800 Mount Lubrication Guide

The following guidelines should be followed to lubricate the three main parts of the 800 mount. The guide is broken into three sections; the polar forks, right-ascension axis and declination axis. Although you can work on any part at any time it would be best to rework the entire mount at one time and not have to worry about it again for many years.

Lubrication of the 800 mount requires that the worm of the right-ascension axis be removed from the worm wheel and that bearing pre-load rings be removed. If you do not feel comfortable meshing the gears or setting the bearing pre-loads after reviewing these instructions, the mount can be sent back to Astro-Physics after consultation with customer service. If the mount is returned, a return authorization number must be obtained.

Helpful web sites:

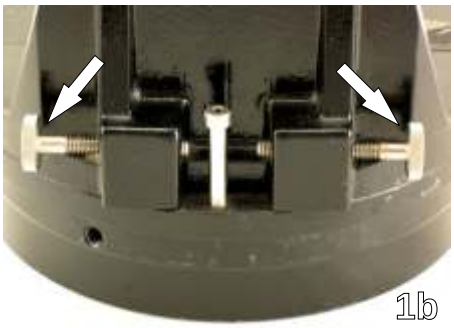
If you no longer have your original mount instructions or just wish to review some of the original materials you can find them with the following shortcut:
http://www.astro-physics.com/tech_support/previous/800_mount/800HDA-8010.pdf

To perform the following operations you will need to do and acquire the following:

Separate the declination housing from the right-ascension housing.
Remove the right-ascension housing from the pedestal or other support.

Lubriplate No.105 Motor assembly grease (available at automotive supply stores)
wood 2”x4” block, 6 inches long
wood 2”x4” block, 12-16 inches long
3/8-16 x 3 inch hex bolt or same length diameter rod (threads not important or needed)
de-greasing agent like ‘simple green’
small artists paint brush
rags and paper towels
3/8 inch, long arm hex key
1/16 inch, long arm hex key
3/16 inch, long arm hex key
5/32 inch, long arm hex key
3/32 inch, long arm hex key
Phillips head screw driver
3/16 slotted flathead screw driver

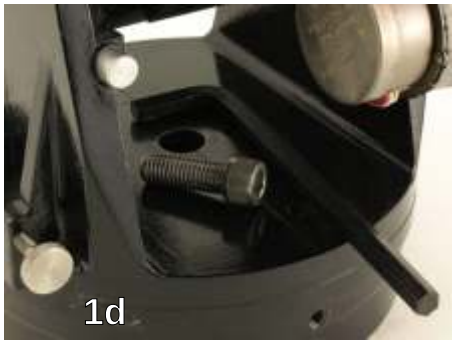
800 Mount Greasing Manual



AZIMUTH BEARING:

Remove the 800 mount head from its pedestal or other support for cleaning and greasing. (1a)

Back off both azimuth adjustment screws to avoid damaging them or the azimuth pin. (1b)



Using a 3/8” long arm hex key loosen and remove the ½ inch socket head cap screw (SHCS) from the center of the polar forks. (1c,1d)

The screw will be used again in the bearing separation procedure, images 1i and 1j.

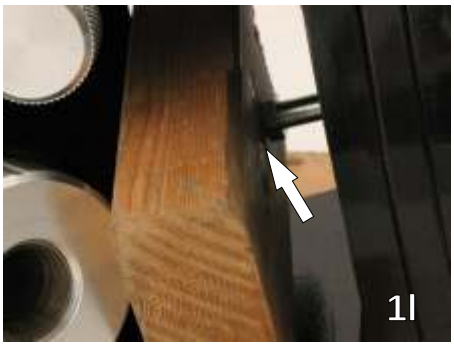
Get a piece of wood 2”x4” approximately 15 inches long to rest the mount head on. (1e)

Get another 2”x4” about 6 inches long plus a standard 3/8-16 x 3 inch hex bolt or equivalent length 3/8” diameter rod. (1f)

Place the 3/8 x 3 inch hex bolt into the center hole of the forks and follow it up with the 6 inch length of 2x4.

