# GruvenParts.com BRASS 2013-2018 RAM Power Folding Mirror Gear Replacement Instructions

Link to the Product Page for Ordering :

https://www.gruvenparts.com/ram-power-folding-mirror-gears-and-motors/

**** You Must Use the GruvenParts.com replacement motors when using this brass gear. This is because the OEM motor sends current through the motor case, which isn't an issue with the plastic spur gear. However, when using the brass spur gear, the current path could proceed to ground. Our motors do not use the motor case for the ground and therefore must be used with the brass spur gear.**

If you are reading this DIY article, you are like many others who have a Ram truck with power folding mirrors which no longer function due to a broken gear within the fold mechanism or a dead power mirror motor. This often occurs during normal operation, and especially with a light impact to the mirror housing. A broken folding mirror gear is evident when the mirror stops power folding. Sometimes you can hear the motor whirring but the mirror refuses to fold in or out. Other times, the broken gear just jams the motor and you hear nothing. You can still fold the mirror by hand. What's happened is a gear within the assembly was made from very brittle, weak plastic. Be advised that there are MANY aftermarket replacement mirrors out on the market – READ THEIR REVIEWS. The aftermarket mirrors are very poor quality and allow the mirror itself to vibrate so badly, you cannot even see out of the mirror while driving. Not to mention the replacement mirrors will also come with the same weak spur gear that that caused this dilemma in the 1st place. The best option is to fix the OEM mirror with the GruvenParts.com reinforced spur gear. Also note, we include the Hi-Torque replacement motors with this kit. Visit www.GruvenParts.com and click on the Ram Trucks Section on the left banner to access the folding mirror product page.

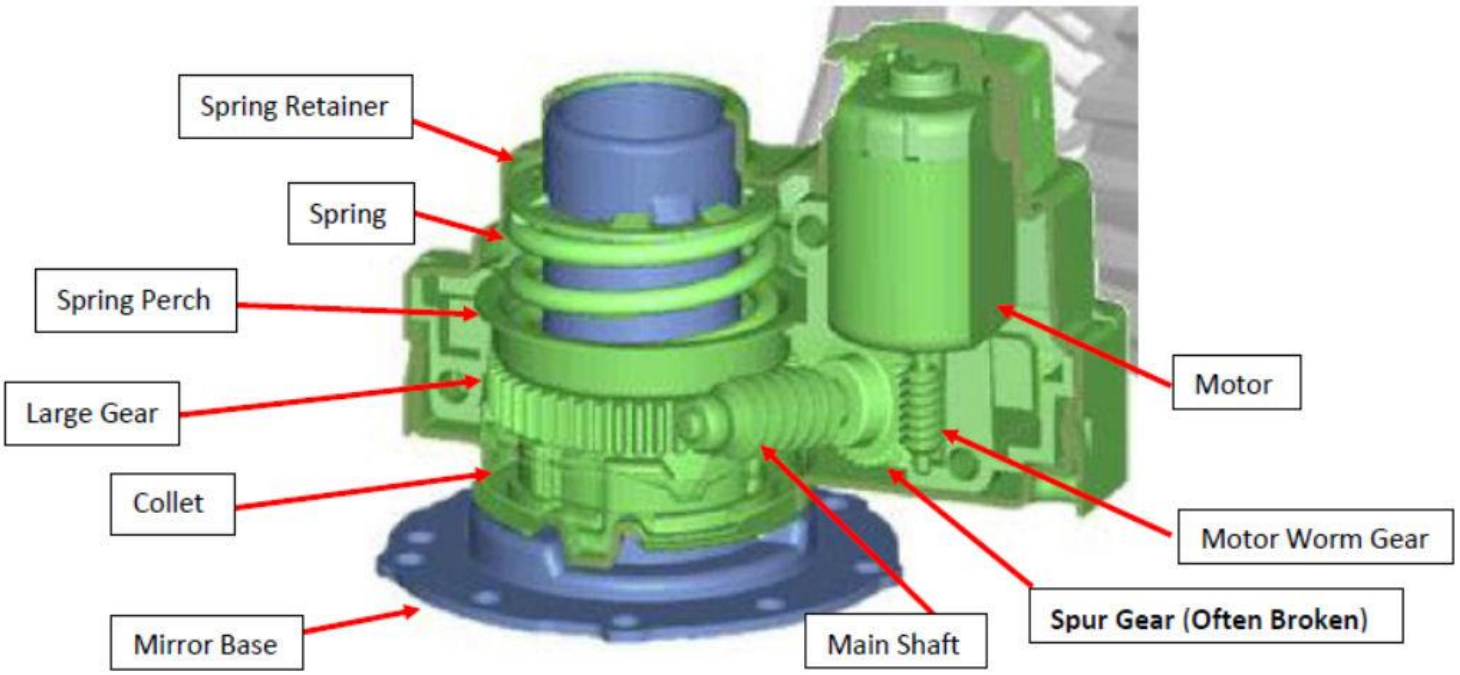
Tools Needed :

- Plastic pry wedge. I used a bicycle tire change lever in the pics shown below.
- T15 torx
- T20 torx
- Small Phillips head screw driver
- Small hammer and thin punch (can also use the Phillips screw driver)
- Vice or small arbor press

