

READY TO FLY? WELL...MAYBE!



It is your first plane. The box said it was **Ready-To Fly** (RTF) from the minute you bought it. In fact, you almost went straight from the hobby shop to the flying field. But the salesperson told you to charge the batteries for twenty-four hours before flying. So you took the box home and opened it. It quickly became obvious that you had some work to do. Not a lot, but some.

RTF airplanes are almost completely built. The airframe is totally built and covered. Only a few assembly steps, using a screwdriver, are required. No adhesives are used. The radio, control surfaces, engine and fuel tank are all installed. Still, the wing halves have to be assembled and the horizontal stabilizer and vertical fin installed. The control rods must also be attached to the control surfaces.

It took a while, maybe even a few hours. But you were careful, you worked slowly, you didn't force parts together and you may have worked around a minor assembly problem or two. But there it is! Once together, it looks great, it looks BIG and it looks sleek with the pointed spinner and swept-back windshield. You are as proud of it as if you had spent the whole winter building it from a wood kit. And you should be proud. Not many people are willing to take on the challenge of flight and most people certainly do not have the patience to assemble their own aircraft. You did.

But hold on for a moment. Is this RTF really *ready-to-fly*? This plane was assembled in a distant factory by mass production methods. Even though today's model manufacturers quality control everything while producing the finest products our hobby/sport has ever seen, mistakes can sometimes happen. Plus, during its journey to you, the plane was rattled in its box and endured large temperature and humidity changes.

Once it is airborne, you can't park the plane on the side of the road to make any adjustments or fix a problem. Whatever you problem take off with, you will have until you land. It's better to spend a little time and check that beauty over before launching it against both Fate and Gravity. But what do you need to check?

What to check? A lot, but it is all easy to check and you may learn about flight during the process. Let's start with the parts inside the fuselage. Sit down, get a small flashlight, some small Phillips and regular screwdrivers, put the plane on the workbench and look inside. You will see something like this:



Photo 1 Photo 2

Checking Inside

Those black objects with plastic arms hooked to metal rods are called the servos. The servos move in response to your transmitter stick movements that are interpreted by the radio receiver and are powered by the plane's on-board battery. Using a small Phillips screwdriver, gently make sure all the mounting screws are tight. Go easy, those screws are only into thin plywood, do not over tighten. Sometimes the wooden servo tray, the part the servos are mounted in, may dry out during shipment and shrink. This causes the screws to loosen. You do not need servos loose in the plane as that makes straight flight very difficult.



Photo 3

Next is a very important step. Take your transmitter and put all the trim tabs (photo 4) in the neutral position. The trim tabs are those small levers just under, or to the side of, the control sticks (photo 4). Then check that the plastic servo arms, on top of the servo connected to the metal rods, are perfectly centered. In photos 5 and 6, one servo in each set was not centered at the factory. In the first example, the servo that is connected to the rudder, and nose gear steering, was not centered. The plane in photo 6 had the elevator servo arm positioned off center.

Sometimes, the servo is not at its neutral point when the servo arm is connected at the factory. This causes the off-center problem. The fix is easy. Using a small Phillips screwdriver, remove the center arm screw (photo 7). The next photo shows the screw removed (photo 8). Next, with the plane and transmitter turned on, gently lift the servo arm off the servo and reposition it in the center. The servo shaft has small plastic teeth onto which the arm slides. These are very tiny plastic teeth, DO NOT force the arm on, just slowly rotate it until it slips back on by itself. Photo 9 shows the arm re-installed and centered. Turn the radio equipment off, support the arm with your hand and gently re-install the center screw.

