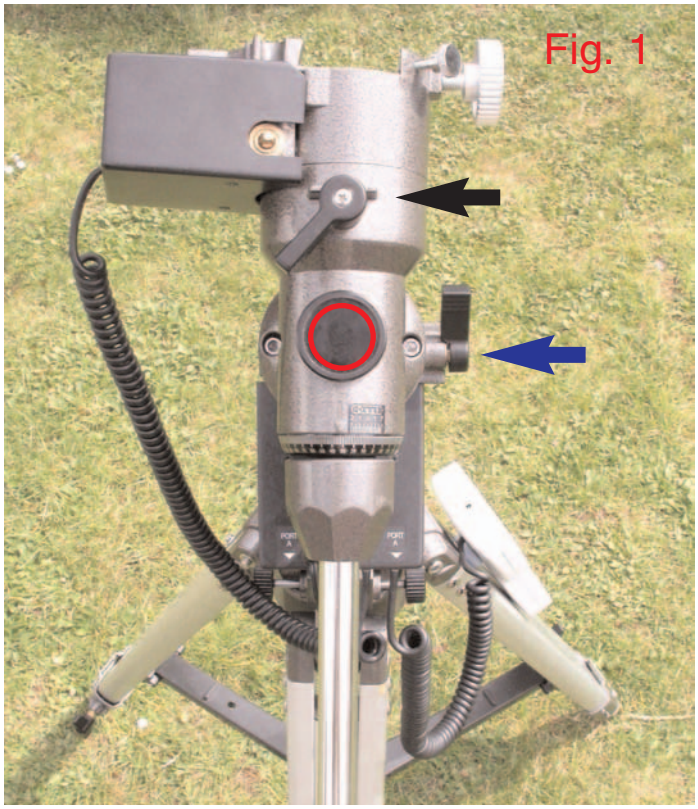
GOTOSTAR™ USERS MANUAL

A quickstart guide to using a Gotostar-equipped EQ5 equatorial mount.

In an earlier guide we showed you how to attach the motors, encoders and hand controller to an EQ5-type mount and make any necessary adjustments to the gear trains. Even if you have a pre-installed Gotostar system, please ensure that you have read through Install_Gotostar.pdf first.

POWER SUPPLIES

Like any GoTo 'scope, the motors place high demands on any power supply that you are using when slewing from one part of the sky to another. We recommend that you use the mains transformer provided (with an extension lead and a U.S. to U.K. plug adaptor, if applicable) when using your Gotostar at home. If you are observing away from mains power, we suggest that you use the car cigarette lighter adaptor from your vehicle, or a heavy-duty rechargeable 12V power source. A 12V power pack derived from C or D-type alkaline batteries is not suitable and can lead to erratic Gotostar performance.



INITIAL SETUP

We also recommend that you familiarise yourself with the operation of your Gotostar in the daytime. For your first trial run you don't need to install a tube assembly or counterweights – just plug in ... the coiled cables and Gotostar hand control. Fig. 1 shows a view of an Astro-5 German equatorial mount as seen from the north looking down the polar axis (circled in red). The important detail is the position of the chromed declination axis counterweight shaft: it is pointing straight down, in line with the north-facing tripod leg. Slacken the polar axis clamp (arrowed in blue) and rotate the mount about the polar axis until your mount looks the same, then lock the polar axis clamp. This procedure satisfies one condition of the Gotostar PARK POSITION and must be performed every time you setup the mount.