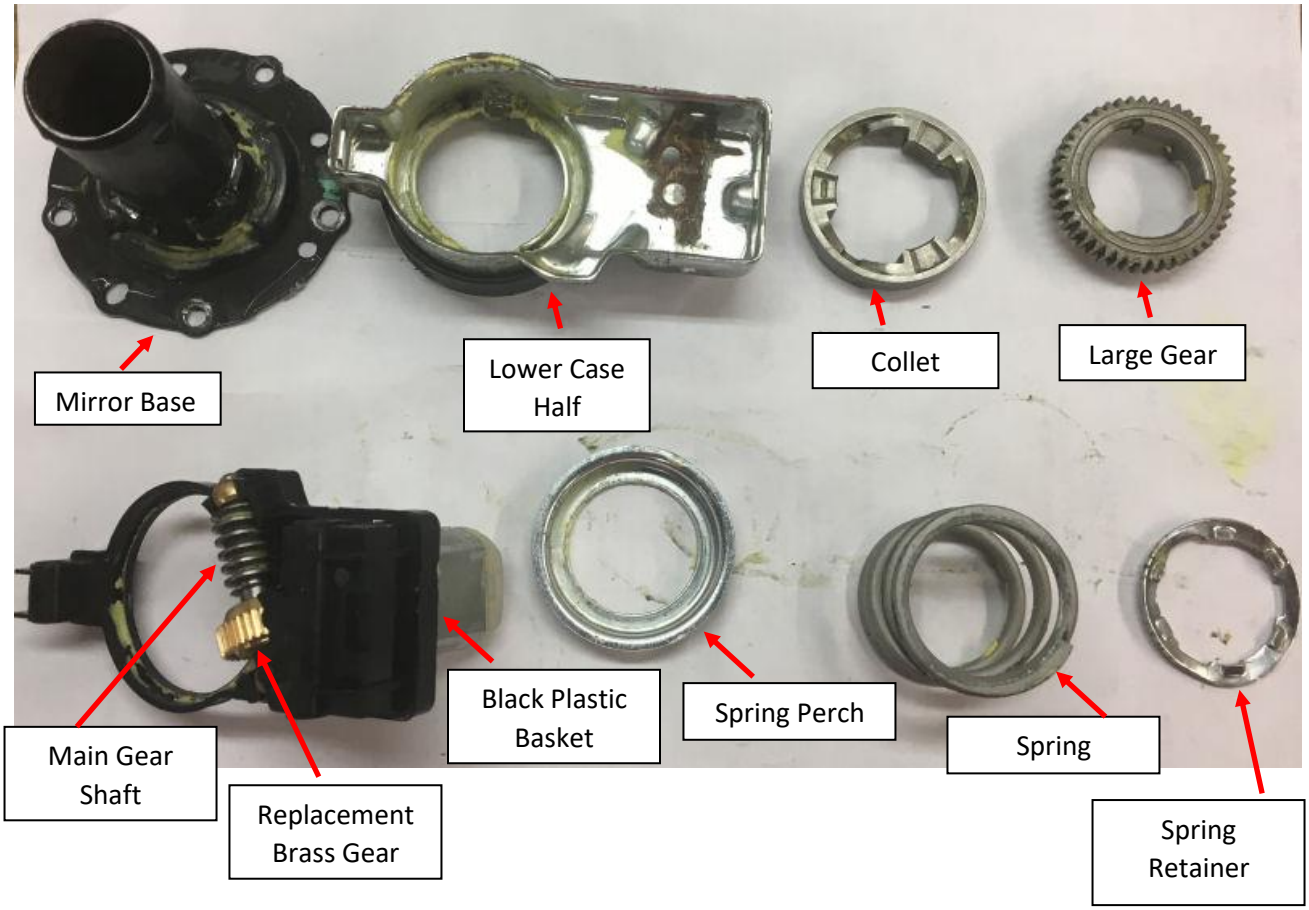
- 24 hour cure 2 part metal to metal Epoxy such as JB Weld 8265 with 3,960 psi cure strength or equivalent. DO NOT USE a 5 Minute Epoxy ! They are not as strong as the 24 hour 2 part epoxy. *Only needed if you are NOT buying the pre-attached gear option.
- Gear grease such as Permatex White Lithium Grease P/N 80345

**There is NO NEED to remove the interior door panel, or mirror base from the door. This can all be done with the mirror mounted on the door, working from outside the vehicle.**

The pictures below show the components of the mirror drive unit.



The unit is assembled starting with the Mirror Base in the Upper Left, and progresses to the Right as shown.



**Step 1 :**

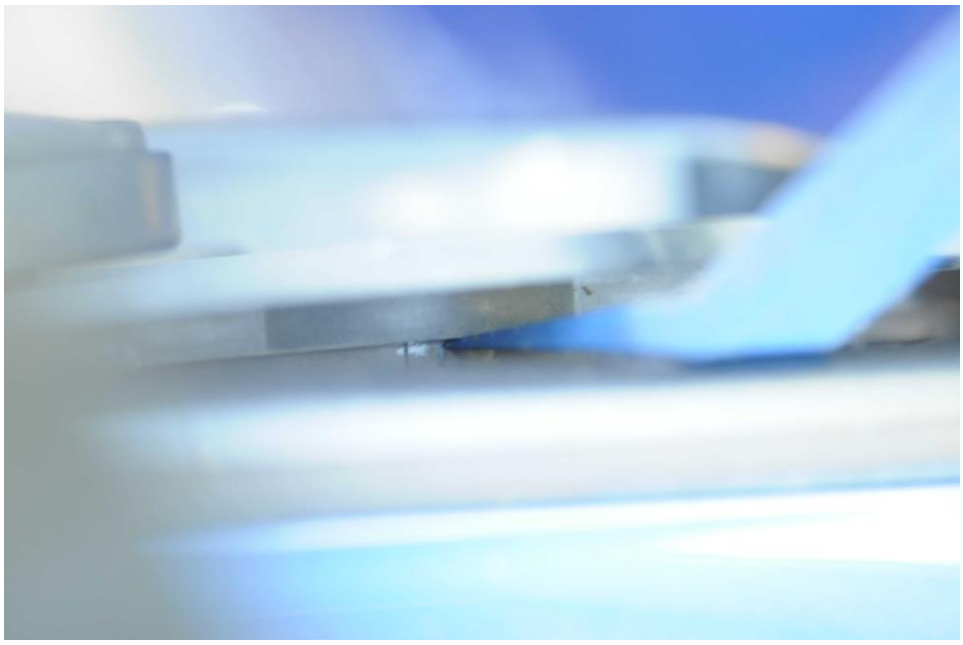
Electrically move the mirror to the full down position (manual glass movement is also OK)


Note the wooden wedge holding the folding arm of the mirror in place. This particular mirror failed gradually. It started failing to fold or unfold occasionally. Folding and unfolding the mirrors again would normally get it working again. Eventually, it failed completely in a partially folded position and it would not stay in place even if manually moved to the unfolded position. The wedge is a door shim from the local lumber yard and worked nicely to hold the mirror in the unfolded position without damaging anything until it could be repaired properly.

