

GOTOSTAR™ INSTALLATION MANUAL

A quickstart guide to connecting the Gotostar motors and hand controller to your EQ5-type mount.

Everyone at Astronomica would like to thank you for purchasing our Gotostar computerised upgrade kit for your EQ5-style German equatorial. The motors, enclosures and hand controller are compatible with the following mounts: Vixen Great Polaris (GP), EQ5, Orion SkyView Pro, Celestron CG-5, Meade LXD55/LXD75 and Astro-5. The kit may also be used on the older Vixen Super Polaris (SP) with a slight modification to the housing. If you own a SP mount, please contact Astronomica for further details.

The Gotostar is a sophisticated and fully-featured GoTo upgrade for your mount that will revolutionise the way you use your telescope, permitting a huge range of observational and imaging possibilities. In a later quickstart guide ([Use_Gotostar.pdf](#)) we will show you how to use the principal features of the computerised hand controller, but first we need to familiarise ourselves with the kit's component parts and how they are attached to your mount.

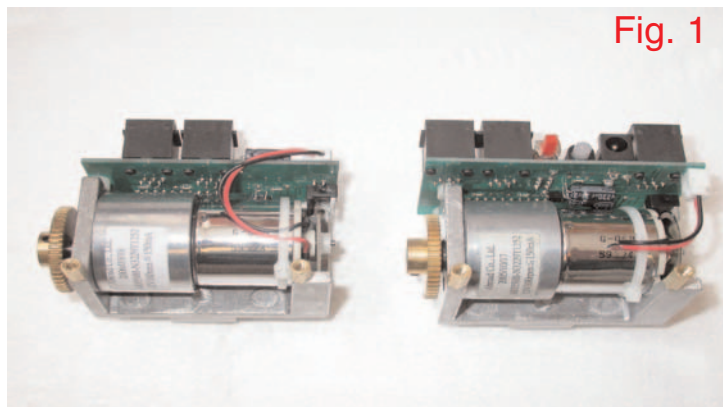
HAVE YOU GOT EVERYTHING?



Inside the delivered 33cm x 24cm styrofoam box you should find the following:

- Gotostar computerised hand controller
- polar axis (right ascension) motor & cover
- declination motor & cover
- 1 x short + 1 x long 5mm Allen head bolt
- 2 x brass gears
- 2 x Allen keys
- 12V power supply
- 2 x coiled cables
- 4 x small Phillips screws
- 1 x grey power button
- 12V car cigarette lighter-style adaptor
- RS-232 serial cable (PC connection)

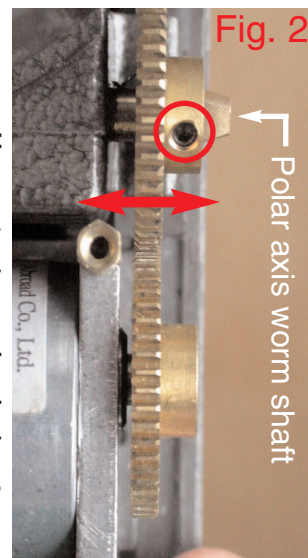
IDENTIFYING THE MOTORS



Before you attempt any assembly, ensure that you correctly differentiate between the motor units destined for the polar (right ascension) and declination axes (**Fig. 1**). The polar axis unit is readily identified since it has three sockets for cables, a red power button and a 12V power connector. The declination unit has just the two cable connectors and is shown left.