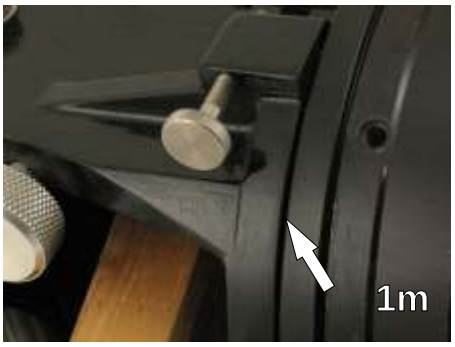
Have the 2x4 contact the underside of the RA axis and the rear clutch knob. (1g,1h)

Take the ½ inch SHCS removed earlier and put in the underside of the mount. Start turning with the 3/8 hex key. (1i,1j)



Advance the ½ inch SHCS enough to start building some pressure on the 3/8 inch hex bolt. (1k)

Square up the 2x4 and hex bolt and begin rotation of the hex key. (1l)



Depending on the condition of the old grease in the azimuth bearing, either a small or large amount of pressure will need to be exerted. The components will break apart at the joint marked by the arrow (1M).
There is enough thread length to break the bearing clean apart. (1n,1o)

With the plain bearing apart you can clean the old grease off with a cleaner of choice or you can try our favorite ‘Simple Green’.

Apply a new coat of Lubriplate No.105 motor assembly grease or lithium grease to both surfaces.
(1o,1p)

Carefully rejoin the two components as squarely as possible with the push pin back between the thumbscrews. (1q)

Squeeze the bearing together and wipe off any excess grease that was squeezed out. (1r)

Turn the mount head upright and return the ½ inch SHCS to its center hole.

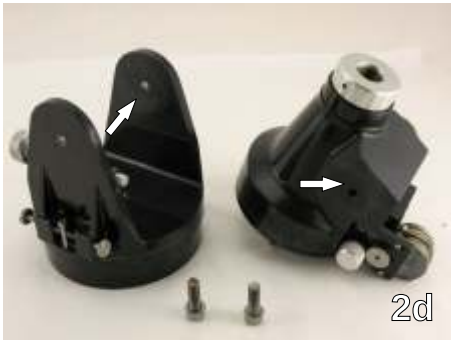
Before tightening the center bolt or the azimuth thumbscrews, rotate the polar forks back and forth in the base to spread the grease evenly. (1s)

Further work on the mount can be done with the mount on a pedestal, if desired. (1t)

ALTITUDE BEARING:

Remove the ½ inch SHCS and washers from each side of the polar forks. (2a)

Carefully lift the right-ascension axis housing from between the forks. (2b)



With the plain bearing apart, you can clean the old grease off with a cleaner of choice or you can try our favorite, 'Simple Green'.

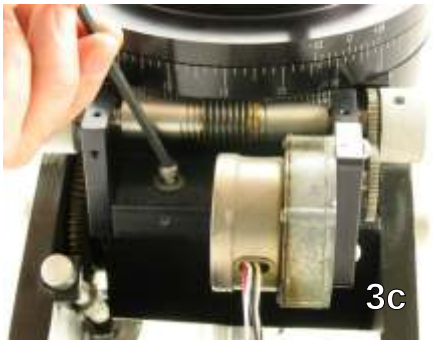
Apply a new coat of Lubriplate No.105 motor assembly grease or lithium grease to the plain-bearing surfaces (see arrows)and the worm gear teeth. (2c, 2d)

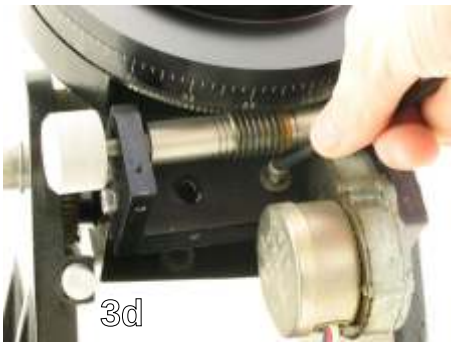
Reassemble and tighten the screws. (2e)

RIGHT ASCENSION SHAFT ASSEMBLY:

