INSTRUCTION MANUAL

Orion Atlas™ EQ-G

Equatorial Mount

#24338

ORION
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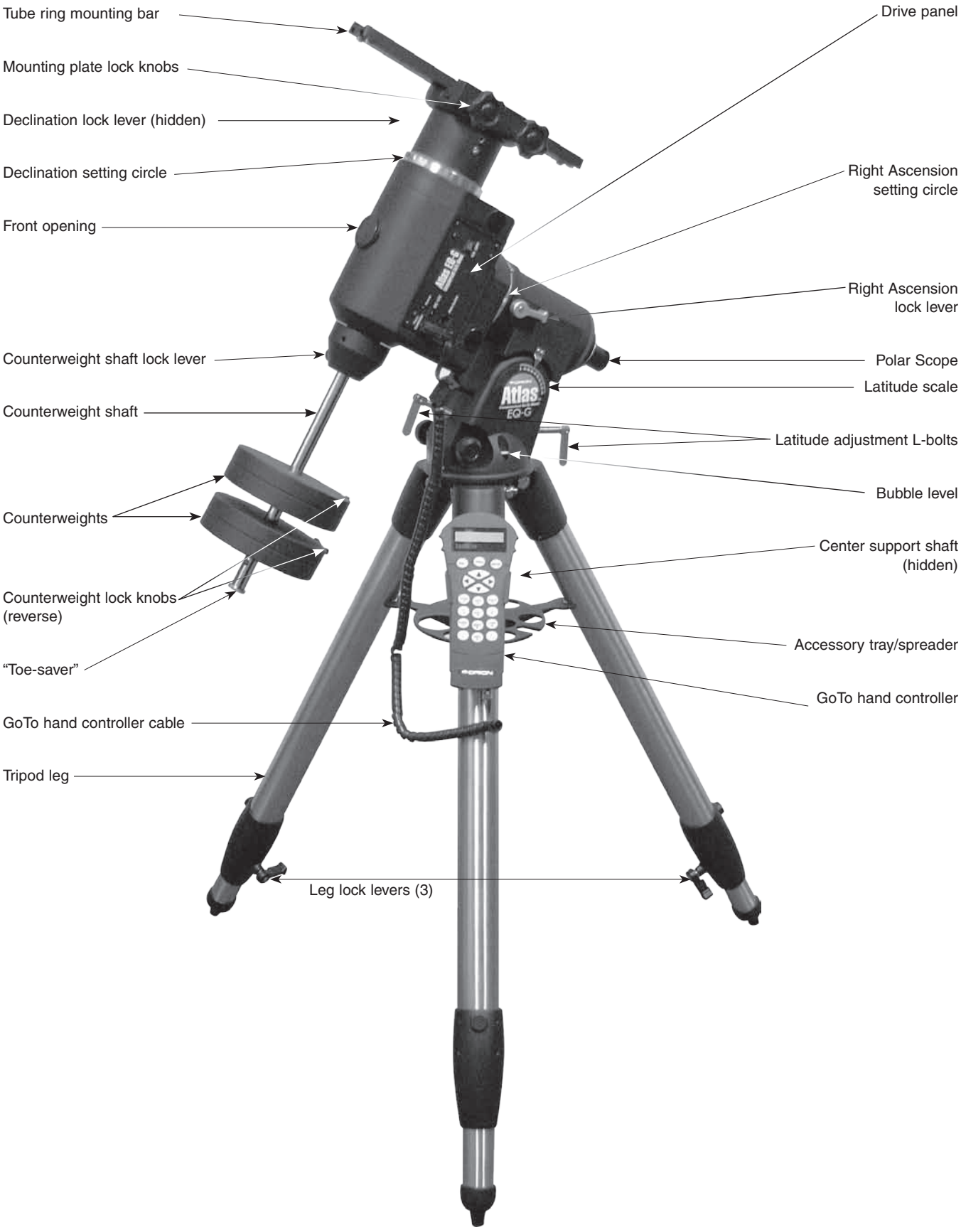

Figure 1. The Atlas EQ-G mount

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Congratulations on your purchase of the venerable Orion Atlas EQ-G equatorial GoTo mount and tripod! This solidly-built, high-quality astronomical mount is equipped with precision optical encoders and dual-axis stepper motors to provide high pointing accuracy, fast slewing, and smooth, accurate tracking of celestial objects. With the included SynScan GoTo hand controller and its 42,900-object database, this mount will provide years of enjoyable, productive observing or imaging performance with whatever optical tube you choose to install on it.

