HAMR

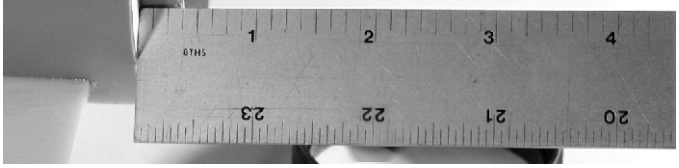
Highly Adaptive Motor Retainer

"HAMR it home!"

Public Missiles Ltd.

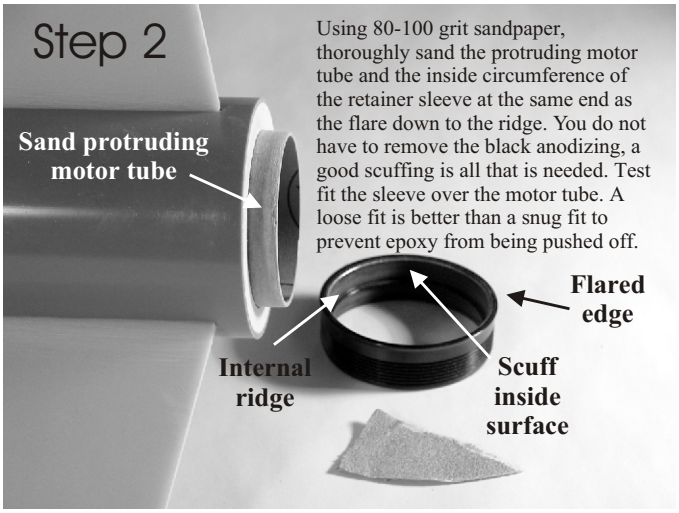
Step 1

When building your rocket, be sure that the motor tube protrudes 3/8" beyond the aft centering ring. This distance is the same for all sizes and versions of the HAMR motor retainer.
You may want to finish and paint your rocket before installing the retainer sleeve since you won't want paint on the anodized surface and threads. Mask off the protruding motor tube while painting.



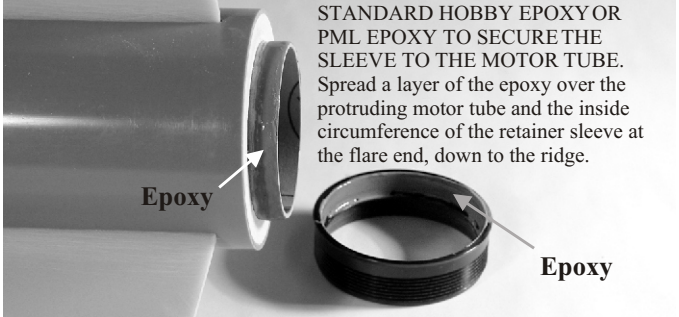
Step 2

Using 80-100 grit sandpaper, thoroughly sand the protruding motor tube and the inside circumference of the retainer sleeve at the same end as the flare down to the ridge. You do not have to remove the black anodizing, a good scuffing is all that is needed. Test fit the sleeve over the motor tube. A loose fit is better than a snug fit to prevent epoxy from being pushed off.



Step 3

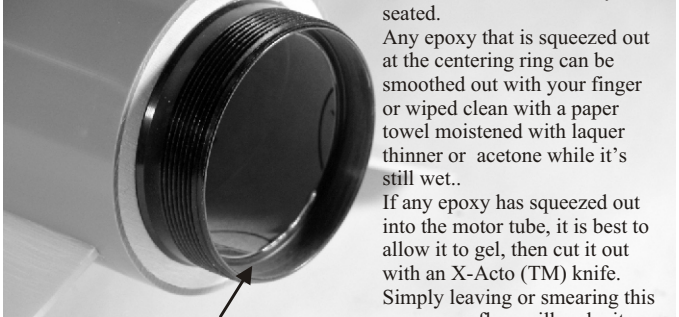
Mix a small batch of high quality, high temperature epoxy such as JB Weld or Lock Tite brand. DO NOT USE STANDARD HOBBY EPOXY OR PML EPOXY TO SECURE THE SLEEVE TO THE MOTOR TUBE.
Spread a layer of the epoxy over the protruding motor tube and the inside circumference of the retainer sleeve at the flare end, down to the ridge.



Remove dust from sanded surfaces before applying epoxy!

Step 4

Using a slow twisting motion, push the retainer sleeve onto the motor tube until it is firmly seated.
Any epoxy that is squeezed out at the centering ring can be smoothed out with your finger or wiped clean with a paper towel moistened with laquer thinner or acetone while it's still wet..
If any epoxy has squeezed out into the motor tube, it is best to allow it to gel, then cut it out with an X-Acto (TM) knife. Simply leaving or smearing this epoxy overflow will make it difficult or impossible to insert the motor.