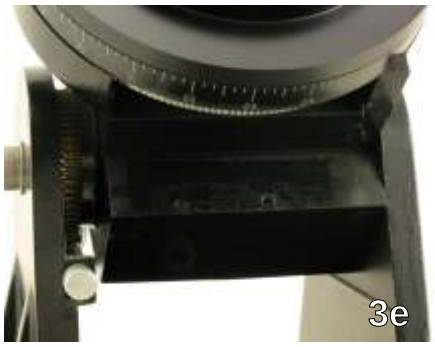
Note: To safely remove the right-ascension shaft without doing damage to the worm, the worm assembly must be removed first. (3a)

Start by removing the receptacle plate. Three 4-40 socket button head or phillips head screws will need to come off. (3b)





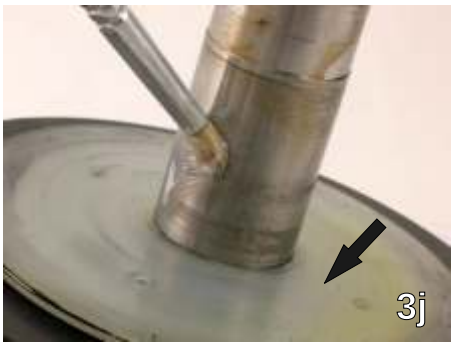
Loosen and remove each of the two 10-32x1 inch SHCS. Do not loosen or remove any other fasteners. (3c, 3d)



Completely remove the worm drive assembly. (3e)

Unscrew the knob at the end of the right-ascension shaft. Remove the bearing. (3f)

Take the right-ascension pressure plate assembly out of the housing. The upper bearing will come free with the shaft and will likely hang up or catch at the end of the shaft. (3g, 3h)



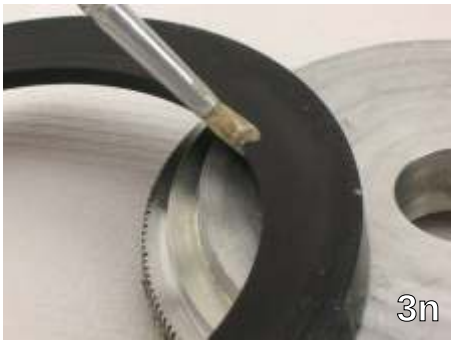
As with the previous assemblies, Simple Green and Lubriplate 105 can be used as described below.

Set the right-ascension shaft assembly on a firm surface and remove the bearing, worm wheel and setting circle. (3i)

Start the cleaning and greasing process at the shaft where the bearing and worm wheel make contact. There is no grease on the plastic clutch plate material.

Clean and grease the lower bearing contact surface. (3k)

Clean and grease the setting circle contact surfaces on the worm wheel. (3l)



Clean and grease the teeth of the worm wheel. (3m)

Clean and grease the contact surfaces of the setting circle. (3n)

Clean well the inside bore of the worm wheel and grease the entire surface. (3o)

The lower bearing can be greased or oiled with 30W oil. (3p) It is easier to apply grease to the bearing cup and allow the rollers to pick up the lubricant from that surface.(arrow) (3q)

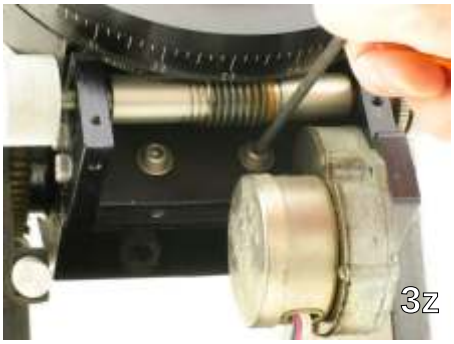
The upper bearing can be greased or oiled. (3r)

It is easier to apply grease to the bearing cup and allow the rollers to pick up the lubricant from that surface. (arrow) (3s)

Reassemble the setting circle, worm wheel and bearing to the shaft and place the whole assembly into the right ascension housing.
Note: Do not place the bearing in the housing first by itself, since this would complicate assembly. (3t)

