



FOUR-STAR 40

Almost Ready To Fly



SIGRC44ARF

Assembly Manual

Introduction

SIG's FOUR-STAR 40 ARF combines the classic looks and performance of Sig's Four-Star series in an almost ready to fly package. The FOUR-STAR 40 ARF is easy to fly and makes an ideal choice for your first low wing airplane. Intermediate and advanced flyers will love the maneuverability and smooth handling of the FOUR-STAR 40 ARF, making it the sport model you'll want to take to the flying field every time.

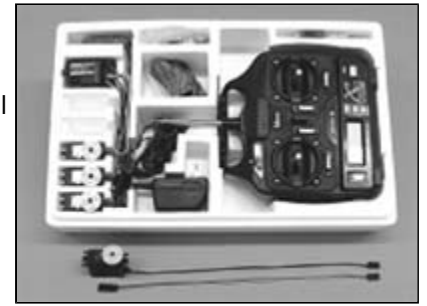
Set the control throws at the suggested rates for your first flights, throttle back and enjoy a truly honest, gentle airplane. As your skill level advances, dial-up the control throws a little to enjoy a very aerobatic airplane. Inside and outside loops, rolls, inverted flight, and snap maneuvers are all in the FOUR-STAR 40 flight envelope.

The FOUR-STAR 40 ARF kit has been engineered to get you into the air quickly as possible with an R/C model that will truly last. The airframe has been expertly built and covered with AeroKote™. This material is both rugged and easy to repair. The covering trim scheme is provided on two large peel & stick mylar decal sheets.

This assembly manual has been specifically sequenced to get your FOUR-STAR 40 ARF assembled and into the air very quickly. We strongly suggest that you read through the manual first to get familiar with the various parts and their assembly sequences. The proper assembly and flying of this aircraft is your responsibility. If you are new to the sport/hobby of radio control, we urge you to seek the assistance of a qualified person to help you assemble this model airplane. If you do not understand a particular assembly step or sequence, do not guess - find qualified help and use it.

Radio Equipment

The FOUR-STAR 40 ARF requires a standard 4-channel radio system and four standard servos. We have used and can highly recommend both the Hitec™ and Airtronics™ systems. Both of these very affordable and reliable radio systems offer all the features you'll need for this and the many other R/C aircraft in your future. For reference, this assembly manual shows the installation of a Hitec™ radio system with standard servos. In addition, you will need a 6" aileron servo extension, (usually provided with the radio).



Motor Selection

Motor choices for the FOUR-STAR 40 ARF are many. The FOUR-STAR 40 ARF has been designed to produce excellent performance when using the recommended motor sizes. Do not use an motor larger than recommended.

2-stroke motors are a perfect choice to power your FOUR-STAR 40 ARF. Any plain-bearing or bearing equipped .40 to .46 sport motor would be a good choice. For example, a great choice would be the Irvine .46 motor. Like all Irvine motors, the .46 is powerful, reliable, and quiet. Whatever motor you choose, take the time to carefully break it in according to the manufacturer's instructions. A good running, reliable motor is a minimum requirement for the enjoyment of this or any R/C model aircraft.

The FOUR-STAR 40 ARF can also use a variety of 4-stroke motors. Any 4-stroke motor in the .45 - .60 displacement range should provide plenty of power. An important thing to remember is that typical 4-stroke motors have their throttle arms usually located differently than throttle arms on 2-stroke motors. If you want to power this model with a 4-stroke motor, you will likely have to install a new, relocated throttle cable tube. While this is not difficult, it is something to consider when choosing an motor.

Covering Material

Your FOUR-STAR 40 ARF has been professionally covered using AeroKote™. This material is well known for its ease of application, light weight, and consistency of color. If you live in a dry climate, you may notice that some wrinkles might develop after removing the covered parts from their plastic bags. This is perfectly normal in low humidity climates. Your model was built and covered in a part of the world with relatively high humidity and therefore the wood was likely carrying a fair amount of moisture. When exposed to drier air, the wood typically loses this moisture, dimensionally "shrinking" in the process. In turn, this may cause some wrinkles. However, wrinkles are easy to remove by just using a hobby type heat iron.



We suggest covering the iron's shoe with a thin cotton cloth, such as an old T-shirt, to prevent scratching the film. The iron should be set to about 220O - 280O F (104O - 121O C). Use the heated iron to lightly shrink the material - do not press on it. Then lightly iron the material back down to the wood. You can also use a hobby-type heat gun to re-shrink the covering but you must be careful around seams or color joints. Re-heating seams may cause them to "creep", making them unsightly.

For part number reference, your FOUR-STAR 40 ARF was covered in AeroKote™ film with the following part numbers: #SIGSTL311 Bright Red or #SIGSTL330 Bright Yellow.

Required Tools

For proper assembly, we suggest you have the following tools and materials available:

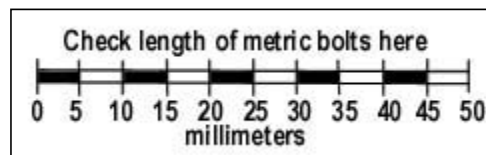


- A selection of glues - SIG Thin CA, SIG Thick CA and SIG Kwik-Set 5-Minute Epoxy
- Screwdriver Assortment
- Pliers-Needle Nose & Flat Nose
- Diagonal Wire Cutters
- Small Allen Wrench Assortment
- Pin Vise for Small Dia. Drill Bits
- Hobby Knife with Sharp #11 Blades
- Scissors
- Threadlock Compound, Such as Loctite® Non-Permanent Blue
- Small Power Drill With Selection of Bits
- Dremel® Tool With Selection of Sanding and Grinding Bits
- Heat Iron & Trim Seal Tool
- A soldering iron and solder.
- Masking Tape
- Paper Towels

Complete Kit Parts List

The following is a complete list of all parts contained in this kit. Before beginning assembly, we suggest that you take the time to inventory the parts in your kit.