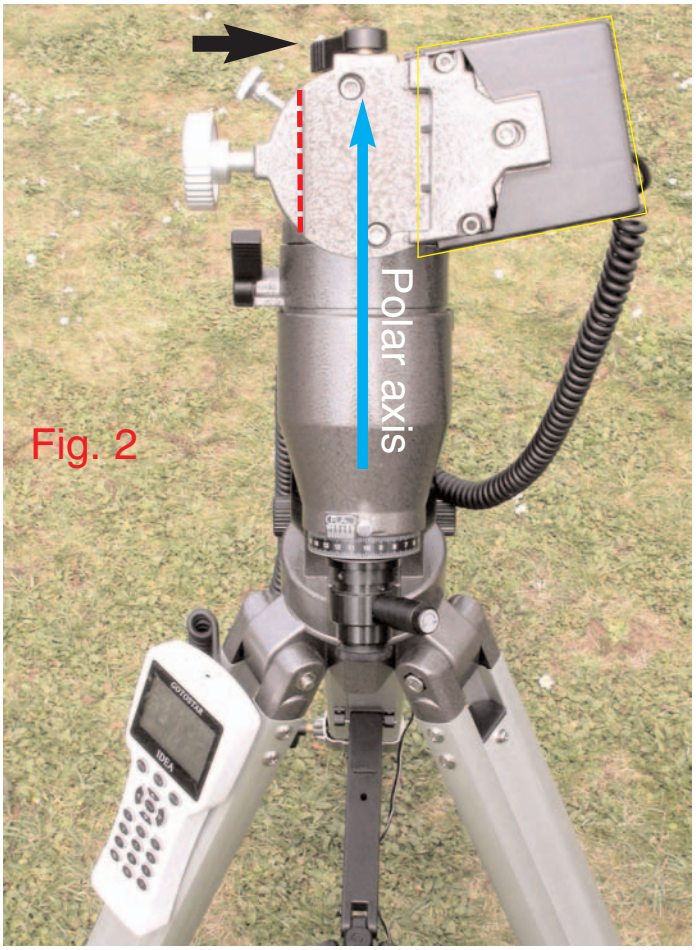
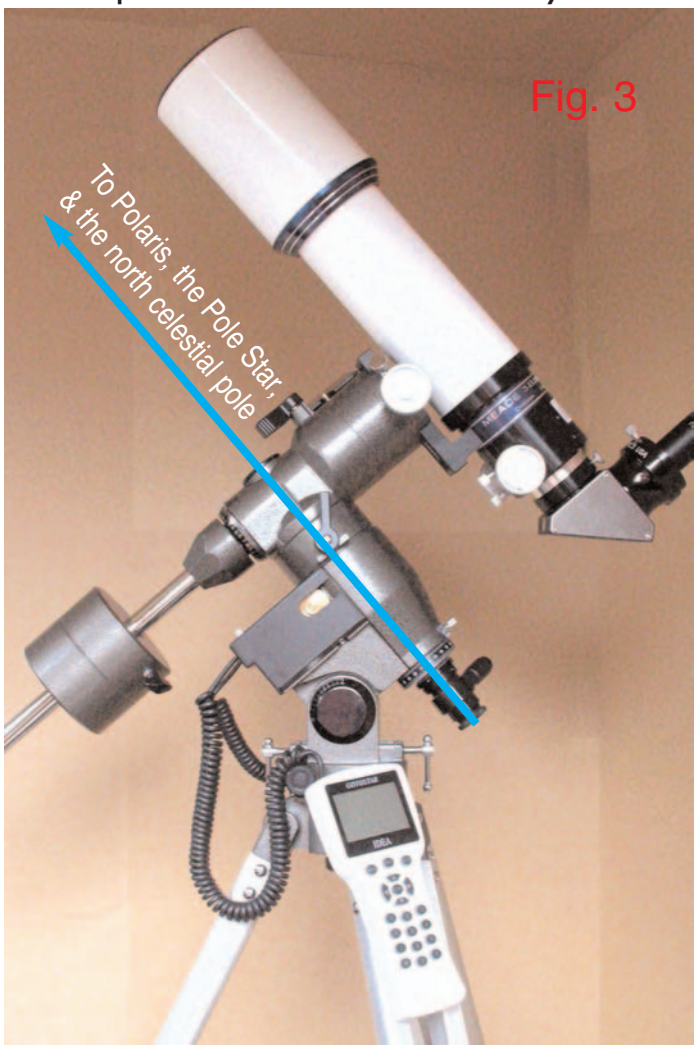


Fig. 2 shows the same mount, but seen from the south. In order to satisfy the final condition of the Gotostar PARK POSITION, you'll need to unlock the declination axis clamp (arrowed black in Figs. 1 & 2) and rotate the mount about the declination axis until the edge of the Vixen-style dovetail bracket (dashed red) lies closely parallel to the polar axis (cyan arrow). The declination axis motor unit (outlined in yellow) must be on the right, or east, side – this is very important! Once your mount looks like Fig. 2, lock the declination axis clamp.

First Time Use

Now that you know how to position your equatorial mount, this is the time to attach any counterweights followed by the optical tube assembly. (It's assumed that you have previously determined the balance point of the tube in the Vixen-style dovetail



bracket and of the counterweight(s) along the shaft. We also assume that you have attempted to point the polar axis of the mount in the close vicinity of Polaris, the Pole Star.) Fig. 3 shows an 80mm Meade triplet refractor in the Park Position as seen from the west with the telescope pointing to the north celestial pole ready to power-up the Gotostar.

