



# mini TEMBO™ FIBERGLASS KIT

## Specifications:

Length: 26.75"

Diameter 1.6"

Weight: 12oz

Recovery: 18" Nylon Chute

Motor Mount: 29mm

Fins: 3 - 1/16" G10

Estimated CP: 21" from nose tip

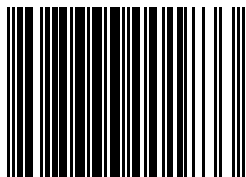
## Parts List

1. (1) Plastic Nose Cone
2. (1) Pre-slotted body tube
3. (2) G10 centering rings
4. (1) 29mm motor tube
5. (3) G10 fins
6. (1) Kevlar/Nylon shock cord
7. (2) Launch Lugs

## Optional Recovery

1. (1) 6x6" flameproof chute protector
2. (1) 18" Nylon chute

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put some **fun** in your rockets!

Please make sure you read all directions and understand how to assemble your model before you start construction. It is also a good idea to test fit each part before assembly. Fiberglass parts still contain small amounts of mold release and other materials on the surface that will inhibit adhesives and/or paint. It is important to clean each part prior to assembly with a solution of 1 part rubbing alcohol, 3 parts water and a drop of dish washing soap. **IMPORTANT:** do not sand any parts until after you have cleaned them - you will embed the materials you are trying to clean making it difficult to clean.

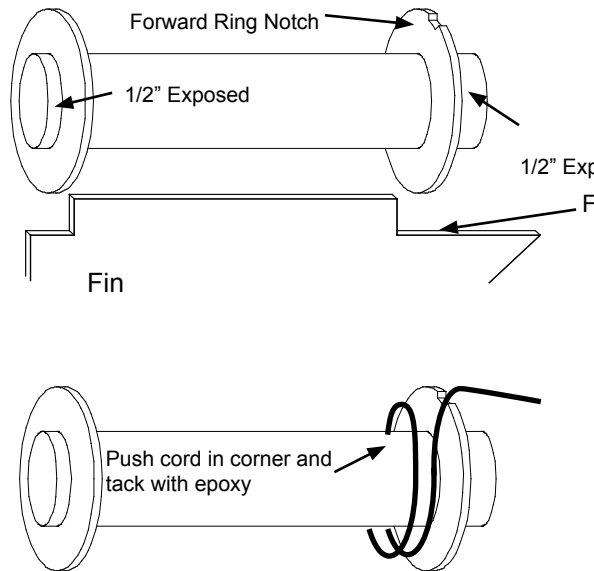
The G10 parts will have holding tabs left over from the CNC machine. These small tabs will need to be sanded off before assembly. Before assembling any part with epoxy, rough up the surface to be epoxied using course sandpaper. The scratches in the G10 surface will give the epoxy something to grab onto.

## Step 1 – Motor Mount Assembly

Test fit centering rings over the motor mount tube and sand motor tube if necessary. Also test fit the centering rings in the body tube and sand if necessary. Spread some epoxy on the outside of one end of the motor tube and slide the ring (without the notch) until there is approximately 1/2" of motor tube exposed. Make sure you clean the motor tube of any epoxy so as not to interfere with the fin tangs later. After the aft ring is dry, make a mark 1/2" from the other end of the motor tube. Spread some epoxy on the motor tube and slide the forward ring until it aligns with the mark. **VERY IMPORTANT: make sure there is not any epoxy on the motor tube that would interfere with the fin tangs later on.**

The shock cord in this kit consists of a shorter section of Kevlar and a longer section of nylon cording. The two sections should be tied together using a single overhand, ring bend or double fisherman's knot. The Kevlar section will be attached to the motor mount and the nylon section will be attached to the nose cone.

Wrap the end of the Kevlar shock cord around the forward end of the motor tube and tack in place with CA. Make sure the cord lays flat enough so it will not interfere with the body tube when you slide the motor tube inside. Apply some epoxy to the cord to hold it in place. Make sure the cord is secure and will not come loose later with ejection forces that will pull on the shock cord.



