

DUAL AXIS CG-5 MOTOR DRIVE (#93523)

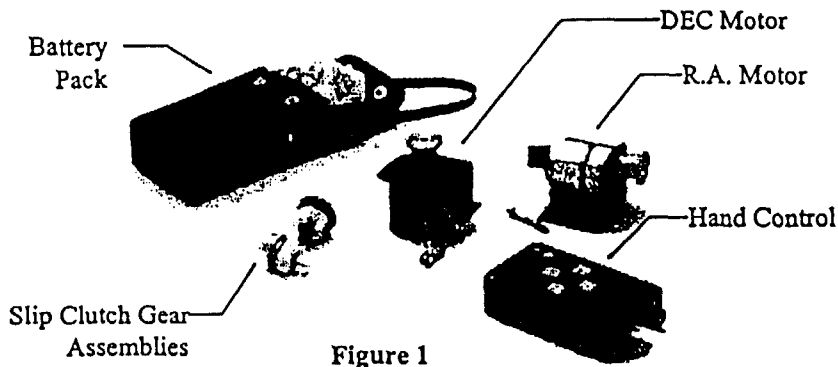
The Dual Axis CG-5 Motor Drive is designed to be used with the CG-5 Equatorial Mount (#91515). In addition to tracking the stars as they move across the sky, this accessory allows you to make small adjustments to the R.A. and DEC axis from a hand controller so you do not have to physically touch the telescope. This is very important in long exposure prime focus astrophotography where an inadvertent bump could ruin a picture. The unit is powered by a battery pack using 4 D-cell batteries (not included) which operates the motors for up to 20 hours. This motor drive is used for tracking and guiding only—there is no slewing function. The kit comes with the following:

- R.A. Motor
- DEC Motor
- Two Motor Gears
- Two Slip Clutch Gear Assembly
- Dual Axis Drive Hand Controller
- Battery Pack
- Mounting Hardware and Allen Wrenches

Read the instructions through once carefully before beginning the installation process. The telescope tube should be removed from the mount while installing the motors for ease of installation.

INSTALLING THE DEC MOTOR TO THE MOUNT

1. Install one of the slip clutch gear assemblies onto the DEC shaft. Tighten the set screw on the side of the DEC shaft gear with a 2mm Allen wrench. If, when using the motor drive, there is no response when pressing the buttons, check to make sure this screw is tight.
2. Next, locate the DEC motor. The DEC motor is the one with the "L" shaped bracket with a small lip on one end (see Figure 1). Near the lip is a threaded hole to accept the mounting screw.



3. Slide the DEC motor gear—hub first—onto the DEC motor shaft. Tighten the set screw on the side of the DEC motor with a 2mm Allen wrench.
4. Slide the portion of the motor bracket with the lip into the cut out just below the telescope mounting platform. The motor should be positioned so that the RJ-11 connector is facing outward.
5. Insert the 1/4-20 screw through the top of the Mount and thread it into the DEC bracket (see figure 3).
6. Adjust the gears along the motor shaft so that the gears mesh properly

7. Reattach the slow motion knob to the brass shaft on the slip clutch gear assembly. (The slow motion knob can also be attached to the shaft on the opposite side of the mount).

INSTALLING THE R.A. MOTOR TO THE MOUNT

The R.A. motor will only install so that the gear is on the left shaft (i.e., when standing behind the mount where the R.A. setting circle is located). To make installation of the R.A. motor easier, turn the altitude adjustment knob until the latitude scale indicates 25° to 50°, otherwise the altitude adjustment knob will interfere with the Allen wrench when tightening.

1. Install the remaining slip clutch gear assembly onto the R.A. shaft. Tighten the set screws on the side of the R.A. gear with the 2mm Allen wrench. If, when using the motor drive, there is no response when pressing the buttons, check to make sure these screws are tight.
2. Slide the R.A. motor gear—hub first—onto the R.A. motor shaft. Tighten the set screws on the side of the R.A. gear with the 2mm Allen wrench.

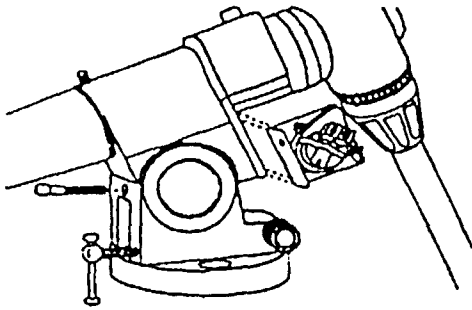


Figure 2

3. Next, locate and remove the plastic cover underneath the R.A. shaft by removing the small Phillips head screws from the bottom of the plastic cover. Removing the plastic cover reveals a recessed area that will accept the R.A. motor.

4. Slide the R.A. motor into the recessed area. The gear on the R.A. motor should be on the left side of the mount (see figure 2).

5. Insert the long screw through the hole in the back of the mount (just above the rear altitude adjustment screw) and thread it into the hole on the R.A. motor bracket. Hint: Have the Allen Wrench inserted in the screw before threading it in.
6. Tighten the screws in the bracket to hold the motor in place.
7. Reattach the slow motion knob to the brass shaft on the slip clutch gear assembly. (The slow motion knob can also be attached to the shaft on the opposite side of the mount).

