



Hobby Lobby Mini Piper ARF Electric

1/4/2007

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The Graupner MINI-PIPER is an ARF electric powered model constructed *entirely* from molded foam. It has been on the market for at least the past four years and continues to be an excellent trainer and sport flying model aircraft. At the current price (December 2006) of \$44.70, it is certainly very, very affordable. To give you an idea of the size, the MINI-PIPER has a 30 inch wing span, 167 square inches of wing area and an all-up weight (with battery) of less than 12 ounces.

You can see me in this photo hand launching my MINI-PIPER early in the morning, without anyone nearby aware that I was flying a model plane. Keep in mind that electric power is very QUIET!



The completed Graupner MINI-PIPER, along with the recommended Hitec RCD NEON FM RC three-channel function RC system, is shown above with the transmitter to show its convenient size ([website](#)). This airplane can be flown about anywhere outside.



Two boxes comprise the airplane ARF kit and the radio system.

Besides the airplane and RC system, you will need several extra items. All of which can be purchased from the airplane's USA distributor: Hobby Lobby International. I refer you to this exact website: ([website](#)). The extra items include a battery pack, electric motor and speed controller (ESC), a battery charger and several extra props just in case you break one. This is what the extra items look like.



The recommended charger is the Graupner No. 6419, Ultramat 5. This is what we call a “peak detect” charger. That means that this charger will operate up until the battery is fully charged (reaches its peak voltage) and then cuts off automatically. To operate this charger you must connect it to a 12-volt storage battery, like your car battery. This particular charger has an input cable terminating in an auto type cigarette lighter plug.



This would require you to plug it into the 12-volt accessory outlet inside your car. We don't recommend that you charge any battery inside your car. So the best alternative is to buy an adapter cable from a local Radio Shack Store. It is called their Battery Terminal 12 volt DC Adapter Accessory Outlet (catalog number 270-1527) and it costs around \$8.00. You open the hood of your auto and attach the alligator clips from the adapter cable to the battery terminals. Then you plug the Graupner charger plug into the other end of the adapter cable. By doing this, charging can take place outside the passenger compartment of your vehicle.



This is the Hitec RCD NEON three-channel function FM RC system. Basically, it consists of the hand held transmitter (at the right). Two Hitec RCD HS-55 servos are used for the rudder and elevator controls. The receiver is the Hitec RCD Micro 05S single conversion unit (in the center), with the instruction manual to the left.



The Hitec NEON FM transmitter employs a single control stick. Rocking the stick side to side provides rudder control for turns. Moving the stick forward and back moves the elevator, which provides pitch control (up and down) of the aircraft. You grip this transmitter with your left hand and hold on to the control stick with your right hand. The index finger of the left hand operates the throttle control (the third channel), which is located on the rear, upper portion, of the transmitter case.

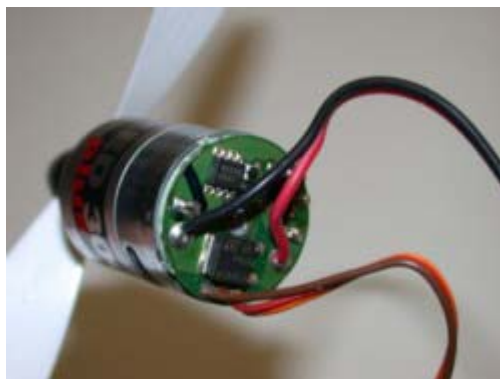


A set of eight AA size alkaline (non-rechargeable) batteries power the NEON transmitter. You must purchase these batteries separately. They will generally provide about ten hours total operating time (*Ed. Note: The batteries will last about ten hours but changing them after 8 hours is a good safety precaution against losing control in the middle of that last flight of the day.*). The transmitter case must be opened to gain access to the battery box. The instructions that come with the RC system will show how to do this.



This is a closer look of the NEON transmitter. You can see the rudder and elevator trim levers. Servo reversing is available from the inside of the transmitter case. There is a switch that operates an elevon mixing circuit. This will mix the rudder (aileron) and elevator control functions enabling you later on to fly a delta wing (tailless) model aircraft. The Mini-Piper is definitely not this type of aircraft.

Three colored LED's will tell you the status of charge in your batteries. When it switches from GREEN to AMBER, you should replace the eight alkaline battery cells. You will also notice that the NEON has provision for add-on optional features like a trainer cable, auxiliary channel (an added fourth channel) and dual rate control. These options can be purchased individually from Hitec RCD and easily installed by the modeler. (*Ed. Note: Nice touch that.*)



The motor recommended for the MINI-PIPER is the Graupner SPEED-300. It is a brushed motor contained in a sealed can. The propeller recommended is the Gunther 5 X 4 plastic. It is press fit to the motor shaft. This motor runs direct drive; it does not require a gear or belt drive. You will notice that two cables exit from the motor. One goes to the battery pack, while the other cable (a servo type with three wires) plugs into the throttle channel of your RC receiver. In this particular set up, the motor speed controller (ESC) is attached directly to the rear of the motor. That eliminates one extra connector.