## Step 2 – Insert Motor Tube Assembly into Body Tube

Test fit each of the fins into the pre cut fin slots. Because G10 thickness varies, you will need to sand the slot to the correct width. Wrap the shock chord into a small bundle and stuff it inside the motor tube for this next step. Test fit the motor tube assembly into the body tube to ensure a snug fit. Sand the centering rings if necessary. When you are satisfied with the fit, spread some epoxy on the inside of the body tube and slide the forward centering ring of the motor assembly into the body tube. **Make sure you have the motor assembly facing the right way!** Spread some more epoxy on the inside edge of the body tube before sliding the rear centering ring into the body tube. Continue

sliding the assembly inside the body tube until the aft centering rings are just clear of the fin slots. It's a good idea to test fit a fin in each slot here before the epoxy sets. Hold the body tube with the motor tube assembly down until the epoxy sets. Make sure the weight of the motor tube doesn't cause it to slide out of alignment.



Ensure rings are clear of the fin slots

### Step 3 – Fin Assembly

Using a door jam or small section of angle stock, pencil a line halfway between two of the fins that extends from the front to the back of the body tube. This line will be used later to align the launch lugs. Test fit each of the fins into the pre cut fin slots. The fin should seat firmly against the motor tube - sand each fin or slot if necessary. When you are satisfied with the fit, apply some epoxy to the end of the fin tang that will contact the motor tube. Also, spread a thin layer of epoxy on each side of the fin tang. Slide the fin into place and check the alignment. Continue rechecking the fin alignment until you are sure the epoxy has set. Clean any excess epoxy from around the fin joint. Repeat for the remaining aft fins. Next, apply epoxy fillets to both sides of each fin by applying a thin bead of epoxy at the fin-body tube joining. Carefully smooth the epoxy fillets with your finger before the epoxy sets. Allow each fillet to set before rotating the airframe for the next fillet.

### Step 4 – Launch Lug

Mark the CP point along the launch lug line you made in the previous step. Make sure you measure the CP point from the tip of the nose cone and NOT the end of the body tube. Apply a small amount of epoxy on the launch lug line about  $\frac{3}{4}$ " long on the CP mark. Press one of the launch lugs into the epoxy and ensure that it is aligned with the launch lug line previously drawn on the body tube. You can sit down the tube and look through the launch lug to make sure it is straight. Similarly epoxy the second launch lug about 2" from the aft end of the body tube (aligned with the aft end of the fins). Site down both launch lugs and make sure they are both aligned. If you have a  $\frac{1}{4}$ " launch rod, you can use this to ensure that both lugs are aligned properly.

### Step 5 – Balancing Your Model

Assemble your model and insert the largest motor you intend to fly (or simulate the weight with a substitute) and ensure that the CG is at least 1 body diameter in front of the estimated CP point specified on the first page. The CP point is measured from the tip of the nose cone. If the CG is behind the desired point, add weight inside the nose cone by pouring lead shot into the nose cone tip and adding some epoxy.

### Step 6 – Nose Cone Assembly

Tie some knots in the end of the nylon section of the shock cord and lay the shock cord onto the inside of the nose cone. Cover the shock cord with epoxy to secure it to the inside, side or tip of the nose cone.

### Step 7 – Flying Your Model

Attach the parachute to the shock cord near the nose cone. You can also attach the chute protector to the shock cord near the parachute. When packing your chute, wrap the chute protector around the chute with the opening in the chute protector facing forward. Always make sure your chute is well protected as the hot ejection motor gasses will melt the nylon chute.

**A WORD ABOUT PLASTIC NOSE CONES:** All plastic nose cones expand and contract with heat and cold. A nose cone that fits correctly at room temperature when moved to a desert heat of 120°f may become so tight that it cannot be removed. Likewise, a nose cone moved from room temperature to a snow covered flying field of 25°f may become so loose that it drag separates at motor burnout. It is always a good idea to adjust your nose cone fit on the flying field at the temperature you expect to fly in. You can adjust the fit by adding masking tape around the base to tighten the fit, or by sanding the shoulder to loosen the fit.

**IMPORTANT:** always use positive motor retention to secure the motor. Failure to use motor retention will cause the motor to be ejected instead of the parachute making for a dangerous ballistic reentry.

**IMPORTANT:** always remember to check your balance point and ensure your CG is forward of the specified CG point.

**IMPORTANT:** Always follow the NAR safety code and remember that rockets are not toys and can be dangerous if not prepared and used properly. If you are a beginner, it is a good idea to fly with a club or other group of experienced rocketeers until you have gained some experience.

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**IMPORTANT:** Please contact us via phone or email if you have any questions about constructing or flying your model.



23016 Del Lago, Unit C  
Laguna Hills, CA 92637  
949.547.8847  
www.madcowrocketry.com  
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