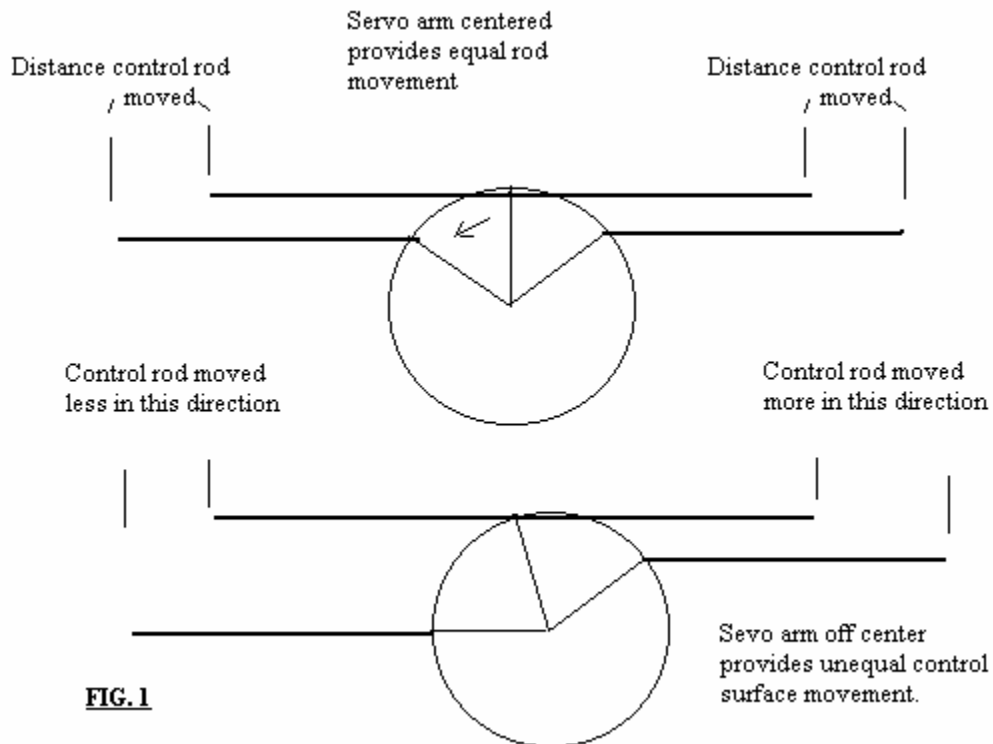


Photo 7



Photo 8 Photo 9

Why is this so important? The servos rotate, but the control rods move in a linear fashion. If the arm is off center, even if the control surfaces are neutral, the servo will move the control surface more in one direction than in the other. Except for ailerons, this is not desirable. To see how this happens, look at figure 1 below:



Centering the servo arm may cause the control surface to move from the neutral position. In photo 10, this plane's elevator was in neutral with the servo arm off-center (photo 6 above). Once the servo arm was centered, the elevator was then deflected downwards (photo 11).



Photo 10 Photo 11

We'll fix this later on. One note, the throttle servo arm should be checked with both throttle trim and throttle control stick in their center positions.

If all the servos are properly centered, check the center arm screw to insure it is tight. Do not apply a lot of force as the screw threads into plastic. Just make sure it is snug.

If the battery to switch connector is visible and accessible, as it is in photo 12, tie some medium thread around it to make sure it never works itself loose.



Photo 12 Photo 13

Most RTF planes use a setscrew to connect the nose wheel steering to the rudder servo (photo 13). If you did not have to move the rudder servo arm, check to make sure this setscrew is tight and the front wheel is straight. If you did move the servo arm, we'll fix this later on.

The last inside check involves the fuel tank. Remove the fuel hoses from the muffler and engine needle valve assembly. Don't lose track of which one goes where! Gently blow into the muffler line. You should feel air flowing freely out the needle valve line. If not there is a blockage. Just moving the fuel tank backwards about one-eighth inch usually solves this problem.

Once the air is flowing freely, clamp the engine line tight in your fingers and GENTLY blow into the muffler line again. Gently! Save all that breath for the flying field bull sessions. There should be no sounds of air leaks and pressure should build quickly in the muffler line, stopping further air input. Release the engine line and you should feel the pressure exhaust itself there.

