

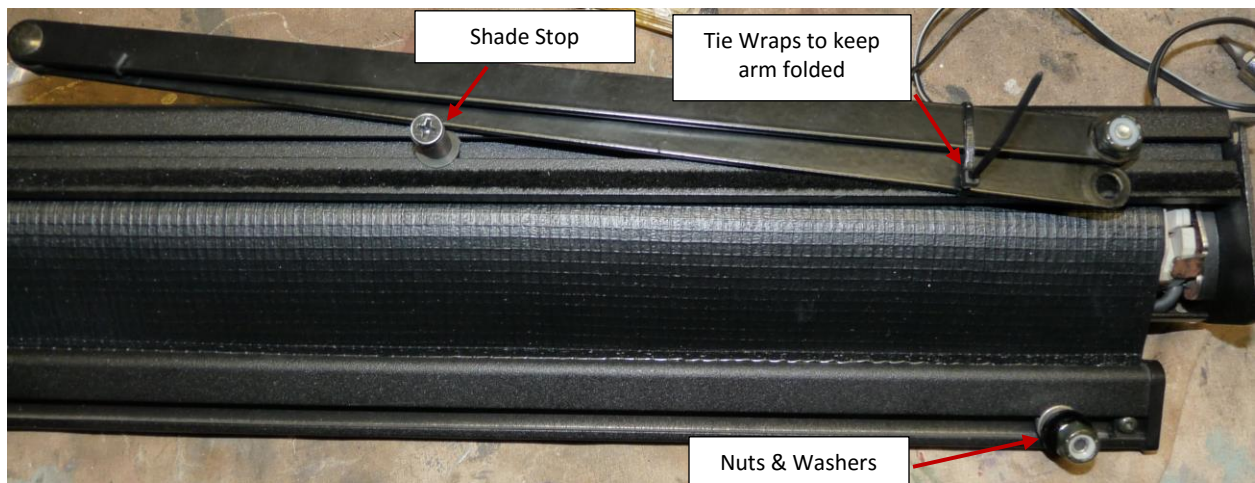
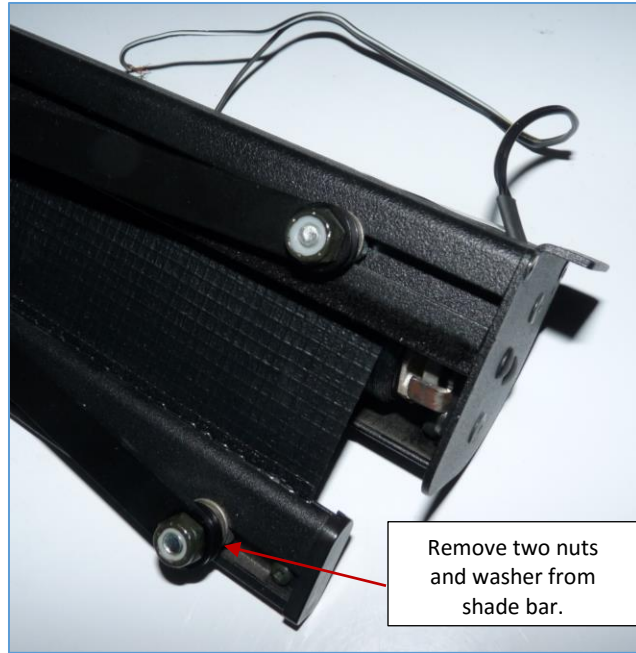
Automation Model 73551 Power Shade Rebuild Using The RollerTrol TMDC-12-25-15-28-NR Tubular Motor

