

# Orion® DC Motor Drive

## For EQ-1C Mount

#7822

This motor drive is designed to provide electronic, hands-free tracking of celestial objects with the Orion EQ-1C equatorial mount. Electronic tracking 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!

This motor drive is designed for use in the Northern Hemisphere only.

### 1. Included parts

- A Motor
- B Battery holder
- C Gear wheel
- D Gear wheel screw
- E Anchor post
- F Spring
- G Clutch cord

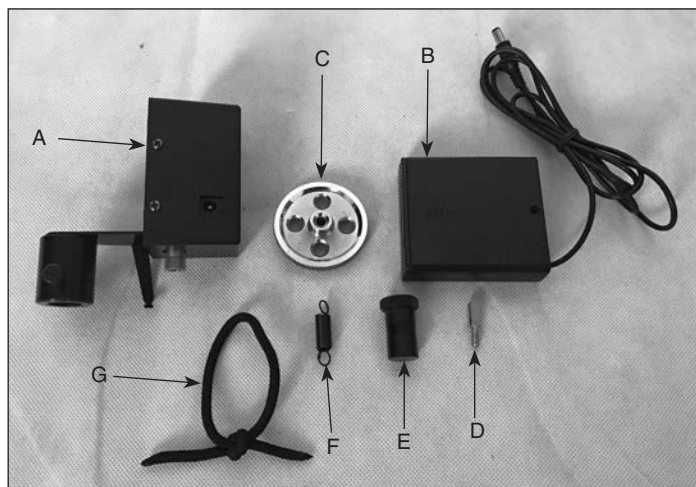
Refer to **Figure 1** and the parts list above to make sure all the parts are present. If anything is missing or damaged contact Orion Technical Support at [www.OrionTelescopes.com/contactus](http://www.OrionTelescopes.com/contactus).

### 2. Assembly

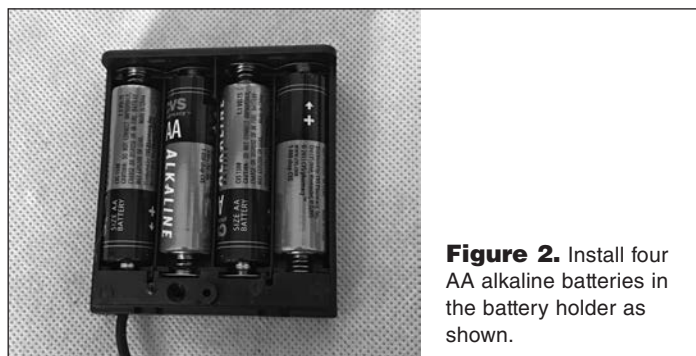
You will need two tools to install the motor drive on the mount: an adjustable wrench or a 17mm crescent wrench and a small flat-blade screwdriver.

#### Installing the Batteries

1. The motor drive is powered by four AA alkaline batteries (not included), which you must place in the battery holder (B) prior to use (**Figure 2**). Make sure the power switch on the bottom of the battery holder is in the OFF position. Remove the battery holder cover and insert the batteries as indicated inside the battery compartment. Then slide the cover back in place.
2. Remove the acorn nut adjacent to the latitude scale from the equatorial mount (**Figure 3**). Leave the latitude scale and clear washer in place.
3. Thread on the anchor post (E) until tight (**Figure 4**). If the latitude scale moved when the acorn nut was removed, rotate it to the proper orientation before tightening the anchor post. The proper orientation is with the 0 degree mark pointing straight up.
4. Place one end-loop of the spring (F) over the right ascension (RA) axle as shown in **Figure 5**.



**Figure 1.** Parts included with the motor drive.



**Figure 2.** Install four AA alkaline batteries in the battery holder as shown.

5. Place the center hole of the gear wheel (C) on the axle (**Figure 6A**). Then insert the gear wheel screw (D) into the hole and tighten with a flat-blade screwdriver to secure the gear wheel on the axle (**Figure 6B**).
6. Place the motor's (A) coupler over the anchor post, then lightly tighten the thumbscrew on the coupler (**Figure 7**).
7. Now hook the free end of the spring onto the end of the clutch tab (**Figure 8**). By doing this, the small brass spur gear should contact and mesh with the larger gear wheel as shown.
8. This step is optional, but if desired you can loop the clutch cord (G) around the clutch tab and tie a knot to make it a loop (see **Figure 11B**).
9. Lastly, plug the cable from the battery holder (B) into the power jack on the motor (**Figure 9**).

