

Maintenance Schedule: IDS Drives

Sheet 1 of 2

Issue 1. 20/09/07

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This document applies to high performance motor driven systems. The mechanical power generated at the worm is enough to move adjustments even though they may be done up extremely tight with large bolts. Maintenance should be done initially with the system unpowered, enabling you to rotate components by hand, and then powered to check the overall performance. The telescope must go through this schedule at installation and then as required or indicated by problems occurring.

At any time during normal operation, maintenance is needed if

- a) The backlash on an axis increases, either suddenly or gradually - Nothing happens for a bit when you change the motor direction.
- b) The motor stalls.
- c) The motor makes unusual noises when operating at sidereal or slew speeds.
- d) Movements seen through the telescope are not smooth

1) Check the pulley or gear on the motor shaft. If there is a line across both the pulley and the shaft it acts as a fiducial line. You can see if the pulley or gear has moved in relation to the shaft. Check the grub screws are not loose. If it is a continual problem glue in place the grub screws and the pulley / gear wheel using Superglue. If there are no lines then make some. See photo.



2) If there is an intermediate gear, check the stub axle is not loose and the gear wheel is free to rotate. There should be a very little amount of play to the gears either side. The motor position is usually adjustable in this instance and it may need re-adjusted and then secured.

3) Gear or pulley on the slow motion (worm) shaft needs checking for stability of position in the same way the motor gear is checked. Slippage of the component could position it further in or out and so it may be binding on screw heads. Grub screws easily come undone. They should work down to a flat on the shaft, (put one on if there is not one there) but they can still work loose. Two grub screws are required and they should be glued.

4) Timing belts need to be tight. Looseness could indicate that the bracketry has moved between the worm housing and the motor bracket. When adjusted it should be possible to lock the adjustments in place by either glue or grub screws. Again a line drawn across a joint will enable you to see if it has moved in the future.

5) The worm. The correct adjustment is to have very little backlash when meshed with the wheel and the worm should not be allowed to move along its shaft. There should be

adjustments for endfloat and mesh on this assembly. Gross backlash will indicate that the securing bracketry has moved and should be adjusted and then fixed by some means.

To check the correct endfloat and rotation force needed on the worm axle you need to disconnect the motor to allow rotation of the shaft by hand and feeling the adjustments. The correct telescope load at normal balance should be fitted. Backlash will be obvious. End float is less obvious but there will be a movement along the shaft with no rotation of the wheel. Adjust as necessary.

6) The worm must be seated properly, that is the shaft must be in the plane of the wheel.



View directly onto the plane of the big wheel and the worm axle should sit squarely without any skew when seen from face on and on the two ends. See picture showing the plane of this wheel. Check to make sure this has not moved.

7) Motor stalling. If this happens in one direction only then it is most likely to be an out of balance load. If it used to work but it stalls in both directions then something has got tight in the drivetrain and you should investigate the worm fit by removing the motor linkage so you can turn the worm by hand. It may be so tight that it binds up immediately in which case you will have to go through the setup adjustments.

8) Lubrication. Gear surfaces under load should be lubricated with either light machine oil, LM grease or Lithium based grease. Worms, if dissimilar metals, are ok to run dry. The problem is one of exposed greased surfaces being exposed to dust pick-up. If you pay attention to covering the worms and wheels then it would pay to coat with the grease, otherwise leave alone unless it is really required.

9) Cables. Check cables are not repeatedly bending at sharp radius at any point. This will in time break. Secure cables by means of 'P' clips or attach some other method of strain relief. Leadouts from motors should have strain relief of some sort.

10) Connectors. Repeatedly undoing and making a connector will weaken it and the cables going to it. Take care if you have to do this, pulling on the connector rather than the wires going into it.