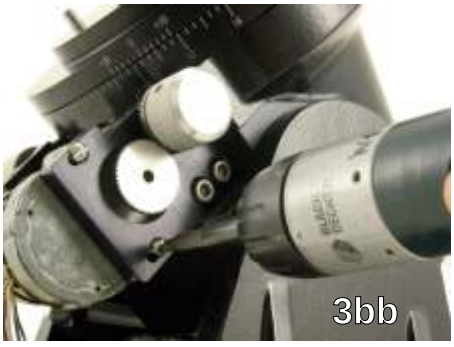
With the shaft assembly in place, turn to the bottom end for installation of the rear bearing. (3u, 3v)

Put the rear bearing in place. While holding it in position, mount the retaining or compression ring. (3w, 3x)



Tighten the compression ring and rotate the shaft assembly to distribute the lubricant. (3y)

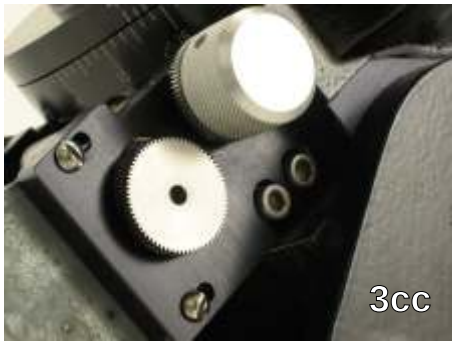
Put the worm drive assembly back in place and fasten lightly with the two fasteners. (3y, 3z)



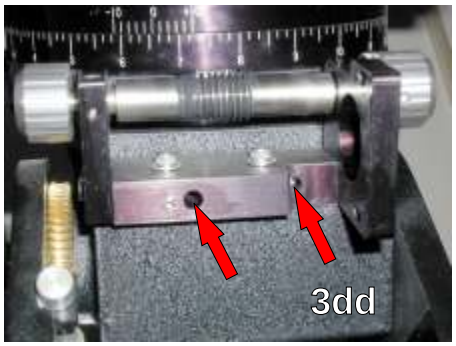
To set the worm mesh, loosen the two screws enough to push the worm squarely against the wheel. Lock the two screws down. (3aa)

Loosen the two motor mount screws. (3bb)

Back the motor spur away from the worm spur. (3cc)



Begin turning the worm knob if it rotates freely. Grab the R. A. pressure plate and feel for backlash every 90 degrees. You can also put the declination assembly in place to make it easier to feel backlash. Expect to find a tight spot and a loose spot 180 degrees from each other. Make your final worm drive position at a point



where you can rotate the knob past the tight spot without too much effort or having the clutch knob slipping. Lock the two screws down. (3ee)

Your mount may have two holes at the base of the center plate. You can use the set screws inside to provide a “push” function to relieve excess pressure. (3dd)

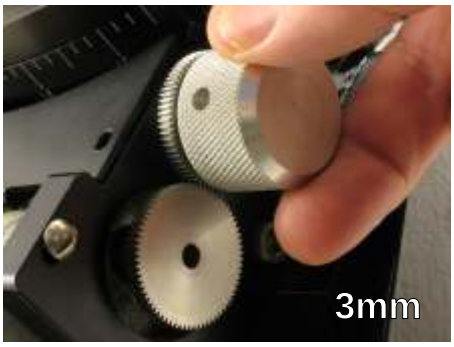
Return the motor spur to make contact with the worm spur. As you lock down the screws, check that some play remains between the teeth of both gears. (3ff, 3gg)

Return the receptacle plate to the worm assembly. Take care not to pinch or damage the wiring. (3hh)

Fasten tight with the 4-40 screws. (3ii)

A drop or two of oil can be placed in the bearings of the worm drive.

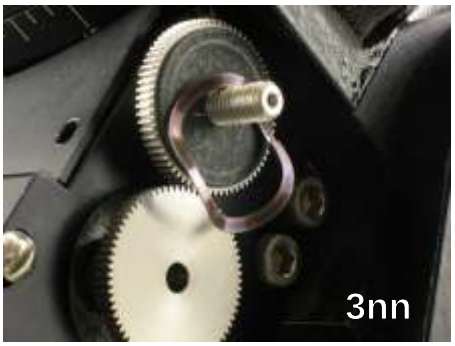
Access the pre-load side bearing by backing off any set-screws in the knob and removing it. (3jj, 3kk)

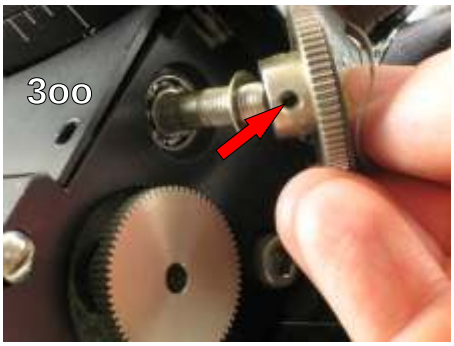


To access the bearing on the motor side, the clutch must be disassembled.

