

## Orion AstroTrack™ DC Motor Drive for EQ-1 Mount

#7812

The AstroTrack DC Motor Drive provides precise electronic, hands-free tracking of celestial objects as they move across the sky. Designed for use with the Orion EQ-1 and Min-EQ equatorial mounts, the AstroTrack counteracts the rotation of the Earth on its axis, making objects appear to stand still in the telescope's field of view. You won't have to reposition the telescope to re-center an object in the eyepiece as the object moves across the sky – a welcome convenience!

The AstroTrack has variable-speed tracking control, allowing adjustment to the exact sidereal tracking rate as well as to speeds slightly slower or faster than sidereal. This ensures accurate tracking of both solar system and deep-sky objects, and allows for correction of any inherent deviation in the motor from the sidereal rate.

The AstroTrack provides sufficiently accurate tracking for piggyback and planetary (eyepiece projection) astrophotography. It is not recommended for prime focus, long-exposure photography.



 **ORION**  
**TELESCOPES & BINOCULARS**  
*Providing Exceptional Consumer Optical Products Since 1975*

*Customer Support:*  
[www.OrionTelescopes.com/contactus](http://www.OrionTelescopes.com/contactus)

*Corporate Offices:*  
89 Hangar Way, Watsonville CA 95076 - USA

Copyright © 2014 Orion Telescopes & Binoculars

All Rights Reserved. No part of this product instruction or any of its contents may be reproduced, copied, modified or adapted, without the prior written consent of Orion Telescopes & Binoculars.

## Assembly

### Installing the Battery

The AstroTrack is powered by a single 9-volt alkaline battery (not included). It should be installed before attaching the AstroTrack to the equatorial mount.

Make sure the power switch is in the OFF position. Unscrew the two thumbscrews on the front panel and remove the housing (Figure 1). You will notice a U-shaped foam liner inside. Place the battery in the liner and snap on the terminal connector (Figure 2). Replace the housing, tucking the battery wires inside so they're not hanging out. Thread on the two thumbscrews to secure the housing.

Use the same procedure to replace the battery when it runs down. (You do not have to remove the AstroTrack from the equatorial mount.)

### Installing the AstroTrack on the EQ-1 Equatorial Mount

When facing the front of the mount, the right ascension (R.A.) slow-motion control cable should be mounted on the left end of the R.A. worm gear shaft (see Figure 3). If it is mounted on the right end, remove it from the mount, and reinstall it on the left end of the shaft. Loosen the knurled thumbscrew on the end of the motor's drive coupler (see Figure 2). Use the provided large Allen wrench and remove the socket head screw on the right side of the equatorial mount (see Figure 3). Orient the motor drive so that the drive coupler slips over the right end of the R.A. worm gear shaft. Now, attach the motor to the mount by inserting the socket head screw through the slot in the motor drive's bracket, and re-threading it into the mount. Tighten the thumbscrew on the end of the motor's drive coupler. The thumbscrew should seat into the groove on the end of the worm gear shaft. You may need to rotate the R.A. worm gear, using the R.A. slow-motion control cable for the thumbscrew and the groove to line up.

Use the thumbscrew on the R.A. slow-motion control cable as a reference to line up the drive coupler thumbscrew and the groove on the worm gear shaft; when the thumbscrews are rotationally aligned, the coupler's thumbscrew should seat into the groove on the shaft (see Figure 4). Once the thumbscrew is tightened, the motor is engaged. *When the motor is engaged, never, under any circumstances, should you use the R.A. slow-motion control cable!* If you want to use the R.A. slow-motion control cable, you must first loosen the thumbscrew on the end of the motor's drive coupler.

The motor is now properly installed on the EQ-1 mount, and should appear as in Figure 5.

## Operation

### Quick Polar Alignment

For best results, the telescope's equatorial mount must be aligned parallel to the Earth's rotational (polar) axis. The AstroTrack will not track objects accurately (objects will not stay in the field of view) if the mount's R.A. axis is pointing to the wrong part of the sky. An approximate polar alignment is



Figure 1: The front panel of the AstroTrack

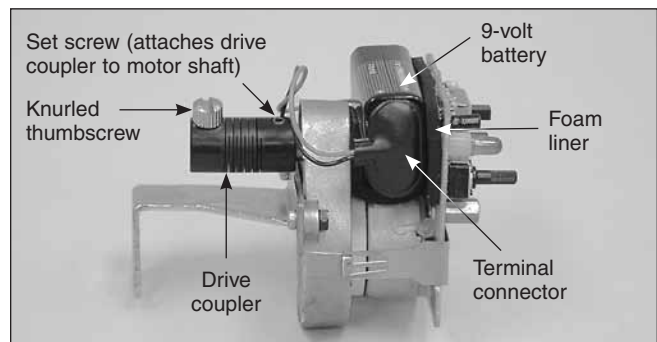


Figure 2: The interior of the AstroTrack. The battery goes in the U-shaped foam liner and the terminal connector snaps on the battery.

