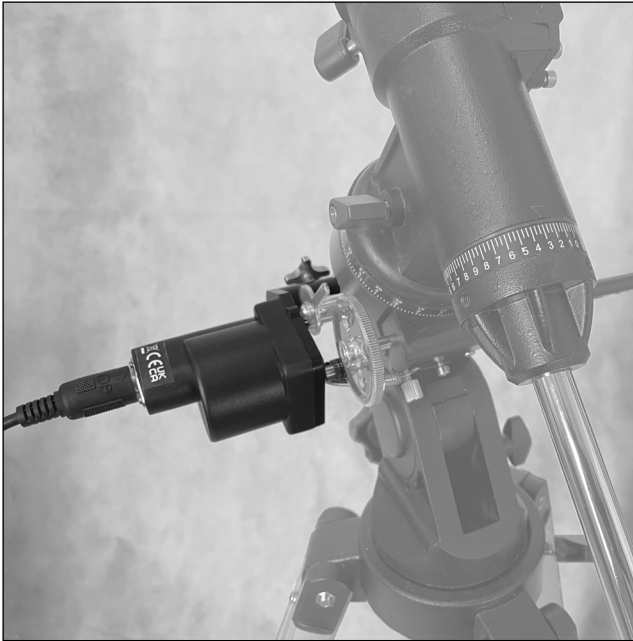


# INSTRUCTION MANUAL

## Electronic DC Tracking Drive for Observer Equatorial Mount

#53089



This single-axis motor drive is designed to provide electronic, hands-free tracking of celestial objects with the Orion® Observer Equatorial Mount. Electronic tracking of a polar aligned equatorial mount makes objects appear to stand still in the telescope's field of view, rather than drifting due to the Earth's rotation. 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!



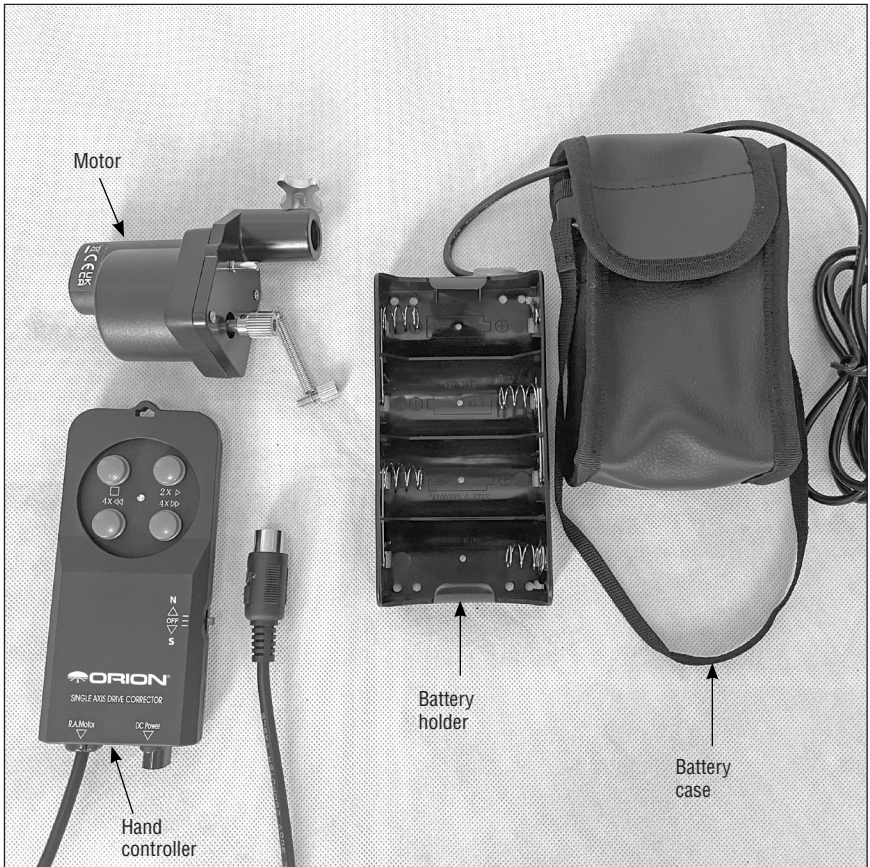
**Corporate Offices:** 89 Hangar Way, Watsonville CA 95076 - USA  
**Toll Free USA & Canada:** (800) 447-1001  
**International:** +1(831) 763-7000  
**Customer Support:** [support@telescope.com](mailto:support@telescope.com)