These instructions will help you set up and properly use your Atlas mount. Please read them thoroughly before getting started. Note that the SynScan GoTo hand controller has its own, separate user manual, which thoroughly explains its features and operation.

WARNING: Never look directly at the Sun through your telescope or its finder scope – even for an instant – without a professionally made solar filter that completely covers the front of the instrument, or permanent eye damage could result. Young children should use this telescope only with adult supervision.

1. Unpacking

The entire mount will arrive in two boxes, one containing the tripod and the other containing the equatorial mount and hand controller. Be careful unpacking the boxes. We recommend keeping the boxes and original packaging. In the event that the mount needs to be shipped to another location, or returned to Orion for warranty repair, having the proper packaging will ensure that your mount will survive the journey intact.

Make sure all the parts in the Parts List are present. Be sure to check the box carefully, as some parts are small. If anything appears to be missing or broken, immediately call Orion Customer Support (800-676-1343) or email support@telescope.com for assistance.

2. Parts List

Box 1: Tripod

Qty.	Item
1	Tripod
2	Counterweights (11lbs. each)
1	Tripod accessory tray/spreader

Box 2: Equatorial Mount

1	Equatorial mount
1	Tube ring mounting plate
1	12V DC Power cable
1	Counterweight shaft extension, 7-1/4" (184mm)
1	SynScan GoTo hand controller
1	Hand controller coil cable
1	Hand controller bracket
1	Computer interface cable (RS-232)
1	Wire clip
1	Allen key, 1.5mm
1	Allen key, 4mm

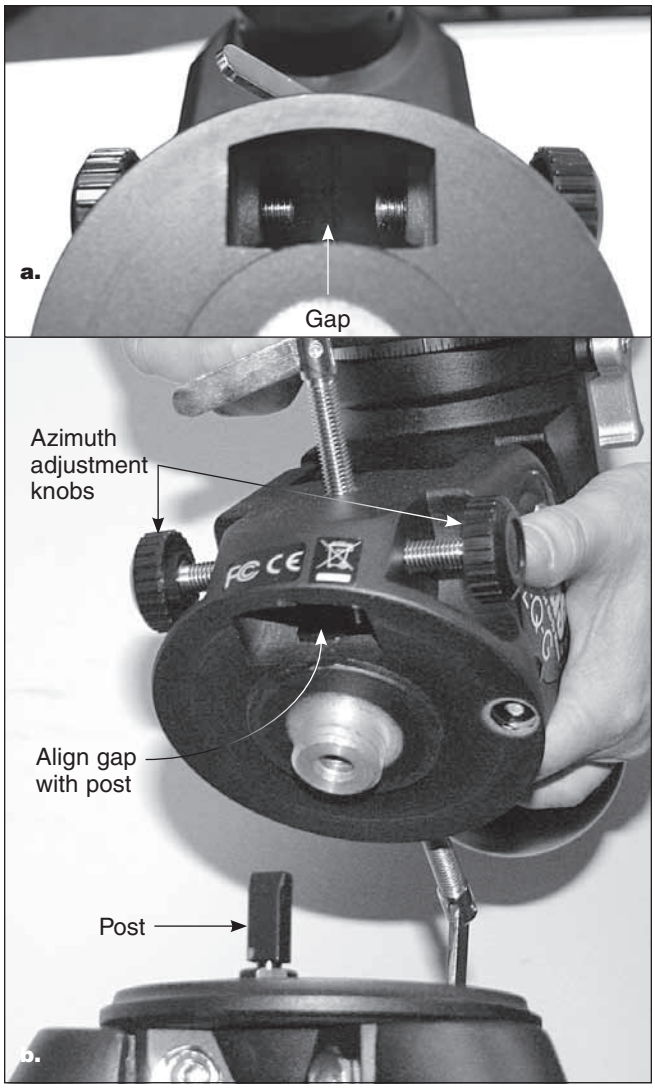

Figure 2. a) Loosen the azimuth adjustment knobs to create at least a ½" gap. **b)** Orient the mount head so that the gap aligns with the metal post on the tripod.

3. Assembly

Refer to **Figure 1** as needed during the assembly process.

1. Stand the tripod upright and spread the legs out as far as they will go. Make certain that the leg lock levers are tightened. Keep the tripod legs at their shortest (fully retracted) length, for now; you can extend them to a more desirable length later, after the mount is fully assembled.
2. Loosen the two azimuth adjustment knobs on the mount head until there is ½" or more of space between the ends **(Figure 2a)**. Then place the mount on the tripod, aligning the metal post on the tripod with the gap between the two azimuth adjustment knobs **(Figure 2b)**.
3. Thread the center support shaft up through the tripod head and into the bottom of the equatorial mount until tight. Use the upper knob on the center support shaft to do this. The equatorial mount should now be firmly connected to the tripod.