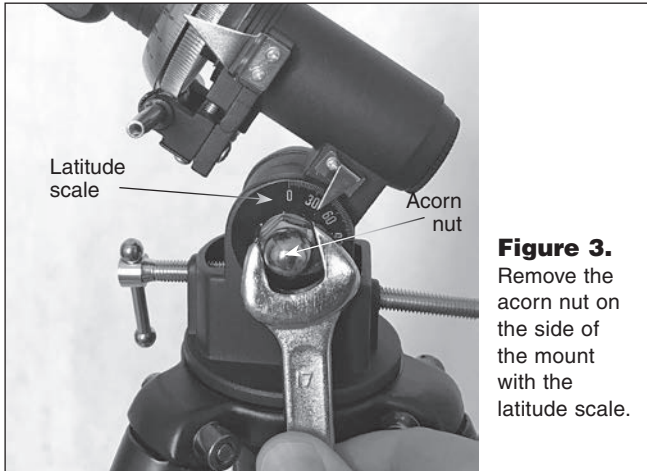
The motor drive is now properly installed on the mount.



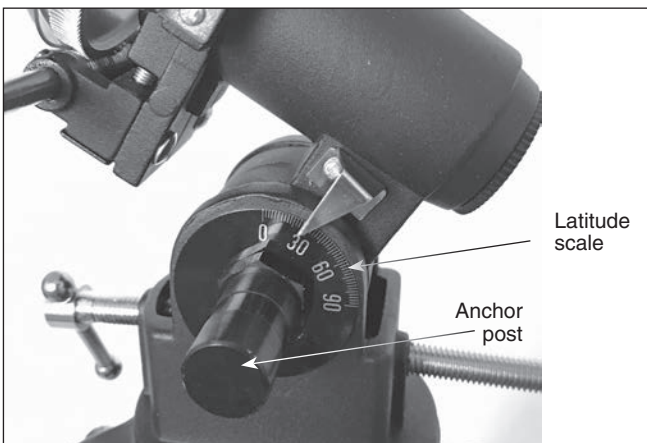
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**Figure 3.** Remove the acorn nut on the side of the mount with the latitude scale.



**Figure 4.** Thread on the anchor post where the acorn nut was.

## Operation

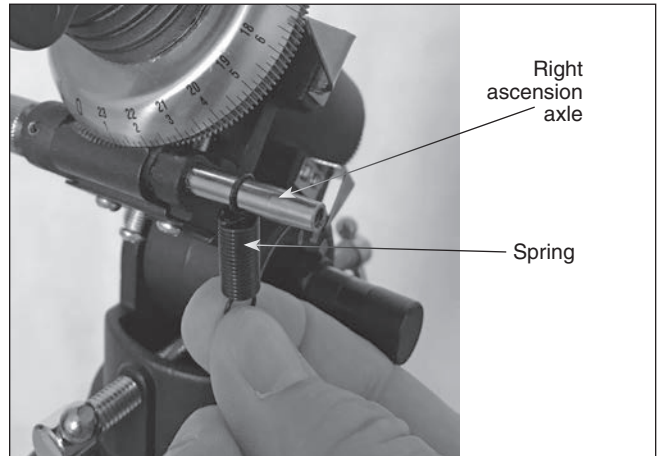
### Quick Polar Alignment

For best results, the telescope's equatorial mount must be aligned parallel to the Earth's rotational (right ascension, or "R.A.") axis. The motor drive 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 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.