Basic Aircraft Parts							
1	Fuselage	1	Right & Left Wing Panel Set with Ailerons.	1	Horizontal Stabilizer & Elevator Set.	1	Vertical Fin & Rudder Set
Wire Parts							
1	Formed Elevator Joiner Wire	1	Formed Tailwheel Wire with Hinge				
Hardware							
2	Nylon Control Horn with Back Plate; Elevator & Rudder	4	M2 x 15mm Horn Mounting Screws	1	5.3mm x 320mm Nylon Throttle Pushrod Housing	1	3.2mm x 280mm Nylon Throttle Pushrod
2	5.3mm x 521mm Nylon Pushrod Housing elevator & rudder	2	3.2mm x 686mm Nylon Pushrod elevator & rudder	2	M4 x 15mm Phillips Head Screws; for main landing gear attachment	2	M4 Split Lock Washer; for main landing gear attachment
4	M3 x 20mm Phillips Head Screws; for motor & mount attachment	4	M3 Flat Washers; for mount to firewall	4	M3 Split Lock Washer; for mount to firewall	1	2mm id Wheel Collar with set screws; for Tail Wheel
2	M4 x 40mm Phillips Head Screws; main wheel axles	4	M4 Lock Nuts; for axles	2	M4 Hex Nuts; for axles	4	M3 x 10mm Phillips Head Screws; Wheel Pant mounting
4	M3 Split Lock Washers; Wheel Pant mounting	2	1/4-20 x 1-1/2"Nylon Wing Bolts; for wing mounting	5	2mm Nylon R/C Links; for elevator (1), rudder (1), throttle (1), ailerons (2)	5	2mm Solder R/C Links; for elevator (1), rudder (1), throttle (1), ailerons (2)
2	2mm x 200mm Pushrod; for aileron (2)	4	2mm x 20mm threaded stud; for elevator (1), rudder (1), throttle (2)	2	2mm x 100mm Pushrod; for elevator (1),rudder (1)		
Miscellaneous							
1	3mm Formed Aluminum Main Landing Gear	1	Molded Clear Plastic Canopy	1	2 pc. Adjustable Motor Mounts, 40-size	2	7.0cm dia. (approx. 2 3/4") Main Wheels
1	25mm dia. (approx. 1") Tailwheel	1	2" dia. Spinner assembly	1	260cc (8.7oz) Fuel Tank Assembly	1	Left Wheel Pant
1	Right Wheel Pant	17	CA Hinges; for ailerons (9), elevator (6), rudder (3)	1	10mm Hardwood Wing Joiner	1	3mm Plywood Aileron Servo Tray
1	8mm x 20mm x 76mm Balsa; Fuel Tank Retainer	2	10mm x 124mm Balsa Triangle; Rudder Fairings	1	3mm x 15mm x 23mm Plywood;Throttle Pushrod Anchor	1	3/8" x 12" Iron On Covering Strip;Bottom wing joint
1	FOUR-STAR 40 ARF Instruction Book	1	Sig FOUR-STAR 40 Decal Sheet 1	1	Sig FOUR-STAR 40 Decal Sheet 2		
Additional Items Required (Not included in kit)							
1	4 Channel Radio with 5 Standard Servos	1	6" Servo Extension cables	1	.40 to .50 2-Stroke motor & Muffler or .45 to .60 4-Stroke motor & Muffler	4	6-32 x 1-1/4" bolts, washers & lock nuts: Motor to mount
1	Propeller to match motor used	2	9" Medium Silicone fuel tubing	2	1cm x 8cm x 20cm Foam Rubber; for radio packing		



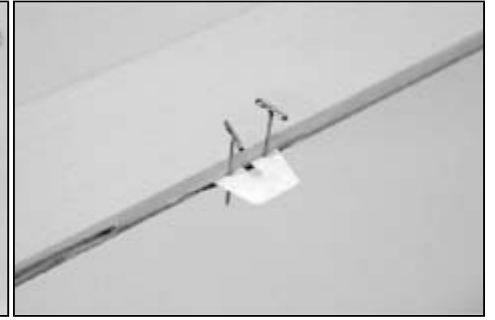
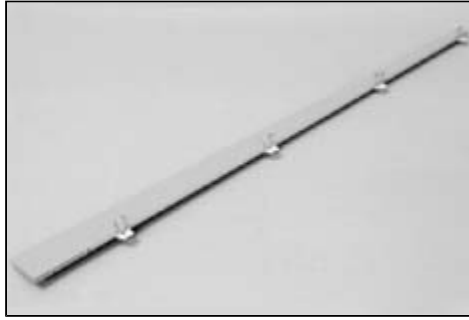
ASSEMBLING THE WING

The wing on the FOUR-STAR 40 ARF is designed as a strong, easy to assemble one piece unit. To avoid unnecessary dents, dings, or scuffing of the various covered parts, we suggest that you cover your workbench with a protective blanket or foam sheet while assembling your model.

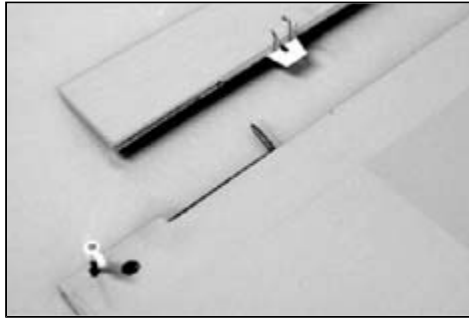
Installing The Ailerons

For the following steps you will need: 1 each left and right wing panels (with ailerons & hinges)

1. The installation process for the aileron hinges is the same for all of the control surfaces on this model. Press the four CA hinges into the slots in the aileron. Use pins in the center of each hinge to keep them centered when pressing them into the slots in the trailing edge of the wing.



2. Mix up a small batch of 5 minute epoxy. Carefully apply a small amount to the aileron torque rod groove at the inboard end of the aileron. Carefully press the torque rod into the aileron and insert the hinges into the trailing edge of the wing. Wipe away any excess epoxy from the aileron and trailing edge of the wing. Adjust the aileron so that the tip of the aileron is flush with the wing tip.



The ailerons should be tight against the pins in the hinges to minimize the gap between the wing and the aileron. The aileron is now in the proper position for permanently gluing them in place with thin CA glue.

3. Flex the aileron down and hold it into this position with a piece of masking tape. Remove the pins from one hinge and apply 4-5 drops of thin CA glue to the hinge. We suggest using a fine tipped applicator on the glue bottle to better control the flow of glue.



4. Remove the pins from the next hinge and repeat the gluing process. Finish gluing the rest of the hinges in the same manner. Remove the tape that is holding the flexed aileron in position and flex the aileron in the opposite direction and re-apply the masking tape to hold it in this position. Now apply 4-5 drops of thin CA glue to the bottom of each hinge on the aileron. Remove the masking tape and return the aileron to its center position. Because it takes a little time for the glue to fully wick its way through the entire surface of the hinge and the surrounding wood, allow 10 minutes before flexing the aileron. Any spilled glue can be removed with Sig Debonder.

After sufficient time has passed, flex the aileron up and down several times to create free and easy movement. You must also pull on the aileron at each hinge location to be sure that the hinges are firmly bonded in place. Repeat this process to attach the aileron to the other wing.

Joining The Wing Panels

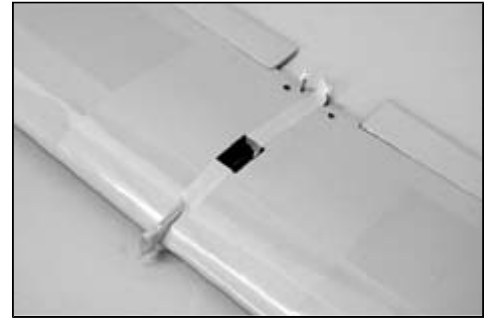
For the following steps you will need:

- 1 each left and right wing panels with ailerons attached
- 1 each 10mm Hardwood Wing Joiner

1. Slide the 10mm Hardwood Wing Joiner into one of the wing panels and then slide the other wing panel into position to test the fit of the joiner. The wings should fit tightly together and the center ribs should fit flush around their edges. If you need to make any adjustments to get the proper alignment, you may slightly trim the openings in the wing ribs.