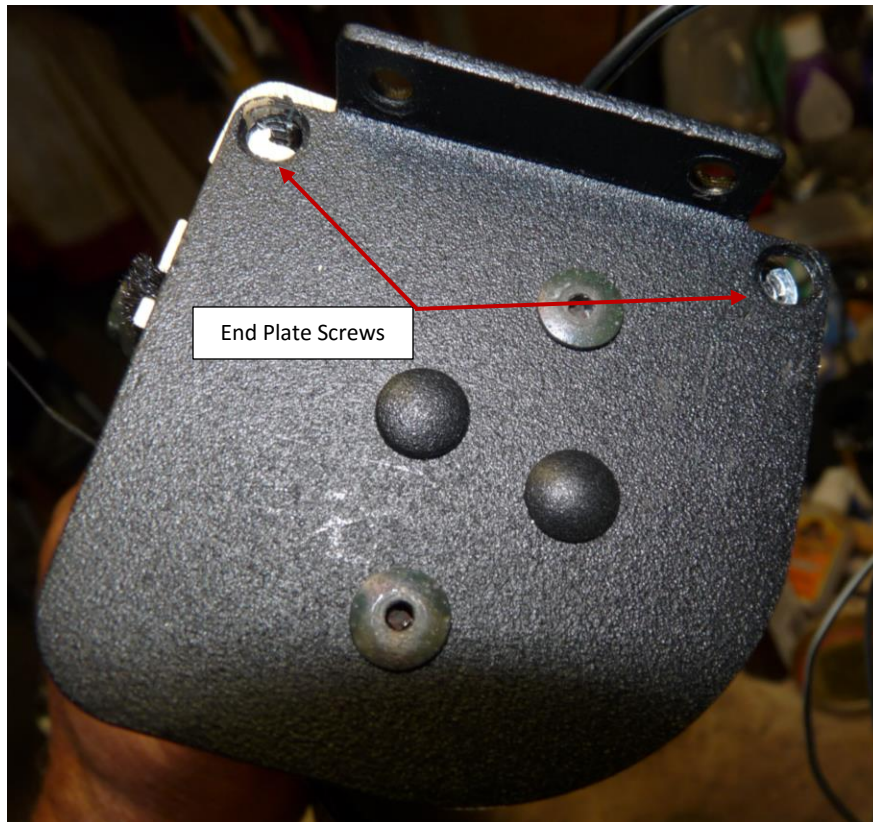
Automation Power Shade Disassembly

Shade removal from the RV requires that the wires be disconnected first and then the shade be removed from the coach. In my installation, the two power wires were connected to the switch using small wire nuts. Each wire nut was removed one at a time and reinstalled on the switch wiring to both keep the wires nuts from being misplaced and to prevent accidental shorting should the switch be inadvertently activated while the shade was out of the coach. Once the wires are detached, the shade has two screws on each end to hold it in place. Loosen and remove one screw from each end then loosen the remaining two screws and get a helper before final screw removal. The shade is not heavy but it is an awkward place to work and an extra set of hands is really helpful.

Once the shade is removed, the motor endplate and the spring loaded support arms that must be disconnected. Remove the two nuts (one on each side) along with their respective washers from the extension arms. Then lift the arms off the bottom bar and loosely re-install the washers and nuts for safe keeping. I used a wire tie to keep the arms folded and then gently lifted them over the top of the shade stops to keep them from moving around while working on the assembly. Next, with the arms secured, remove the two screws from the endplate to which the motor is attached. This will allow the shade with motor attached to be removed from the aluminum housing.

