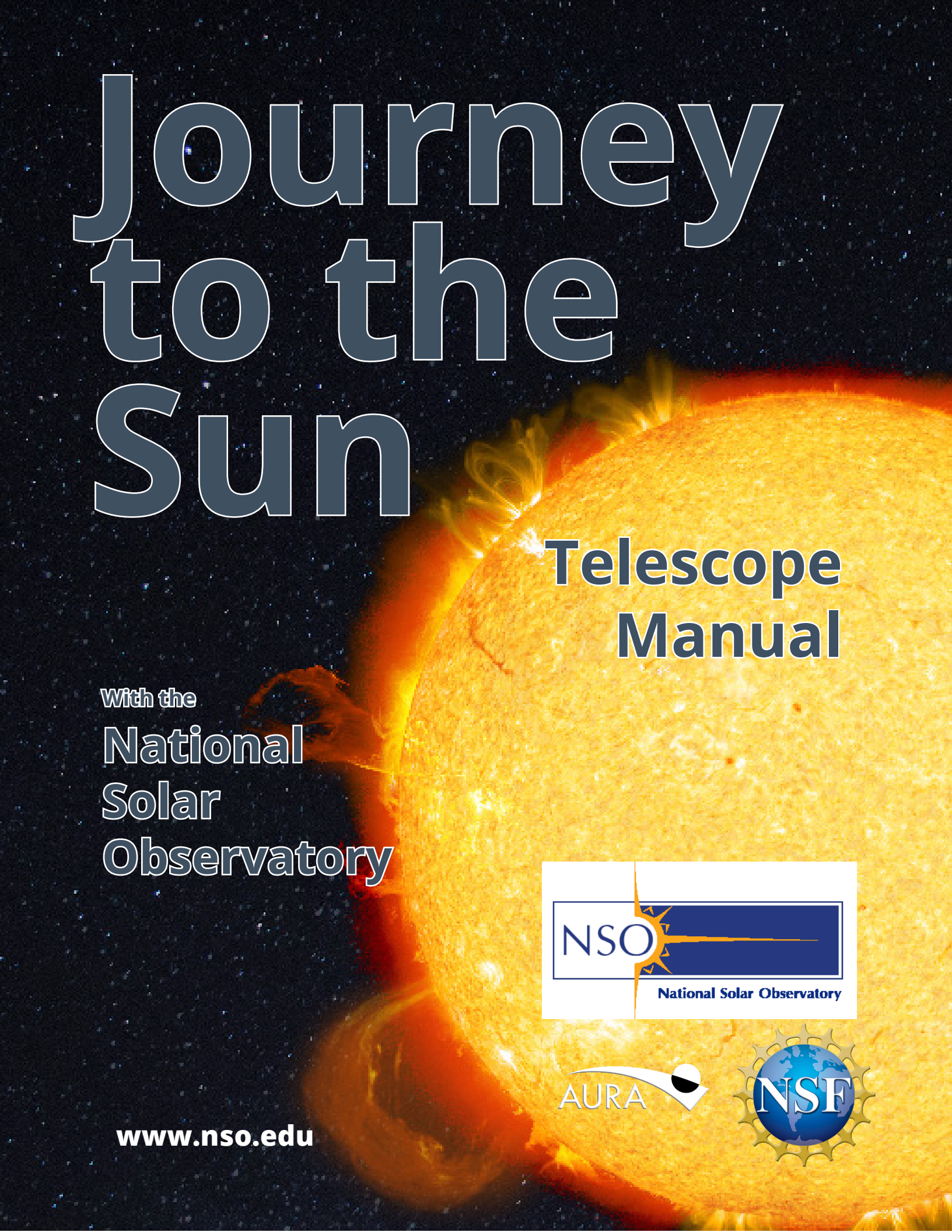
Journey to the Sun

Telescope Manual

With the National Solar Observatory



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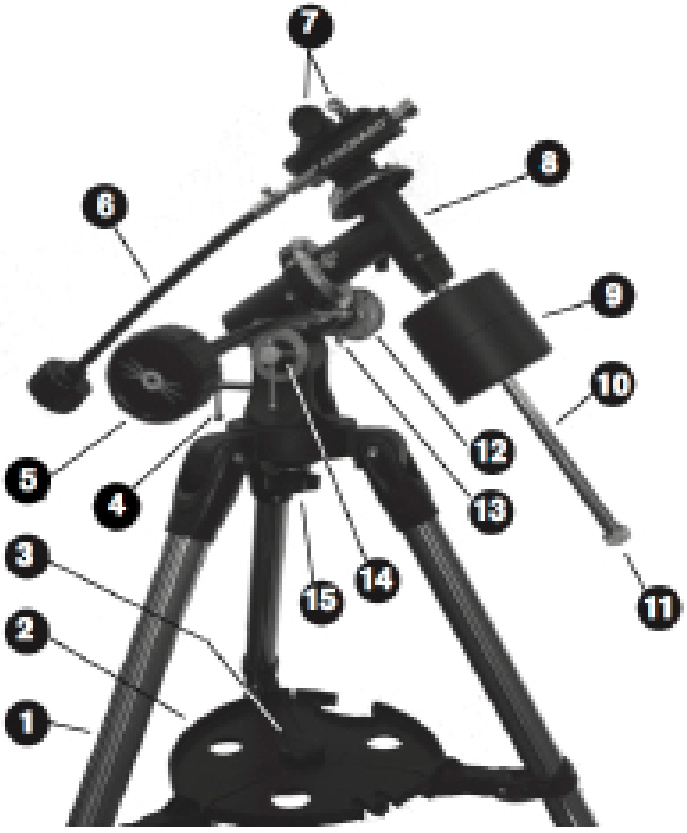
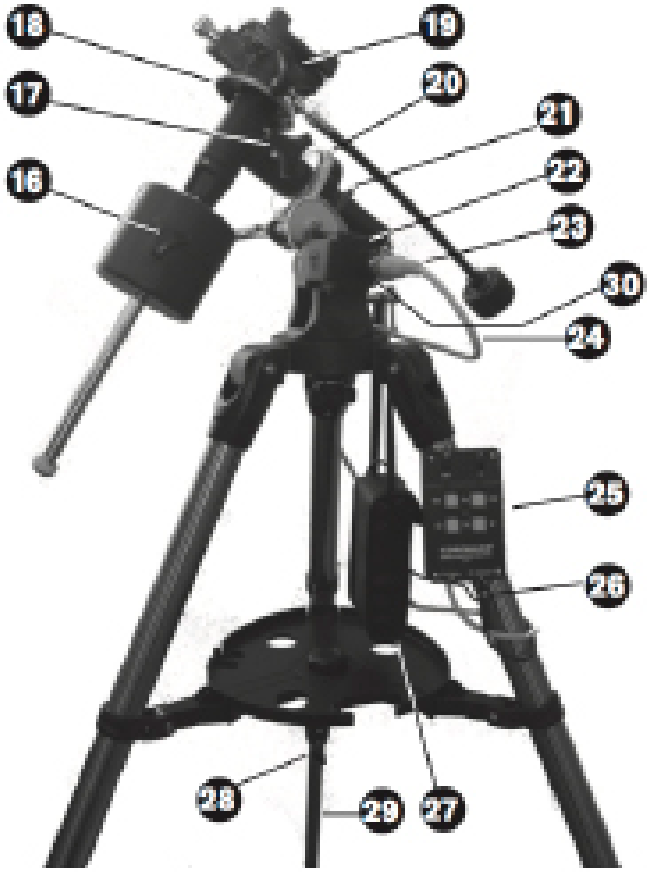
Setting Up Your Coronado Personal Solar Telescope and EQS Mount



1. Tripod
2. Accessory tray
3. Accessory tray mounting knob
4. Latitude adjustment knob
5. RA slow-motion control
6. DEC slow-motion control
7. OTA mounting lock knobs
8. EQ mount body
9. Counterweight
10. Counterweight shaft
11. Counterweight shaft safety nut
12. RA spur gear
13. Motor tension spring mounting screw
14. Latitude lock knob & scale
15. Mount body lock knob
16. Counterweight lock knob
17. RA lock knob
18. DEC setting circle
19. DEC lock knob
20. RA setting circle
21. Motor clutch knob
22. RA motor drive assembly
23. Motor 5-pin DIN connector
24. Motor cable
25. Hand controller
26. Battery pack power cable
27. Battery pack
28. Tripod leg lock
29. Inner tripod leg
30. Motor mounting shaft (not visible)



Credit: Adapted by NSO from Meade Instruments / Coronado

Setting up your EQS Mount

1. Begin by setting up tripod with legs splayed out evenly apart.

2. Set the height of your tripod by loosening the lock knobs at the bottom of each leg. Slide the inner portion in or out to your desired length. When you're finished, check that the tripod is level. Adjust as necessary.