- Use Sig Slow Cure epoxy to join the two wing panels together. Apply the glue generously to the end ribs, Work some glue into the joiner slots and coat the hardwood joiner. Carefully slide the wing halves into place and hold them in the proper alignment with tape until the epoxy cures. Wipe away any excess epoxy that oozes from the center joint with a paper towel or a rag dampened with isopropyl alcohol before the glue cures. Be careful that the leading and trailing edges of the two wings are perfectly aligned and that there is no built in twist.



Installing The Aileron Servo And Pushrods

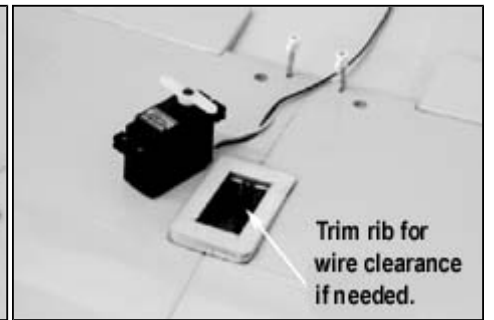
For the following steps you will need:

- 1 each Joined wing with ailerons installed
- 1 each 3mm Plywood Aileron Servo Tray
- 1 each Aileron Servo
- 2 each 2mm x 200mm Pushrod
- 2 each 2mm Nylon R/C Links
- 2 each 2mm Solder R/C Links

- Center the 3mm Plywood Aileron Servo Tray over the cutout in the top of the wing. The tray has a doubler glued to one end to make it thicker. This end is the front. When properly positioned, use a felt tip pen to mark the front and back edges.



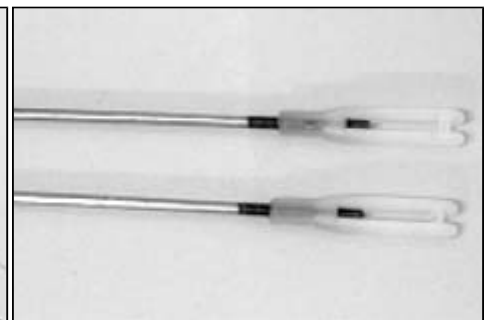
- Remove the servo tray and carefully cut the covering away from the areas where the servo tray makes contact with the wing. Now use thin C/A to glue the servo tray into position.



- Test fit the aileron servo in the servo tray. The servo output arm should be facing the trailing edge of the wing. The servo tray may be trimmed slightly to allow the servo to fit. Also, the center wing ribs may interfere with the wire where it exits the servo. If this is the case you may trim away the ribs as needed.

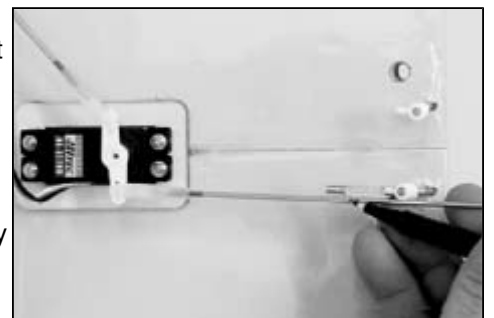
Note: We recommend using servo output arms for the aileron servos. The arms should be at 90 deg. to the servo when the aileron control stick on the transmitter is in neutral and the transmitter trims are in neutral as well.

- Fit the servo into the servo mount in the wing panel. Take up any slack in the servo cable as you insert the servo by pulling on the end of the cable where it exits the top of the wing. Use a pin vise and a small drill bit to drill small pilot holes in the servo mount for the servo mounting screws. Use the screws supplied with your radio system to mount the servo securely in place on the servo tray.



- Thread one of the 2mm Nylon R/C Links onto the 2mm x 200mm Pushrod so that the barrel of the connector is centered on the threaded section of the pushrod.

- Attach the Nylon R/C Links and pushrod to the second to last hole in the aileron servo output arm. Place a 2mm Solder R/C Link into the hole in the fitting on the aileron torque rods. Hold the aileron pushrod against the solder link. Make sure that the servo is still in the neutral position and tape the aileron into approximately neutral position. Mark the pushrod wire 1/8" beyond the end of the center barrel of the solder link.



NOTE: Depending on the type of servo that you use, you may have to bend the pushrod slightly in the middle to angle it up from the wing so that it is aligned with the control horn without putting any bending force on the servo arm.

7. Remove the pushrod from the servo and remove the solder link from the torque rod. Cut the pushrod at the mark. Slip the solder link onto the end of the pushrod so that the end of the rod extends 1/8" beyond the barrel on the link and solder into position, using enough heat to "sweat" the joint completely.



8. Reattach the pushrod to the servo and the aileron torque rods. The aileron should be approximately neutral. Final adjustment will come later. Now fabricate and install the opposite pushrod assembly the same way.

FITTING THE WING TO THE FUSELAGE

For the following steps you will need:

- The assembled wing
- The fuselage
- 2 each 1/4-20 x 1-1/2" Nylon Wing Bolts
- 1 each 3/8" x 12" Iron on Covering Strip

1. Now mount the wing onto the fuselage and install the nylon bolts through the wing and into the blind nuts installed in the fuselage. Now remove the wing and bolts from the fuselage.



2. Take the 3/8" x 12" Iron-on Covering Strip and apply it to the bottom of the wing to cover the joint at the center of the wing.

The strip should start at the bottom of the finger at the leading edge and wrap around the trailing edge and ending on the top of the wing.

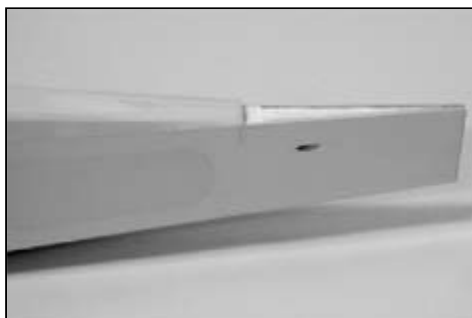
ASSEMBLING THE FUSELAGE

Preparing The Fuselage

For the following step you will need the fuselage.

The fuselage has been built and covered but there may be several openings that must now be opened up. If these openings have not had the covering removed from them, you must use a sharp knife to cut away the covering from these areas.

1. Elevator & Rudder pushrod exits... Located below the stabilizer at rear of fuselage.
2. Two screw holes for mounting landing gear... Located on the bottom of the fuselage just ahead of the wing opening.



3. Motor compartment drain hole... Located on the bottom of the fuselage just ahead of the firewall.

Also, at this time, you should drill a 1/16" dia. antenna exit hole in the aft fuselage bottom sheet. This hole should be about 1/4" behind the wing opening in the fuselage and centered left to right.



