



Maintenance Instructions for Meade LXD55 / 75 Motor Gear Box

MOUNTS & DRIVES

TIPS & TRICKS SERIES

MAY 19, 2006

There has been much discussion regarding loose gears, setscrews, rubber-banding and inconsistencies in the tracking and go-to capabilities of some LXD55 / 75 mounts.

While many of these issues have been minimized through modifications and adjustments, there still remains the internal motor reduction gearbox which could use some maintenance.

This guide addresses the assembly and disassembly of the motor reduction gear box, its cleaning and re-lubing and alignment of the delicate encoder discs.

All modifications and enhancements are done at the risk of the owner and may affect your warranty.

Setup / Tool Check...

Tools You Will Need:

- Assorted Allen Wrenches (see pictures)
- Small Phillip's Screwdriver
- Wire Cutters / Sharp Scissors
- Toothpicks
- Tweezers
- Single Edge Razorblade
- Lubricating Grease
- Application Paddles (wood coffee stirrers)
- 1 - .050 Allen wrench for set screws
- 1 - 3/32" Allen Wrench
- Shallow Dish and Fresh Turpentine
- Old Toothbrush
- Q-Tips
- Clear Silicone Glue
- Ultra Flat Black Paint (optional)
- Red Felt Tip Marker
- Shrink Tubing / Electrical Tape

These are the wrenches that I regularly use in working on my mounts. The ball-ended Allen wrenches are available at home depot for about \$19.00 a set. They are made by Husky and include the following sizes:

Metric: 1.5, 2, 2.5, 3, 4, 4.5, 5, 5.5, 6, 7, 8, 9, 10

SAE: .050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8



The ball end seems to offer a much better grip on some of the tiny set screws used in this mount. It has easily removed and tightened set screws that other normal wrenches seem to just spin in. Highly recommended.

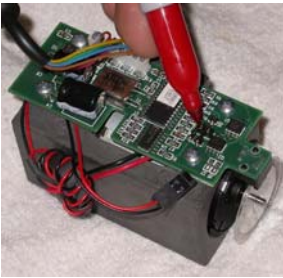
Note: This procedure can be done with the encoder in place - if you are careful. Removing the encoder requires a very tiny 0.9mm allen wrench and the tiny set screw is easily stripped. If you try to remove it - proceed with extreme patience and care.

Here you see the bare motor assembly removed from its plastic housing. Notice the delicate encoder (shiny slotted disc on the left end of the motor). It is absolutely essential that this wheel be straight, clean, tight on the shaft and nearly centered between the emitter and receiver. Centering does not have to be absolute - just make sure it is not rubbing against either the emitter or receiver.



The white wire block at the upper left appears to be a removable plug - it is not. Do not pull or try to pry it loose from the board.

Caution: Caution: do NOT touch the encoder disc with your fingers as you will leave an oil residue which will attract dust and pollen in the air. If you do touch it, clean it with a very soft, fine brush and denatured alcohol or acetone.

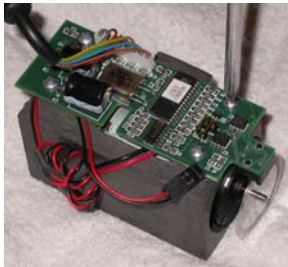


The plug with the red and black wires are the wires going to the motor and is removable. Note the orientation of the wires and mark the pin for the red wire with a red marker.

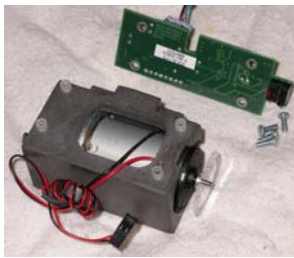
Caution: This small controller board has several integrated circuits on it and is there-

fore susceptible to damage due to static discharge. I recommend touching something that is grounded to drain any charge from yourself each time you sit down to work on or handle the board. In 40+ years of handling electronics, I've never had a piece of electronics damaged by static electricity - but you don't want this to be the first time.

After removing the red / black wire plug and marking the red pin, use a small Phillip's screwdriver to remove the 4 shiny screws holding the controller board to the motor housing. Be careful so you don't slip off of the screw and damage the board.



Note: There are 4 very small nylon spacers under the board on each screw which holds the board away from the motor housing. Be careful not to drop and loose these tiny spacers.