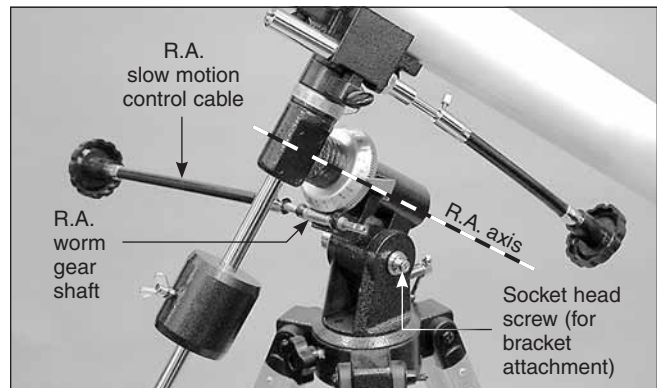
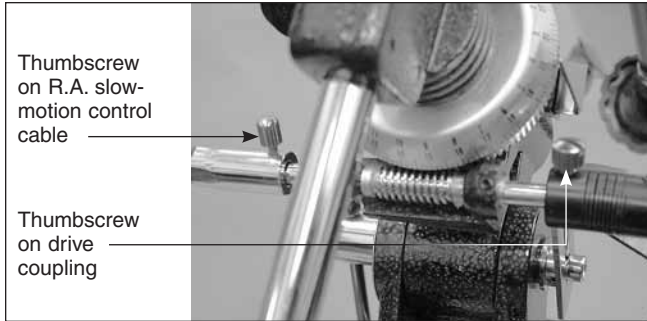


Figure 3: The right ascension (R.A.) slow-motion control cable needs to be mounted on the left end of the R.A. worm gear shaft.

sufficient for most observing situations and is all that will be covered here. For a more accurate alignment, consult your telescope manual or detailed instructions in an observing guide.

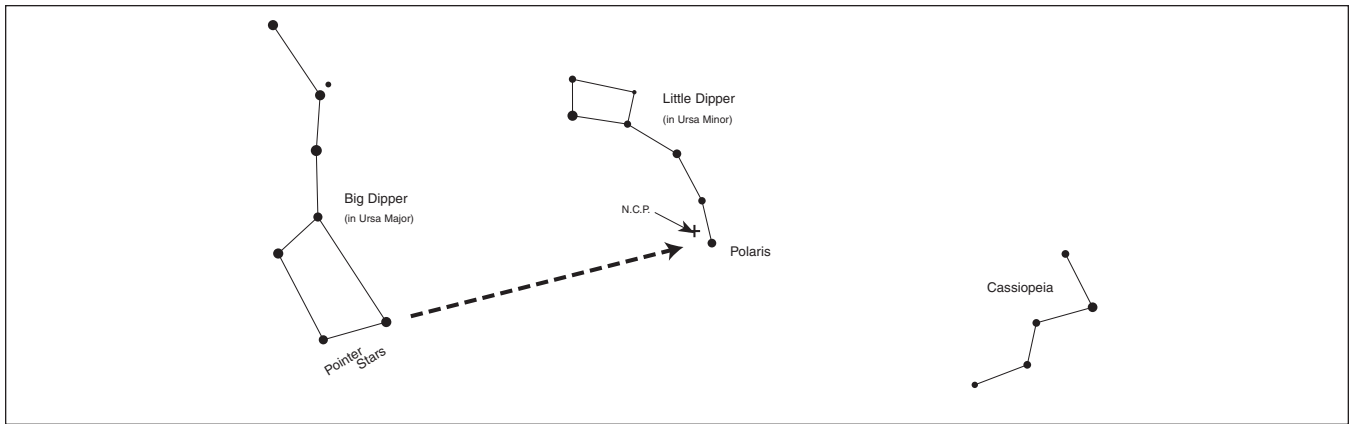
For observers in the Northern Hemisphere (north of the Earth's equator), alignment is achieved by aiming the mount's R.A. axis at Polaris, the North Star (see Figure 6). An eyeballed approximation is all that's necessary. Do this by sighting along the R.A. axis from behind it while adjusting the latitude adjustment on the tripod and repositioning the tripod itself, until the R.A. axis is pointed toward Polaris. For observers in



**Figure 4:** When the thumbscrews on the R.A. slow-motion control cable and the drive coupler are rotationally aligned, the coupler's thumbscrew should seat into the groove on the R.A. worm gear shaft.



**Figure 5:** The AstroTrack installed on the EQ-1 mount.



**Figure 6:** Use the constellation Ursa Major (the Big Dipper) to find Polaris (the North Star). Extend an imaginary line from two “pointer stars” in the bowl of the Big Dipper, Travel down this line about five times the distance between the two pointer stars and you will be at Polaris.

the Southern Hemisphere, align on the star Sigma Octantis in the constellation Octans.