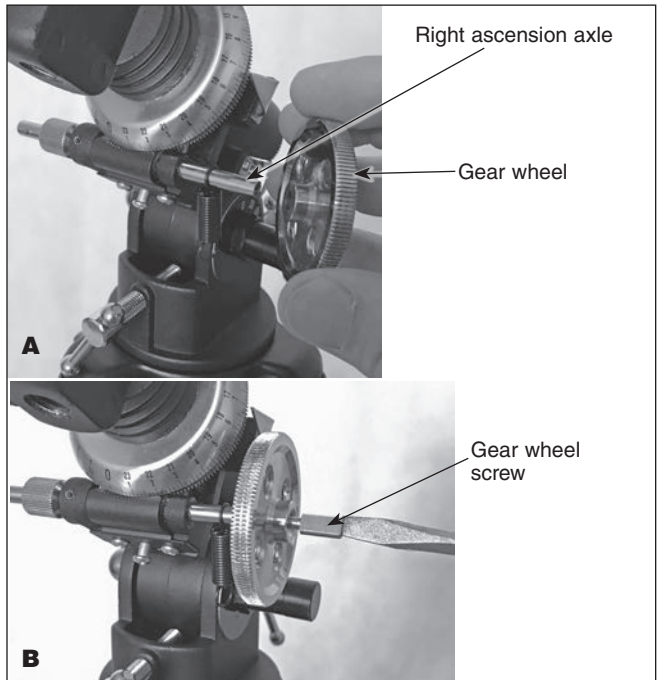
For observers in the Northern Hemisphere (north of the Earth's equator), alignment is achieved by aiming the mount's R.A. axis at Polaris, the North Star (see Figure 10). An eyeballed approximation is all that's necessary. Do this by sighting along the R.A. axis from behind it while adjusting the latitude adjustment on the tripod and repositioning the tripod itself, until the R.A. axis is pointed toward Polaris.

### Powering Up

To begin tracking, slide the power switch on the battery holder to ON. The green LED power light on the motor housing should begin to blink slowly, and you should be able to hear



**Figure 5.** Attach one end of the spring to the right ascension axle as shown.

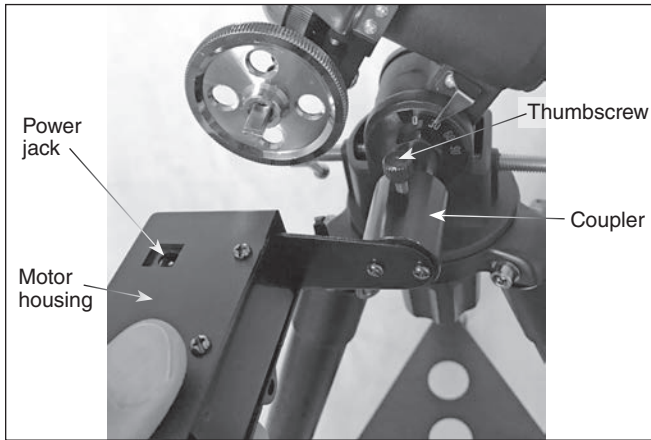


**Figure 6. A)** Insert the gear wheel onto the right ascension axle, then **B)** secure it by tightening the gear wheel screw.

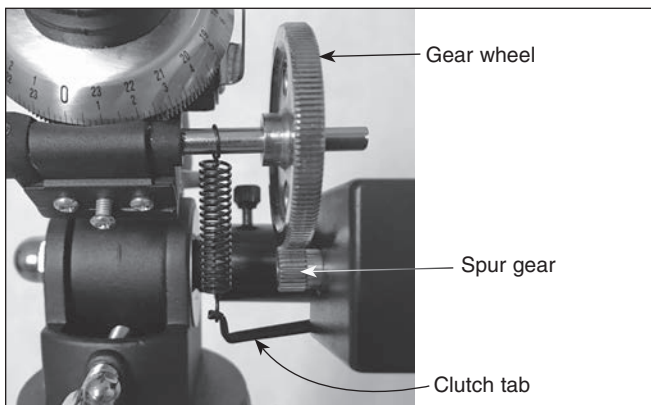
the motor drive operating. If these things don't happen then check that the battery pack cable is plugged properly into the motor drive. If it is, then you may have dead batteries in the pack that need to be replaced with fresh ones.

### Using the Manual Slow-Motion Control

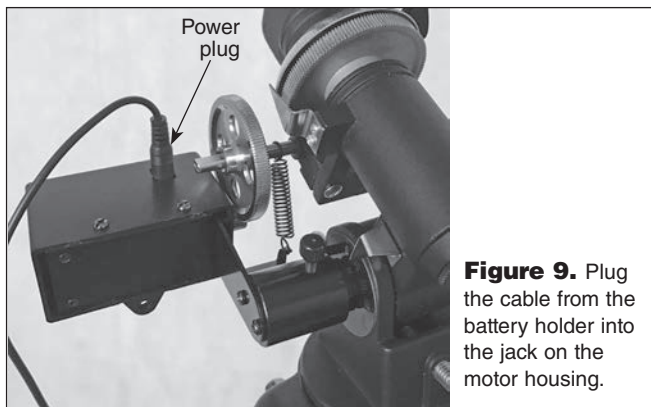
You can still use the R.A. slow-motion cable for slewing the telescope even when the motor drive is attached. (The cable and the motor drive are attached to opposite sides of the R.A. axis.) But before rotating the R.A. slow-motion cable, you must first disengage the motor drive from the EQ mount. Do this by pushing down on the motor housing with one hand until the spur gear is free of the gear wheel (Figure 11A). Alternatively, you can pull down on the clutch cord, if you attached it in step