Once the controller board is removed from the housing, take a small pair of wire snips or wire cutters and cut the two wires as pictured. If you look closely, you can see where the wires have been cut previously and then spliced and covered with shrink tubing. If you cut and splice in this same area - everything will look the same as a stock setup. You will notice a small metal "donut" that the wires are wrapped around. This is a ferrite choke to suppress any RF energy which may be emitted by the motor wires - causing interference in radios/tv's.



Caution: The connections of the wires to the motor are very delicate. Do not pull or put un-necessary strain on these wires. If you do happen to pull one loose - it probably can be fixed by carefully soldering it back to one of the tabs visible from the encoder end of the motor.



Note: Since I did not see the need for this, I removed the ferrite donut and thus shortened the wires considerably. Running the motors in house next to my TV, computer, wireless lan and and stereo exhibited no unwanted interference. This option would be your call.

Remove the three allen head screws on the end of the motor housing where the "keyed" shaft emerges from the housing.



Once these three screws are removed, the motor will slide out of the housing.

Note: Take note of how the wires are routed and be careful not to stress them as you slide the motor out of the housing.



Carefully remove the two screws that hold the gear cover casing to the motor. Be careful not to let the gear housing come off - hold it in place as you remove the screws.

Hold the motor so that the motor shaft and gear housing is pointed upward. As you hold the motor shaft in place by placing your finger on the end of the shaft, slide the motor housing up and off to expose the internal gearing. Note the position of the gears before removing any of them.

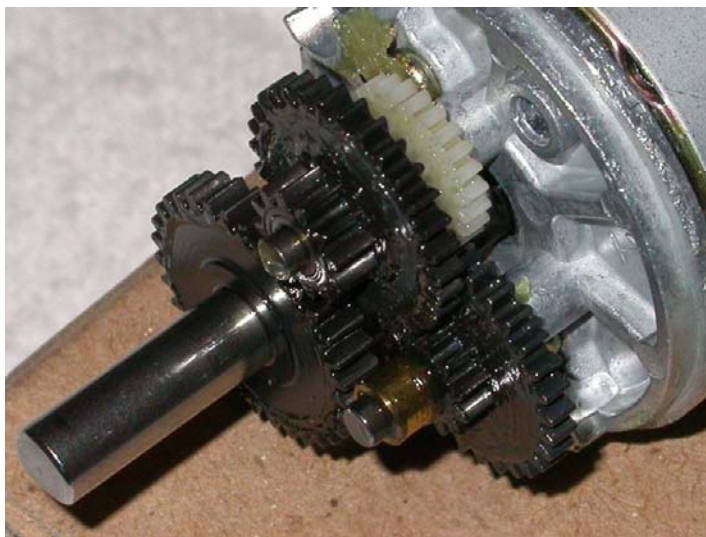


REMOVING THE GEARS...

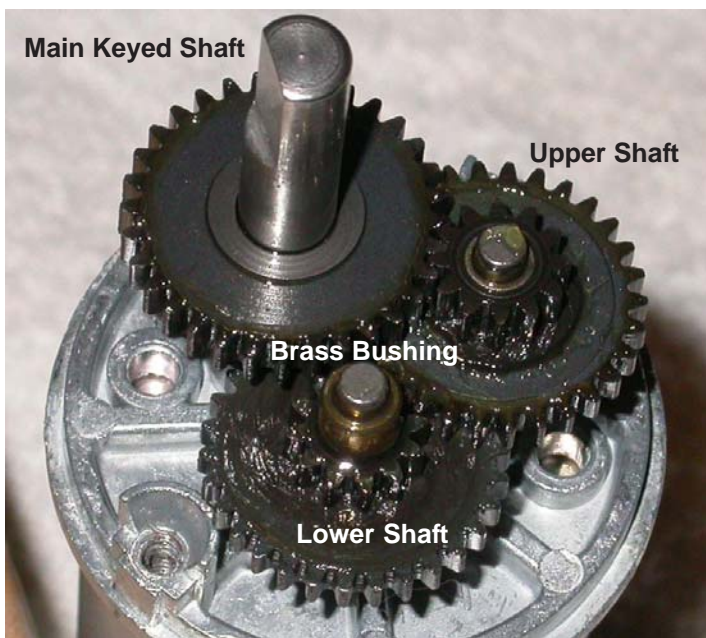
Once the gears are exposed, grasp the larger "keyed" motor shaft and lift it out of the housing. Be careful as there is a washer/bearing sitting directly on top of the large black gear and there is a very tiny little washer that goes over the small spindle at the bottom of the shaft. The gear itself is attached to the shaft and does not move.