These are the molded foam parts that comprise the MINI PIPER ARF kit. Since this is ordinary foam, you must use either 5-minute epoxy cement in the assembly process or a foam friendly CAA cement and accelerator like the NHP FLASH brand available from BP Hobbies ([website](#)). Keep in mind that the 30-inch wing is molded as one piece ready for use. You won't have to join two panels to make up your wing.

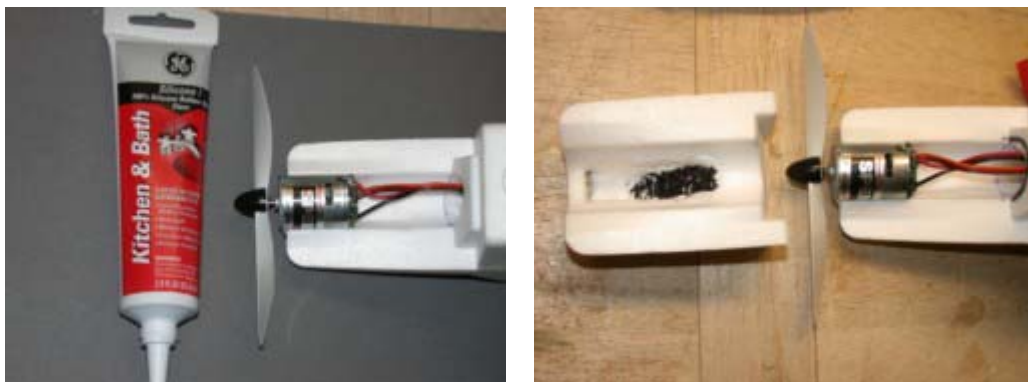
The remainder of the accessory items supplied with the kit includes, wheels, wheel collars, landing gear, wing hold down and extra servo output arms.

There is a considerable amount of foam flashing left on both sides of the fuselage. Before doing anything you should cut this excess foam off with a long bladed hobby razor knife or a razor saw. After doing that, do a little sanding to smooth out the fuselage sides. A good instruction booklet is supplied and it contains many key assembly photos. The instruction booklet is printed in several languages, including English. You have to search around a little for the language of your choice. In addition to the booklet, a full size set of plans is included. But in this case, the captions are all in German only. Still these plans are very helpful!

Next step is to carefully remove the foam flashing at the rudder and elevator hinge lines. This will be only at the tips of the stab and vertical fin. Use a razor saw and cut free about a ½ inch of foam on each end of the stab and fin. The remainder of the foam at the hinge line actually becomes the hinge itself. So please don't cut away any more than you need. Otherwise, you will have to add a hinge tape to hold the control surfaces in place.

There are several locations where foam has to be removed to allow cooling air to circulate from the front of the motor, through the motor itself, then around the battery pack and finally out the exit hole located in the top of the wing near the trailing edge.

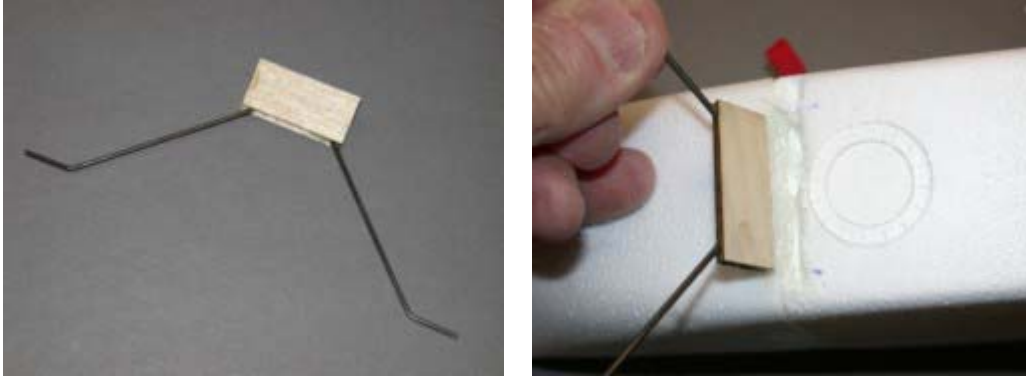
The wing hold down involves the use of a single nylon screw. The screw passes through a metal sleeve that is cemented to the wing. It then enters into a nylon-threaded insert that is cemented to the fuselage. Use 5-minute epoxy cement for this. Clever molding of the foam wing allows key points to match up with the upper fuselage. With this technique, the wing is locked into place and can't move or rotate, while still being held in place with only one screw.



The SPEED-300 electric motor fits snugly into a channel cut into the molded foam fuselage. Position the motor so that the two air openings are straight up and down. The motor was held in place with some GE clear silicone sealer. Note that the top of the lower foam cowl piece was partially cut away so that air can pass through the motor and then on into the battery compartment. Another hole is cut in the rear of the battery compartment allowing the air to enter the RC compartment. Finally, the air exits out the hole on the top of the wing.



The screwdriver points to the added silicone sealer placed around the front of the motor. An air opening is cut into the bottom of the front cowl block. You can see the motor through this hole.



The wire landing gear is sandwiched between two small plywood formers using 5-minute epoxy cement. After the cement cures, cut a slot in the lower fuselage (as noted on the plans).



