable trim change. Once lined up on finals to the runway and at about 8ft you can select full flap if desired, be sure to maintain good throttle management. As soon as the Spitfire settles onto the ground hold in full up elevator to prevent the model nosing over. Retract the flaps and taxy back to the pit area.

HINTS & TIPS

• For optimum flight performance and model longevity we recommend that you always fly with a balanced propeller. The supplied propeller should be balanced but it is always good practice to check this.

• Keep all leads within the fuselage area as tidy as possible. A tidy wiring set-up looks better, allows for easier access to all the internal components, better battery installation, increased airflow around the electronic components and also reduces the potential electronic signal interference (noise).

• Inspect the propeller frequently, especially if you have suffered a hard landing or prop strike. If the propeller is in any way damaged it must be replaced and any loose fixings should be tightened.

• It is important that your flight battery is as far forward as possible for initial flights to prevent you from flying the Spitfire in a tail heavy configuration. Ensure you follow the C of G guidelines on pages 6-8 and 9 before flying your Spitfire.

• Do not use full flaps on a windy day, only use full flaps on days when there is little or no wind. Full flap requires good throttle management to prevent the model from stalling, so initially practice the use of full flap at a reasonable altitude.

• To avoid any chance of your Spitfire tipping onto its nose on landing switch to high rates on the elevator as soon as the model settles onto the ground after landing and hold full up elevator.

• Do not leave your model in direct sunlight or in a hot vehicle for prolonged periods, as this will have an adverse effect on the foam surface of the model.

RECOMMENDED ACCESSORIES:

TWIN X14 ACCESS
2.4GHz Tx (Orange)
SKU: 9236720209

FLYSKY Paladin PL18 18CH
Tx w/FTr10 Rx
SKU: 9114000085-0

FrSky TW R6 6ch TW
Protocol Receiver
SKU: 9236720013

FrSky TW R8 8ch TW
Protocol Receiver
SKU: 9236720012

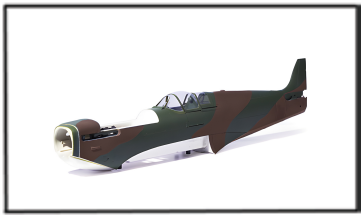
Turnigy Nano-Tech 4000mAh
6S 70C LiPo w/XT90
SKU: 9210000268-0

Turnigy 4000mAh 6S 60C
LiPo w/XT90
SKU: 9067000386-0

Turnigy Graphene Panther
4000mAh 6S 75C LiPo
SKU: 9959320007

Turnigy Reaktor T240 LiHV
1~6S 10A 2 x 150W Charger
SKU: 9959320007

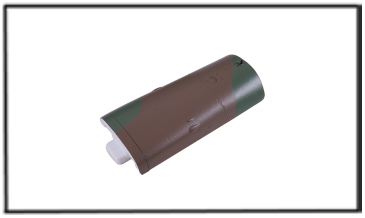
SPARE PARTS:



Fuselage
SKU: 9499790665

Wing Set
SKU: 9499790666

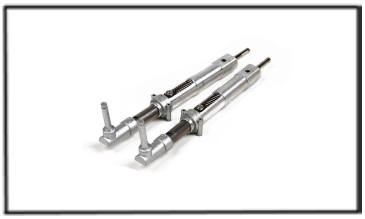
Horizontal Stab Set
SKU: 9499790667



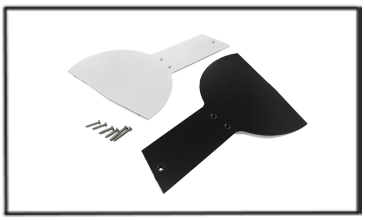
Battery Hatch
SKU: 9499790668

Rudder w/LED
SKU: 9499790669

Sliding Canopy Set
SKU: 9499790670



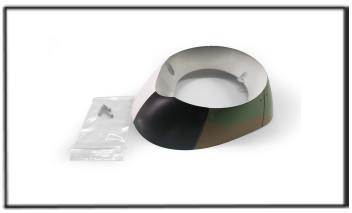
Oleo Struts (1pr)
SKU: 9499790671



Landing Gear Doors (1pr)
SKU: 9499790672

SPARE PARTS:

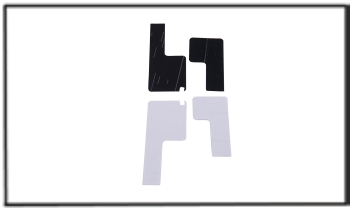
Spinner Set
SKU: 9499790673



Cowl
SKU: 9499790674

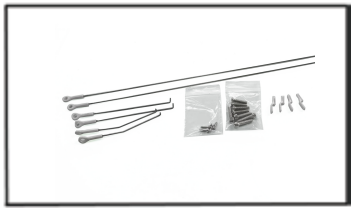
Scale Detailing Parts
SKU: 9499790675

Lower Nose Cowl
SKU: 9499790676



Retract Servo Covers (1pr)
SKU: 9499790677

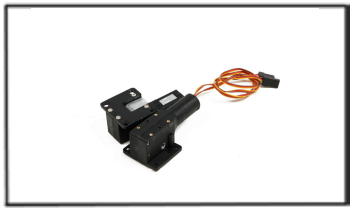
Flap Set w/Hinges
SKU: 9499790678



Linkage Set
SKU: 9499790679

Tail Wheel Set
SKU: 9499000229-0

Prop Adapter
SKU: 9499000240-0



Retract Set (1pr)
SKU: 9499000245-0

Prop Blades (3pcs)
SKU: 9499000246-0

Motor X-Mount
SKU: 9499000247-0

Wing Spar Set
SKU: 9499000248-0

DECAL APPLICATION GUIDELINES

Applying the supplied decals will take you longer than assembling the model. This is because great care must be taken when doing so. Please follow carefully the guidelines below to achieve the best possible finish on your Spitfire Mk.1a.

Note:

**** The decals supplied are vinyl type decals and are supported on a clear adhesives fronting film. These require care and attention when applying so please follow the below guidelines and the techniques outlined for the best results.***

1. Study the scheme reference sheet carefully and understand fully where each decal should be applied (see page 18).

2. Separate the decal you wish to apply (decals are grouped according to their layout on the model) from the main sheet. The entire decal sheet (including the paper backing) is pre-cut for you so you can seperate each group of decals as required.

3. Before lifting from the paper, rub the surface of the clear protective film/fronting to ensure all of the decal sticks to it. This will ensure the marking lifts fully off the backing paper in tact.