THE MAIN KEYED GEAR AFTER IT IS REMOVED FROM THE HOUSING. BE CAREFUL NOT TO LOOSE THE TWO WASHER-BEARINGS AS PICTURED BELOW.



THE INTERNAL GEAR CLUSTER SHOWING THE STOCK STICKY GREASE AND LOTS OF PLASTIC DEBRIS



This washer sits on top of the plastic gear.

This washer fits over small pin at bottom of shaft..



MAIN SHAFT REMOVED. THE OTHER TWO SHAFTS DO NOT COME OUT - THE GEARS SLIP OVER THE SHAFTS.



Remove the large black gear from the lower shaft.



Remove the large black gear from the upper shaft.

LARGE GEAR FROM UPPER SHAFT



LARGE GEAR & BRASS BUSHING FROM LOWER SHAFT

Remove the small brass bushing / bearing from the lower shaft.

Remove the small white gear from the shaft.



BRASS BUSHING FROM LOWER SHAFT

Note: Directly under the brass bushing is another small washer between the brass bearing and the gear face.



The small pinion gear on the motor shaft does not come off.



CLEANING THE GEARS...

I used a white (easy to see small washers that drop off of the shafts and gears while cleaning) cool whip container (cause I like cool whip) with about 3/4" of fresh turpentine (mineral spirits will also work) and an old toothbrush to clean the sticky original grease from the gears.



Once cleaned, it's time to re-lube and re-install the gears in the reverse order of removal.



I've tried several different lubricants and had settled on white lithium grease but change happens and I have now changed my "preferred" lubrication to SuperLube. It is 100% synthetic, clear, resists water, has PTFE particle suspension, does not run and is super slick. You can read more about here:

http://www.super-lube.com/product_description.htm

I purchased mine from:

<http://precisionreloading.com/superlube.htm>

Note: In its out of the tube or tub form, SuperLube is extremely good - although a little "stiff". In my mounts, I made my own custom formulation by filling a shot glass almost to the rim with the SuperLube and then adding about 3/4 of a cap of 100% pure synthetic motor oil (Mobile 1, Penzoil, etc - just make sure it is NOT a blend but 100% synthetic). Mixing this up gave me a very nice viscosity which gave super smooth buttery like movement in all parts of my mount with no running and no breakdown.



Re-assemble the gear box in reverse order adding lubricant to each shaft, each washer/ bearing, each gear face all gear teeth. Make sure to put a large dab on the end of each shaft, on the inside of the gear housing where the indents are to hold the gears and on the motor pinion gear. I was not afraid to use a lot of lube as the gear box is pretty much sealed and the SuperLube does not run - I covered the whole gear cluster with lube.

Once you have the gears lubed up and back in place, carefully put the gear casing back in place and tighten down the two screws holding it in place. Turn the encoder end of the shaft a couple of times to ensure you have nothing binding and smooth rotation. (I touched the two bare ended motor windings to a AA battery to allow the motor to turn a few rotations - reverse the wires to rotate it in the opposite direction - and confirmed all was operating as it should).

REASSEMBLE THE MOTOR...

Follow the directions in reverse till you have the motor mounted back inside the housing. Solder the connections to the motor wires, remount the controller board (don't forget the spacers under the board), plug the two red/black wire plug back in place with the red wire towards the middle of the board (away from the encoder) and you are finished.

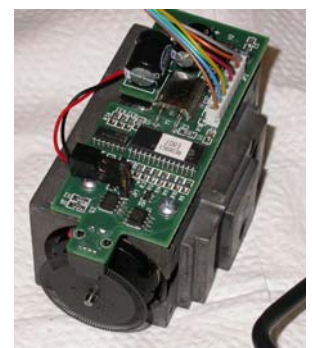
Enjoy Smoother - Quieter motoring!

**GOOD ENCODER POSITIONING
WITH .09MM ALLEN KEY**



**DRIVE GEARS REPLACED WITH
WARPSDRIVE BELT CONVERSION
TIMING PULLEYS**

**BLACKENED ENCODER WHEEL
USING SEVERAL EXTREMELY LITE
COATS OF ULTRA FLAT BLACK
MIST.**



Feel free to email me if you have any questions at:

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