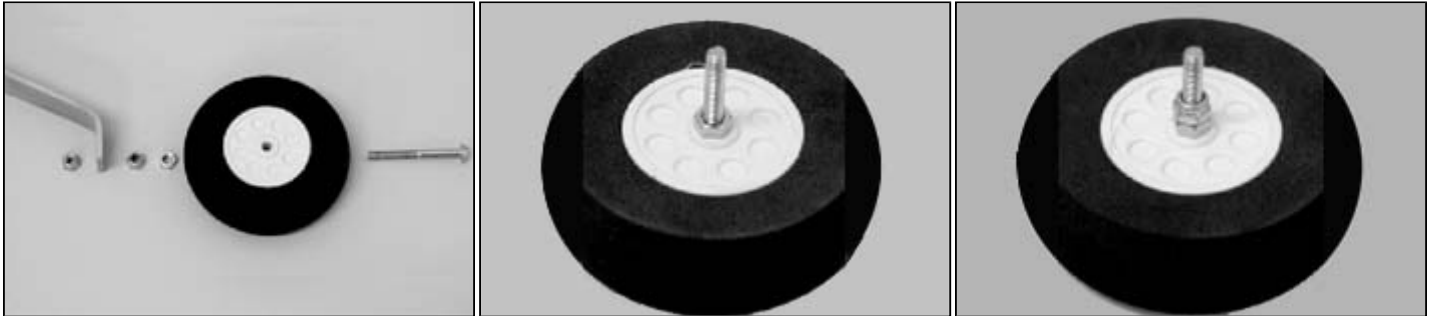
Installing The Main Fuselage

For the following steps you will need:

- The Fuselage
- 1 Formed Aluminum Main Landing Gear
- 2 M4 x 15mm Phillips Head Screws
- 2 M4 Split Lock Washer
- 2 M4 x 40mm Phillips Head Screws
- 4 M4 Lock Nuts; for axles
- 2 M4 Hex Nuts; for axles
- 4 M3 x 10mm Phillips Head Screws
- 4 M3 Split Lock Washers
- 2 7.0cm dia. Main Wheels
- 1 Left Wheel Pant
- 1 Right Wheel Pant

Note: When assembling the hardware in the following steps you must use a thread-locking compound such as Loctite® #242.

1. Slip one M4 x 40mm Phillips Head Screw through one wheel. Thread one M4 hex nut onto the threads snug or finger tight against the wheel.
2. Use a Phillips screw driver to hold the screw from rotating while you thread one M4 Lock Nut onto the axle screw. Use a wrench to thread the locknut onto the axle. Stop the locknut when it is close, but not touching the hex nut. A space between the nuts equal to about 3 or 4 sheets of copy paper is good. Now hold the lock nut from turning with one wrench while using another wrench to tighten the hex nut tight against the lock nut. There should be a slight amount of play and the wheel should rotate freely on the axle screw.



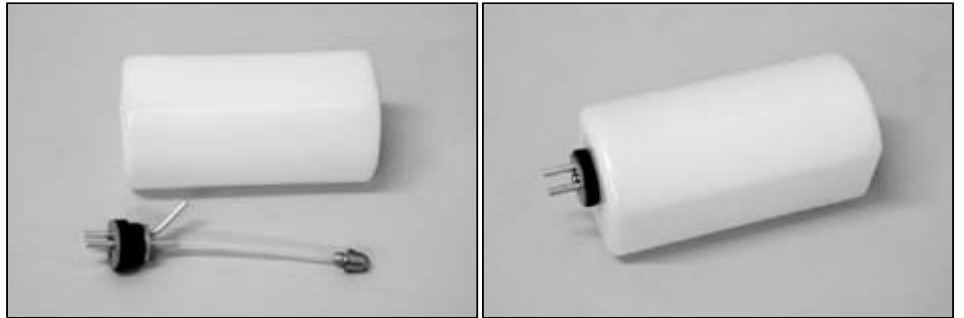
3. Now slide the axle through the hole in the aluminum landing gear. Use one wrench to hold the wheel side lock nut while using another wrench to tighten the retaining lock nut tightly against the aluminum landing gear. Now repeat for the other main wheel & axle.
4. Slide one of the wheel pants down on the wheel. Position the mounting holes in the wheel pant so that they line up with the mounting holes in the aluminum landing gear. Use the four M3 x 10mm Phillips Head Screws & four M3 Split Lock Washers to secure the wheel pants to the landing gear. Again, be sure to use Loctite®.
5. The entire landing gear assembly is now mounted onto the bottom of the fuselage using the two M4 x 15mm Phillips Head Screws & two M4 Split Lock Washers.



MOTOR AND FUEL TANK INSTALLATION

Fuel Tank Assembly

The 260cc (8.7oz.) fuel tank supplied with this kit is now assembled. We suggest using a simple two line fuel system in this airplane. One fuel line is connected to the "clunk" or fuel pick-up line and the motor's carburetor. This same line will also be used to fill the tank. The second line is the overflow line for use when filling the tank.



After filling the tank, this same line is then connected to the motor's muffler pressure nipple, providing muffler pressure to the tank. Note that the rubber stopper for the tank has two holes all the way through it. Use these holes for the two fuel lines. Gently bend the aluminum overflow tube upwards to 90°, to reach the top of the tank. Adjust the length of the internal silicon fuel tubing to allow free movement of the fuel pick-up inside the tank. Press the stopper assembly into the neck of the tank and secure by tightening the compression screw firmly. Do not over tighten this screw.

Motor Installation

Note: These instructions describe the installation of a typical 2-cycle motor. There are some variations between brands of motors so you may find some small details that are different for your installation. The same thing holds true if you are using a 4-cycle motor. Just adjust the mounting and throttle pushrod location to fit your installation.

This instruction sequence will install both the fuel tank and the motor. Therefore, you will need the following

- The Motor (with muffler removed) - not included
- The Assembled Fuel Tank
- 1 Throttle Pushrod Housing
- 1 8mm x 20mm x 76mm Balsa Fuel Tank Retainer
- 2 Motor Mounts
- 4 M3 x 20mm Phillips Head Screws
- 4 M3 Flat Washers
- 4 M3 Split Lock Washer
- 2 9" Lengths of Silicon Fuel Tubing - not included
- 4 6-32 x 1-1/2" Socket Head Screws - not included
- 4 #6 Washers - not included
- 4 6-32 Lock Nuts - not included

1. Feed the throttle pushrod housing into position in the holes in the firewall and the internal fuselage formers. Leave about 1" extending forward of the firewall. Use epoxy to secure the housing in place. The fuel tank is installed first. Apply a bead of silicon sealer around the neck of the fuel tank and install it into the fuel compartment, aligning the neck with the round hole in the firewall. Press the neck into the firewall hole. Allow the silicon sealant to cure before applying any pressure to the fuel lines.
2. Glue the 8mm x 20mm x 76mm Balsa Fuel Tank Retainer into position against the front of the former at the rear of the fuel tank. Do not allow the retainer to block the throttle pushrod holes that are located in the former.



NOTE: The motor compartment was fuel proofed during production of the airplane. However, for a little extra insurance, you could give the motor compartment an additional coat of surfacing resin. If you decide to do this, use a brush to apply the resin and be sure to brush the resin up to the covering edges. In addition, YOU WILL HAVE TO SEAL THE EDGES OF THE FUSELAGE SIDES AFTER THEY ARE TRIMMED FOR MUFFLER AND NEEDLE VALVE CLEARANCE.



- Place the four M3 Split Lock Washer onto the four M3 x 20mm Phillips Head Screws followed by the four M3 Flat Washers. Apply a little thread-locking compound to the screws and install the two motor mount arms to the firewall - do not tighten in place yet. As mentioned earlier, these arms can be positioned to adjust to the width of the motor's crankcase. Place your motor on the motor mount arms and move the arms as needed to accept the motor. Also, center the motor to the fuselage in the top view. When everything appears correct, tighten the screws, securing the mounts to the firewall.