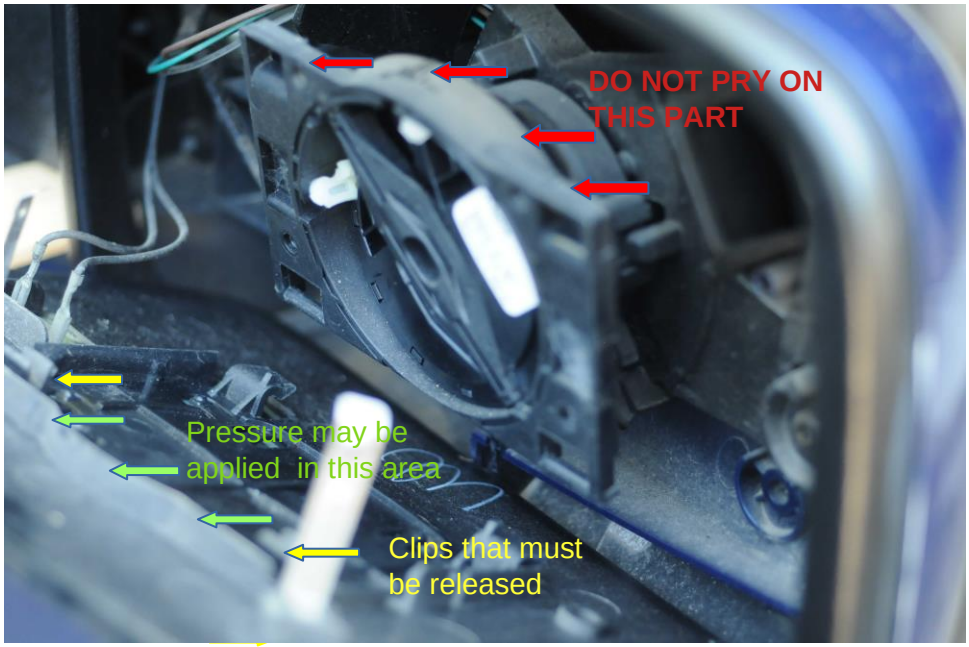
**Step 2:**

Use a suitable non marring pry bar to reach in behind the mirror and pry the top part of the mirror out. CAUTION: DO NOT pry on the top of the mirror! The picture below only shows the area to insert the bar. Please see the pictures following this one to see where to apply pressure.


The following picture was difficult to take but you can see the plastic mount on the back of the mirror and the tip of the pry bar. Before proceeding please see the pictures following to help understand how the mirror is held in and be careful not to pry on the wrong parts. Apply pressure along the top of that mount to cause it to release from the adjusting motor plate.



The next picture shows the mirror after it has been released. The yellow arrows show the clips that must be released. There are 2 on the top of the mounting area for the mirror. Once they are loose, tilt the mirror down to release the bottom clips. This may take a little patience to find the right position. Do not force it. It is tight but it will come loose when the angles are correct with only reasonable effort.

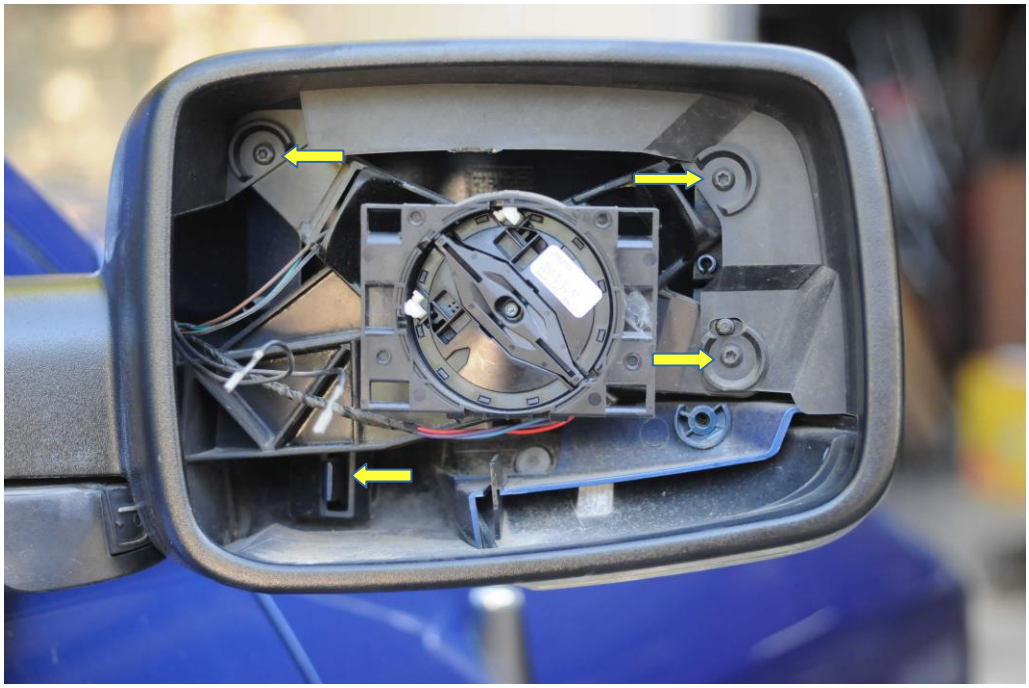


**Step 3:**

Remove the heated mirror wires. Do not pull on the wire. Pull on the connectors. Be sure to support the terminals while pulling the connectors. They are tight and will need to be wiggled a bit to get them free. Do NOT stress the terminals on the mirror. They can be pulled loose from the mirror or the electrical connection in the mirror can be broken.