Back off the set screws in the clutch knob. (3ll)

Unscrew the clutch knob. Holding onto the knob on the other side of the assembly will keep pressure off the motor. (3mm)



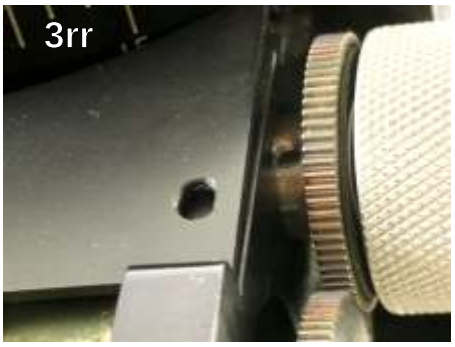


With the clutch components being exposed remove all the parts taking care not to loose any of the parts.(3nn, 3oo)

Please note the worm shaft spur gear has no screw in the threaded hole. This is ok and part of the design. Do not add one. (See red arrow in 3oo)

With the bearing exposed add a drop or two of oil. (3pp)

Reassemble the clutch, supporting the wave spring up against the face groove in the aluminum clutch knob. (3qq)



Begin compression of the wave spring but do not crush or compress it completely. Please review the following for proper clutch adjustment.(3rr)

Remember that the motor is always turning when the power is on. The clutch has been designed into the system to protect the motor. When you grab your telescope to point it, the clutch prevents you from stalling out the motor.

You can verify that the clutch is working properly. Hold the motor spur and rotate the clutch knob. The clutch knob should be able to rotate with the motor spur engaged. You will notice that turning the knob also turns the worm. This must occur for the drive to work properly. (3ss)

The clutch pressure can be adjusted by backing off the one or two set screws and rotating the knob in or out while holding on to the knob on the other side. Apply enough spring compression to allow the worm to turn right through the tightest spot on the worm wheel. Avoid crushing the wave spring under the knob and nullifying the clutch action. (3tt)

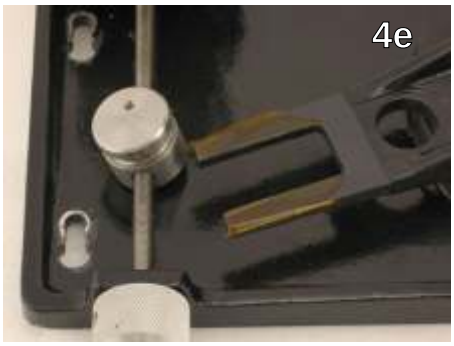
DECLINATION AXIS SHAFT ASSEMBLY

Remove the declination assembly from the R. A. head and place on a table. (4a)

Flip the assembly on its side and remove the 4 socket flat head screws using a 3/16 hex key. (4b)

Carefully turn the assembly back on its cradle plate side, supporting the shaft assembly against the cradle plate. (4c)

The intent is not to damage the fork tines of the tangent arm. (4d)



Slide the fork out of the captured nut. (4e)

Back off the lock knob of the tangent arm. (4f)

Remove the tangent arm from the shaft assembly. There are no parts to grease on the tangent arm. (4g)

Using a 1/16 inch hex key, back out the set screw retaining the declination setting circle.(4h)

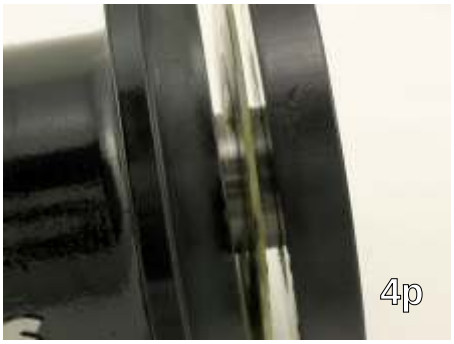
Remove the setting circle.
You may encounter difficulty removing it if the nylon tip of the screw catches in the groove of the silver colored knob behind it. (4i)