Important Note: The triangular gussets / webs on the motor mounts are located on the bottom side of the mounts as shown. Be sure to maintain this orientation when attaching the motor to the mount.

- Temporarily install the spinner back plate and propeller onto the motor and snug up finger tight. Place the motor onto the mounts. Slide the motor forward or aft until the rear face of the spinner is 1/4" to 3/8" in front of the fuselage sides.

Use a punch or pencil to mark the motor's mounting screw locations directly onto the motor mount arms. Remove the motor and drill the four required holes in the mounts for your motor. If you are using 6-32 x 1 1/2" screws and lock nuts (not supplied) to mount your motor, use a 5/32" dia bit for the clearance holes. Do not drill and tap these motor mounts. Doing so may weaken them. Temporarily bolt the motor to the mount. Test fit the muffler and needle valve. You will have to cut away the fuselage side for clearance. There should be about a 1/8" gap between the fuselage side and the bottom of the muffler / needle valve. After the fuselage sides have been trimmed for the proper clearance, seal them with epoxy to fuel proof the bare wood.

Now, reinstall the motor securely to the mount. Use a little thread-locking compound on all screws when assembling these components. The muffler should be mounted after the throttle linkage has been installed in a following section.

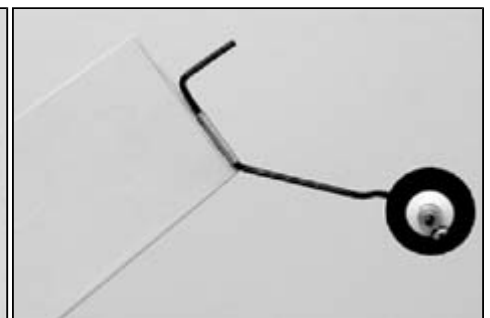


TAIL SURFACE INSTALLATION

For the following steps you will need:

- The Fuselage
- 1 Horizontal Stabilizer & Elevator Set.
- 1 Vertical Fin & Rudder Set
- 1 Left & Right Vertical Fin gussets
- 1 Formed Elevator Joiner Wire
- 1 Formed Tailwheel Wire
- 1 Tailwheel
- 1 2mm id Wheel Collar with set screw
- 9 CA Hinges; elevator (6), rudder (3)

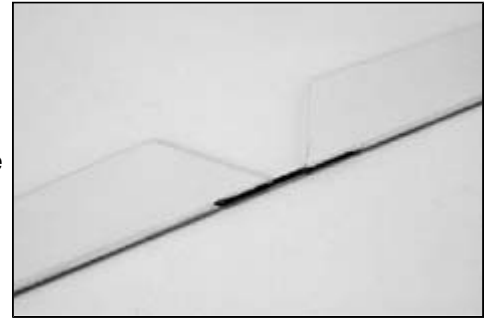
- Slide the tail wheel onto bent tailwheel wire. Now slide the wheel collar onto the axle and tighten the set screw. Don't forget the Loctite®. The collar should be spaced slightly away from the wheel and not tight against it.
- Test fit the tailwheel wire to fuselage. The metal hinge bracket slides into the slot that is cut in the rear of the fuselage.



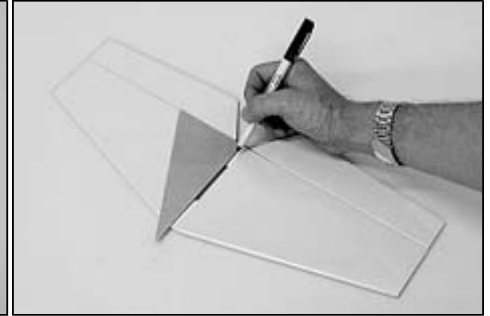
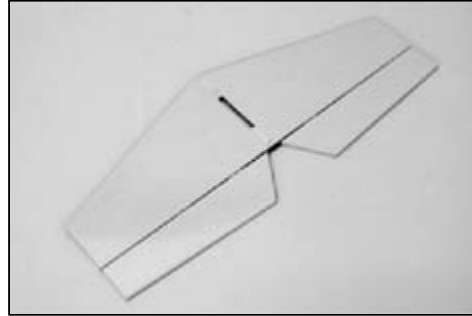
The hinge bracket should be positioned as low in the slot as possible. About 1/8" from the bottom of the fuselage. Now remove the tailwheel assembly from the fuselage. Apply a small drop of oil to the inside of the hinge bracket. Do not get any oil on the outside of the hinge bracket. Use epoxy to glue the tailwheel assembly back into position on the fuselage.

- The elevators are now joined, using the elevator joiner wire. Note: The elevator joiner wire in your kit may already be glued to the elevators. If it is, carefully check it for security. If it is OK, then you can move on to gluing the hinges.

4. Use a toothpick or small dowel to apply epoxy into the elevator joiner holes and channels in each elevator half. Press the wire elevator joiner into each elevator half and lay the assembly on a flat work surface, protected with waxed paper. Wipe off any excess glue with a paper towel and alcohol. Make sure the leading edge of the entire elevator assembly is straight (we held the elevators against the rear of the stabilizer for several minutes while the epoxy cured). Allow the epoxy to cure completely before continuing.

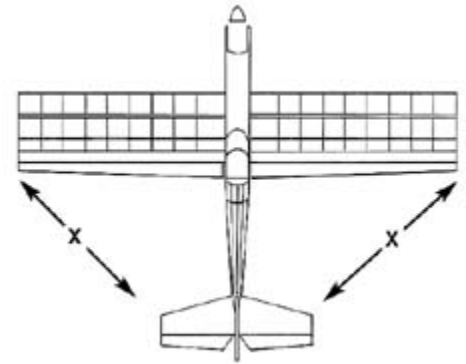


5. The elevators are now hinged to the stabilizer. Install and glue the six elevator hinges in place to the horizontal stabilizer, using the same method that you used for the ailerons.



6. Use a felt tip pen and a small square to mark the centerline on the top of the stabilizer.

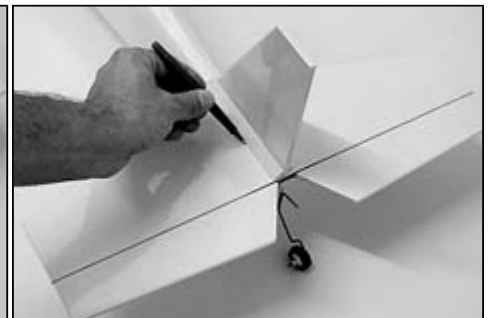
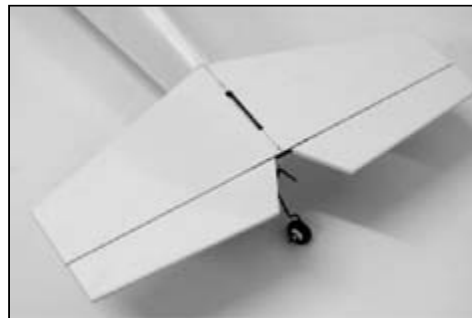
7. Test fit the horizontal stabilizer in place onto the rear of the fuselage. Position the stab accurately and make any final adjustments that might be needed. We have found it helpful to attach the wing panels to the fuselage before gluing the stab in place. This provides a good visual aid when checking the stab for level and also for being square to the wings in the top view. Lay the stab in place, being careful to align it squarely and that the slot at the rear of the stab is aligned with the fuselage sides. With the fuselage on a flat surface, sight the model from the front. The stab should be absolutely aligned with the wings, without leaning to one side or the other. If it is leaning, use a small weight or a little masking tape to straighten it out.