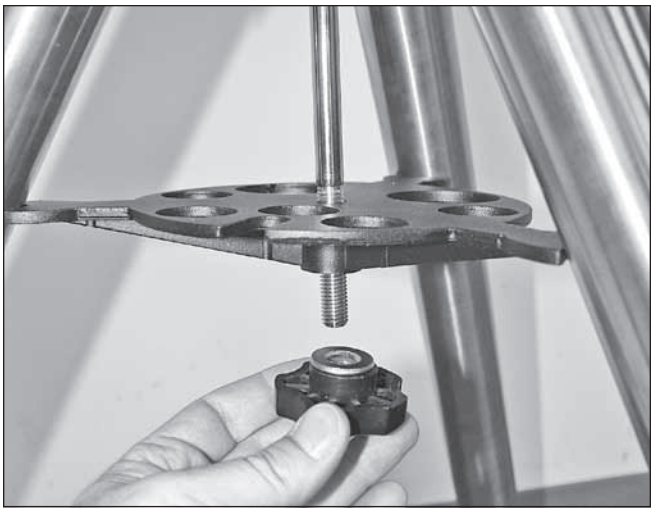

Figure 3. Installing the tripod leg spreader, which doubles as an eyepiece/accessory tray.

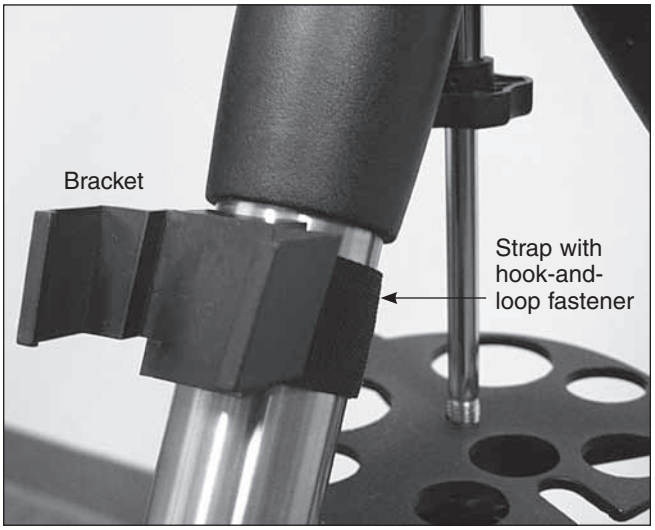

Figure 4. The hand controller bracket should be fastened to a tripod leg.

Attaching the Accessory Tray/Spreader and the Hand Controller Bracket

1. Remove the knob and washer from the bottom of the center support shaft. Slide the tripod support tray up the bottom of the shaft until the three tray arms are touching the legs of the tripod. The flat side of the support tray should be facing up. Make sure the "V" of each tray arm is against a tripod leg. Place the washer on the center support shaft against the tray, and follow it by threading the knob all the way up the center support shaft until it is tight against the tray (**Figure 3**). The tripod support tray provides additional stability for the tripod, and holds up to five 1.25" eyepieces and two 2" eyepieces.

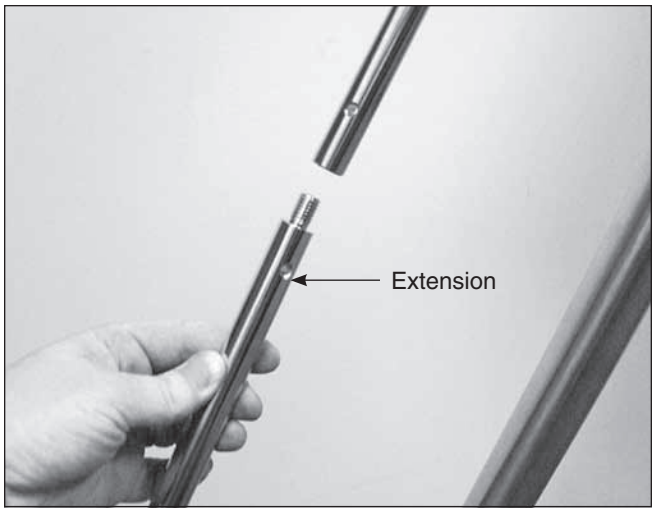

Figure 5. The counterweight shaft extension threads into the end of the counterweight shaft.