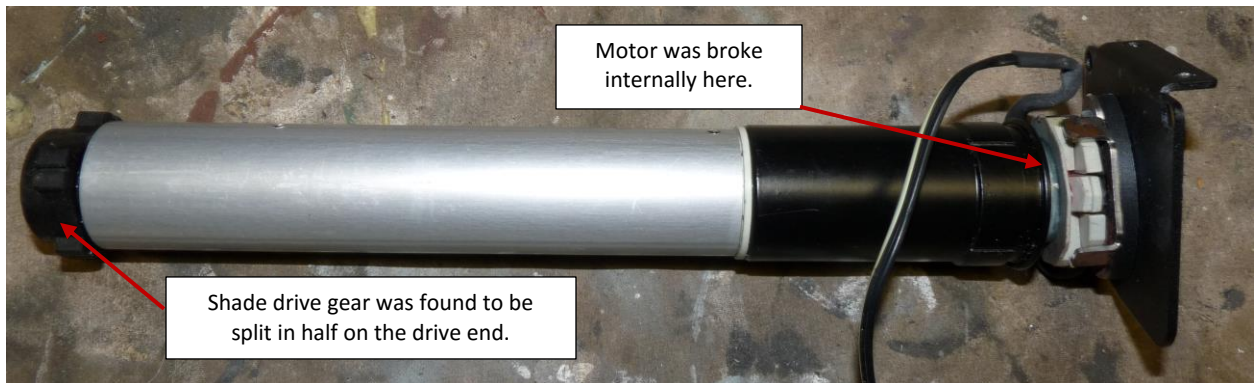






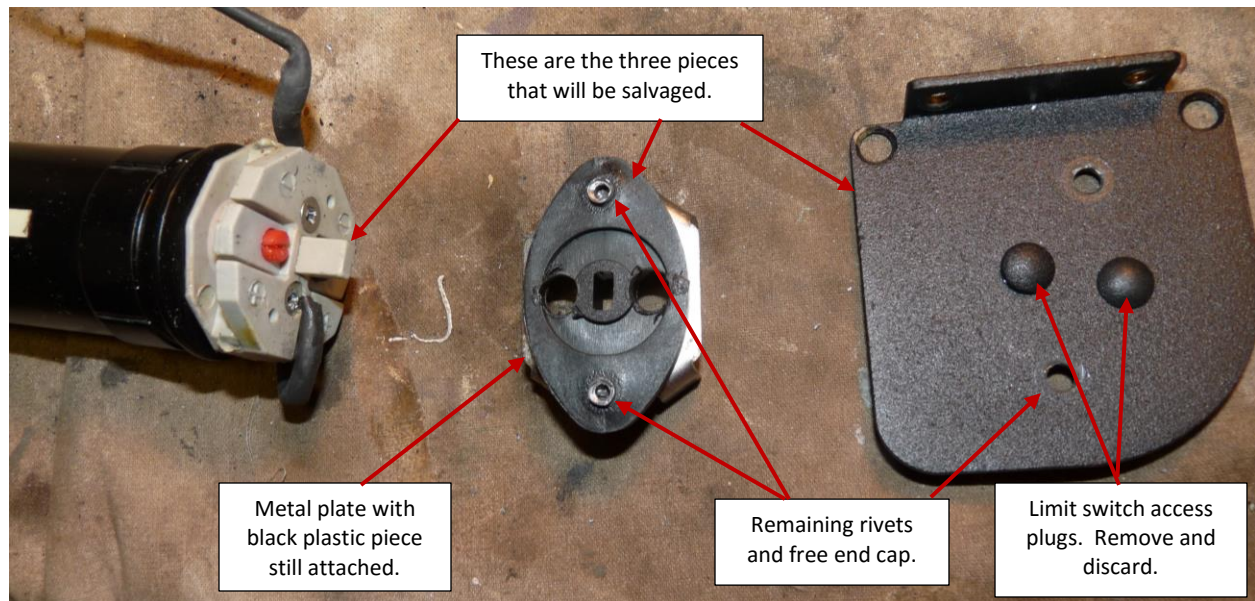
Now that the shade assembly is removed from the housing, remove the end cap with the small hole from the opposite side of the aluminum shade tube as that of the motor. This allows the motor assembly to be removed (especially if broken like mine was) and will aid with fitment of the new motor. To remove the end cap with a small hole, roll the shade so it unwinds from the aluminum tube and use a screwdriver to lightly tap out the end. The end piece will pop out such that you have a clear path to the motor inside the tube. Using a wooden handle and a hammer, tap out the motor from the now open end of the aluminum shade tube. The motor is then extracted as shown in the photo where the breakage is now evident.





The next step is to salvage the original parts required to install the RollerTrol tubular motor into the existing shade assembly. What follows is the method I used after several different approaches were taken. First, the torque restraint from the original motor must be removed from the end cap to obtain the necessary parts to match the new RollerTrol tubular motor. The first step is to drill out the rivets and remove the housing end cap from the motor. Make sure to work your way up with drill bit size and only drill deep enough to break the rivet head free. Once the housing end cap is removed, pry the metal plate off of the motor along with the black plastic piece with the center slot in it. This center slot will be key to getting the RollerTrol tubular motor to work correctly. In the photo below, there are three pieces that will be salvaged from the original motor. 1. The housing end cap. 2. The black plastic piece with the slot in the center (shown below still attached to the metal plate). 3. The plastic rectangular key from the original motor tan plastic end plate. This is also a good time to remove the two plastic plugs from the housing end plate that were used for access to the factory limit switches. They won't be re-used.