3. Attach the "Accessory Tray" (***#2***). Do this by placing the tray underneath the center of the tripod under the center knob as shown in ***Figure 1***. Tighten the center knob until there is a firm fit.

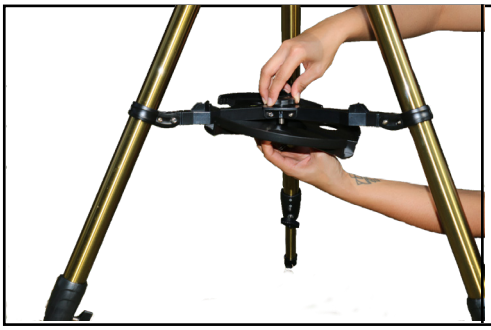


Figure 1.

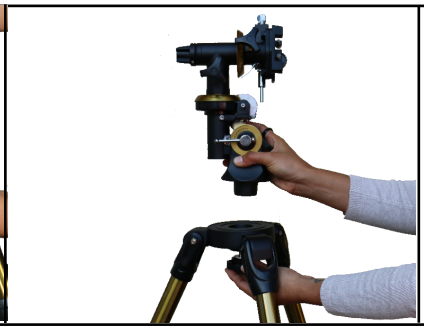


Figure 2.

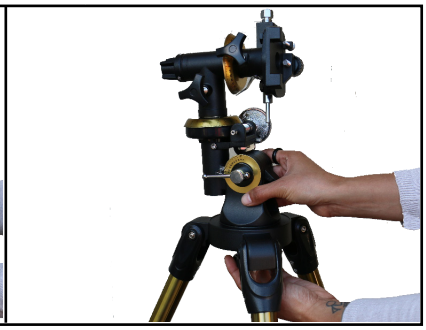


Figure 3.

4. Attach the "EQ Mount Body" (***#8***) to the tripod by placing the base of the mount on top of the tripod as in ***Figure 2***. The front of the mount body should sit over one of the tripod legs. (***Figure 3.***)

5. Tighten the "Mount Body Lock Knob" (***#15***) to secure the mount to the tripod (***Figure 3.***)

6. Loosen the Latitude Lock Knob on the side of the mount to move the upper portion of the mount body so that you can now thread the "Latitude Adjustment Knob" (***#4***) into the back of the mount (***Figure 4***). You do not need to thread the adjustment knob all the way in. Tighten the "Latitude Lock Knob" (***#14***) to secure in place (***Figure 4.***)

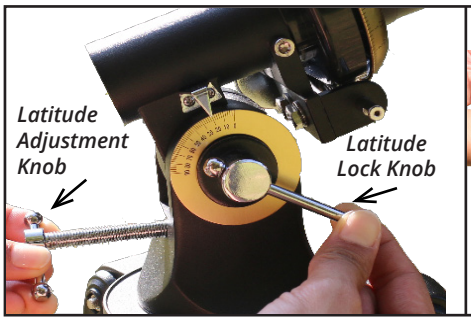


Figure 4.

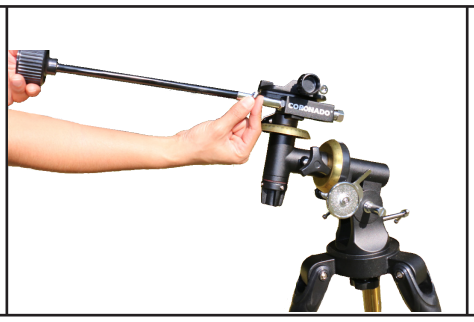


Figure 5.

Figure 6.

7. Attach the "DEC Slow-Motion Control" (***#6***) by tightening the screw into the groove of the attachment point on the mount as in ***Figure 5.***

8. Attach the "RA Slow-Motion Control" (***#5***) by tightening the screw within the groove of the attachment point on the mount as in ***Figure 6.***

9. Loosen the Motor Mounting Lock Knob of the RA assembly (***Figure 7.***) You can find the RA assembly in the Clock Drive Box.