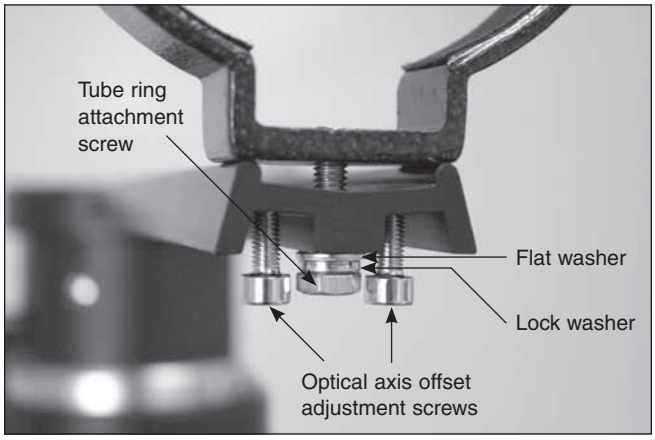

Figure 6. The tube ring mounting plate, or dovetail mounting bar, shown with tube ring (sold separately) attached.

2. Using the bubble level on the mount (see **Figure 1**), level the mount by adjusting the length of the tripod legs as needed.
3. Strap the included hand controller bracket to a tripod leg above the tripod center support tray using the hook-and-loop strap, as shown in **Figure 4**.

Warning: The accessory tray/spreader will ensure the tripod legs remain firmly expanded, which will prevent the tripod from accidentally toppling over. When using the Atlas mount, it is important to always install the accessory tray/spreader before attaching the telescope.

Installing the Counterweights

Always attach the counterweight(s) *before* installing your telescope on the mount, or the scope could swing downward by gravity and crack into the tripod!

1. Loosen the counterweight shaft lock lever (see **Figure 1**) and fully extend the shaft. Then re-tighten the lock lever.
2. Loosen the right ascension (R.A.) lock lever and rotate the R.A. axis until the counterweight shaft is pointing toward the ground, as in **Figure 1**.
3. Remove the "toe saver" safety stop from the end of the counterweight shaft.
4. The Atlas mount comes with a 7-1/4" (184mm) counterweight shaft extension, which can be installed at this point if necessary for balancing heavier payloads (**Figure 5**). Ensure that the extension is tightly secured before installing counterweights.
5. Loosen the counterweight's lock knob and slide one or both counterweights onto the counterweight shaft as needed to balance your instrument. (See **Section 5** for details on how to balance the telescope.) Retighten the lock knob to secure the counterweight on the shaft.
6. Replace the safety stop on the end of the counterweight shaft. The safety stop prevents the counterweights from falling on your foot if the lock knobs happen to loosen.

4. Installing a Telescope on the Mount

The Atlas EQ-G mount is designed to hold a telescope payload of up to 40 lbs. For heavier telescopes, the mount may not provide sufficient stability for steady viewing or imaging.

Before installing a telescope, be sure that:

- The mount is in the "home" position, with counterweight shaft pointing toward the ground.
- The counterweights are installed on the counterweight shaft and have been moved to the bottom end of the shaft.
- The R.A. axis is secured by tightening the R.A. clutch lever.

The dovetail mounting bar (a.k.a. tube ring mounting bar) included with the mount allows attachment of tube rings (sold separately) that hold a telescope's optical tube. Some telescopes come with their own mounting bar and tube rings, or have a built-in dovetail bar and do not need tube rings; in either case you will not need the included dovetail bar.

1. If using the included dovetail mounting bar, attach the tube rings to the bar using the screws that came with the tube rings. The screws should go through the center holes in the ends of the mounting bar and rethread into the tube rings. Note that the side of the mounting bar with the central "groove" will be facing up **(Figure 6)**. Use a small wrench to secure the tube rings to the mounting bar.

Note: The tube ring mounting bar has four optical axis offset adjustment screws located at each corner of the mounting plate. The screws should be oriented so that the threaded shaft extends upward through the top surface of the tube ring mounting bar. If the mounting bar arrives with the optical axis offset screws installed backwards, reverse their orientation to that shown in Figure 6 before proceeding. For now, confirm that all four adjustment screws are sufficiently unthreaded so that the ends

of their threaded shafts are flush with the top surface of the mounting bar.

2. Loosen the two clamp knobs on the dual-width saddle plate (**Figure 7**) until the width of one of the dovetail grooves is slightly wider than the width of the dovetail bar on your telescope.
3. While holding the telescope, seat the dovetail bar of the telescope into the proper groove of the saddle. The lower groove is for a "narrow" (Vixen style), 45mm width dovetail bar and the upper groove is for a "wide" (Losmandy style), 75mm bar. (The included dovetail bar fits the narrow groove.) Then tighten the two clamp knobs to secure the dovetail bar in the saddle.