Insert the plywood former/landing gear sandwich into the slot using more epoxy cement.



The stab and vertical fin get installed next using 5 minute epoxy cement. Both surfaces are pre-molded so they fit exactly into correct alignment. Just make sure the stabilizer is level with the wing.



I chose to use a yellow Teflon tubing (available from Stevens Aero Models at [website](#)) with an inside diameter of .040 inches, to house two lengths of .020 inch diameter wire. These two tubes and wires become the control rods that go from your servo output arm to the control horns on the elevator and rudder. Once these tubes are in place, and anchored in several places, the top foam piece is added and epoxied in place.



Special metal control horns are supplied with the kit. I inserted these “horns” into small diameter holes in both control surfaces and epoxied them in place.



With the wing removed, this is what you see. The forward compartment easily holds the 6-cell, 1000 mAh NiMH battery pack. You must access this battery pack each time for recharging purposes by first removing the wing. The only alternative to doing this would be to fashion a trap

door at the bottom of the battery compartment. That would allow you to keep the wing in place. To the rear of the wing is the RC compartment with the receiver attached to one fuselage side (with double sided tape!) followed by the two HS-55 servos sitting side by side. I press fit the servos in place and then applied a little of the clear silicone sealer to anchor them in position.



In my particular case the rudder control was reversed. I was able to correct this by opening the transmitter case and accessing the servo reversing connectors. The rudder in this case in the CH-1 position. All you do is unplug that connector, rotate it 180 degrees and plug it back in. After doing that, the control function is reversed. As you can see in the photos, I employed DuBro Mini EZ connectors ([website](#)) on the servo output arms and “Z” bends at the control horn ends. This way you can easily adjust the neutral position of both control surfaces.



The completed MINI-PIPER weighed 11.5 ounces, which, with a 167 square inch wing, works out to a wing loading of only 9.9 ounces/square foot. One of the last steps is to place the supplied decals on the model. Without these decals it would look far too plain. The final center of gravity position worked out perfectly at a distance of 1 5/8 inches back from the leading edge.



Rudder control throw worked out best in the next to the outer most hole position of the servo arm, which provided 1/2-inch travel either side of neutral. You probably wouldn't be able to use the outer hole anyway because the arm might rub against the fuselage side. I had to trim the end off the rudder control arm because of that interference problem. The elevator needed the inside servo arm hole to reduce the throw to approx. 1/4 inch either side of neutral. I didn't have any end point adjustment on this RC system and so had to resort to mechanical means to adjust the control throws.



As mentioned earlier, when charging the battery, remove it from the plane and only charge outside of your vehicle. This is the Graupner "ULTRAMAT-5" peak detect charger that Hobby Lobby recommends to charge this 6-cell 1000 mAh NiMH battery pack. This charger sets the charge current automatically between 0.1 and 5.0 amps, depending on the sensed battery capacity. Although you can obtain up to about 20 minute flight times you may still want to purchase a second battery pack. That way one can be on charge while the other is in flight. An extra pack will only cost about \$27.00. If fully depleted it shouldn't take more than 30 minutes to recharge.

FLYING



Flying the MINI-PIPER was a total joy as you can see in the several flight photos that follow: The airplane is very stable, has more than enough power to handle winds up to 10 mph. Approaches are smooth and controllable, but the descent rate requires a little power be held until the landing flair for best results.

Hand launching was necessary at my rough flying field on the east end of Long Island. But on any smooth surface there is more than enough power available to take off the ground. Remember to hold rudder during the turn, opposite aileron flying of the Mini-Piper will roll out of the turn to fly straight. If you get into a problem situation, let go of the controls and the Mini-Piper will self-recover given a little altitude.



This motor and battery choice still produces good flight performance at about 3/4 throttle settings. Basic loops can be done from level flight at full throttle. The light wing loading allows the airplane to land very slowly, without any stalling tendencies. So in essence, this MINI-PIPER is a perfect training type aircraft.



Also, its size and weight make it an ideal parking lot/schoolyard type sport flyer. The foam construction is rugged, yet can be fixed easily. Also replacements parts are available. Best of all is the reasonable price.

For more information on this extremely affordable, excellent first airplane, go to:
<http://www.hobby-lobby.com/minipiper.htm>

AIRCRAFT SPECIFICATIONS

Manufacturer: Graupner

Cost: \$45.00

Radio: HiTEC Neon 3-Ch

Servos: 2 x HiTEC HS 55

Engine: Speed 300

Wingspan: 30 in.

Wing Area: 167 sq. in.

Weight: 11.5 oz

Wing Loading: 9.9 oz./sq. ft.

Length: 22 in.

Airfoil: Flat Bottom

Special Airframe Features: All foam. Wing is one piece. Very Quick Construction, Good Flyer.

Electric Power Specifications

Prop: Gunther 5 X 4 **Max RPM:** 8900

Max Watts: 24 watts **Power Loading:** 2.09 W/oz

Max Voltage: 7.15 V **Motor Current:** 3.51 A

Motor Run Time: 17 - 20 minutes

Battery: 6 cell 1000 mAh NiMH