8. Now use a felt tip pen to mark the position of the fuselage onto the bottom of the stabilizer.



9. You must now carefully remove the covering from the stabilizer in order to expose the wooden structure for gluing. The covering should be trimmed away 1/16" inside the drawn lines. It is extremely important that you cut the covering only and not the balsa underneath. **Do not cut into the balsa.**



10. The horizontal stabilizer is now glued in place onto the rear of the fuselage. We suggest using 5-minute epoxy for this job to allow time to position the stab accurately and make any final adjustments that might be needed. Allow the glue to set completely.

11. Place the fin and left & right fin gussets into position on the model. Use a felt tip pen to mark the position of the fin and gussets onto the top of the stabilizer. You will also want to mark the location of the gussets on the side of the fin and top of the stabilizer. Remove the fin and gussets from the model.

12. Carefully remove the covering from the stabilizer and fin in order to expose the wooden structure for gluing. The covering should be trimmed away 1/16" inside the drawn lines. It is extremely important that you cut the covering only and not the balsa underneath. Do not cut into the balsa. Also remove the covering from the sides of the fin in the location of the tail fairings.



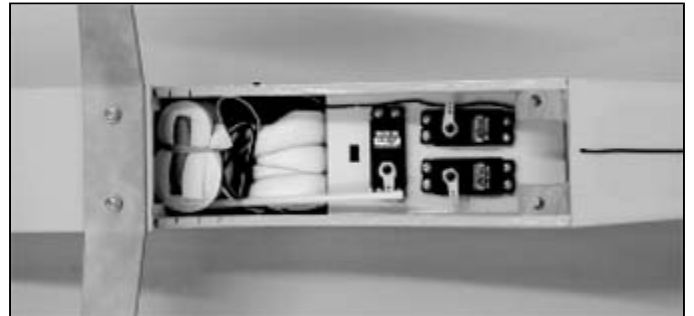
13. The vertical fin and gussets are now glued in place onto the rear of the fuselage - use 5-minute epoxy to give a little working time. Apply glue to the exposed wood on both sides of the fin base and to the bottom of the fin where it contacts the stab. With the fin and gussets in place, sight the model from the front to make sure the fin is absolutely 90° upright to the stab. If needed, use a little masking tape to pull it into alignment. Wipe off any excess glue using alcohol.



14. The rudder is now hinged to the vertical fin and the rear of the fuselage. Use the same hinging method as you used for the ailerons and elevators. Use 5 minute epoxy on the tail wheel wire to bond it into the hole in the front of the rudder.

RADIO INSTALLATION

1. Because the aileron servo is already installed and ready, the installation of the rest of the radio system only consists of dropping in the rudder, elevator and throttle servos, the receiver, and the switch. The pushrod connections to these servos will be made shortly. Install the rubber grommets and eyelets supplied with your radio system onto the rudder, elevator, and throttle servos. Install all three servos in place into the fuselage servo tray, again using the screws supplied with your system. We have found it handy to label the servo leads for easy identification when plugging them into the receiver.
2. The on/off switch should be mounted on the fuselage side opposite of the motor exhaust. You must cut a small rectangular slot for the switch body and mount it with the hardware supplied with the radio system.
3. The receiver is now mounted in place. First feed the receiver's antenna through the 1/6" hole that you drilled in the bottom of the fuselage just behind the wing. The receiver is wrapped in foam rubber, (not included), and placed in the fuselage, just ahead of the servos. Use foam rubber to pad your airborne battery pack. Wrap the pack securely within foam and slide it forward under the fuel tank. The final location of the battery pack will be determined during final balancing.



Pushrod Assembly & Connection

From the kit contents locate the following:

- The Fuselage
- 2 Nylon Control Horn with Back Plate
- 4 M2x15mm Horn Mounting Screws
- 1 5.3x320mm Nylon Throttle Pushrod Housing
- 1 3.2x280mm Nylon Throttle Pushrod
- 2 3.2x686mm Nylon Pushrod
- 3 2mm Nylon R/C Links
- 3 2mm Solder R/C Links
- 4 2x20mm threaded stud
- 2 2x100mm Pushrod

You will also need three servo output arms for your servos and be sure your radio system is charged and ready to use for this section.



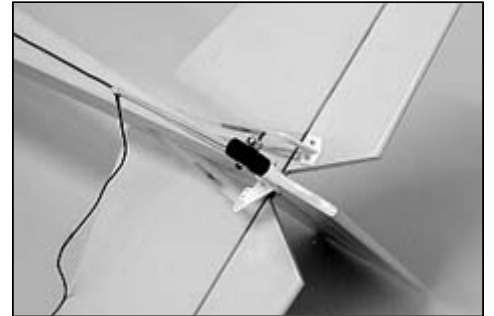
1. Use your soldering iron to solder the unthreaded ends of the three 2mm x 20mm threaded studs into three of the solder links.

2. Insert the unthreaded end of the 2mm x 100mm Pushrod into one of the 3.2mm x 686mm Nylon Pushrods, up to the threads on the rods. Thread the rod into the tube about 3/16" - 1/4". Repeat this procedure with the remaining tube and rod. Also, Insert the unthreaded end of the 2mm x 20mm threaded stud into the 3.2mm x 280mm Nylon Throttle Pushrod. Thread it in like the elevator and rudder pushrods. Thread a nylon R/C link onto the exposed threads of each rod - these are the ends that will be attached to the rudder and elevator control horns, and to the carb.



3. Start with the rudder pushrod. Looking at the fuselage from the rear, the rudder pushrod exit is on the left side. Use a hobby knife to cut the base away from the nylon control horn. Attach the control horn to the nylon R/C link. Slip the unprepared end of the nylon control tube into the pushrod exit at the rear of the fuselage on the left side. Push the rod all the way into the radio compartment. Hold the nylon control horn in place against the rudder at its leading edge, lining up the holes in the horn with the hinge line of the rudder. Use a pencil to press indentations into the rudder covering through the two screw hole locations on the base of the horn.
4. Remove the nylon control tube from the fuselage and remove the control horn from the R/C link. Use a 3/32" dia. bit to drill two holes through the rudder at the marks just made. Press two M2 x 15mm screws through the base of the rudder horn and the holes in the rudder. Hold the nylon base part to the opposite side of the rudder and secure the horn in place with a screwdriver.