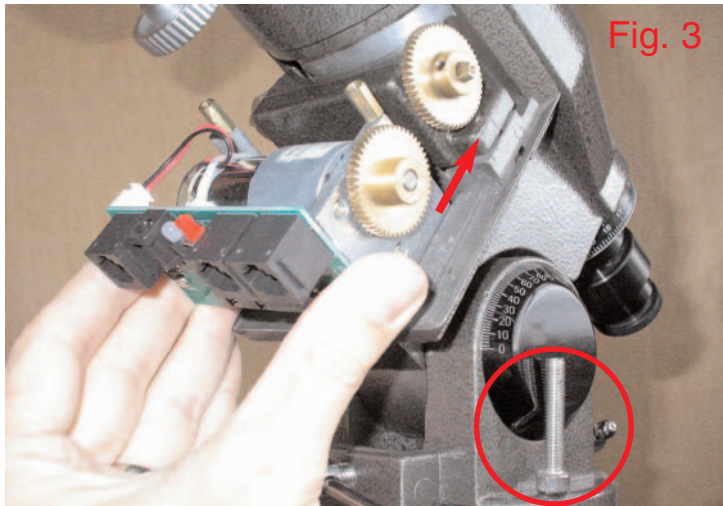
GEAR ALIGNMENT

The two brass gears provided with each Gotostar kit are intended to fit on the ends of the polar and declination axis worm shafts. You may need to move the brass gear side to side on each shaft in order to find the best point for it to mate with the corresponding gear on the motor unit (**Fig. 2**). Each brass worm shaft has a flat side milled onto it. Once the gears are correctly aligned as shown, lock down each grub screw circled in red with the small Allen key.



Both the right ascension and declination motor units are attached to the mount by single 5mm Allen-head bolts. There is a little latitude of adjustment, so always ensure that the gear teeth mesh in parallel and do not bind over a full rotation (we will revisit this topic later). Careful adjustment at this stage will result in better GoTo and pointing accuracy.

INSTALLING THE POLAR AXIS MOTOR



The polar axis motor unit is attached to the mount via the long 5mm Allen-head bolt supplied (circled red in Fig. 3). This bolt on the 5mm Allen key needs to be inserted through a small aperture in the polar axis altitude adjuster of the mount (Fig. 4). This can be rather fiddly, so to ease access ensure that the polar axis is lowered at the northern end via the chromed altitude adjustment screws. (For the illustrations of this guide an Astro-5 equatorial is shown; your EQ5-compatible mount may vary slightly in build.)



As mentioned under **GEAR ALIGNMENT** on page 1, when meshing the cog on the polar axis drive unit against its corresponding gear on the polar axis worm shaft, don't feel tempted to bind the cogs too tightly as you risk straining the motors. A slight amount of 'play' is acceptable – indeed, desirable. The magnified image at right shows the correct spacing. A small quantity ...



of a temperature stable lithium-based grease applied at this point is also a good idea.

Before putting the cover on the polar axis motor, ensure that the optical encoder (Fig. 5) on the end of the unit is free of any dust and debris. A photographic puffer brush is useful here. Why is this important?



Anything that prevents the encoder from accurately counting the number of shaft revolutions will ultimately affect the pointing and GoTo accuracy of your instrument. (The same applies to the declination axis encoder.)



When sliding the plastic cover onto the polar axis drive unit, ensure that the data port connectors slide into their respective holes in the case and that the 12V power connector and red on/off button are visible (Fig. 6). Use two of the small Phillips screws supplied to seal the enclosure.

To complete the installation of the polar axis motor unit, press the small grey push button onto the recessed red on/off switch.



INSTALLING THE DECLINATION AXIS MOTOR

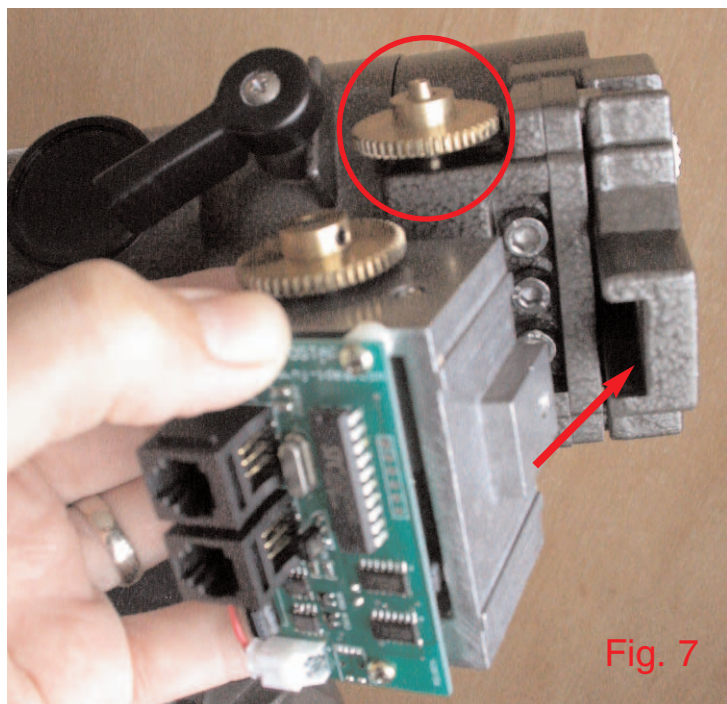


Fig. 7

The declination axis motor and encoder unit is attached to the mount via the short 5mm Allen-head bolt provided. Ensure that one of the two brass cogs included in the kit is in place on the brass declination worm shaft (circled red in Fig. 7 above). Its position on the shaft may need to be adjusted up or down in order to mesh correctly with the corresponding cog on the drive unit. This process is described under **GEAR ALIGNMENT** on page 1.