Using a 3/32 hex key back off the set screws of the retaining knob. (4j)

Rotate off and remove the knob. Please note that there are nylon tips on the set screws of this knob as well. These keep the threads of the stainless steel shaft from being damaged. Try not to loose them if they separated from the screws. (4k)

Pull off the bearing. (4m)

Turn the housing upright and push the exposed shaft against a piece of wood. The shaft will move up in the housing and stop as seen in 4n.



Any cleaning and greasing of this portion of the mount will unfortunately have to be done in the gap provided. The black aluminum disk attached to the shaft is glued in place and prevents shaft removal. (4o, 4p)

Push the housing down on the black disk to close up the gap when finished.

Grease the bearing cup and bearing, if desired. (4q)

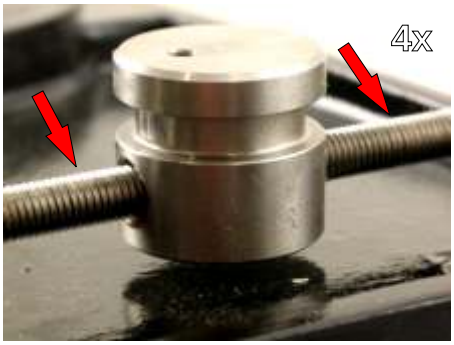
Return the bearing to set in its cup. (4r)

Before screwing the knob back in place, make certain that a piece of plastic is in the screw hole in front of the screw. (4s)

Rotate the knob to contact the bearing, but before locking it in place, rotate the shaft. There should only be minimal drag. (4t)

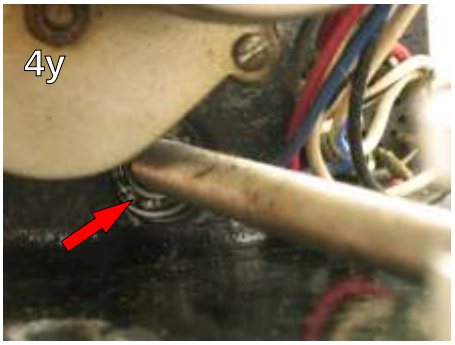
Lock down the two retaining set screws. (4u)

Put the setting circle in place and put a spacer between it and the declination vernier ring. Folded over pieces of paper will do fine if a feeler gauge is not available. (4v)



With a gap defined between the setting circle and vernier ring lock down the circle. Align the 90 degree mark to the zero on the vernier. (4w)

Before placing the fork back in place you may wish to place lubricant on the threaded rod where the captured nut travels. (4x)



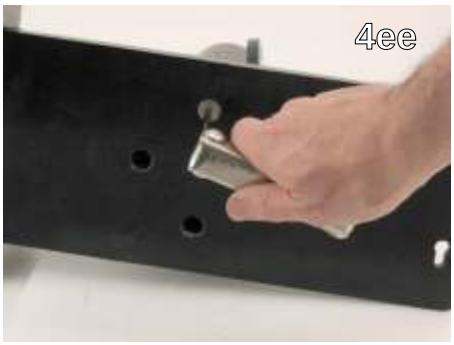
You can also place a few drops of oil on the ball bearings at each end of the rod. (4y, 4z)

Invert the housing and prepare to mount the tangent arm. If the white plastic disk has slipped out of place, simply push it concentric with the black disk. (4aa)

Mount the tangent arm by having the lock knob loose and pushing the plastic strap into the gap around the housing. (4bb)

Place the declination housing on the cradle plate and slide the fork into the captured nut. (4cc, 4dd)

Center up the declination housing with the cradle plate. (4dd)



Place the declination housing and cradle plate on its side. Line up the first of the four holes and install the first screw. Leave loose.(4ee)

Finish up with the remaining fasteners and tighten. (4ff)

Note: You will have to calibrate your declination setting circle again when the mount is back out under the sky.