### Setting the Directional Switch

Before turning the power switch on, observers in the Northern Hemisphere should make sure the directional switch is set to N; Southern Hemisphere observers should set it to S.

### Powering Up

To begin tracking, slide the power switch to ON. The red LED power light should illuminate. If it does not, check the connection between the battery and the terminal connector.

### Adjusting the Tracking Speed

The AstroTrack is equipped with adjustable speed control. Turning the speed control knob clockwise increases the motor speed, counterclockwise slows it.

Adjustable speed has several benefits. First, it allows you to achieve a precise sidereal tracking speed for your telescope. That's the speed at which most celestial objects appear to move across the sky. Second, it allows correction for any deviation from sidereal rate that is inherent in the motor itself. Third, you can track objects that move at a rate different from sidereal. The Moon, for instance, moves at a slightly slower rate, so the motor speed would be reduced.

How do you know when the tracking speed setting is “correct”? Essentially, when the object in the field of view of the telescope doesn't drift. There's no need to spend a lot of time precisely canceling the minutest amount of drifting: even with a small amount of movement, an object will stay in the field of view for a long period of time.

### Using the Manual Slow-Motion Control

Before rotating the R.A. slow-motion cable on the EQ-1 mount, you must first disengage the motor drive. You must do this whether the power switch is on or off. Disengage the drive by loosening the coupler's thumbscrew a few turns. The R.A. worm gear should then rotate freely when you rotate the slow-motion control or circular gear (and the coupler should remain motionless). If you feel it “catch,” loosen the coupler's thumbscrew some more until the rotation of the shaft is unhindered.

To re-engage the motor drive, tighten the thumbscrew on the coupler. Note, however, that to prevent slipping of the coupler on the worm gear shaft, the coupler's thumbscrew should lock into the groove on the shaft. You may have to rotate the R.A. worm gear (using the slow-motion control cable or circular gear) until the slot lines up with the thumbscrew. Use the thumbscrew on the R.A. slow-control cable or the mark you made on the circular gear for reference to line up the groove and coupler's thumbscrew. Then tighten the thumbscrew.

---

### **Note Regarding Motor Interference with the Mount:**

It is not possible to point the telescope at all positions in the sky with the AstroTrack installed. This is due to mechanical interference with the motor and the telescope/mount. If you wish to view these areas of the sky, you will need to remove the motor from the mount. Do this by simply loosening the thumbscrew on the drive coupler, and removing the socket head screw that attaches the motor's bracket to the mount.

### **Battery Life**

A 9-volt alkaline battery provides about 35 hours of operation. When the battery dies, the motor will slow noticeably and the LED power indicator light will dim. When this occurs, remove the old battery and install a new 9-volt battery.

## **Troubleshooting**

If, when the AstroTrack is turned on, the telescope does not move or is intermittent in its tracking, there are a few possible causes.

1. Is the telescope properly balanced? The motor provides only limited torque, so if the telescope is not balanced on both the right ascension and declination axes, the imbalance may put stress on the motor and inhibit the smooth movement of the telescope.
2. Is the thumbscrew on the AstroTrack's drive coupler tight? If it is loose, the R.A. worm gear shaft may not be turning at the same rate as the coupler, or may not be turning at all. Make sure the thumbscrew is tight and is seated in the groove on the end of the shaft.
3. Is the set screw that attaches the drive coupler to the motor drive tight (see **Figure 2**)? If it isn't, the coupler may be slipping on the motor's output shaft. Use a 2mm Allen wrench to tighten the set screw, if necessary.
4. Weak or dead battery? Replace it with a fresh one and try again.

## **One-Year Limited Warranty**

This Orion product is warranted against defects in materials or workmanship for a period of one year from the date of purchase. This warranty is for the benefit of the original retail purchaser only. During this warranty period Orion Telescopes & Binoculars will repair or replace, at Orion's option, any warranted instrument that proves to be defective, provided it is returned postage paid. Proof of purchase (such as a copy of the original receipt) is required. This warranty is only valid in the country of purchase.

This warranty does not apply if, in Orion's judgment, the instrument has been abused, mishandled, or modified, nor does it apply to normal wear and tear. This warranty gives you specific legal rights. It is not intended to remove or restrict your other legal rights under applicable local consumer law; your state or national statutory consumer rights governing the sale of consumer goods remain fully applicable.

For further warranty information, please visit [www.OrionTelescopes.com/warranty](http://www.OrionTelescopes.com/warranty).

Orion Telescopes & Binoculars

Corporate Offices: 89 Hangar Way, Watsonville CA 95076 - USA

Customer Support: [www.OrionTelescopes.com/contactus](http://www.OrionTelescopes.com/contactus)

Copyright © 2000-2014 Orion Telescopes & Binoculars

All Rights Reserved. No part of this product instruction or any of its contents may be reproduced, copied, modified or adapted, without the prior written consent of Orion Telescopes & Binoculars.