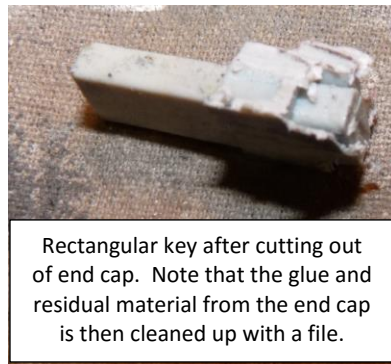


Remove the tan plastic piece from the motor after removing the two Philips head screws, which will require breaking wires and other parts to free this component completely from the original motor. Since my motor was severely damaged internally, this didn't matter as long as the tan piece is removed unscathed. As seen in the photo, the end piece is placed in a vice and a hacksaw was used to remove the full length of the rectangular key. Note that this key is glued into the tan plastic piece and is longer than seen in the photo because it penetrates the full thickness of the plastic part. In order to maximize the length of the salvaged rectangular key, it is cut away very carefully and then cleaned up with a file to remove the glue and any residual parts of the tan plastic piece from which it was cut. Once removed, you will find that the key is too thick to fit into the RollerTrol tubular motor but it will fit into the black plastic piece that was salvaged. Simply use a file and carefully reduce the thickness of only that end of the key that will fit into the RollerTrol tubular motor. Don't file the end that fits into the black plastic piece. This ensures the plastic key will fit snugly into both parts.



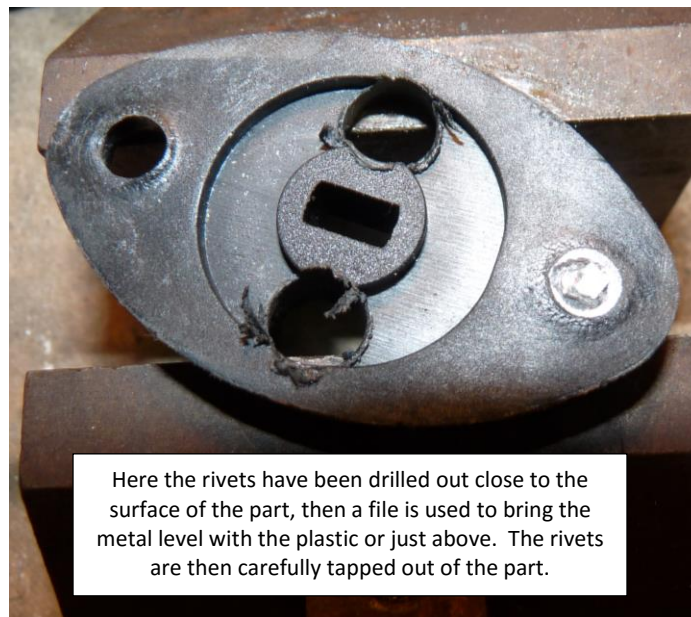


This is the part to remove from the original motor from which the rectangular key will be cut out.



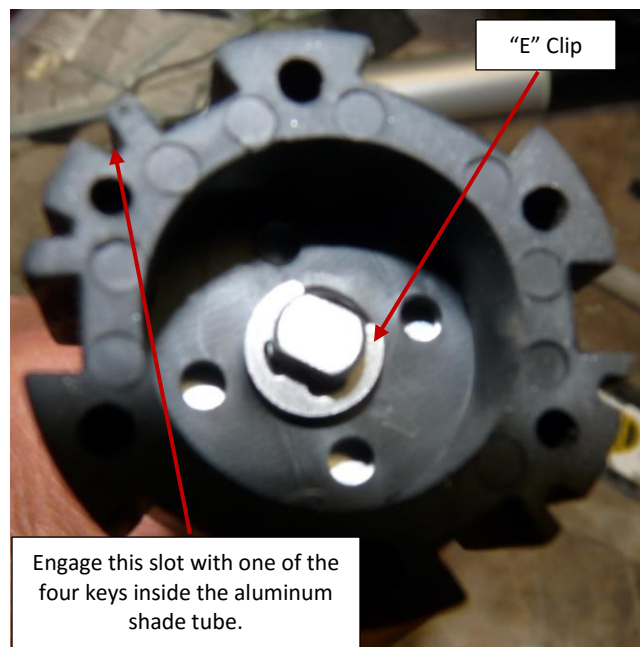
Rectangular key after cutting out of end cap. Note that the glue and residual material from the end cap is then cleaned up with a file.