10. Slide the Motor Assembly onto the Motor Mounting Shaft (***Figure 8.***) The Coronado label should be facing the same direction as in the ***Figure 8*** picture.

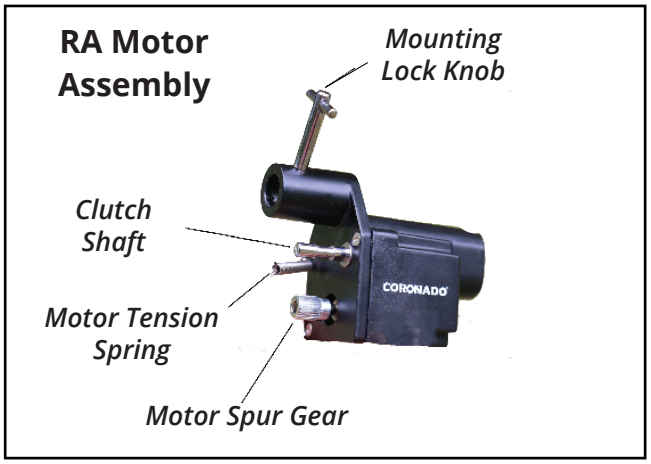


Figure 7.

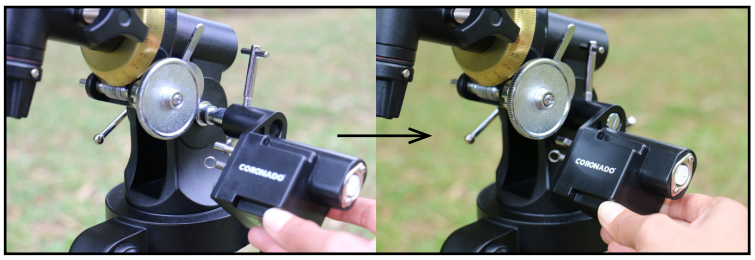


Figure 8.

11. Turn the RA Motor Drive Assembly until the Motor Spur Gear (***Figure 7.***) and RA Spur Gear (***#12***) fit together (***Figure 9.***)

12. Lightly tighten the Motor Mounting Lock Knob to hold the motor in place (*Note: tightening the Motor Mounting Lock Knob too much will inhibit the gears from turning and the motor will not work properly*).

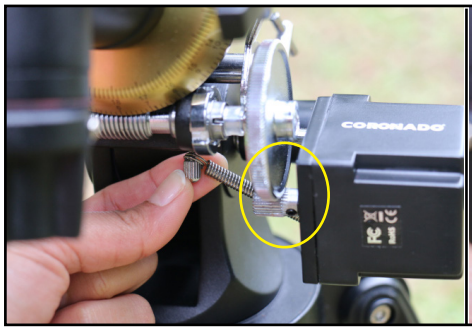


Figure 9.

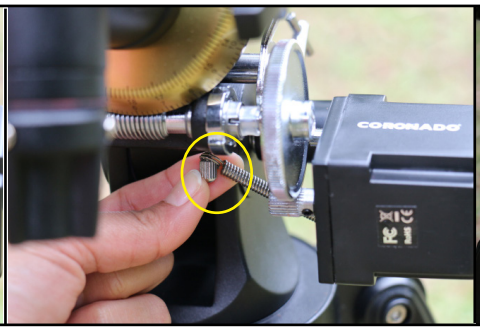


Figure 10.

Figure 11.

13. Partially loosen the Motor Tension Mounting Screw, located below the RA Spur Gear. Then, slide the circular end of the Motor Tension Spring over the Motor Tension Spring Mounting Screw (***Figure 10.***). Tighten the mounting screw until firm.

14. From the hand controller, located in the Clock Drive Box, plug in the DIN cable into the motor assembly (***Figure 11.***)

15. Insert batteries into the battery case. Thread the power cord through the leather case and plug it into the power outlet on the control box (***Figure 12.***). **DO NOT TURN ON YET.**

16. **Caution! Counter weight is heavy. Be careful it doesn't loosen and fall, which may cause injury.** Unscrew the "Counterweight Shaft Safety Nut" (***#11***) at the bottom of the shaft (***Figure 13.***) Slide the counterweight onto the shaft and re-screw the safety nut back to the shaft (***Figure 14***).