You want to detect a little play in the motors. If they are too tight the gears can bind up and damage the motors.

POWERING THE DRIVE

The DA-CG-5 motor drive is powered by 4 D-cell size batteries (not included). This can operate the motor drive for up to 20 hours or more depending on the ambient temperature. To power the drive system:

1. First, remove the battery compartment from its vinyl case.
2. Insert batteries into the compartment so that they snap firmly into place.
3. Put the battery compartment back inside its vinyl case.

The DA-CG-5 Motor Drive has three cables that must be plugged in. Two cables attach to the drive motors and the other attaches to the hand control. To install the cables:

1. Locate the phone jack cable coming from the hand control unit (marked "DEC") and plug it into the jack outlet on the DEC motor. Likewise, plug the cable marked "R.A." into the jack outlet on the R.A. motor.
2. Plug the battery pack cable (stereo jack type) into the outlet on the hand control labeled "DC Power".

USING THE DRIVE

The hand control consists of two switches and four control buttons.

- The switch marked "N/Off/S" turns the power to the motor on and off as well as changing the direction of the motors. Turn the switch to "N" to begin tracking for the northern hemisphere. Changing the switch to "S" will reverse the polarity of the motor to track stars in the southern hemisphere.
- The switch marked "2X/4X/8X" determines the rate at which the motor will move when the hand controller buttons are pressed. 2X, twice the sidereal rate, is used for guiding on a star when doing long exposure astrophotography. 4X, four times sidereal, is used for centering objects in the eyepiece; and 8X, eight times sidereal, can be used for centering objects in the finderscope as well as the eyepiece.
- The four push buttons control the motor drive direction. The "Up" and "Down" buttons control the telescope in declination (DEC). The "Left" and "Right" buttons control the telescope in Right Ascension (RA). The direction for each button will be reversed when switched to the southern hemisphere position.

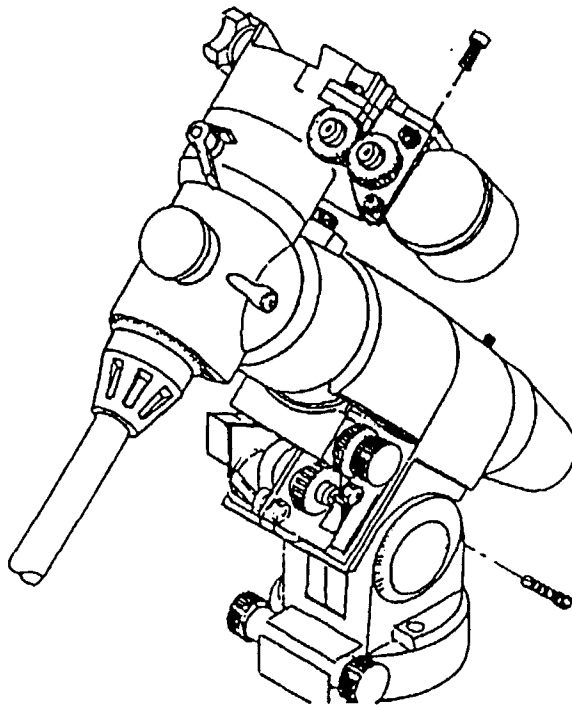


Figure 3

To override the motor drives and control the Right Ascension and Declination with the slow motion control knobs, the slip clutch gear assemblies must be loosened. This will allow the gear hub to rotate independently from the actual gear. To disengage the gear you must rotate the clutch wheel counterclockwise to release the clutch. The mount can now be moved manually by turning the slow motion knob. Tighten the clutch wheel to re-engage the tracking.

Troubleshooting?

A common problem with the DA-CG-5 motor drive on the CG-5 mount is the worm gears are sometimes fitted too tightly to the helical gears. This causes the motors to bind up. Conversely, the worm gear may fit too loosely, causing excess backlash in the motors. In either case the worm may need to be adjusted. The procedure and the assemblies are the same for the DEC and the R.A. The only difference is the location. The DEC worm assembly is located on the top of the mount. It is the box to which the slow motion knobs are attached. To recognize if the gears are meshing too tightly, turn the manual slow motion controls. If it is noticeably hard to turn then it should be loosened. If you cannot tell, then the motor will let you know. It will either run or it won't.

To Adjust the Worm Gears:

1. Remove the motor drive assembly.
2. Locate the worm assembly on either the R.A. or Dec axis. This is the box to which the slow motion knobs are attached.
3. Locate the 4 Allen head cap screws that hold the worm gear assembly in place. Two are located underneath the box with a set screw located in between. Two are located on the backside of the mount.
4. Slightly loosen all four screws.
5. Turn the center set screw on the underside about a quarter turn clockwise (to loosen the R.A. worm assembly) or a quarter turn counter-clockwise (to tighten the worm gear assembly if the backlash is too great).
6. Tighten the four cap screws and try the worm gear.

Note that if worm is loosened too much, then backlash between the gears can become a problem. You may need to tighten the worm assembly. This process of loosening then tightening the worm takes some trail and error, but once it is adjusted correctly, it won't need any further adjustments.