**Step 4:**

Manually fold the mirror forward to make it easier to work on and remove the 3 T20 size Torx screws.

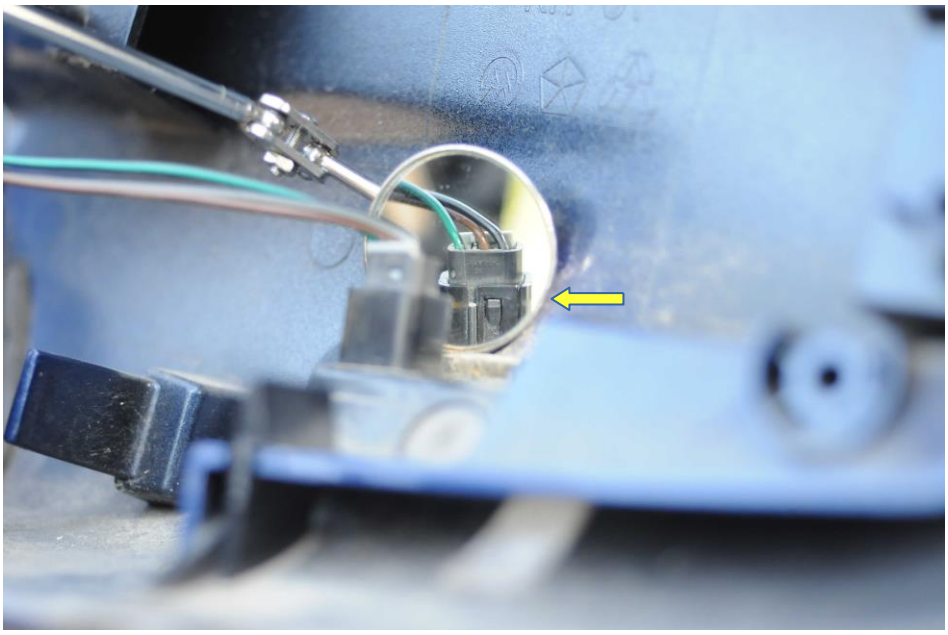


Then release the clip holding the mirror cover and work the cover off. Be careful not to break any of the tiny plastic alignment guides. There are a few on the top and inner edge of the cover. The puddle light does not need to be removed.

**Step 5:**

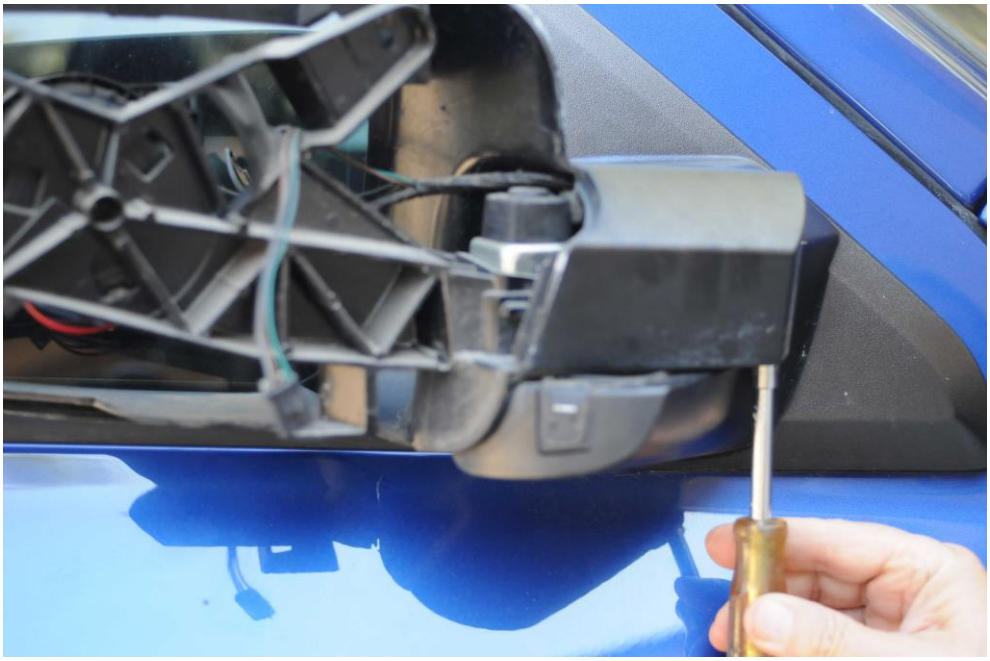
Remove the puddle light wire connector. There is a clip on the back side of the connector that must be released before the connector can be removed.

Note – The outer part of the socket must be lifted away from the plug to release the clip. A small flat tip screwdriver should do the trick. Be careful not to lift too much or the clip could be broken.