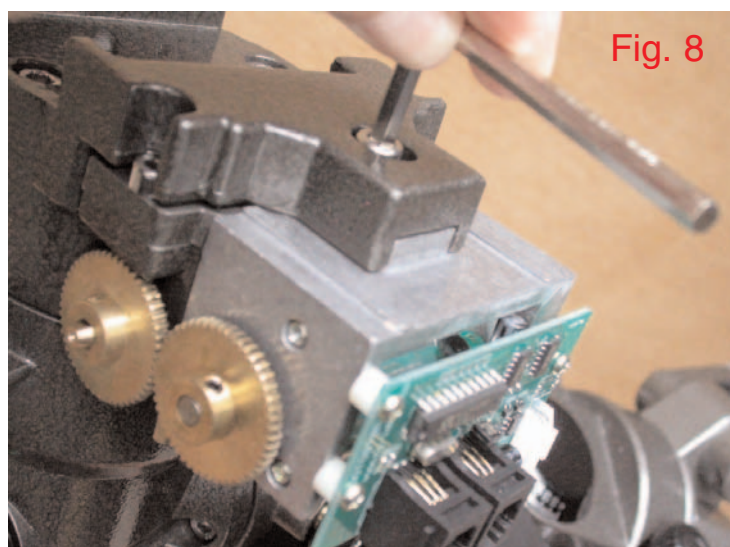


Fig. 8

Before tightening the 5mm Allen bolt firmly (Fig. 8), ensure that the declination axis motor unit is correctly positioned with the two brass cogs parallel and their teeth are not meshing too tightly. If they are too tight, you will stress the motor and shorten its life. If they are too loose, there will be unacceptable backlash in the gears. If you look at the close-up image of the identical polar axis gears under Fig. 4 on ...

page 2, you will see how they should be adjusted. However, if you are in any doubt, it's better to have the gears meshing very slightly too loose rather than tight. Don't forget to add a small amount of grease (preferably lithium-based so that it doesn't stiffen in the cold of winter) to the teeth of these gears.

As with the polar axis drive unit, before attaching the cover do ensure that the optical encoder (see Fig. 5 on page 2) is free of any dust and debris. Your GoTo and pointing accuracy may otherwise be impaired. When sliding the declination axis motor cover into place, make sure that the two data ports are lined up with their corresponding holes in the case (circled red in Fig. 9). The cover is fixed in position by using the remaining two small Phillips screws.

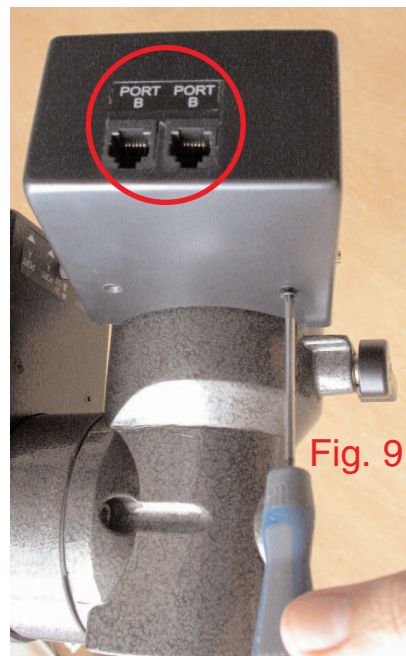


Fig. 9

ATTACHING THE CABLES

This is a straightforward process, though do note that the 'phone-style connectors will only go into their appropriate sockets one way. Push them all the way in until you hear a 'click'. When attempting to remove them, be sure to depress the small retaining clip first.

One coiled cable should connect a PORT B on the declination motor to a PORT A on the polar axis motor. Use the other coiled cable to connect another PORT A on the polar axis motor to the white Gotostar hand controller.