You have just shown that the fuel system will not be leaking once it is pumped full of fuel. If there were an air leak, remove the engine and tighten the stopper screw shown in photo 14. Check the fuel lines for holes.



Photo 14

Setting Control Surfaces

That completes the inside checks. Move back to the tail, turn the receiver and plane on, transmitter trims in neutral, and sight down the vertical fin. If the rudder is deflected to one side as in photo 15, this must be corrected. Remove the clevis using a small screwdriver to unlock it, as in photo 16, and remove it from the control horn.

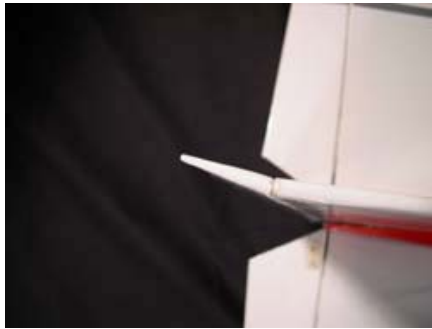


Photo 15



Photo 16

The clevis is adjustable

Clamp two rulers over the vertical fin and the movable rudder as shown in photo 17. Hobby clamps are useful for this task. Hold the control rod with pliers as in photo 18 and turn the clevis in or out until the clevis pin is even with the hole in the control horn.

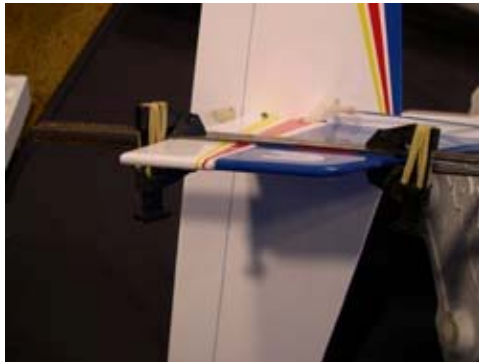


Photo 17



Photo 18

It is not necessary to install and remove the clevis to check how the adjustment is proceeding. This puts unnecessary wear on it. Instead just close the clevis all the way until the pin protrudes as in photo 19 and then put only the protruding pin into the control horn's hole. Remember that the radio must still be turned on. Once the clevis pin fits easily into the control horn hole, the clevis is adjusted.

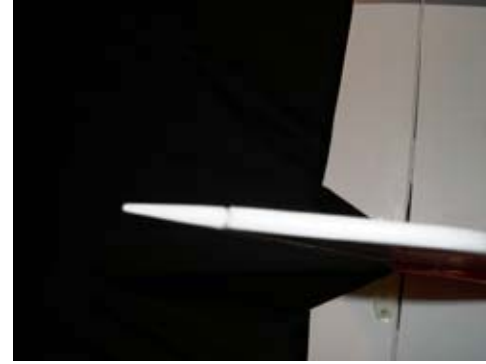


Photo 19 Photo 20

Remove the clamped rulers and connect the clevis, including the locking rubber piece. The rudder should be perfectly centered as in photo 20. Once the rudder is adjusted, the front wheel may no longer be straight. Adjust this by loosening the setscrew on the rudder servo arm, center the wheel and tighten. While at the nose wheel, tighten the nose bearing mounting screws (photo 20A).



Photo 20A

The flight control surfaces of any airplane, even those of a trainer, are extremely sensitive. If these surfaces are not exactly neutral, the plane WILL respond as if a flight control command were given. An offset rudder will cause the plane to fly slightly crooked. Be sure to center the elevator the same way as you did the rudder (photos 21, 22). Make your first flight with centered control surfaces. The plane flies better that way.