Before connecting your 12V DC supply, ensure that the grey power switch (see Install_Gotostar.pdf, page two) is in the OFF (button out) position. Check that both the polar axis and declination axis clamps are locked. Press the ON switch, the Gotostar will beep, and the power-up splash screen (right) will be displayed.

```
GOTOSTAR
Ver. 070312 ENG

©NANJING IDEA SCIENCE
& TECHNOLOGY CO. LTD.
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The version number of your software may be slightly different from 070312 ENG, reflecting updates to the built-in software. (The version number is the date in year, month, day format.) After a brief pause, the display will revert to something like that shown left. Don't worry about what the figures mean at this stage as first you will need to set the Gotostar's internal clock to the correct date and time.

```
TR.A. 13h 6m36s
TDEC  90° 0'00"
R.A.   1h 7m 6s
DEC   89°40'55"
Lgst   7h16m55s    64X
Alt.  51°21'29"   Stop
Azi.   0° 0' 0"
2007-05-23 16:23:40 N
```

What time is it? Where am I?

Unlike most GoTo systems, the Gotostar has a back-up battery that remembers this information between sessions. By referring to the red box (How do I navigate my way around the Gotostar menus?) on page 4, ensure that the correct date and time is set for your location – use the left and right arrows to get to the figures you need to change, then type over them using the numeric keys. Just as important is the Daylight Time saving option: use the up or down arrow to change this to a tick or a cross as appropriate. Be sure to press ENTER once you have finished to save the information.

Now that it has the correct local date and time, the Gotostar also needs to know where you live in order for it to create a mathematical model of the sky above you. Prior to the next step, obtain your precise latitude and longitude from an Ordnance Survey map, atlas or online gazetteer. Using the Gotostar Menu Tree on page 4, select the 'Setup site' option then the 'Setup lat. & long.'sub-menu (you may also 'Select city', but it's unlikely that there is one close enough to get accurate results). Above is an example for Stonehenge in Wiltshire, U.K. – 51°10'44"N, 1°49'35"W. Always remember to press ENTER after modifying any screen entries to ensure that the new data is saved.