Figure 12.

Figure 13.

Figure 14.

17. Screw the shaft, with counter weight attached, to the mount (***Figure 15***). Position the counter weight high on the shaft as shown in ***Figure 16,*** then tighten the "Counterweight Lock Knob" (***#16***) to secure it in place.

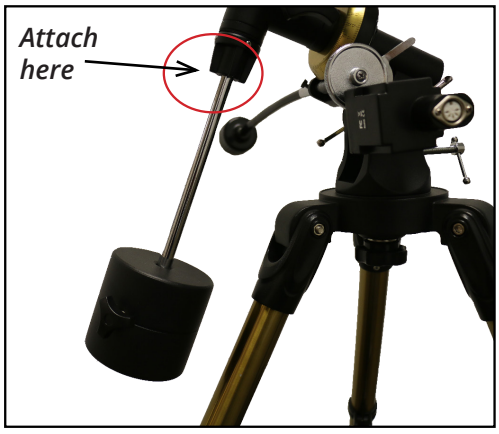


Figure 15.

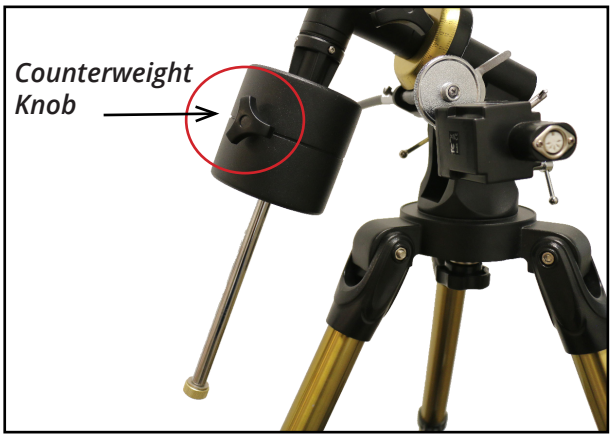
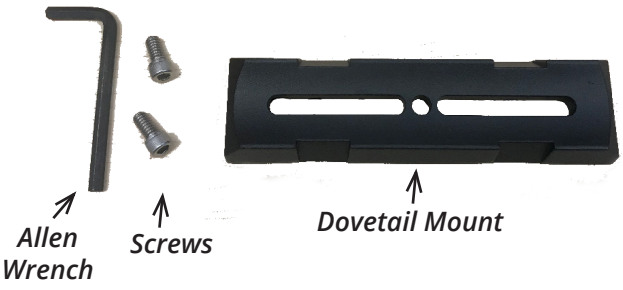
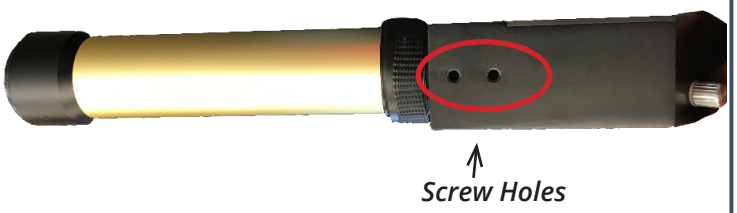


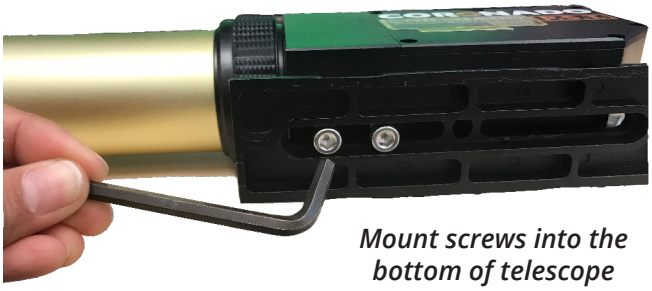
Figure 16.

Attaching Your Telescope to the EQS Mount

1. Align the Dovetail Mount so that the flat side is faced away from the telescope. Using the screws and allen wrench provided, securly attach the Dovetail Mount to the telescope by screwing into the two holes located at the bottom of the telescope. The screws can be tightened anywhere along the elongated holes in the dovetail mount, where ever feels comfortable to you.