4. Peel the fronting off of the sheet ensuring the entire decal lifts with it.

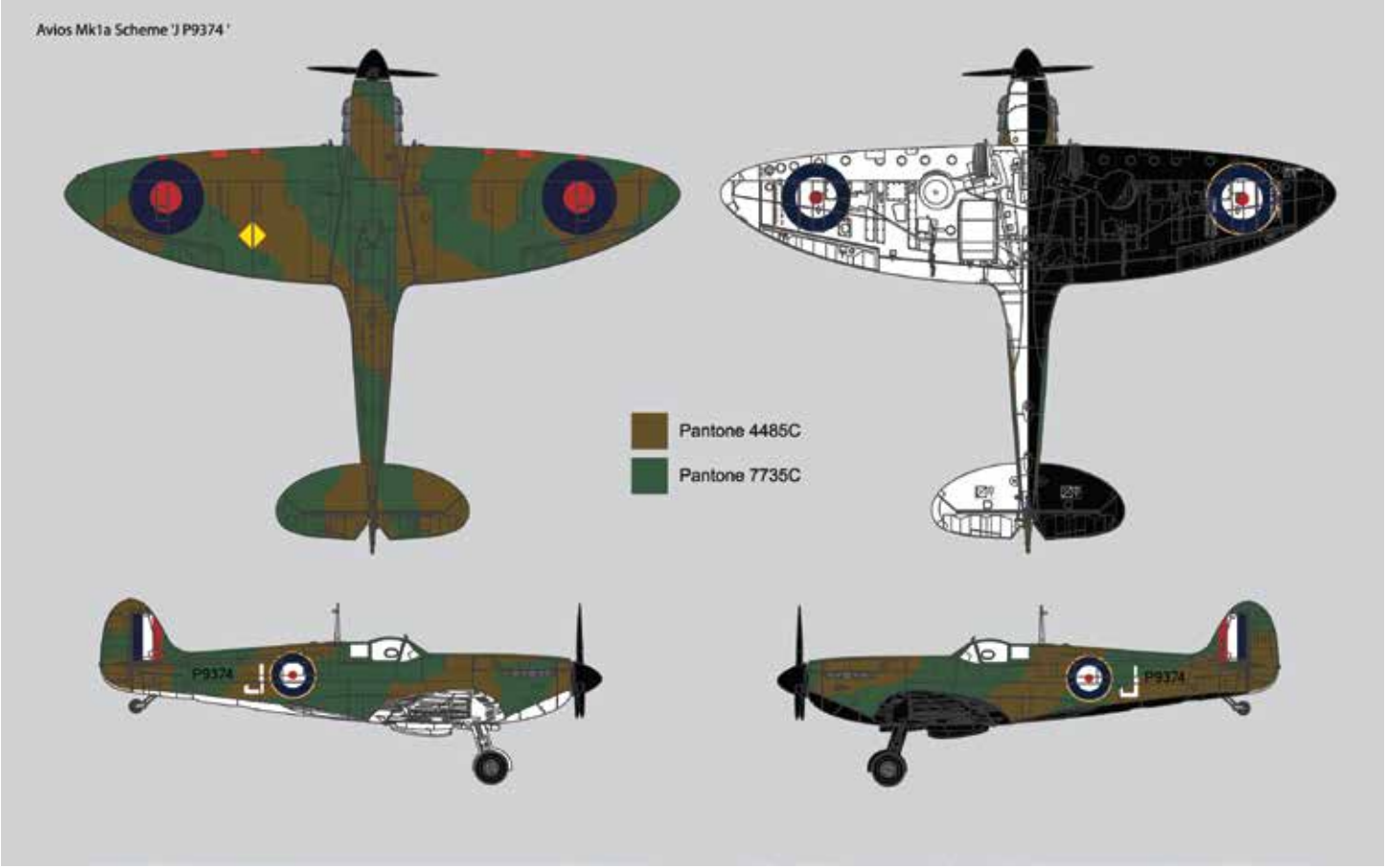
5. Position the decals/fronting carefully on the model according to the decal reference sheet then gently rub (using a dry cloth) the decal in place, rubbing from the center of the decal outwards, to avoid wrinkles and air bubbles.

6. If air bubbles are present, use the tip of a sharp blade to make a small hole in the bubble then rub over it again to push the air out.

7. Once the decal is firmly rubbed down and any air bubbles are removed, you can slowly remove the front clear protective film. DO NOT pull this clear film upwards to remove it, instead pull the film slowly off to the side. This will ensure the decal doesn't lift up from the surface of the model when you remove the clear film.

8. Very gently rub the decal again with a cloth now that the clear film is removed to ensure all edges are firmly stuck down.

9. Finally the use of a covering iron is STRONGLY recommended to seal the decals to the painted foam surface and prevent them from lifting at the edges over time. Set the iron to a low temperature and gently run the iron lightly over the surface of the decal as illustrated on the following page. Use of a cloth to cover the head of the iron is recommended to help prevent damage to the foam and the decal. A household iron can be used if no covering iron is available.



Positions of the decals on the Avios Spitfire Mk.1a.

Some extra tips for applying these type of decals can be found in this video.

https://www.youtube.com/watch?v=jE2CA5QJU6Q

DECAL TIPS

• Rub the clear front film before you remove the decal from the paper backing to ensure it lifts fully from the backing.

• Remove the clear fronting by pulling it gently of to one side once the decal has been applied. DO NOT pull this clear film directly upwards as this could cause the decal to tear.

• To avoid bubbles under the larger decals use a sharp blade to remove the small molding marks from the surface of the foam where the decal is to be applied.

• Position all decals carefully, once applied they cannot be removed without lifting the paint from the model.

• Be patient and take your time when applying the decals, this will reward you with the perfect finish.

• It is strongly recommended that a covering iron is used to seal the edges of the decals. If not, changes in temperature can result in the lifting of the edges.

Thank you once again for purchasing the Avios Spitfire Mk.1a. We hope you will have many happy hours flying this great model and we look forward to bringing you more Avios models in the future.

Made in China