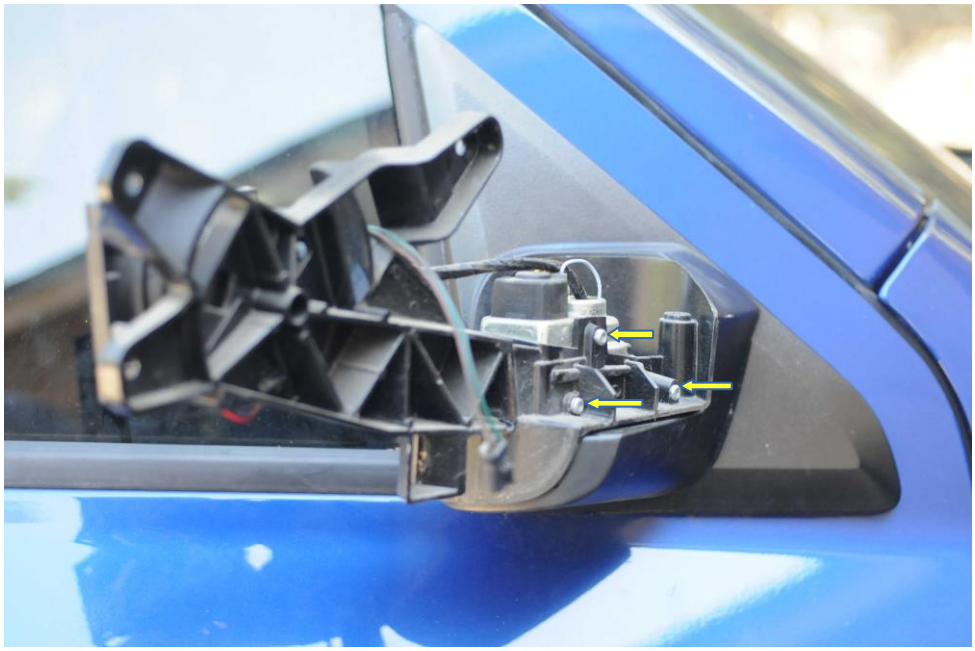
**Step 6:**

Manually move the mirror into the folded position and remove the T15 size Torx screw from the bottom of the folding arm.  (Yep – They hid that one pretty good.)  Then remove the cover.



**Step 7:**

Manually move the folding arm to the normal position and remove the 3 T20 size Torx screws. Note – There is a video for a different mirror model that is very similar to this RAM that shows driving these fasteners out with a punch. While it looks almost the same, it is different. DO NOT TRY TO DRIVE THESE SCREWS OUT WITH A PUNCH.

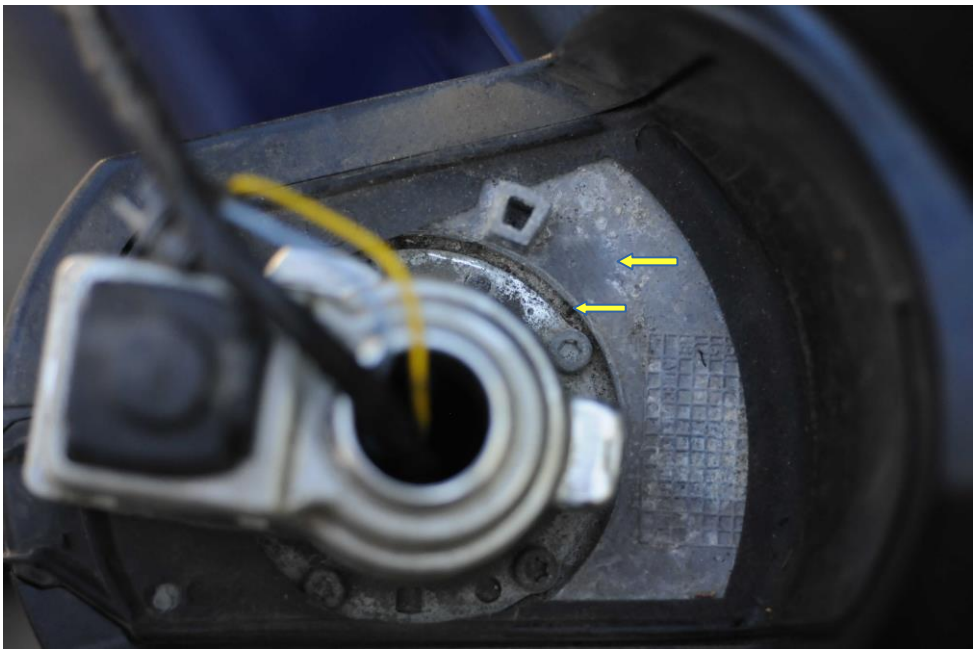


**Step 8:**

Disconnect any remaining wires and lift the folding arm free of the folding motor gearbox.

**Step 9:**

Make index marks on the folding motor gearbox mounts. There are several methods for accomplishing this. In this case a center punch was used. The metal is soft and it does not take a very hard tap to make the mark.



**Step 10 :**

Remove the 4 T20 size Torx screws holding the gearbox to the mount then remove the gearbox. The wires and plugs are easily removed through the center hole in the gearbox as the gearbox is removed. Note – If all the screws are not accessible, the gearbox may be moved using large pliers.

**Step 11 – Open Motor Assembly**

If you bought the entire drive unit, just swap in our unit and send back your old unit. If you bought the piece parts, proceed.

Place the motor assembly in a vice with the circular base facing up as shown in the pics. You will need to pry the case halves outward a bit to disengage the snap fit. There are 4 areas where the case halves are snap fit together as shown in the pictures. You can use gentle taps from hammer to force the metal case halves outward.


(4) Arrows show the locations of the snap fits. Flat head screw driver is inserted between the case halves, forcing outer half outward. Gently tap flat head screw driver downward to force case walls outward. Pry center portion upwards to separate.


Case halves separated. Note motor on the right. Motor can be gently pulled straight up to disengage from the motor drive unit, or wait until main spring is removed and it will come up.