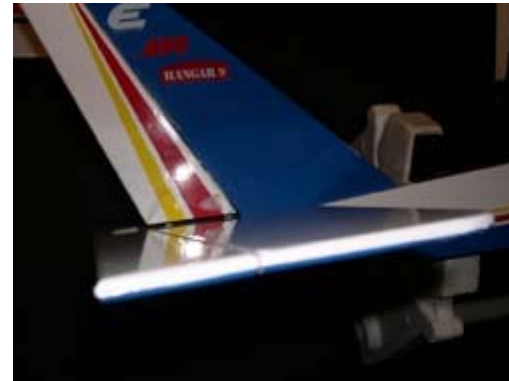


Photo 21 Photo 22

The ailerons also need to be centered before flying. Connect the aileron servo to the extension lead in the plane and turn on the radio. Center the servo arm and then check for alignment. The ailerons should be exactly aligned with the wing's trailing edge. If not, as in photo 23 below,

disconnect the clevis, use a small plastic clamp to hold the aileron even with the trailing edge (photo 24) and adjust the clevis.

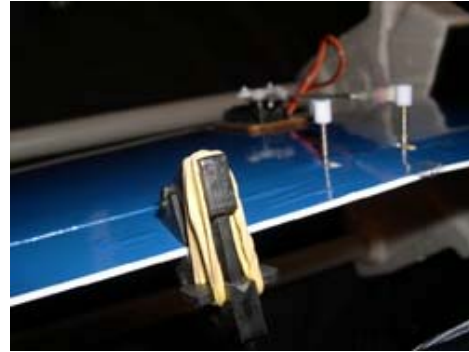
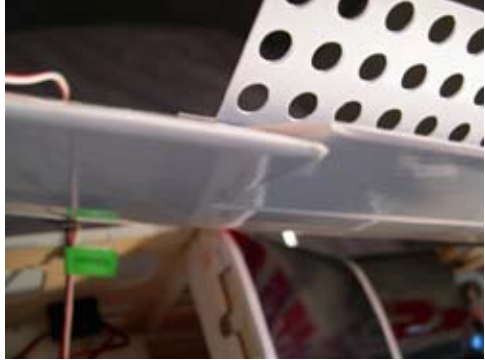


Photo 23 Photo 24

Many new pilots notice that a control surface is just a slightly off neutral. It doesn't look like much and couldn't have much effect. Think a moment. That one-eighth inch up elevator is actually about as much elevator input a pilot would add for takeoff. If left off center, the plane will takeoff *by itself* during the ground roll and start to loop. There will not be enough elevator trim movement to fully compensate and the pilot will need to input down elevator throughout the entire flight. Get all the surfaces neutral before the first flight.

While aligning the control surfaces, check that all the control horns are tight. Sometimes the wood expands or contracts during shipment. This can cause the control horns to loosen. Check each mounting screw and gently tighten if necessary as in photo 25.

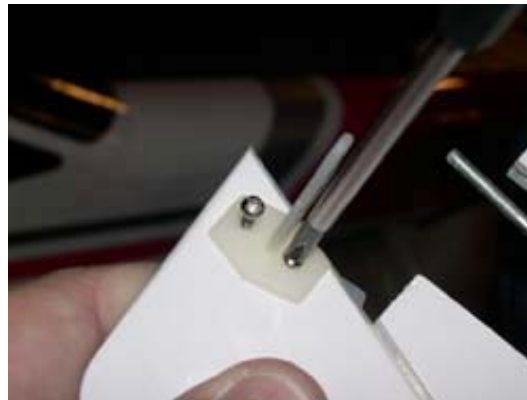


Photo 25

Setting The Engine Throttle

Now is a good time to adjust the engine. Turn the transmitter and receiver on; advance the right side throttle control stick all the way to the top. Remember to also set the throttle trim lever, just to the right of the throttle control stick, all the way to the top as well. Look inside the carburetor opening, the venturi, and it should look like photo 26 below. Neither the front nor the rear of the rotating throttle barrel should be showing inside the venturi. Some engines are designed so that some of the barrel is visible on one side. This cannot be changed and is normal.



Photo 26



Photo 27

The throttle servo should not be making noise. If the venturi is not fully open, or the servo is buzzing, readjust the clevis as you did for the control surfaces. Ideally, the throttle should be just fully open and the servo quiet. If the throttle is not fully open, the engine will not run at full power and the high speed fuel mixture may be set too lean.

