



F – 5 Tiger Instruction Manual

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Magnum Models would like to thank you for purchasing one of our kits. We would like to remind you to read the instructions before you start building this kit to avoid any mistakes that could cost you time in building.

We take great pride in the manufacturing of our kits in the hope of bringing you a quality kit that is easy to build and fly. We also take great pride in selecting quality foam and materials that should greatly reduce the amount of time and effort you will have to spend in the assembly of our kits. Remember our kits are built by flyers for flyers.

Be a Responsible Flyer

Remember to fly only in areas that are safe for radio control planes. Never fly close to houses or power lines. Avoid areas with people like public parks. Magnum Models is not responsible for injury or property damage caused by this airplane. Remember FLY SAFE; be aware of who and what is around you.

Recommended Radio Equipment

The radio equipment we use was chosen for its weight, durability, and power. The recommended radio equipment has been used successfully in the prototype F-5's. For durability and maintenance, we like to use metal-g geared servos. It is easier to replace servo arms than servo gears. If you fly inland slopes with light to moderate lift, you should be concerned with the minimum weight (light weight = better performance in light lift). If you choose to use servos other than those recommended, they should be comparable in terms of power.

BATTERY – 600mah to 800mah flat 2/3 A packs will work. Larger capacity batteries provide longer flight times and reduce the need for adding lead (useless weight) to balance the aircraft.

RECEIVER – JR 600 and 700 series and Hitec 535 and 555 receivers are a good fit. We prefer to use the smallest receiver possible to reduce weight: however, there is sufficient space for any modern receiver. We are using a Burg receiver with much success.

SERVOS – Hitec HS-82MG or HS-85MG servos are an excellent choice for the ailerons because of their small size and power. In the prototypes we use these servos, but standard size servos could be used if you are willing to pay the weight penalty.

Tools and Supplies Needed to Complete This Kit

ADHESIVES, TAPES, AND COVERING MATERIAL:

For our airplanes, we use clear 100% Silicone because it is readily available at most hardware stores.

Epoxy, 5 minute to 30 minute. Five minute is faster but slower cure rates are stronger.

Contact adhesive, 3M-77

Two inch filament tape

Covering – Ultracoat or any other low temperature heat shrink covering.

TOOLS:

Hobby knife with number 11 blades, 6 inch or 12 inch ruler, 3/8" brass tube with the end sharpened, sanding blocks with various grits of sandpaper, "snap-blade" knife or other long bladed sharp knife, Dremal tool with 1/8" router bit (optional), ultra fine "Sharpie" or ball point pen.

NOTE: Prior to beginning construction read the instructions carefully and study the drawings.

Wing Construction

1. Lightly sand the wing with 100-grit sandpaper to remove the "fingers" left during the cutting of the cores.
2. Scuff the carbon fiber spar to remove the shine. Apply a liberal amount of 3M-77 to the spar channel; install the spar in the channel. The spar should end approximately 1" from the wingtip. Glue a piece of 1/4" EPP in the spar channel from the end of the spar to the wingtip. Epoxy, "Goop" or hot glue may be used instead of 3M-77. Allow the glue to dry.
3. Lightly sand the trailing edge stock to remove any saw marks.
4. Epoxy the sub-trailing edge (T.E.) stock to the wing trailing edges. Insure the T.E. stock and wing T.E. are glued on a flat surface and remain on the surface until the epoxy has set.
5. Plane and sand the trailing edge to match the contour of the wing. Sand the T.E. to a thickness of 1/16".
6. Make a line on each aileron, parallel to the center chord line of the wing, 2" and 10" from the wingtips. Draw a line 3/16" aft of the wing/trailing edge glue joint between the existing 2" and 10" lines on the T.E. Cut on these lines to make the aileron.
7. Sand a radius on the leading edge of the wing.
8. Cut and sand the excess 1/4" EPP flush with the wing tips.
9. Make a right and left torque rod. Insure the brass-bearing is placed over the torque rod before the second bend is made. **Note:** The treaded end of the torque

rod should be $7/8$ " long and the aileron end of the torque rod should be $5/8$ " long.