**Step 12 – Open Motor Bracket**

In order to open the motor bracket, place it in an arbor press (or vice) as shown. **WEAR EYE PROTECTION !!** Use a suitable socket or collar to push down on the spring retaining ring. With the spring compressed, rotate the socket or collar approximately 1/6 turn and slowly release compression on the spring. This will align the male tabs in the shaft with the female indents on the retaining ring, and allow the ring to come off the shaft. Release compression slowly, this is a pretty heavy spring. You might need to "help" the retaining collar to rotate while compressed, if its being stubborn. Just use a pair of channel locks or large pliers to grip the spring, and rotate while slightly compressed. **** It has been suggested that for "field repairs" you can use a length of 1" PVC pipe and body weight to compress and turn the spring retainer. I would wire tie the spring to the unit if you do this, to prevent It from sailing into orbit if you slip off mid turn. USE EYE PROTECTION HERE !!!**


Arrow showing the retaining ring sitting just above the spring. You need to compress this and rotate the socket or collar about 1/6 turn either direction to disengage the retaining ring. Release compression slowly as the spring is heavy. You can also do this by hand with a deep well socket, by pressing down firmly on the spring then rotating. **Use eye protection and be careful, the spring is heavy.**

**Step 13 – Remove / Replace Worm Gear**

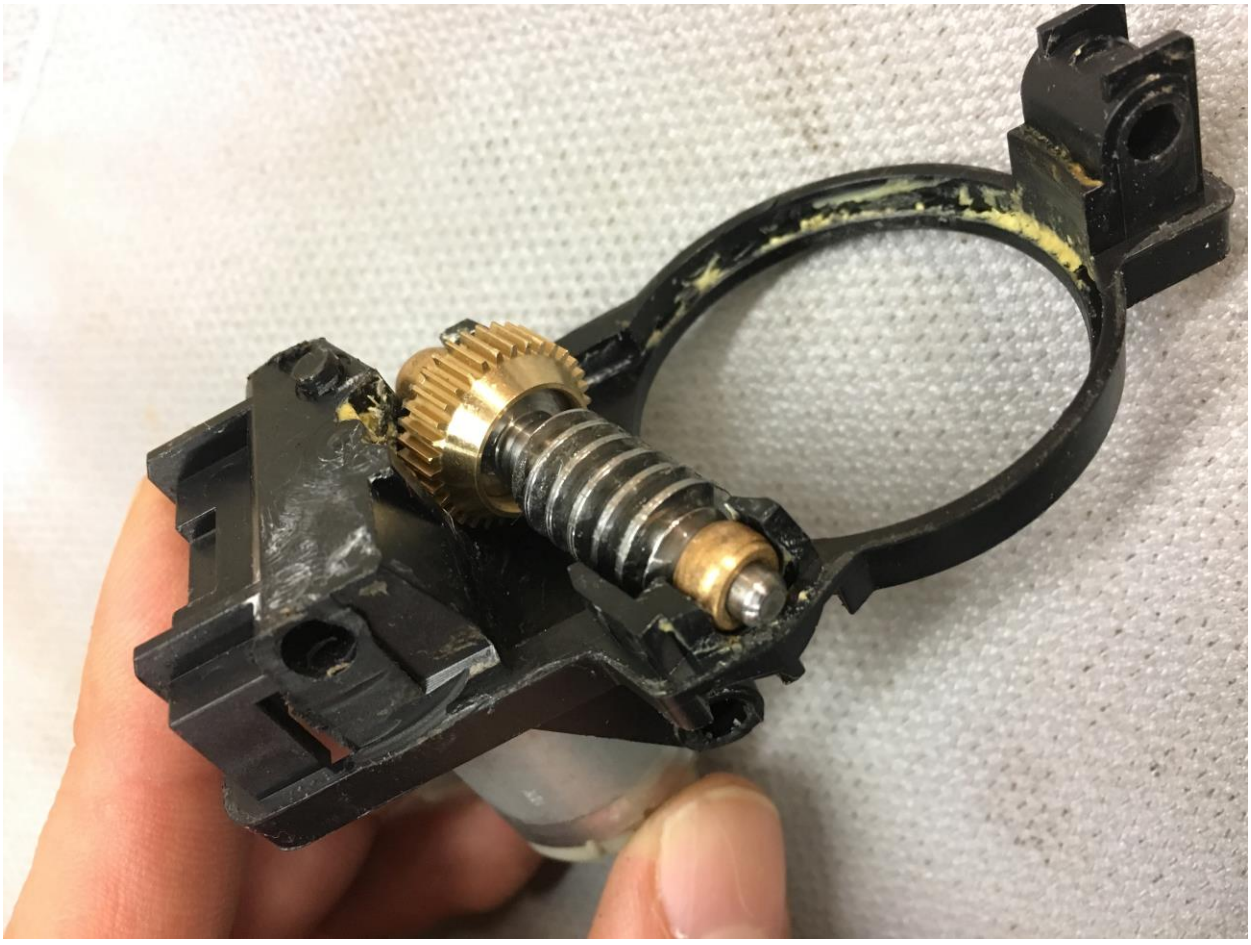
Remove retaining ring, spring, lower spring perch. Then remove the black plastic motor housing and flip over to see the discrepant worm gear that RAM never wanted you to find. Gently pop this worm/spur gear out using a small flat head screw driver. Retain the brass bushings on either end.


Discrepant gear shown. Note the plastic spur gear over-molded onto the metal worm gear. This is what has likely broken if you hear the motor whirring or if nothing happens when you hit the button. Most times the ger breaks apart and lodges into the unit, preventing anything from happening.