**Figure 7.** Install the motor by slipping the coupler over the anchor post.



**Figure 8.** Attach the free end of the spring to the clutch tab of the motor.

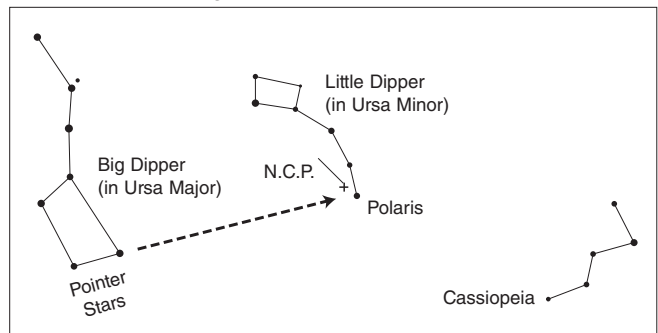


**Figure 9.** Plug the cable from the battery holder into the jack on the motor housing.

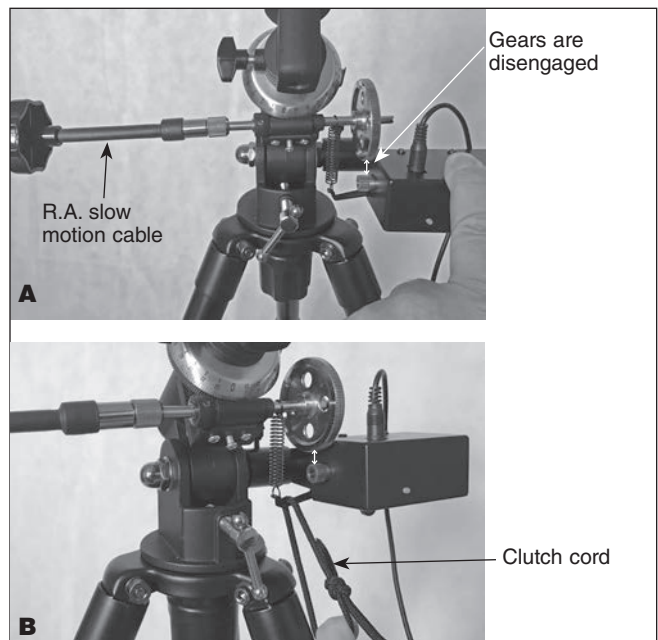
8 of the assembly procedure (**Figure 11B**). You do not need to turn the motor drive off when disengaging it to use the slow-motion cable. Then with the other hand turn the R.A. slow-motion cable to slew the mount. Do not attempt to turn the R.A. slow-motion cable when the motor drive is engaged or you could damage the motor! When finished slewing with the slow-motion cable, gently release the motor drive or clutch cable so the gears re-engage.

## Normal Operation of the Motor Drive

You may notice that the motor drive speed varies over a period of time. This is normal for this type of drive! Due to slight irregularities in the gears, a controller circuit inside the motor housing calculates how fast or slow the motor needs to run at any particular time to compensate for the forces that build up or dissipate as the gears turn against each other. Those calculations result in minor moment-to-moment variations in the motor speed in order to maintain an average speed equivalent to the sidereal rate, the Earth's rate of rotation. Since absolutely constant speed is not required for this level of mount, as would be needed to do deep-sky astrophotography, for in-stance, the motor drive is well suited to casual observing and will keep target objects in the telescope's field of view for a prolonged period of time.



**Figure 20.** To find Polaris in the night sky, look north and find the Big Dipper. Extend an imaginary line from the two "Pointer Stars" in the bowl of the Big Dipper. Go about five times the distance between those stars and you'll reach Polaris, which lies within 1° of the north celestial pole (NCP).



**Figure 11** To move the right ascension axis with the slow-motion cable, disengage the motor drive by **A**) pressing down on the motor housing using your hand, or **B**) pulling down on the clutch cord.

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## 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.

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