10. Cut a $1/8$ " wide groove, centered on the aileron hinge line, in the T.E. starting $1/2$ " from the wing centerline and ending an aileron cutout. The groove should be deep enough to allow the torque rod to be in the center of the T.E.
11. Lightly sand the brass tube on the torque rod assembly. Spread Vaseline on the ends of the torque rod where you don't want epoxy to stick. Epoxy the torque rod assemblies in their respective grooves. When the epoxy has cured, fill the grooves with light weight spackling.
12. When the spackling has dried, insure the torque rods move freely, and then sand the spackling to match the contour of the wing.
13. Make a cutout in the center of the wing the size of the servo case and $1/2$ " deep, forward of the spar, for the aileron servo. Temporarily install the aileron servo and the ailerons. Fabricate the aileron linkage. Remove the aileron servo and ailerons.
14. Make a mark $3/4$ " and $1\ 3/4$ " aft of the leading edge (L.E.) on the wings centerline on bottom of wing. Place the 1 " x 3 " x $1/8$ " wing hold down block between these marks centered on the wing centerline. Trace the outline of the hold down block on the foam. Remove enough foam in this area so the hold down block will sit flush with the wing surface. Epoxy the hold down block in the cutout.
15. Spread a thin layer of lightweight spackling over the entire wing and allow to dry. When dry, sand the spackling to match the contour of the wing. Fill any low spots with another layer of spackling, allow to dry and sand to a smooth surface. Note: This provides a smoother surface when the wing is covered.
16. Bevel on the L.E. of the aileron top, bottom, and center hinge. Remove the sanding dust from the ailerons and cover.
17. Spray the lower surface of the wing with a light coat of 3M-77, allow to dry a few minutes and cover the bottom of the wing.
18. Spray the top of the wing with a light coat of 3-M77. Allow to dry a few minutes and cover top of wing.

Fuselage Construction

1. Study the drawings and place your radio equipment on the fuselage in the indicated locations. The exact location for the equipment on your fuselage may have to be altered based on your choice of servos, receiver, and battery, but keep the location of the equipment as close to the locations indicated in the instructions and shown on the drawings. This will make balancing the F-5 easier.
2. Starting 4 1/2" aft of the nose cut a cavity for the battery. Cut this cavity so the battery will be snug but not so tight so as to deform the fuselage. The battery should be installed from the bottom of the fuselage.
3. Starting 1 1/2" aft of the battery cut a cavity for the receiver. When cutting this cavity, insure it is cut large enough to allow the battery and servo plugs to be installed. The receiver should be installed from the bottom of the fuselage.
4. Approximately 1" forward of the wing saddle on the bottom of the fuselage, cut a cavity for the switch. The switch slide should be slightly under the surface of the fuselage.
5. Within the wing saddle, cut a cavity approximately 1 1/4" wide by 1" deep between the L.E. and T.E. The dimensions of the cavity may have to be altered based on your choice of servos and their installed locations.
6. Within the horizontal stabilizer saddle, cut a 1" wide by 1" deep cavity between the L.E. and the T.E.
7. With a sharpened 3/8" diameter brass tube, bore a wire channel between the battery cavity and the receiver cavity, and from the receiver cavity to the switch cavity, and from the switch cavity to the wing saddle cavity.
8. Determine the approximate location of the elevator servo in the wing saddle cavity (at the servo location the wing saddle cavity may have to be modified to allow the servo to sit below the surface of the wing saddle). From the end of the servo arm, draw a line to the center of the elevator cavity T.E. Cut a groove in the bottom of the fuselage 1/8" wide by about 1/2" deep for the elevator pushrod housing.
9. Install the pushrod housing in the groove. The housing should extend into the horizontal stabilizer cavity approximately 1 1/2" and into the wing saddle cavity about 1". Install the pushrod in the housing and check servo to control horn alignment.
10. Cut 1/8" wide strips of EPP and push into the groove above the pushrod housing.

11. Cut a pocket for, and epoxy the 1" x 3" x 1/4" front wing mounting block in the wing saddle, centered 1 1/4" aft of the L.E. Insure the wing-mounting block is flush with the surface of the wing saddle.
12. Cut a pocket for, and epoxy the 1" x 2 1/4" x 1/4" aft wing mounting block in the wing saddle, centered 5/8" forward of the trailing edge. Insure the wing-mounting block is flush with the surface of the wing saddle.
13. After the wing mounting block epoxy has cured, center the wing on the saddle, measure the dimension from each wingtip to the same point on the end of the fuselage. Adjust the position of the wing in the saddle until this dimension is the same on each side of the wing.
14. Match drill a pilot hole through the center of the front wing mounting block and the wing hold down block 1 1/4" aft of the leading edge. Check the wing alignment, adjust as required, and then match drill a pilot hole through the center of the T.E. into the rear wing mounting block 5/8" forward of the trailing edge.
15. Drill through the pilot holes in the mounting blocks in the saddle with a #7 bit, then tap with a 10-24 tap. Apply a drop or two of thin CA to the threads. Drill through the pilot holes in the wing with a 1/4" bit.
16. Cut pockets for and epoxy the 2 1/4" x 1/2" x 1/4" horizontal stabilizer mounting blocks in the horizontal stabilizer saddle. Insure the mounting blocks are installed flush with the surface of the saddle. The front mounting block should be centered 3/4" aft of the saddle L.E. The aft block should be centered 1" forward of the saddle T.E.
17. Route the battery wire to the receiver cavity and install the battery in its cavity. Make and install a foam plug to fit in the cutout from the bottom of the battery to the bottom of the fuselage.
18. Route 6" or 9" servo extensions between the receiver cavity and the wing saddle cavity.
19. Route the switch charge jack to the wing saddle cavity and the switch battery and receiver plugs to the receiver cavity.
20. Make all electrical connections and verify everything works.
21. Install the switch and receiver. Make and install a foam plug to fit in the receiver cavity.
22. Three quarters of an inch forward of the aft end of the fuselage cut a 1/8" wide groove 1/2" deep in the center of the fuselage of the vertical stabilizer.