**Step 14 – Reassembly**

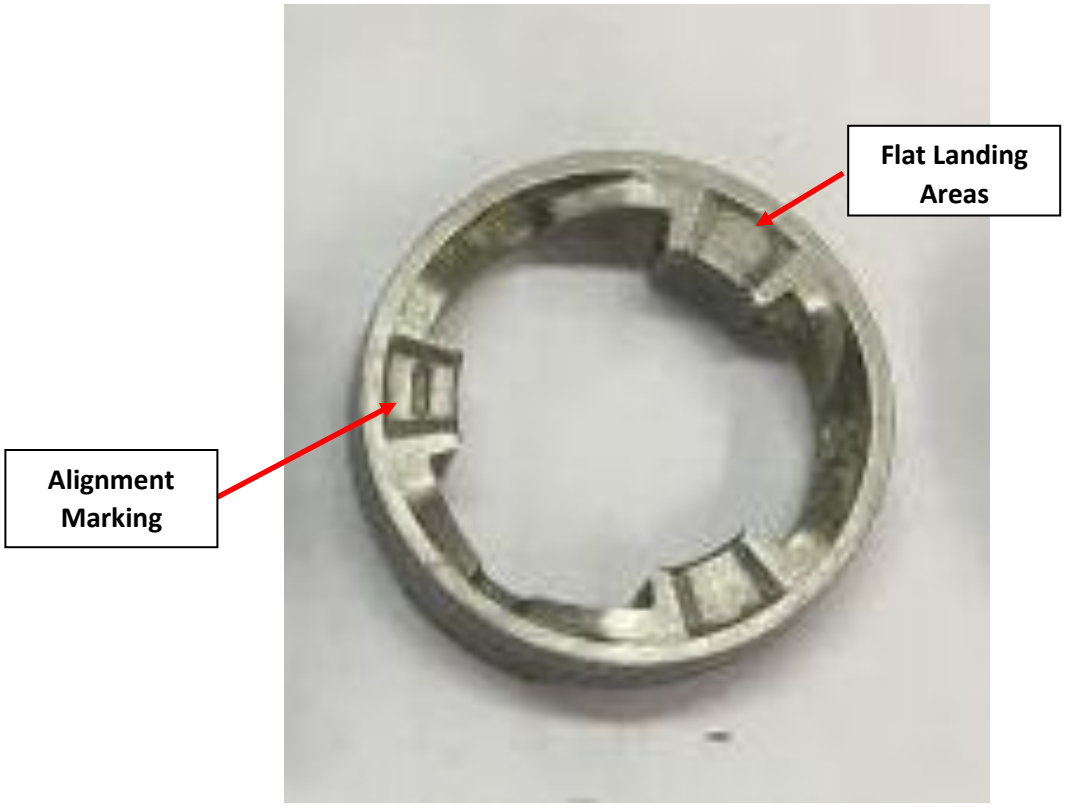
Reinstall the main shaft worm gear with the new brass gear and motor and ensure motor gear teeth make proper contact with new brass spur gear. You may need to adjust the brass bushings that the shaft rides on to ensure the gear stays centered in the motor slot. You can reposition those brass bushings slightly to ensure the shaft doesn't have much play. Plug in motor connection and operate motor back and forth several times to ensure everything is aligned properly before reassembling – you will need to hold the motor in place if running it without the metal cover installed.

NOTE : YOU SHOULD CAREFULLY CLEARANCE THE AREA OF THE BLACK PLASTIC BASKET UNDER THE NEW BRASS GEAR USING A BOX CUTTER OR RAZOR BLADE TO ENSURE THE NEW BRASS GEAR DOES NOT CONTACT THE BLACK BASKET. IT IS A BIT THICKER, SO MAKE SURE IT FITS WITHOUT RUBBING.



Assembly is the reverse of removal. Use Permatex White Lithium grease P/N 80345 or equivalent on all the moving parts of the mechanism when reassembling. Note the assembly order and orientation as shown on Page 3. Place the mirror base down onto the vehicle frame, it will only sit 1 way. Now, drop the lower case half onto the mirror base such that it sweeps from open to close in the proper direction. Now, drop in the collet – **and NOTE : the collet will only go on 1 way. More on this below.** Don't mash it down, it will fit into the grooves in the mirror base only 1 of the 3 ways so find that correct orientation and drop it in and make sure it sits all the way flat down into the mirror base/lower case half. Do not change the orientation of these 3 parts after you align it. These mirrors can be set up to sweep on either drivers side OR passenger side! Proceed with installation of other components.

Regarding the Collet : **note that it can only fit onto the Mirror Base in 1 orientation,** so you will need to rotate it on the Mirror Base until you find that correct orientation. Looking DOWN on the collet from above, you will notice 3 flat landing areas. ONE of those 3 landing areas will have some sort of marking on it, like a MINUS sign, or a DOT, or an ARROW. Just 1 of the 3. See Pic.

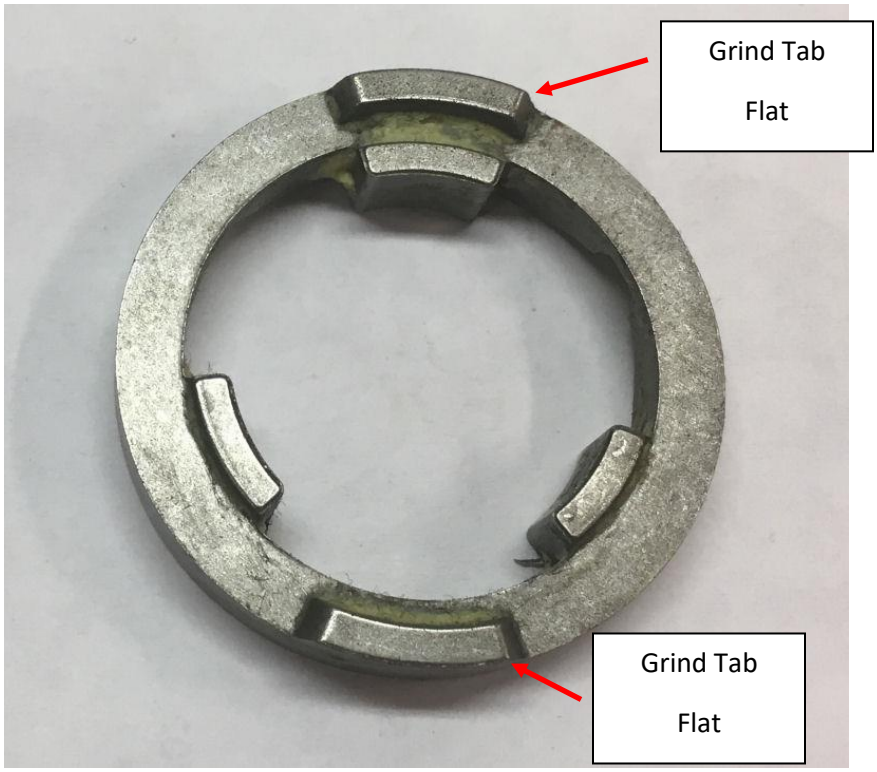



**If working on the DRIVERS SIDE, this alignment mark should roughly be facing the FRONT of the vehicle.**

**If working on the PASSENGER SIDE, this alignment mark should roughly be facing the Passenger side window (to the left, if standing BEHIND the mirror looking forward).**

