

From: Thomas Mathis <support@mathis-instruments.com>
Subject: Re: Backlash in MI-750 mount
Date: February 23, 2024 at 3:18:57 PM EST
To: Walter Golay <walter.golay@cfa.harvard.edu>

Walter,

We have attached our fork manual, which discusses adjustments of the worm assembly. You should examine the gear teeth about once a year. Since your mount is over eight years old, the grease on the gear is has likely harden and should be removed. This can cause backlash and poor lubrication of the gear.

Use the hand control to rotate the gear and then use a toothbrush with a small amount of solvent to clean the teeth removing the old grease. You may want to loosen the gear clutch so the axis can be moved freely. Keep a few old rags handy to prevent making a mess. When most of the old stuff is gone, apply new grease to the gear.

To apply new grease, run the servomotor at modest speed. This rotates the gear so that you can apply new grease with a brush to the exposed gear teeth.

Only a small amount of lubricant is needed. Make sure that the grease is applied to the inside of the teeth, since this is the contact surface of the worm gear and worm. The grease we use is Molybdenum Disulfide (MoS₂), often its name is shortened to "moly". It is a good general-purpose grease.

To push the worm away from the main gear, pull on the back left side of the worm plate. The plate will move a small

amount away from the gear. When you release, the plate will move back against the main gear. There is a small spring on the left edge of the worm plate that controls the tension of the worm against the worm gear. There is also a limit screw on the left backside of the worm plate; this controls the amount movement (or slop) of the worm plate away from the worm gear. Loosen this screw as needed.

The tension should be somewhat stiff to minimize the backlash between the worm and worm gear. But if the tension is too stiff, this will put an extra load on the servomotor as it turns the tightly meshed gears. The goal is to set the tension sufficient so the worm snaps into to the main gear minimizing backlash; but the tension should be not excessive putting a heavy load on the servomotor.

With the gear having new grease, restore the limit screw to allow only small motion away from the main gear. Run the servo control to test the adjustments. The drive should run smoothly, and the backlash should be very small. Note that when the mount slews, it passes the target slightly to the east and then moves westward to center the target. This assures the drive it tracking to the west with no delay in tracking from gear slop.

Let us know how this is working. We have some mounts built in the 1980's that with proper maintenance are still working.

Regards,

Thomas

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