Next, carefully drill out the rivets on the black piece with the rectangular hole to free it from the metal bracket. This part is irreplaceable so proceed with caution here. Once this is removed, and the rectangular key is cleaned up, it is time to finish fit the RollerTrol tubular motor.



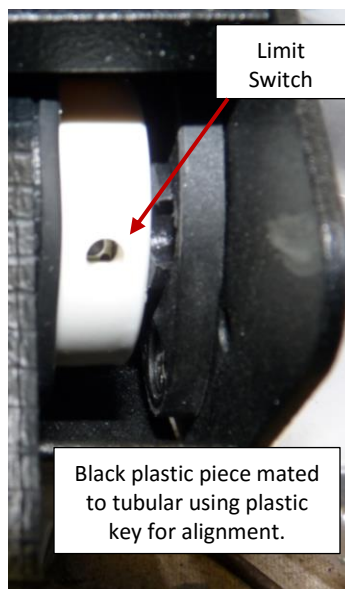
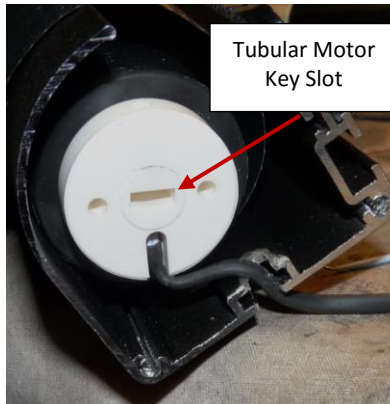
Here the rivets have been drilled out close to the surface of the part, then a file is used to bring the metal level with the plastic or just above. The rivets are then carefully tapped out of the part.

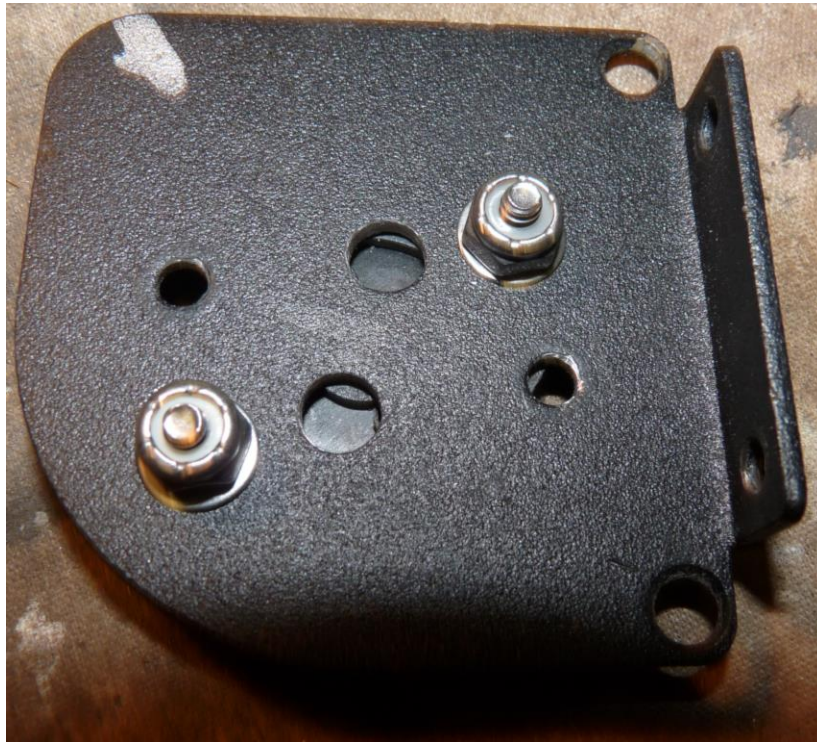
The first step in fitting the RollerTrol tubular motor is to remove the drive gear from the drive shaft. This is held in place with a small “E” clip. Once the rubber drive gear is removed, trial fit it into the aluminum roller shade tube. I cleaned up the inside edge of the aluminum roller shade tube with a file since the cutting operation during the original manufacturing had left a peened over sharp edge. I then pushed a cloth through the tube length to remove chips and dirt. I found that the rubber drive gear was a very tight fit to the point I didn’t want to force it into the tube. I used a file and some sand paper to slowly and carefully remove material from the outer diameter trial fitting constantly until I got the rubber drive gear to fit into the tube with a minimal effort, however I also didn’t want a loose or sloppy fit. I found that aligning the small slot in the rubber with one of the four keys in the aluminum shade tube also aligned the slot on the opposite side and set the larger rubber pieces on either side of the two remaining keys such that the drive gear fits into the tube. It shouldn’t be loose rather it should just fit in with a small force pushing it down the tube. Once this point is reached, set aside the rubber drive gear and the “E” clip until final assembly.