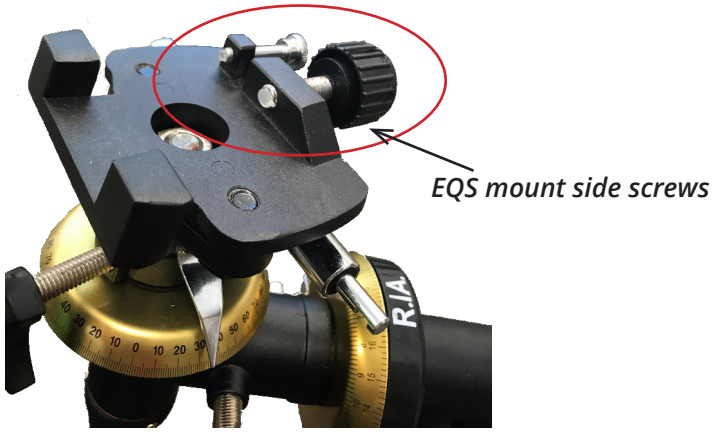




Mount screws into the bottom of telescope

Telescope with mount attached

2. Attach the telescope to the EQS mount by screwing the EQS mount side screws into the Dovetail mount, holding it firmly in place.



Tightened side screws hold the Dovetail mount and telescope firmly in place

Orienting Your Telescope - "Finding the Sun"

1. Use a compass to help you to point the mount's "EQ Mount Body" (***#8***) towards north (***Figure 1.***) It is important ensure that the mount body is pointed north, **<u>independent of where the actual telescope is pointed.</u>**

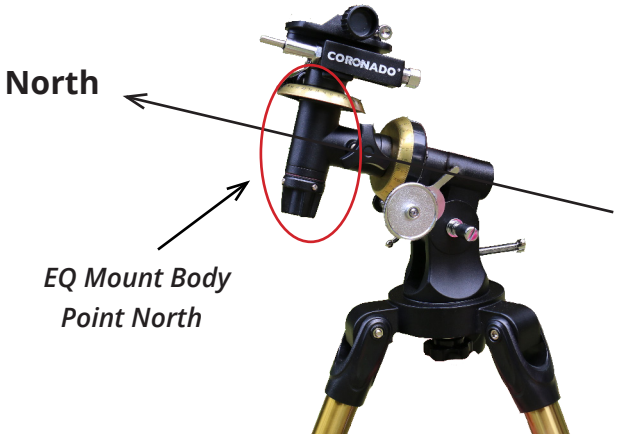


Figure 1.

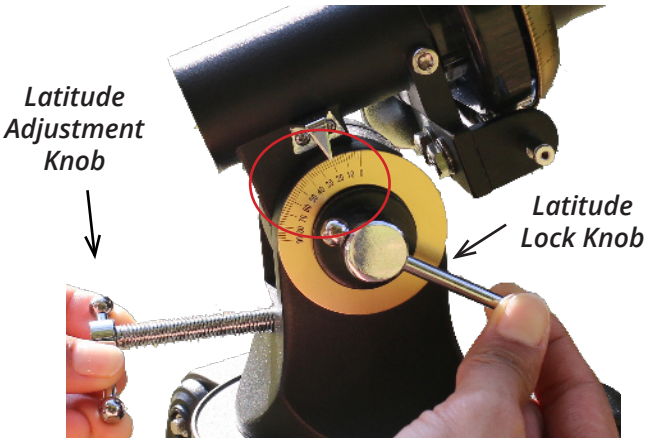


Figure 2.

2. Use the "Latitude Adjustment Knob" (***#4)*** to set the angle to Hawai'i's latitude (~20°) (***Figure 2.***)

3. Lock at this latitude by tightening the "Latitude Lock Knob" (***#14***).

4. Loosen "RA (Right Ascension) Lock Knob" (***#17***) and the "DEC (Declination) Lock Knob" (***#19***). The telescope should now move freely so that you can aim it at the Sun (***Figure 3.***)