*Copyright © 2022 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.*

# 1. Included Parts

- Motor drive
- Battery holder with cable
- Case for battery holder
- Hand controller with cable

Refer to **Figure 1** and the parts list at left to make sure all the parts are present. If anything is missing or damaged contact Orion Technical Support at [www.OrionTelescopes.com/contactus](http://www.OrionTelescopes.com/contactus).

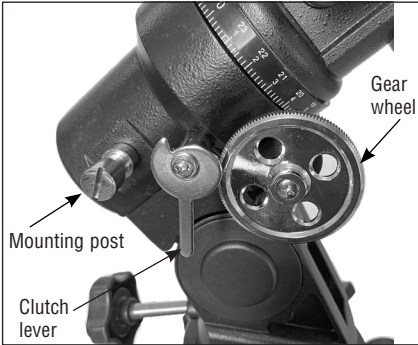


**Figure 1**

## 2. Assembly

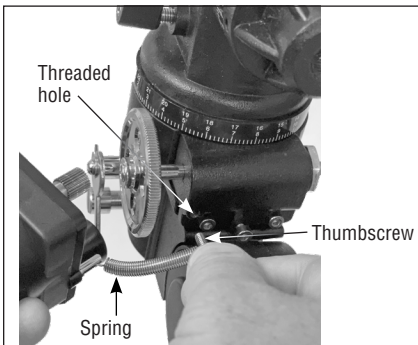
No tools are needed to assemble the motor drive to the Observer EQ mount.

Some of the components necessary for the attachment and operation of Electronic Tracking Drive come pre-installed on the Orion Observer Equatorial Mount. Familiarize yourself with these components in **Figure 2**.



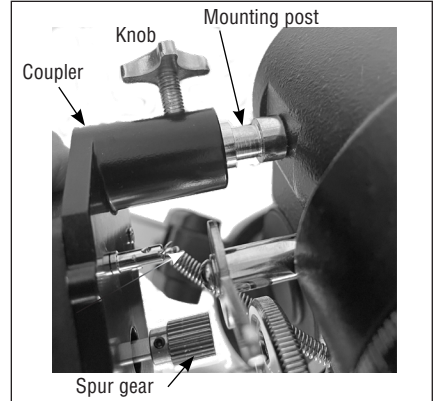
**Figure 2**

1. First, you will attach the spring to the mount's housing using the included thumbscrew, which should come attached to the free end of the spring. Thread the thumbscrew into the threaded hole in the mount housing (**Figure 3**).



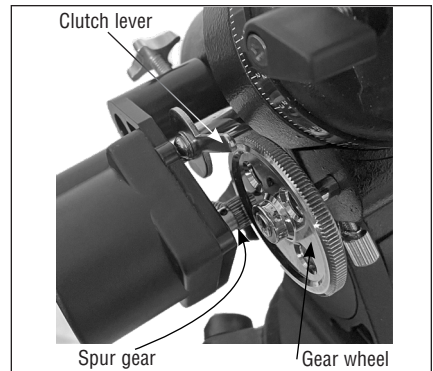
**Figure 3**

2. Next, you will install the motor drive's coupler to the motor mounting post on the mount. In doing this, however, make sure the spur gear is positioned on the underside of the gear wheel, and that the clutch lever is positioned upward, not hanging downward. Then pull the motor and slide the coupler onto the mounting post (**Figure 4**). The spring will stretch when you do



**Figure 4**

this. When the motor drive is properly installed, the spur gear should be meshed against the gear wheel and the clutch lever should be up or leaning toward the gear wheel as in **Figure 5**.