The RollerTrol tubular motor has an up and down limit that is set once the shade is fully reassembled. However, in order to set the limits, the limit setting switch must be accessible once the shade is fully reassembled. As a result, the alignment of the RollerTrol tubular motor key slot, the black plastic piece key slot and the housing end cap become critical. To sort this out, I installed the motor part way into the aluminum shade tube with the rubber drive gear remaining off. I then installed the plastic key into the tubular motor and the black plastic piece and then rotated the tubular motor until the limit switch was correctly oriented. Once this was done place the housing metal end cap into the correct position so that the orientation of the black plastic piece to the end cap can be established. Once this is marked, two new holes must be drilled into the end cap using the same center as the original two holes to ensure the RollerTrol tubular motor is in the center of the housing. I did this by scribing a line between the centers of the original rivet holes and a second line between the centers of the two original limit switch access holes (where the plastic plugs were removed). Where these two lines cross provides

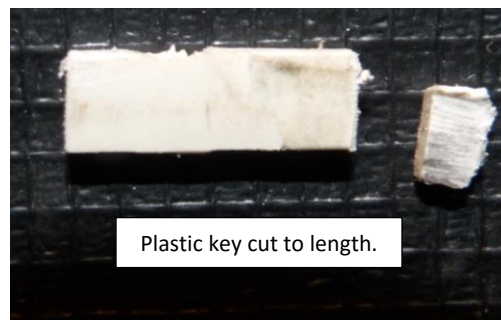
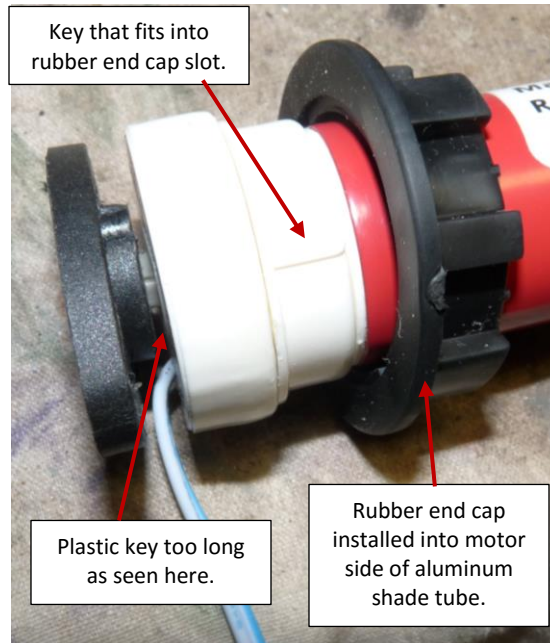
a center from which to work. I then put a small dab of white paint that was easily visible where the two lines crossed (center) and placed the black plastic piece onto the inside surface of the housing end cap so the center was visible in the center of the rectangular hole and marked my two bolt holes for drilling. Once drilled I used two 5/8" #6 screws, two flat washers and two nylock nuts to hold the black plastic piece to the end cap. Verify the RollerTrol tubular motor limit switch orientation as you move through this process to ensure the new bolt holes are correctly placed prior to drilling.