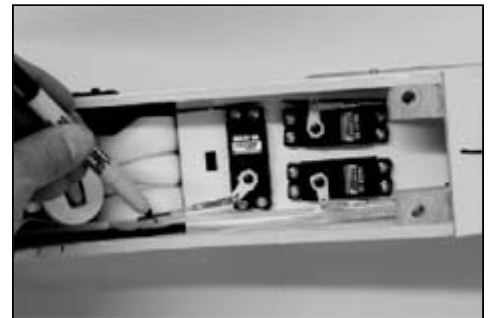
5. The nylon elevator control horn is mounted to the bottom of the right elevator half (when viewed from the rear) in the same manner as the rudder horn. Note that the elevator horn is angled slightly inward toward the fuselage to line-up with the pushrod exit. Install both the rudder and elevator pushrods into their exits from the rear of the fuselage and snap the R/C links in place to the nylon horns.



6. The pushrod connections are now made for the rudder and elevator servos. Begin by neutralizing the rudder and holding it in this position with masking tape.

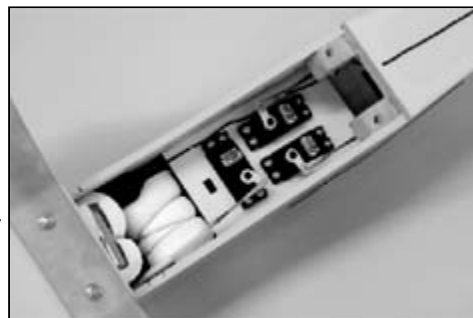
Turn the radio system on and center the rudder and elevator transmitter trims. Trial-fit the servo arms onto the servos until you find a spline location that places one of the arms at 90 deg. to the servo body. We suggest clipping off the other three arms to avoid any potential mechanical interference. Press the servo arms in place.

Press one of the solder links into the outermost hole in the rudder servo arm, alongside the nylon pushrod. With the solder link and pushrod tube in this relationship, use a marker pen to make a mark on the nylon tube for cutting the tube to final length. This length must leave enough tube to thread the stud end of the solder link into it about 1/2" or half way. Cut the tube with your hobby knife at the mark just made.



Thread one of the solder link/studs into the end of the trimmed nylon rudder pushrod. Connect the solder link to the servo output arm. Adjust the rear nylon R/C link as needed to set the rudder at neutral. Repeat this process for the elevator servo connection.

7. The throttle pushrod is made up the same way as the rudder and elevator pushrods. Slide the unfinished end of the throttle pushrod into the housing in the firewall. Attach the nylon clevis to the throttle arm on the carburetor. Mark and cut the end of the pushrod to length and thread the remaining solder coupler into the end.

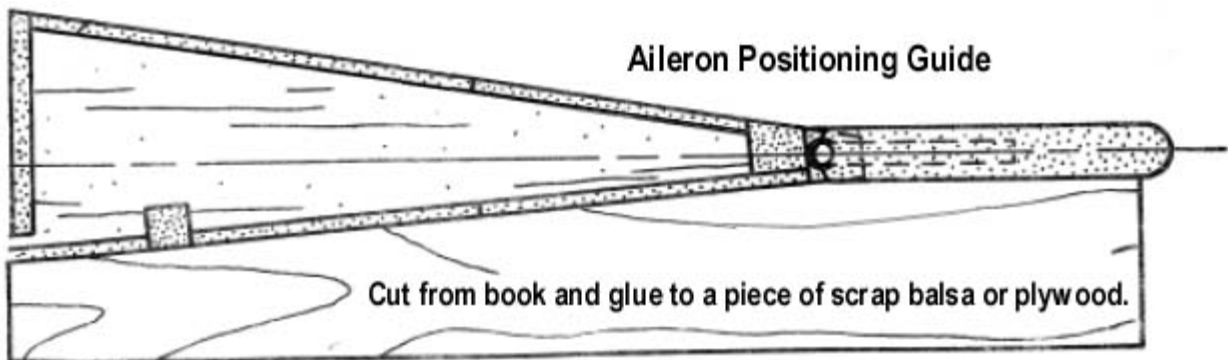


Use the radio to test the throttle action and adjust as needed to obtain true "low" and "high" throttle movement without any binding.

- Use the Aileron position Guide (APG). to precisely measure the neutral position of each aileron. First cut the APG from the book and glue it to a scrap piece of wood or cardboard. Make sure you trim the edges of the APG exactly on the printed lines. Then hold the APG tight against the bottom of the wing panel at the trailing edge. Adjust the length of the aileron pushrod until the bottom surface of the aileron is flat against the rear of the APG.
- After the flight surfaces have been neutralized, take the time to fit each R/C link with a short length of fuel tubing (medium silicon tubing is fine for 2mm hardware) to keep the links firmly in place to each control horn and servo arm.

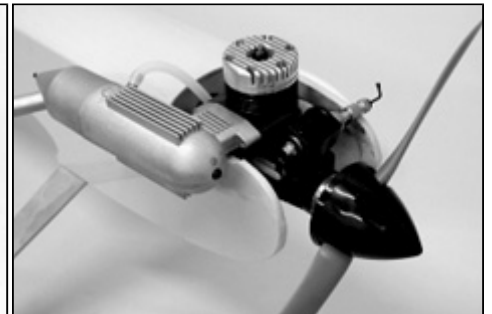


This common safety practice has saved a lot of models! Last, make sure that you have secured the servo arms to each servo with the retaining screws.



SPINNER ASSEMBLY

- Locate the black SIG spinner assembly from the kit contents. This spinner is easy to install, lends a great look to your finished FOUR-STAR 40 ARF and is ready for use with APC propellers! Choose the correct adapter ring for your motor.



- The fit should be a nice slip fit over the motor's prop shaft. Slip the spinner back plate onto the prop shaft and onto the adapter ring. The propeller is installed next, followed by the nose cone. The cone is held in place with the provided screws. Be sure to snug the screws securely in place, but do not over-tighten them. Install the muffler onto the motor and connect the fuel tank vent line to the pressure outlet on the muffler.

CONTROL SURFACE TRAVEL

There are any number of different radio systems currently in use and on the market. Because of this, it is not possible to explain the optimum set-up for all systems for this particular airplane. The following suggested control surface travel information is based on our experience with the FOUR-STAR 40 ARF. These suggested surface movements should be considered as starting points. As your experience and confidence builds, control movements can be adjusted to suit your particular style of flying and to explore the airplane's capabilities.

Surface	Control Surface Travel	NOTE:
Elevators	1/2" Up - 1/2" Down	These measurements were taken as follows:
Ailerons	5/8" Up - 5/8" Down	Elevator travel measured at the widest inboard trailing edge
Rudder	1" Left - 1" Right	Aileron travel measured at the inboard trailing edge
Throttle	Full Range Of Travel	Rudder travel measured at the widest lower trailing edge

DECAL APPLICATION

The decals supplied with your FOUR-STAR 40 ARF are high quality Mylar® with an extremely aggressive adhesive. These are not die-cut decals and must be removed from the sheet with a hobby knife and a sharp #11 blade or sharp scissors.

We suggest the following method to accurately apply the larger decals in this kit. Carefully cut out the decal and lift it off the sheet with tweezers. Use a product like SIG Pure Magic Model Airplane Cleaner, Fantastic®, or Windex® to spray the area of the model that will receive the decal. Then spray the adhesive side of the decal as well. Lightly position the decal in place on the model.