```
Set up site info:
Longitude:
   W001d49m35s
Latitude:
   N51d10m44s
000 Min.ahead of UT
```

GOTOSTAR ALIGNMENT BASICS

Now that Gotostar knows where you live, the date and local time, the hand controller has all the information it needs to locate any of the objects in its vast database. But before it can find anything for you it needs to establish that the PARK POSITION of your mount's polar axis is indeed pointing at the north celestial pole. Furthermore, every mount's accuracy of construction varies somewhat, so the optical axis of the telescope may not be perpendicular to the declination axis or, more rarely, the polar axis may not be at right angles to the declination axis. These small errors (known collectively as the cone error) can make a big difference to the GoTo performance of your mount, so it pays to understand the implications. Fortunately, Gotostar version 070312 ENG and later has a ' Three star align' that can largely correct for cone error and is therefore the preferred alignment mode.

KNOW YOUR STARS!

The align process requires you to accurately point the telescope at one, two or three stars (depending on the alignment mode you chose) in turn. Gotostar will choose readily identifiable alignment stars for you by name, since it already knows which ones should be visible from the location and time you've specified. If you don't already know them, it obviously pays to first learn the Arabic names of the brighter stars from a star atlas or planisphere.

YOUR FIRST ALIGNMENT

Assuming, then, that you have chosen the 'Three star align' option from the 'Align' menu, Gotostar will ask for confirmation that the mount is in the PARK POSITION before you press ENTER. Gotostar will then present you with the name of a suggested alignment star. If this star is hidden by a tree or building, press the down arrow to advance through the list in alphabetical order until you find a star that is visible. Press ENTER and the mount will spring into life, slewing to where it thinks the star you have selected lies, beeping once it has finished moving. Most likely, the 'scope won't be pointing exactly at the star, so use the up, down, left or right arrows to centre the star – first in the finder, then in ... the eyepiece. Once you are done, press ENTER and the next alignment star will be selected. Don't be surprised if the Gotostar slews the telescope from one side of the mount to the other during this procedure; it is establishing the mount's cone error by doing so. Repeat this process until you have selected all three stars whereupon Gotostar will compute the polar axis positioning error of your mount and display it. Press BACK and you will return to the display.

SELECT AND SLEW

You will hear that the polar axis motor is now tracking the stars (pressing STOP will arrest the motion, pressing it again will resume tracking) and the altitude (Alt.) and azimuth (Azi.) figures will change as the 'scope follows an object across the sky. Now that the mount is calibrated and aligned the hard part is over, so you are free to enjoy using the 'Select and slew' menu options to find any one of the myriad objects listed in the hand controller's database.

TIP 1: if you find that the GoTo accuracy of your mount is poor for certain areas of the sky, use the 'Sync. to target' option on a readily identifiable star in the region before slewing to a fainter target nearby.

TIP 2: if you are able to leave the 'scope setup in an observatory, use the 'Park Scope' option for a pre-aligned startup next time.

ADVANCED TECHNIQUES & SUPPORT

The Gotostar system is well supported by its Chinese developer, Nanjing IDEA S&T Co. Ltd. This ongoing development ensures that the hand controller's features and capabilities are continually being updated. Consequently, you are encouraged to visit and join the Gotostar Yahoo Group on the Internet where you will receive help and advice from a dedicated team of enthusiasts devoted to getting the most out of this product. You can find out more at this address:

http://tech.groups.yahoo.com/group/ideaxuwen/

Everyone at Astronomica would like to thank you for investing in Gotostar and look forward to hearing of your experiences and observations while using it. Above all, clear skies and enjoy!

GOTOSTAR™ MENU TREE

At-a-glance guide to the menu options available under software Ver. 070312 Eng.

- **MENU**
- **Select and slew**
  - Planets, sun, Moon
    - Mercury
    - Venus
    - Mars
    - Jupiter
    - Saturn
    - Uranus
    - Neptune
    - Pluto
    - Sun
    - Moon
  - Deep sky objects
    - Named deepsky object
    - Messier Catalog
    - NGC IC Catalog
    - UGC Catalog
    - MCG Catalog
    - Caldwell Catalog
    - Abell Catalog
    - Herschel Catalog
  - Comets
    - *By number in catalog*
  - Asteroids
    - *By number in catalog*
  - Stars
    - Named stars
    - Double stars
    - GCVS variable stars
    - SAO catalog
    - Constellations
    - User objects
    - Enter R.A. DEC.
- **Sync. to target**
  - Use "Arrow keys" center the object in the telescope's field of view, then press "ENTER".
- **Electronic focuser**
  - Focus
    - Electric focus
    - Speed: 16X
  - Set anti-backlash
    - *Display briefly clears, then returns to menu*
- **Set up GOTOSTAR**
  - Set up Local Time
    - *Enter local date & time + daylight savings*
  - Set up site
    - Select city
    - Set up lat. & Long.
  - Set N/S hemisphere
    - North hemisphere
    - South hemisphere
  - Set Display contrast
    - Adjust LCD contrast
  - Set eyepiece light
    - *Adjust on-screen slider*
  - Set Backlight
    - LCD Backlight *sliders*
    - KeyPads Backlight
  - Set anti-backlash
    - *R.A. & DEC anti-backlash in 1.5 arcsec steps*
  - Set Key Beep
    - Key Beep ON
    - Key Beep OFF
  - Set Mount Type
    - *German equatorials only*
  - Reset All
    - Reset all settings
    - return
  - Upgrade firmware
    - *Displays splash screen and enters upgrade mode*
- **Align**
  - One star align
    - *Start in Park Position, press "ENTER", then follow instructions*
  - Two star align
    - *Start in Park Position, press "ENTER", then follow instructions*
  - Three star align
    - *Start in Park Position, press "ENTER", then follow instructions*
  - Dis R.A. axis error
    - *Displays error of polar axis position in altitude and azimuth*
  - Test anti-backlash
    - *Allows you to adjust backlash settings in R.A. and DEC*
- **PEC option**
  - PEC play back
    - PEC play back ON
    - PEC play back OFF
  - Record PEC
    - PEC data will be replaced. Continue?
  - Delete PEC record
    - Erase PEC data?
- **Set up tracking**
  - Sidereal speed
  - Solar speed
  - Lunar speed
  - User defined speed
- **User objects**
  - Add a new record
    - *Enter R.A. and DEC in Epoch J2000 coordinates*
  - Modify records
    - *Select user catalog number and modify accordingly*
  - Delete one record
    - *Select user catalog entry by number to delete*
  - Erase all records
    - Erase all records?
- **Auto guide**
  - Manual or Auto guide
    Guide rate:
    1: 1.0X 2: 0.8X
    3: 0.6X 4: 0.4X
- **Park Scope**
  - *Parks 'scope then displays*
    Please turn the controller power off.
- **To Park Position**
  - *Returns 'scope to Park Position if not already there.*

HOW DO I NAVIGATE MY WAY AROUND THE GOTOSTAR MENUS?

After the power on message appears, press the button labelled MENU under the screen to access the menu structure depicted above. Use the up (Δ) and down (∇) arrows to move vertically through the list. Selecting an item and pressing ENTER moves you to the right of the diagram; BACK moves you to the left.

For example, turn on your Gotostar and press MENU followed by the down arrow three times: this brings you to the 'Setup GOTOSTAR' menu. Pressing ENTER at this point takes you to the 'Setup Local Time' option; pressing ENTER here enables you to edit the date and time entries.