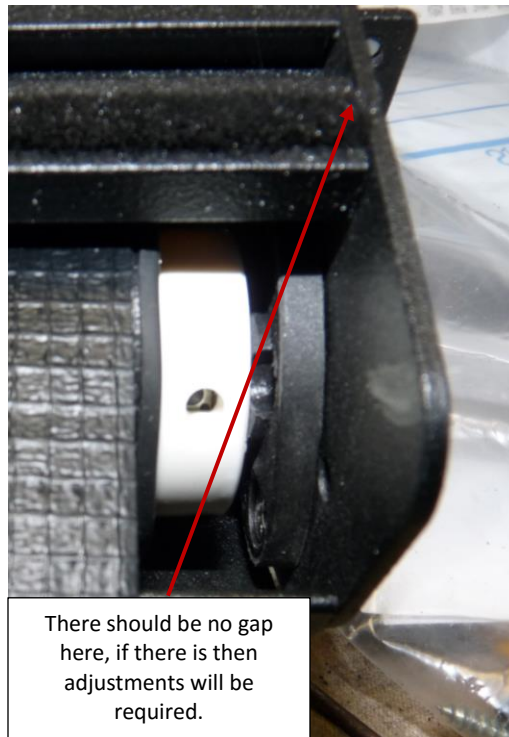


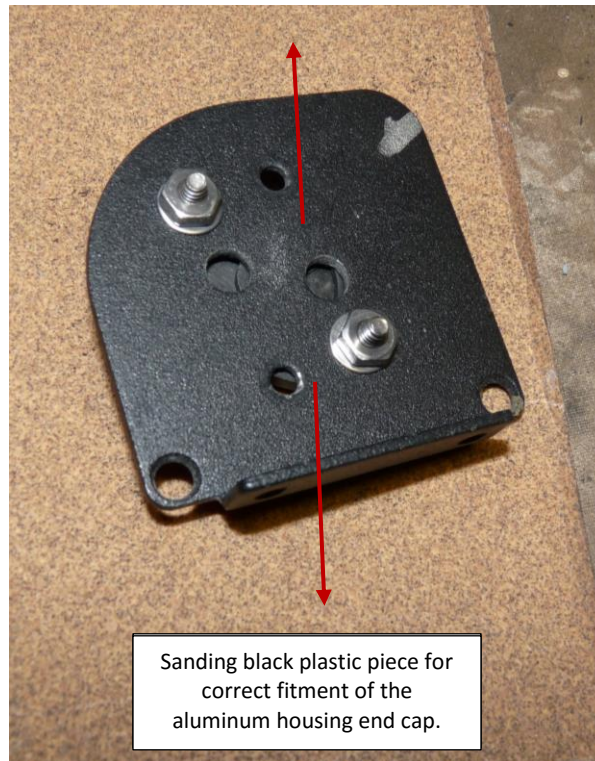


Now that the black plastic piece is correctly mounted, the plastic key length must be adjusted and the protrusion of the black plastic piece must also be adjusted. I put the key into the black plastic piece and the RollerTrol tubular motor and found that it was too long and it was cut it to fit. Next, reinstall the plastic end cap with the small center hole into the end of the aluminum shade tube opposite where the motor will be inserted. Then fully insert the RollerTrol tubular motor (without the rubber drive gear) into the end of the shade. To do this, first install the rubber end cap into the aluminum shade tube noting that it will fit with the aluminum shade tube keys between the rubber protrusions and then the RollerTrol tubular motor into the cap so that it is full seated. Note that the tubular motor has a white plastic piece that freely spins with two keys on it. These keys fit into corresponding slots in the rubber end cap. Done correctly, the motor will fully seat into the aluminum