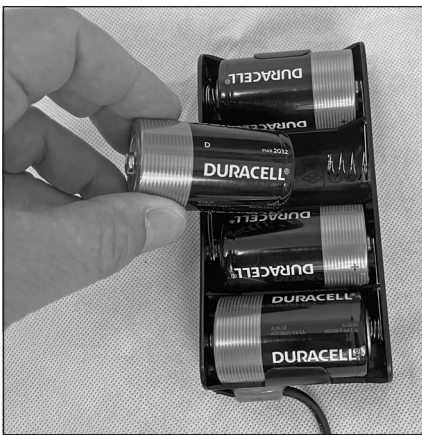
**Figure 5**

3. Tighten the four-point knob on the coupler until tight, then loosen it a quarter turn (see **Figure 5**). This loosening is needed for the motor drive to function properly.
4. Now insert the 8-pin plug of the hand controller into the socket of the tracking motor, as shown in **Figure 6**.



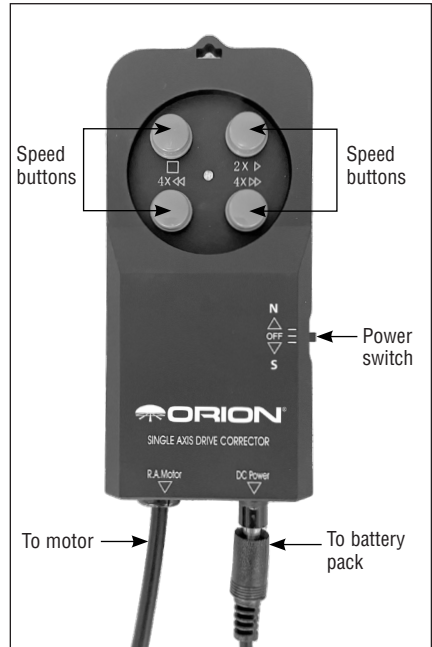
**Figure 6**

5. Take the battery holder out of its case, then install four 1.5V D-cell alkaline batteries in the battery holder (**Figure 7**). Make sure the polarity (+/-) of the



**Figure 7**

6. Lastly, plug the cable from the battery pack into the "DC Power" jack on the hand controller (**Figure 8**).



**Figure 8**

---

### 3. Operation

For the Electronic DC Tracking Drive to work properly, the equatorial mount must be polar-aligned. This involves aligning the R.A. axis of the mount so it is parallel to the Earth's axis of rotation (polar axis). Consult the manual that came with your equatorial mount or telescope for details on how to polar-align it.

#### Turning the Electronic Tracking Drive On and OFF

The power switch for the tracking drive is on the right side of the hand controller (**Figure 8**). To turn the power on, slide the switch from the center "OFF" position to "N" if you're in the Northern hemisphere, or to "S" if you're in the Southern Hemisphere. Return the switch to the center "OFF" position when you are finished using the telescope for the evening.

Once the power is turned on, if the mount is properly polar-aligned, it will track the motion of the night sky, and the telescope should hold any astronomical object in its eyepiece steady over time. The LED in the center of the button formation will light up green to indicate the power is on and the motor is tracking.

#### Using the Hand Controller

There are four buttons on the hand controller (**Figure 8**). If no buttons are pressed, when the power switch is turned on the motor will turn the right ascension (R.A.) axis of the mount westward

at sidereal rate – the same rate at which the stars are moving from east to west in the sky. If the top right button is pressed, the motor will turn westward at 2x sidereal rate, which will cause objects viewed in the telescope's eyepiece to move slowly eastward. If the bottom right button is pressed, the motor will turn westward at 4x sidereal rate.

If the upper left button is pressed, the motor will pause the tracking function, which will cause objects in the eyepiece to drift slowly westward. Releasing the button will cause tracking to resume. If the bottom left button is pressed, the motor reverses direction at 4x sidereal rate, causing objects in the telescope's field of view to move westward. Note that whenever any of the four buttons on the hand controller is pressed, the LED in the center of the button formation will shine red; when the button is released, the LED will shine green again.

The hand controller buttons are useful for centering objects in the telescope's field of view. To slew the telescope farther and more quickly than is possible with the tracking drive, you can release the R.A. lock knob and move the telescope optical tube manually. But to use the R.A. slow-motion control you will need to disengage the motor using the clutch lever.



### Using the Motor's Clutch Feature

The clutch lever allows you to disengage the motor; that is, to disengage the spur gear from the large gear wheel. To do so, push the clutch lever to the left (**Figure 9A and B**). To re-engage the gears, toggle the clutch lever to the right (**Figure 9C and D**).

