

## ALTER D6 MOTOR UPGRADE PROCEDURE WITH NEW GEARBOX

Alan Buckman 18<sup>th</sup> July 2006

Prepare mount by removing telescope, balance weights.

**KEEP RA COMPONENTS SEPARATE FROM DEC COMPONENTS.**

**IF YOUR GEARBOX DOES NOT LOOK LIKE THE PICTURE CONSULT AWR.**

### RA:

Remove large cover plate.

Remove small cover plate with 'D' connector.

Strip out 'D' connector and motor electronics.

Leave opto coupler and its board in place

Transfer wires over on pins 6,7,8 of old connector to new 'D' connector (wires in same order).

Perform change of gearbox ratio as below.

### DEC:

Remove large cover plate.

Remove small cover plate.

Strip out 'D' connector and motor electronics.

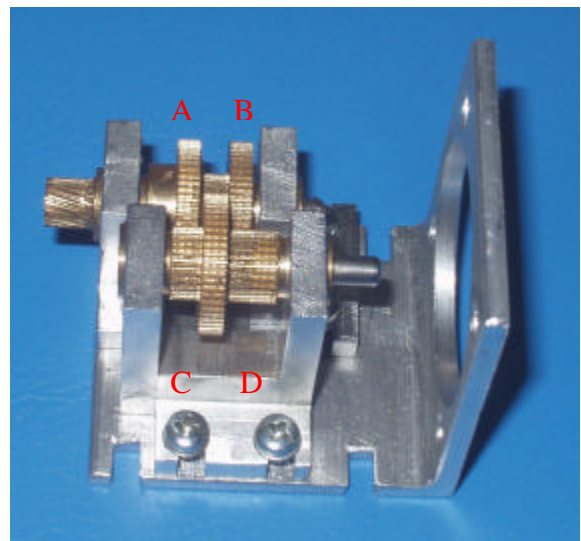
Perform change of gearbox ratio as below.

### CHANGING THE GEARBOX

RA and DEC:

The picture shows the initial state of the new form gearbox. The gearbox and the motor can be changed over without taking the gearbox out of the mount.

The input shaft (C,D) and its housing are easy to remove without upsetting the other gear mesh onto the slow motion worm. However it will be easier if you take out the three screws in the three slots in the underneath component making it much easier to replace the motor.



The motor has a large flexible coupling joining to the input shaft on the right. The first gear D is screwed down onto the shaft, the other gear C is an idler and not fixed. This front shaft must be changed over so the fixed gear wheel and the idler gear change positions. (The idler gears just become a spacer). The shaft carrying C and D will need a flat put on it to allow fixing properly to the shaft by means of the grub screw. **KEEP THE ORIENTATION OF D THE SAME** but reverse C. There is a grub screw on D which must not interfere with the mesh of A when it rotates.

The back shaft needs the idler gear (B) to be removed. If you undo the fixing of the gear (A) then the shaft will move to the left allowing the idler gears to come out, and then returning the gear fixed on the shaft to the position it is at present. A spacer is not needed on the back shaft.

When the motor is disconnected you can rotate the gears and turn the worm reduction. If there is any backlash it will be obvious. It will also be obvious if the gears are binding extremely tight. This can result in the motor stalling without actually moving the telescope. The worm does need to be a tight fit but not excessively so. There are three large screws on the rear of the worm staging, adjusted from outside of the mount which can adjust the position of the worm. There may also be a retaining HEX adjuster to keep the stage in place when adjusted. This is a M4 HEX rod at the bottom of the stage pressing on the side away from the worm.

The motor will probably require 5mm cut off the shaft (with the cut de-burred afterwards) so that it will fit nicely with the mechanical coupling. The motor mounts using the same screws onto the bracket. The rubber pieces are for vibration reduction and are not necessary with the AWR system. The DEC motor mounting has to be done up tight as there is very little leeway in the housing for it. You will have to use your judgement on getting the motor leadout wires coming out into spare space in the housing.

The RA opto coupler amplifier board may need moved (or turned round) in order to allow space for the motor to fit.

When re-assembling the motor into the housing, it may be necessary to angle the components slightly to get the motor shaft to be parallel with the worm shaft, but they should all be square on.

#### **PARTS THAT ARE ALTERED:**

Gearbox.

Motor assembly.

'D' connectors.

NEW PARTS NEEDED: 2 off - motor, 'D' connectors (male on RA which is also 'X3', female on DEC which is also 'X4').

Estimated time 15 minutes per axis!

#### **GEAR RATIOS ON MOUNT UNDER CONVERSION**

RA:

Motor 12800 microsteps per revolution.

Motor 30:60

30:60 removed

30:60 removed

20:140 (140 gear is 45mm dia)

Worm 200

DEC:

Motor 12800 microsteps per revolution.

Motor 30:60

30:60 removed

30:60 removed

20:140 (140 gear is 45mm dia)

Worm 134