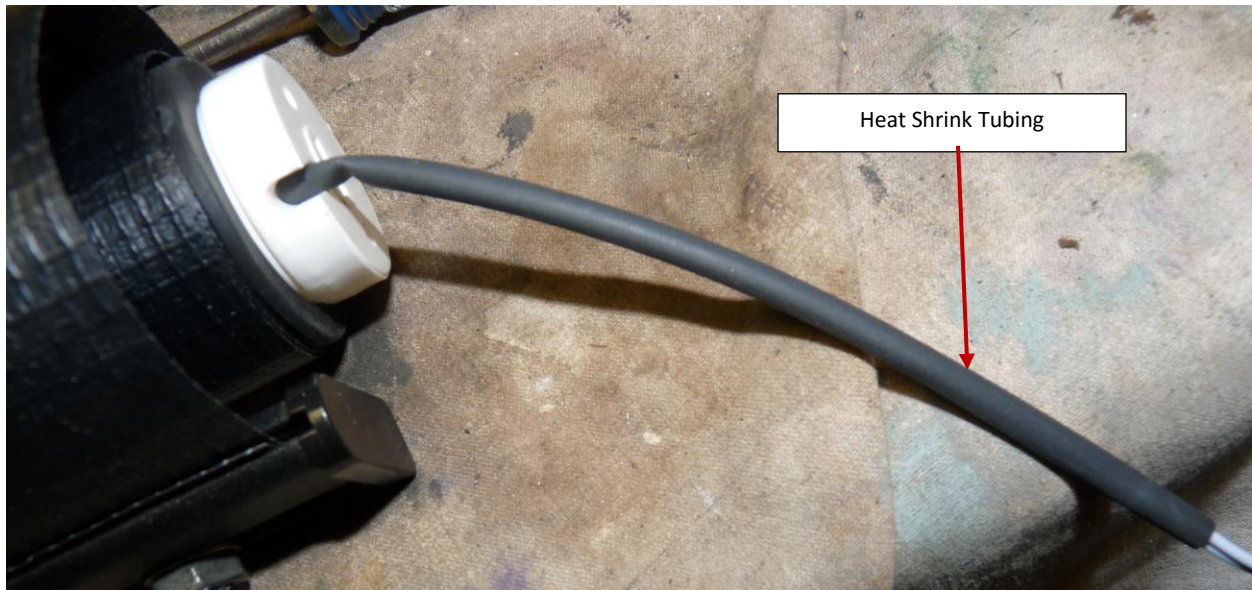
tube as seen in the photo. Now install the shade with the tubular motor in place into the housing making sure to engage the small hole in the end cap on the center pin on the other shade housing metal end cap. This is how the shade will fit when finally assembled. Now fit the housing end cap with the black plastic piece attached to see if it fits flush against the shade housing. If it doesn't, and it likely won't, then the circular protrusion on the black plastic piece must be reduced in thickness for a correct fit. Don't sand too much to create a gap and trial fit as you remove material.







One last thing to do prior to final assembly. Install some heat shrink tubing over the first several inches of the wires to protect them from insulation damage.



Now that all the fitments are correct and complete, it is time for final assembly. First, remove the RollerTrol tubular motor from the aluminum shade tube including the rubber end cap. Leave the rubber end cap on the motor and reinstall the rubber drive gear using the “E” clip. Slide the rubber drive gear and RollerTrol tubular motor slowly into the aluminum shade tube about half way. Then push the rubber end cap into the end of the aluminum shade tube. Finally, push the RollerTrol tubular motor in the rest of the way making sure to engage the white keys with the two slots in the rubber end cap as done previously during fitment checks. Next, unroll about 10” of shade so that once finally assembled the shade will actually be partially extended. Once in position, carefully route the wire around the end of the tubular motor and out the slot in the top of the housing in a similar manner as the original motor. (Note, I cleaned up the slot in mine with a file to ensure no sharp edges.) Install the plastic key into the black plastic piece attached to the housing end cap and then aligning the limit switch as previously shown, install the housing end cap by inserting the plastic key into the slot in the RollerTrol tubular motor and install the two previously removed housing end cap screws. Finally, remove the tie wraps holding the arms out of the way and place them below the stops. Set each end onto the stud with a plastic washer above and below the arm. Tighten the nuts so the washers just spin with fingers. Don’t overtighten or the shade won’t extend or retract correctly.



To set the limits, I drilled a hole in a 2X4 so I could feed the wires through similar to the coach mounting surface and then I mounted the shade assembly to the 2X4 and fixed it in my vice so that it was hanging as it would in the coach ensuring it was level. Using a 12V battery, I set the limits using the procedures that are on the RollerTrol web site prior to reinstalling in the coach. Once the limits are set, remove from the 2X4 and install in the coach.