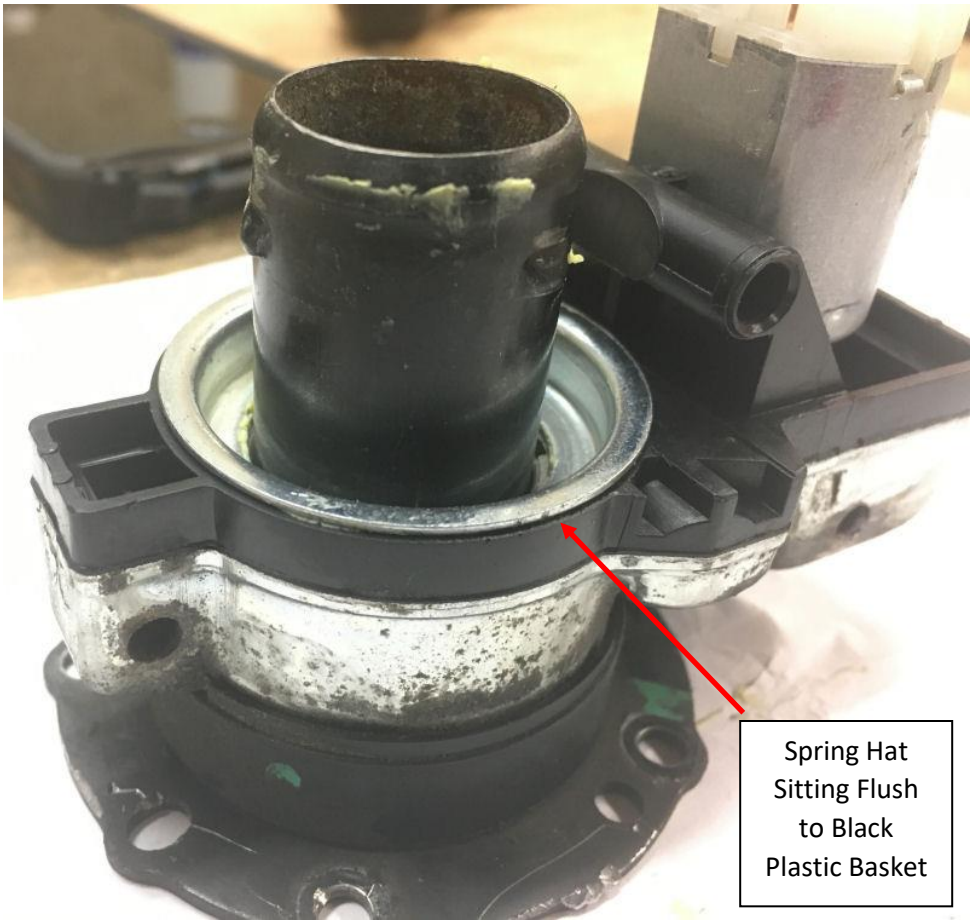
Don't get this wrong, this collet will ONLY go down properly into the base in 1 orientation, not all 3.

Also regarding the Collet – you should grind off completely the 2 protrusions on the BOTTOM side. See picture below. The reason for this is because these Tabs/Protrusions are meant to act as detents or stops for when the plastic gear breaks. When the old plastic gear breaks, It will lock the unit in the extended or retracted position, with no chance of the unit back driving due to the force of the air pushing on the mirror. These detents put a huge strain on the unit, and since the plastic gear has been changed out with a proper metal gear, these are no longer needed and therefore these tabs/protrusions can be ground flat. Use eye protection when grinding this, a Dremel tool works well here. Note your tabs might look a bit longer, that's OK, RAM made several varieties.




**Collet Bottom Side Shown, Remove the Tabs**

Once the case unit has been reassembled, make sure the spring hat is sitting flat on the black plastic basket as shown in the pic below. If its riding up off the basket, it means you do not have the main gear or collet situated properly. Repeat the assembly until the spring hat is sitting flat as shown below.



**** TROUBLE SHOOTING / TIPS SECTION ****

1. Ensure the brass gear internal bore and the main shaft worm gear are CLEAN and free of any debris before applying epoxy.

2. The new brass gear is slightly thicker in cross section. If it rubs the bottom of the black plastic housing, you can use a dremel tool or sharp knife to gently clearance the area directly under the gear. Ensure the gear can spin freely without contacting the black plastic housing.

3. When installing the brass spur gear, check to make sure its perpendicular to the main worm shaft (not crooked). Let the epoxy cure fully while the gear is held concentric to the main worm shaft. It can be a little bit off, but make sure you don't have it too crooked to the main worm shaft. The new brass gear can wobble slightly as it turns, that's not an issue.

4. If there is any binding in the new gear shaft, resolve the binding. Make sure the new gear shaft isn't poking too far out on 1 side or the other past the brass bushings because it will hit the metal case that goes around it. That will jam the whole mechanism. If you need to, trim a bit of the shaft off so it doesn't protrude past the brass bushings on either end. Use a dremel tool or similar for this, wear eye protection. It's a hardened steel shaft, so sparks will be flying as you trim the ends off.

5. If all else fails, email us – paul@gruvenparts.com and we will help. We stand behind everything we sell. We realize this process seems difficult, due to the poor design of the OEM mechanism which we're designing a fix for.