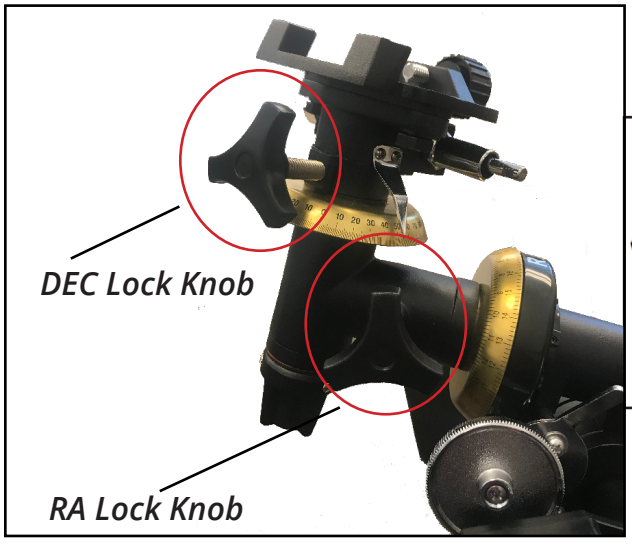


Figure 3.

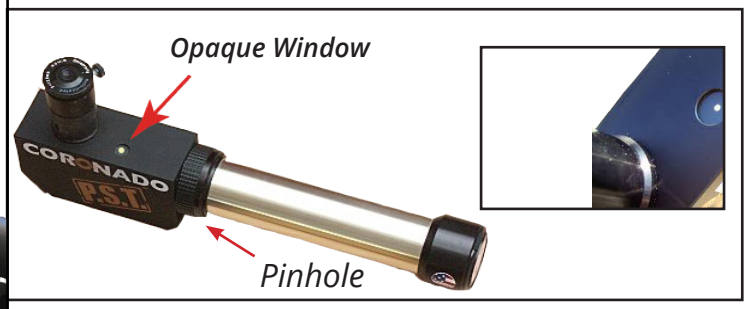


Figure 4.

5. Use the shadows on the ground and the Sol RangerTM sun spotting device (***Figure 4.***) to help aiming the telescope. This device is a small pinhole on the front face of the telescope body and a small opaque window on the top, near the eyepiece holder. When properly aligned on the Sun, the pinhole will let in light that will be projected onto the opaque glass in the form of a small harmless ball. ***Note: You will not see the projected light if your hand is blocking the small pinhole.***

6. Once you can see the Sun projected in the Sol Ranger window, tighten the RA and DEC lock knobs to hold the telescope's position.

7. Prepare the eyepiece by first removing the clear plastic cap and black eyepiece cover. Flip the rubber surrounding the eyepiece up. Next, insert the eyepiece into the holder and secure it in place by tightening the eyepiece screw.

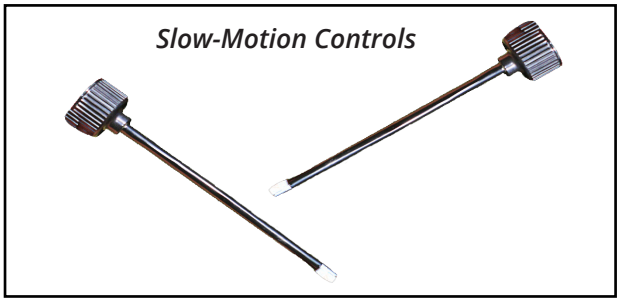


Figure 5.

8. Look through the telescope eyepiece to see if the Sun is in your field of view. Adjust as needed by slowly twisting the "RA Slow-Motion" (***#5***) and the "DEC Slow-Motion" (***#6***) controls (***Figure 5.***)

9. Once the Sun is nicely centered within your field of view, turn the tracker on by flipping the ON switch on the "Hand Controller" (***#25***) (***Figure 6.***)

10. Flip the N/S switch to N, as we are in the northern hemisphere (***Figure 7.***)

11. Next, flip the "Motor Clutch Knob" (***#21***) to engage the tracking motor (***Figure 8.***) When engaged, the tracker slowly moves the telescope to track the Sun as it moves across the sky due to Earth's rotation. Once the tracker is engaged, you may still need to make minor adjustments using the slow-motion controls. ***Always disengage the tracker by flipping the Motor Clutch Knob, before making fine adjustments with the slow-motion controls.***

Figure 6.

Figure 7.