Step 5

When ready to fly, insert a motor into the motor tube. The HAMR system works with most motor brands and types. In this case, an Aerotech (TM) motor is being inserted into the motor tube.

Step 6

Push the motor all the way into the retainer. Apply a very small amount of grease onto the threads of the motor retainer to eliminate the potential for galling. Thread the retainer cap in place over the motor. Do not over-tighten the cap. Snugging it with your thumb and two fingers is enough. That's it, go fly!

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General notes for retro-fitting the HAMR system onto existing rockets and other important information:

1) The motor tube must protrude 3/8" beyond the aft ring for the sleeve to fit. If the rocket is already built and the motor tube is flush with the ring, difficult but possible surgery is required for a retro-fit. You will have to Dremel out the aft ring, Dremel back the fin tabs about 1/4", then insert a new ring to the proper depth to expose 3/8" of the motor tube. This is beyond what most people would want to do. In this case, the best solution is the original Public Missiles Ltd. PMR.

If the motor tube protrudes more than 3/8”, the motor tube can be cut back to fit. Depending on how much tube needs to be removed, you can use a hack saw, X-Acto razor saw, or a coarse sanding block.

2) For years we have only sold the PMR for motor retention. Hence all of our kit instructions state that the motor tube should be flush with the aft centering ring. But as stated in note #1 above, the motor tube MUST protrude beyond the aft centering ring by 3/8”. You can confidently ignore the kit instructions and make the required adjustment to facilitate the HAMR system. There will be no adverse effects to the rocket, it’s assembly, or it’s flight characteristics. However, it is always prudent to check the CP/CG relationship on any rocket before flight.

3) It is actually a very simple matter to retro-fit a rocket that uses a boattail or tailcone. Simply scribe a line around the boattail or tailcone 3/8" from the base and cut this section off with a Dremel cut-off wheel leaving the motor tube intact and exposed. Of course, you can perform the cut with a hacksaw blade or X-Acto razor saw just as easily. This method works with kits where the motor tube is wedged into the narrow end of the boattail without the use of a centering ring (IE. Bull Puppy, Pit Bull 256). It will not work with the Bull Dog or Pit Bull 600 since these have a centering ring at the base. See note #1 above for details.

4) JB Weld, Loc-Tite Weld, or similar must be used to secure the sleeve to the motor tube. These epoxies have a high temp rating, are not brittle, and bond very well with phenolic and aluminum. Common hobby epoxy may soften from the heat of the motor and fail. Do NOT use standard hobby epoxy or even the epoxy PML sells for general kit construction. The high temperatures generated by the motor can cause these epoxies to fail.

The motor retainer sleeve should be inspected after every flight to make sure the impact from landing did not loosen the retainer sleeve.

5) For the KS washers to work with older KS kits already in the field, both adapter tubes must be cut 1/8" to 3/16" by the user. In the past, we made the adapter tubes a bit long to aid in insertion and removal of the adapters within the mother tube. This is not really necessary and now the adapter tubes are too long to work with the HAMR-KS adapters. The tubes can be easily cut by the user with a hack saw, Dremel, miter saw, X-Acto saw, etc. whether they are assembled or not. Beginning in mid-February, 2007, we have changed the length of the KS adapter tubes to accommodate the use of these retainers. This includes all KS kits that were in stock at that time. Keep in mind that dealers may have older kits on their shelves for an extended period of time. If all of the tubes in the Kwik-Switch set (Mother tube and both adapter tubes) are the same length, then you have the new version. This change will not affect the use of the original PMR KS version.

6) The bonding surface of the sleeve must be sanded with 80 grit sandpaper to thoroughly scuff the anodized surface. The anodizing does NOT have to be removed (that's almost impossible anyway), just scuffed.

7) The motor tube must be sanded with 80 grit as well. The retainer sleeve should fit loosely on the motor tube. IE. It should just fall off when tipped. This will assure that the JB Weld (or similar) is not just pushed out of the way when mounting the sleeve on the tube. The sleeve's bonding surface and the tube should be coated with the epoxy and then the sleeve should be pushed onto the tube with a slow twisting motion. Any epoxy squeeze-out can be removed when the epoxy gels but before it cures.

8) After....and only after....the adapter sleeve is epoxied to the rocket, the threads can be lubed with a tiny bit of grease for smoother threading of the 2 pieces and to prevent future galling (however unlikely). The grease should not be applied before assembly since even the slightest bit accidentally smeared on the bonding surface will weaken the epoxy bond.