Move the transmitter throttle level all the way down, but keep the throttle trim lever up. The throttle barrel should now resemble photo 27. This is "high idle" and should be about 3,000 rpm when the engine is run. Fully reducing both the throttle trim lever and control stick should *just barely close* the throttle as in photo 28. This is your engine shutoff.



Photo 28

The final throttle settings must be done at the field with the engine running. Most new engines require 10-20 flights to develop full power and to have a reliable low-idle speed. These initial throttle settings are a good start. The high idle, full up throttle trim, insures the engine will run throughout the entire flight. Your instructor will use it to make the final landing approach, but then will lower the throttle trim all the way to shut off the engine and land. Eventually, your engine will be able to hold a reliable, 2,400-2,500 rpm idle *which you have already set in your transmitter*; just lower the throttle trim lever to half way.

The throttle trim lever is active at both high and low settings in most four-channel radios supplied with RTF planes. Therefore, full high throttle trim is required for takeoff. After reducing power the first time, you can lower the throttle trim lever to half if you wish. Or, you may keep the high-idle setting throughout the flight and lower the trim lever to half just before entering the landing pattern.

Final Checks

The plastic covering on your RTF plane uses heat sensitive adhesive. Check the overlapping areas such as the one shown in photo 29. Sometimes temperature changes loosen these overlapping areas. Reseal these joints with a small modeling iron (photo 30). These are available in most hobby shops and from mail order vendors for about \$20 or less.



Photo 29



Photo 30

We are almost done. The last check concerns the plane's balance. Your plane's instructions stress checking the forward and rearward balance point called the **Center of Gravity (CG)**. This point is usually measured back from the leading edge of the wing. If not already marked on your plane, measure the proper distance back from the leading edge and mark it with a small felt tip pen (later removed with alcohol). Mark both right and left wing halves, on the underside, of wing near, but outside of, the fuselage. Mount the wing and using both hands, put a finger tip under the wing at each mark and gently lift.



Photo 31

Do this without fuel. The plane's nose should point just slightly downwards. Not much, just about ten degrees. Photo 31 shows the right angle. The photo also shows a CG device in use, but educated finger tips work almost as well. If the nose points downwards even more, up to about 30 degrees, don't worry about it. This is called being a little "nose heavy" and your plane will still fly and might actually be slightly easier to fly. If the nose drops straight down, you'll need to add tail weight, but this almost never happens with a RTF plane.

If the nose swings upwards, however, worry about it. Sometimes, not often, heavier wood than specified by the manufacturer may be used in the tail surfaces. Almost always, the manufacturer's quality control checks catch this problem and the "tail-heavy" plane is never shipped. In checking dozens of RTF planes, we have only found one that was tail-heavy and that one, not by much. Still, a tail heavy plane is difficult, or impossible, to fly, so check for it. If required, bundle some lead weights (available at hobby stores) into some light foam wrappings and put them into the plane's nose.

Far more common among RTF planes is that the lateral balance is poor. Good lateral balance is when the plane remains wings-level as it is supported only by the propeller, (engine glow plug removed), and by thin nylon fishing line under the top rudder hinge (photo 32) and then lifted from the ground. A helper is handy here. You will find that your plane is heavier on the muffler side, so that wingtip will drop.



Photo 31



Photo 32



Photo 33



Photo 34

Adjust this condition by using small finishing nails in the lighter wing tip. Tape one or two small such nails to the light wing tip as in photo 33. Add or subtract nails until the plane remains wings-level. Then just insert the nails into the wooden wing tip (photo 34).

Your plane is now completely Ready To Fly. Most student pilots arrive at the field with one, two, three, or even more, of the above problems evident in their planes. Take the time to make these few last minute checks. When your instructor examines your new plane before its first flight, it will stand out as having been well built. You will also stand out as a pilot who thinks and plans ahead; a pilot who truly is Ready-To-Fly