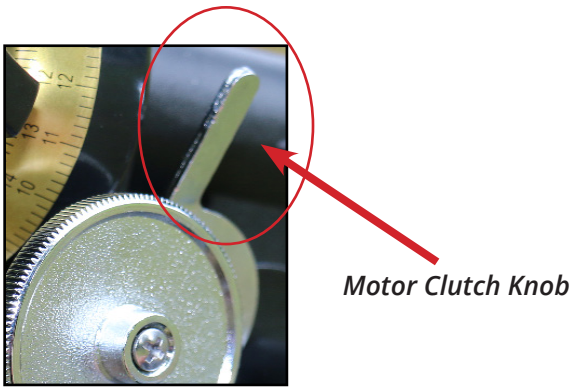
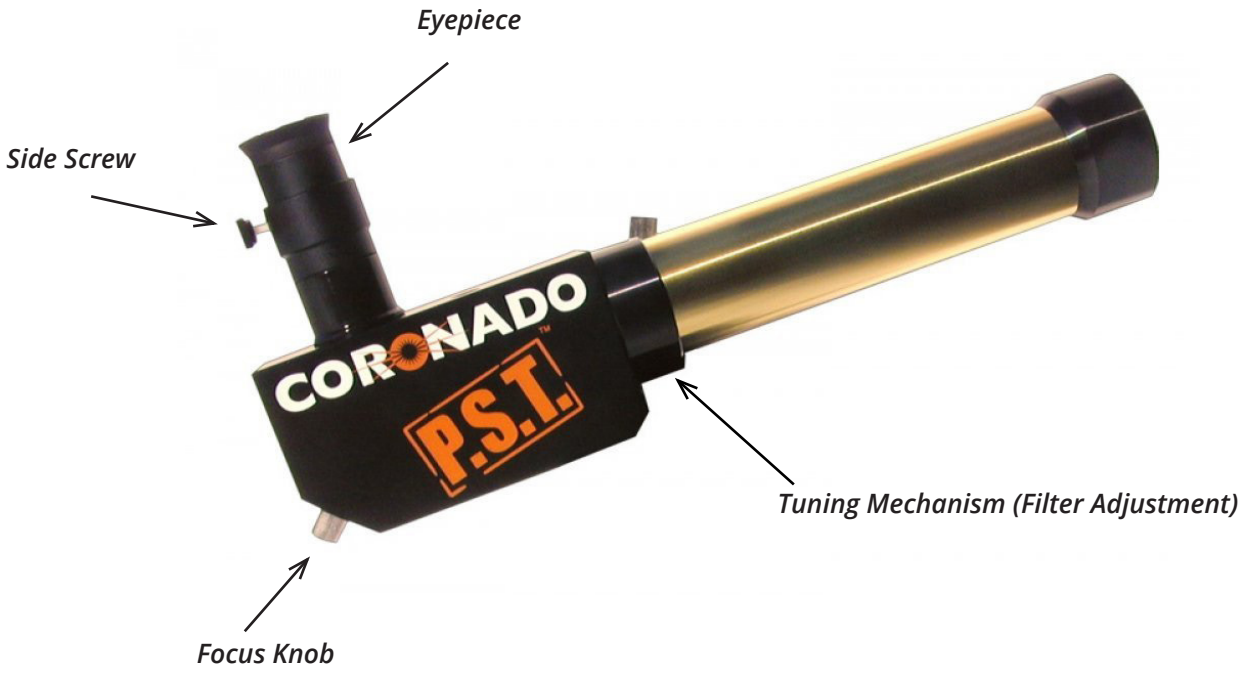


Figure 8.

12. When the Sun is centered in your field of view, turn the tracker back on. The white buttons are used to stop/start tracking, and move the telescope left or right.

Focusing

1. Adjust the eyepiece by moving it up or down.
2. Once the image is clearest, secure the eyepiece in place by tightening the side screw.
3. Adjust the focusing knob to further focus your image.
4. The tuning mechanism is used to adjust solar filter performance. The purpose of this adjustment is to compensate for possible detuning of the filter due to possible changes in operating conditions (e.g. barometric pressure changes due to changes in elevation). In most cases, filter adjustment will not be necessary - the telescope is delivered properly tuned by Coronado engineers.



5. If, for example, the prominences are not seen after the telescope has been focused, the filter adjustment may be of help. ***DO NOT*** however, adjust the filter until ***AFTER*** appropriately focusing the telescope using the focus knob.
6. If you have a faint, hard to center image, it may be a second reflection. Correct this by moving the image in the opposite direction until it is completely out of your field of view. Keep adjusting in this direction until a clear, complete image appears from the other side.

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