23. Draw lines $\frac{1}{2}$ " from the fuselage and engine intake "corners". About 6" aft of the nose, taper the lines so they are about $\frac{3}{8}$ " from the "corners": at the nose. About 12" from the end of the fuselage, taper the lines so they are about $\frac{1}{4}$ " from the "corners" at the end of the fuselage.
24. Use a snap blade knife or other long sharp knife to cut the corners off of the fuselage on the lines.
25. Carefully shave the remaining points off of the fuselage then sand the fuselage and intakes to a "round" shape with 60 grit sandpaper. Finish sand with 120 or 150 grit sandpaper.
26. Glue the exhaust nozzles to the end of the fuselage.
27. For a smoother fuselage surface refer to step 18 under wing construction.
28. Remove the sanding dust from the fuselage. Spray with a light coat of 3M-77 and allow to dry for a few minutes then Apply fiber tape spray and then cover with your favorite low temperature covering.

Tail Assembly

1. Taper the trailing edges of the vertical a thickness of $\frac{1}{16}$ ".
 2. Sand a radius on the leading edge of the vertical stabilizer.
 3. NOTE: The next two steps are optional and the material for accomplishing either of these steps is not included in the kit. Accomplishing either of these steps will increase the strength of the horizontal stabilizer and will improve the "ding" resistance of the leading edge.
 - A. Cut $\frac{1}{4}$ " of material off of the tapered portion of the L.E. of the horizontal stabilizer. Glue a $\frac{1}{4}$ " by $\frac{1}{8}$ " section of basswood or spruce in place of the removed section. Trim the reinforced L.E. to match the shape of the original horizontal stabilizer. When finished with this option, skip to step four.
- OR
- B. Block sand both sides of the horizontal stabilizer on a flat surface. Radius the L.E. of the horizontal stabilizer. Taper the T.E. of the horizontal stabilizer to a thickness of one sixteenth of an inch or less. Vacuum bag the horizontal stabilizer with 2 oz. to 3.2 oz. fiberglass. For additional ding resistance, add a 1" wide strip of cloth over the L.E. before bagging the stabilizer. When finished with this option, skip to step five.

4. Block sand both sides of the horizontal stabilizer. Radius the L.E. of the stabilizer. Taper the T.E. to 1/16" thick.
5. Center the horizontal stabilizer on its saddle. Drill pilot holes on the stabilizer centerline, centered over the through the stabilizer mounting blocks. Drill the mounting blocks with a number 36 bit and tap with a 6-32 tap. Drill the pilot holes in the stabilizer with a number 29 or 9/64" bit. Apply a drop or two of thin CA on the screw threads on the mounting holes in the fuse. When it is dry, retap the holes.
6. Bevel the T.E. of the stab and use a tape hinge on the bottom.
7. Temporarily install the elevator on the horizontal stabilizer. Install the elevator pushrod in its housing. Use the pushrod to locate and align the elevator control horn. Install the control horn in the basswood.
8. Prepare the vertical stabilizer, horizontal stabilizer and elevator for covering and cover. Cover all parts for final assembly.

Final Assembly

1. Glue the elevator servo in the fuselage and make the elevator linkage.
2. Make all electrical connections and verify proper operation.
3. Assemble the airplane and balance. The CG should be 3 3/8" aft of the L.E. at the wing root.
4. Adjust the control throws. The ailerons should deflect 1/4" up and down for the initial flights, and up to 3/8" up and down for future flights (if you have dual rate capability on your radio, set the aileron throw at 1/4" in the low rate position). The elevator throws should be 1/4" up and down.
5. Go flying and have fun!!!