When the tracking drive is engaged – no matter whether the power is on or off – you should not attempt to use the mount's R.A. slow-motion control. Doing so could permanently damage the motor.

So let's say you've observed a celestial object with your Observer telescope and now want to move to a new object in a

different part of the sky. First, loosen both the R.A. and Dec. lock knobs and move the telescope by hand until it is pointed in the general direction of the object. Retighten the R.A. and Dec. lock knobs. Now, disengage the tracking drive by pushing the clutch lever to the left. Then use the R.A. and Dec. slow-motion control cables to roughly center the object in the eyepiece's field of view. Re-engage the tracking drive by flipping the clutch lever to the right, and the motor drive system will keep the object centered over time. If it does drift, maybe because your polar alignment wasn't very accurate; you can use the buttons on the hand control to re-center it.

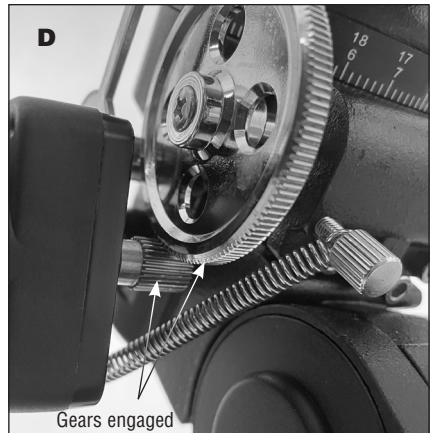
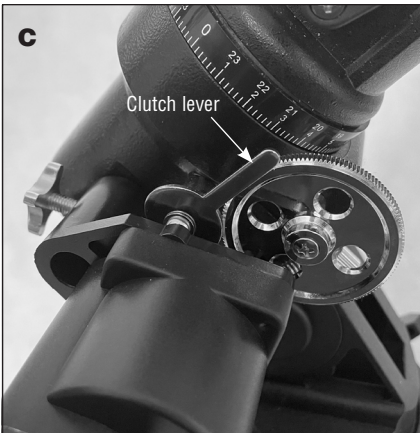
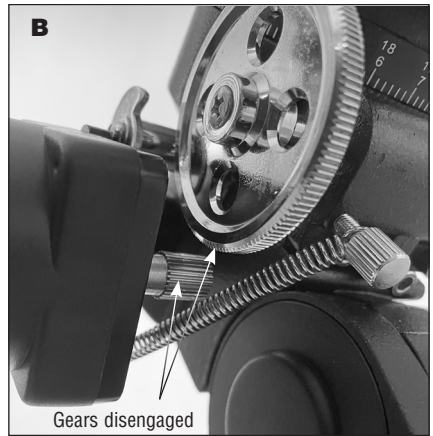
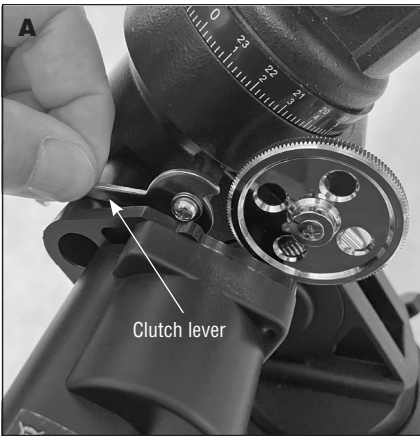


Figure 9

---

Remember, never use the R.A. slow-motion control cable when the motor is engaged, or you could permanently damage the motor. You may safely use the Dec. slow-motion cable whether the tracking motor is engaged or disengaged.

## Specifications

- Motor type: DC stepper motor
- Tracking rate: Sidereal
- Centering rates: 2x and 4x sidereal
- Power requirement: 6V DC
- Battery type: Four D-cell alkaline (1.5V), user supplied
- Hemisphere: Works in Northern or Southern Hemisphere
- Clutch: Lever to engage and disengage tracking motor

---

## 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).



**Corporate Offices:** 89 Hangar Way, Watsonville CA 95076 - USA  
**Toll Free USA & Canada:** (800) 447-1001  
**International:** +1 (831) 763-7000  
**Customer Support:** [support@telescope.com](mailto:support@telescope.com)

*Copyright © 2022 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.*