The liquid cleaner allows the decal to slide easily into the desired position as long as you don't press down on it. Once you have it in position, hold the decal lightly in place with your fingertips and use a paper towel to gently dab the excess liquid away. Use a small squeegee to now set the decal in place, removing all excess liquid and any trapped air bubbles from beneath the decal. The SIG 4" Epoxy Spreader - #SIGSH678 - is perfect for this job. Remove any excess fluid with a dry paper towel and allow the decals to set overnight. They will be solidly adhered to the model without any air bubbles.

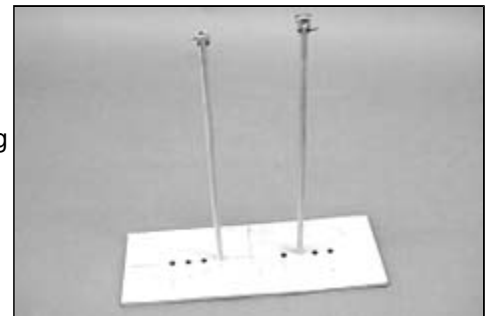
BALANCING THE MODEL

Balancing this or any R/C model airplane is critical to its ultimate success in the air. The recommended starting balance point for the FOUR-STAR 40 ARF, is located 2-15/16" behind the leading edge of the wing. This measurement corresponds to the center of the main spar. We have flown this airplane with the balance point location back as far as 3-1/2" without any trouble. However, moving the balance point further back tends to make the elevators more sensitive. Remember that the model is always balanced with the fuel tank empty.

Using a simple balancing fixture, such as two dowels with rubber tips to protect the finish. It is the most accurate method for determining and adjusting the correct balance point. However, since the balance point is located at the main wing spar on this airplane, you and a friend can lift the assembled model at the wing tips to check the balance. The airplane should balance perfectly level. If the nose hangs down, the model is nose heavy. Likewise, if the model hangs tail down from level, it is tail heavy. If either of these conditions exist, they should be corrected.

If the model is nose heavy, try shifting the location of the battery pack a little further back to correct the condition. If the model is still nose heavy, small stick-on lead weights - available from your hobby shop - can be used to temporarily correct the problem. Later, these can be placed inside the fuselage, through a hole that can then be covered over with matching covering film.

If the model is tail heavy, move the battery pack as far forward as possible to correct the problem. If the airplane still needs more weight to balance, then adding weight such as stick-on lead weights should be used.



FLYING

If you have carefully followed the assembly instructions in this manual, test flying your new FOUR-STAR 40 ARF should be a lot of fun. When it comes to test flying a new model, we always advise modelers to choose a calm day with little or no wind. These conditions allow you to better evaluate and more accurately adjust the trim requirements for your airplane. As we've mentioned before, a good running, reliable motor is a must for the ultimate success of your airplane. Take the time to solve any motor problems before you try to fly.

Always make it part of your pre-flight routine to check each control on the airplane, making sure the surfaces are moving in the correct directions. Also check each control linkage to be sure they are secure and that nothing is loose. With all the controls checked, make a range check with your radio system, making sure everything is working perfectly.

After starting and warming up the motor, taxi the FOUR-STAR 40 ARF out to the take-off position on the flying field, (holding up elevator during the taxi will keep the tailwheel firmly to the ground). For take-off, the airplane should be lined-up with the center of the field with the nose pointed directly into the wind. Hold a little up elevator and smoothly advance the throttle - do not slam the throttle full open all at once. As the FOUR-STAR 40 ARF begins moving forward, back off of the up elevator input and use the rudder as needed to correct any motor torque and/or wind induced deviations from a straight take-off run. At takeoff speed use a slight amount of up elevator to lift off, using ailerons to keep the wings level. Climb to a reasonable altitude before making any trim changes.

Although not intended as a trainer, the FOUR-STAR 40 ARF is a very forgiving design that allows you to fly at relatively low speeds. With the control movements set at the measurements provided in this manual, the airplane should exhibit smooth, predictable control. Try a few loops and rolls. Inverted flight is easy, requiring a little down elevator for level flight. The FOUR-STAR 40 ARF also performs nice inside and outside loops, snap rolls, Immelmans, stall turns, Cuban eights, and spins. Of course, it is not a pattern aircraft but with practice, there isn't much that it won't do. As with any aircraft, getting consistently good results is usually just a matter of practice.



While still at altitude, throttle the motor back to idle. This will give you a good idea of the glide characteristics. While still at idle, steadily increase up elevator input to get a feel for the stall characteristics. Stalls tend to be very gentle with the nose dropping straight ahead with little tendency to drop a wing. This is great information to have when setting up your first landings.

Landing the FOUR-STAR 40 ARF is typically a pleasure. We suggest using a standard landing approach, beginning with a throttled back downwind leg and base turn to the final approach into the wind. During final approach, keep just a little power on the motor until the airplane is over the end of the runway. In crosswind situations, a little rudder input will likely be needed to keep the airplane lined up with the runway. The FOUR-STAR 40 is best landed in the three-point position. As long as we're on the subject, no landing gear system is bulletproof. Your FOUR-STAR 40 ARF has a great landing gear system that has proven to be very tough on both grass and asphalt flying fields. However, it can be ripped off during less than desirable landing approaches, poor field conditions, failure to flare, and just plain "brain fade". If this happens, simply epoxy the landing gear block back in place and learn to be more careful the next time. After landing, always remember to hold up elevator when taxiing to keep the tailwheel firmly to the ground.

We sincerely hope that your FOUR-STAR 40 ARF will provide you with many, many enjoyable flights. We also hope that this has been a pleasurable kit for you to assemble and fly. Please operate your airplane in a safe, responsible manner with constant regard to other flyers, spectators, and property.

Warning! This is not a toy!

Flying machines of any form, either model-size or full-size, are not toys! Because of the speeds that airplanes must achieve in order to fly, they are capable of causing serious bodily harm and property damage if they crash. IT IS YOUR RESPONSIBILITY AND YOURS ALONE to assemble this model airplane correctly according to the plans and instructions, to ground test the finished model before each flight to make sure it is completely airworthy, and to always fly your model in a safe location and in a safe manner. The first test flights should only be made by an experienced R/C flyer, familiar with high performance R/C aircraft.

The governing body for radio-control model airplanes in the United States is the ACADEMY OF MODEL AERONAUTICS, commonly called the AMA. The AMA SAFETY CODE provides guidelines for the safe operation of R/C model airplanes. While AMA membership is not necessarily mandatory, it is required by most R/C flying clubs in the U.S. and provides you with important liability insurance in case your R/C model should ever cause serious property damage or personal injury to someone else. For more information, contact:

ACADEMY OF MODEL AERONAUTICS
5161 East Memorial Drive
Muncie, IN 47302
Telephone: (765) 287-1256
AMA Web Site: www.modelaircraft.org

Customer Service

SIG MFG. CO., INC. is totally committed to your success in both assembling and flying the Four-Star 40 ARF kit. Should you encounter any problem building this kit or discover any missing or damaged parts, please feel free to contact us by mail or telephone.

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	SIG MODELER S HOTLINE (for technical support)	1-641-623-0215
	SIG WEB SITE	www.sigmfg.com

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