Parts List for F – 5

- 1 - 1.9 EPP Fuselage
- 2 – 1.9 EPP Wings
- 2 – 1.9 EPP Exhaust Nozzles
- 1 – 1.9 EPP 1/4 x 1/4 Filler Strip
- 1 – 1.9 EPP Scrap block For Plugs
- 1 – Shaped Fin 1/8 Balsa
- 2 – Shaped Balsa Ailerons
- 2 – Carbon Wing Spar

Part #1 Front and rear stab mounting blocks 1/2 x 2 1/4 x 1/4 ply

Part #2 Front wing mounting block 1 x 3 x 1/4 ply

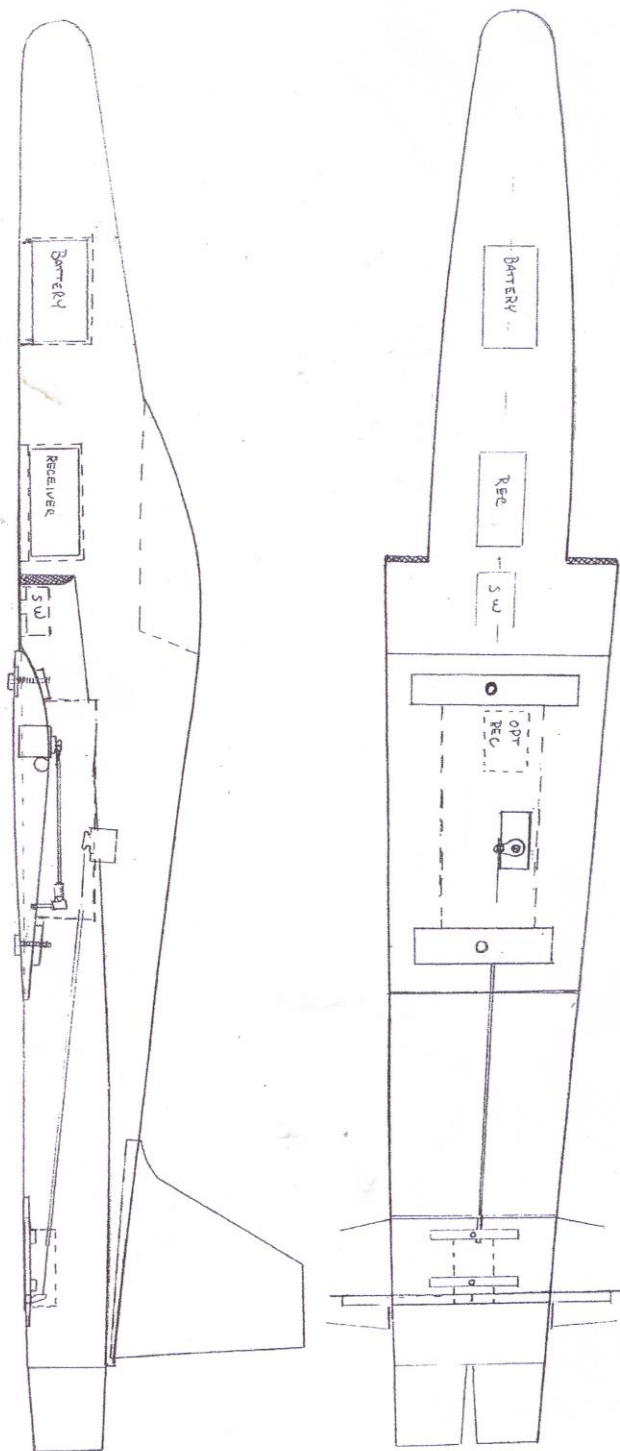
Part #3 Rear wing mounting block 1 x 3 x 1/4 ply

Part #4 Wing bolt plate 1 x 3 x 1/16 ply

Hardware

- 1 – Elevator Pushrod and Housing 1/32 Wire
- 2 – 10 x 24 Nylon Wing Bolts
- 2 – 8 x 32 Nylon Stab Bolts
- 3 – Nylon Washers
- 2 – 4-40 Torque Rods with Brass Sleeves
- 1 – 2-56 Threaded Rod
- 1 – Threaded Brass Coupler
- 1 – Nylon Control Horn for the Elevator
- 5 – Nylon Clevises
- 2 – Nylon Torque Rod Horns
- 2 – CA Hinges to be cut into three pieces each
- 1 – Clear Canopy
- 1 – 1/4 x 4” Brass jointer tube

F-5 Fuselage Radio Installation and hard point diagram



F-5 Wing Diagram