Warning: Keep supporting the telescope until you are sure it has been firmly attached to the saddle!

5. Balancing the Telescope

To minimize stress on the motor drive system and ensure smooth, accurate movement of a telescope on both axes of the mount, it is imperative that the optical tube be properly balanced. We will first balance the telescope with respect to the right ascension (R.A.) axis, then the declination (Dec.) axis.

1. Keeping one hand on the telescope optical tube, loosen the R.A. lock lever (refer to **Figure 8**). Make sure the Dec. lock lever is tightened, for now. The telescope should now be able to rotate freely about the R.A. axis. Rotate it until the counterweight shaft is parallel to the ground (i.e., horizontal).
2. Now loosen the counterweight lock knob and slide the weight(s) along the shaft until it exactly counterbalances the telescope. That's the point at which the shaft remains horizontal even when you let go with both hands. Once balance is achieved, retighten the counterweight lock knob.
3. To balance the telescope on the Dec. axis, first tighten the R.A. lock lever, with the counterweight shaft still in the horizontal position. Then with one hand on the telescope optical tube, loosen the Dec. lock lever and check for any rotation. If there is some, adjust the telescope forward or back in the saddle or in its tube rings until it remains horizontal when you carefully let go of it. You may want to rotate the RA axis back to the home position (counterweight shaft pointing downward) before making any adjustments to the position of the telescope in the saddle or tube rings.

The telescope is now balanced on both axes. When you loosen the lock lever on one or both axes and manually point the telescope, it should move without resistance and should not drift from where you point it.

NOTE: For imaging, it is recommended that the mount be slightly IMBALANCED – weighting the R.A. axis to the EAST and the Dec. axis in either direction. The imbalance should be very slight and should be implemented after

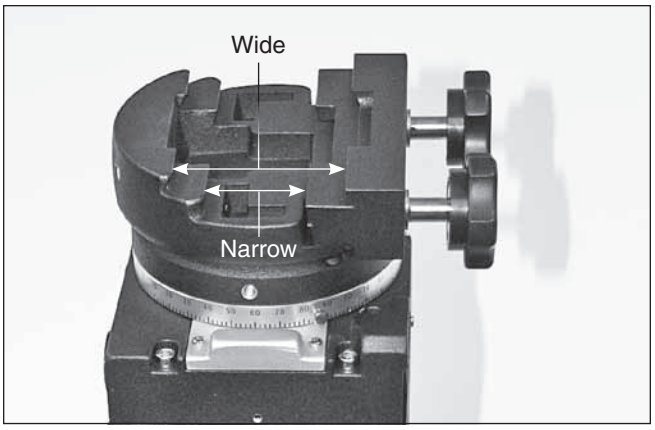

Figure 7. The dual-width saddle accommodates narrow or wide dovetail mounting bars or plates.

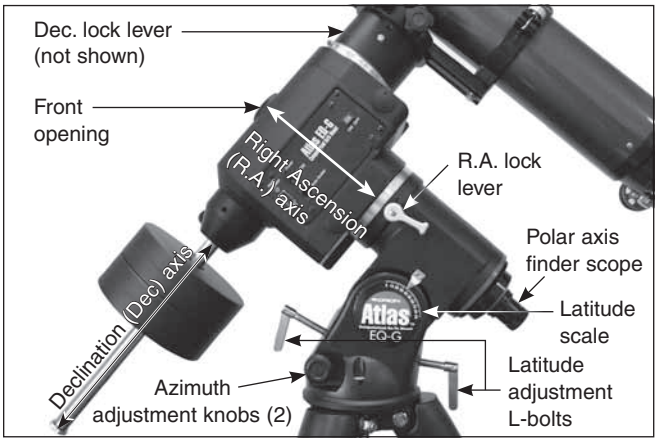

Figure 8. The R.A. and Dec axes of the Atlas EQ-G and related parts.

you have found the correct balance point using the above procedure. This weight offset keeps a minimal load on the gears at all times, which improves guiding behavior.

So for the R.A. axis, if the telescope is on the west side of the mount, slide the counterweight down the counterweight shaft (which is on the east side of the mount) a bit – 3 centimeters or so should be enough. If the telescope is on the east side of the mount, slide the counterweight up the shaft by the same distance.

6. Setting Up and Using the Equatorial Mount

When you look at the night sky, you no doubt have noticed that the stars appear to move slowly from east to west over time. That apparent motion is caused by the Earth's rotation (from west to east). An equatorial mount is designed to compensate for that motion, allowing you to easily "track" the movement of astronomical objects, thereby keeping them from drifting out of your telescope's field of view while you're observing.

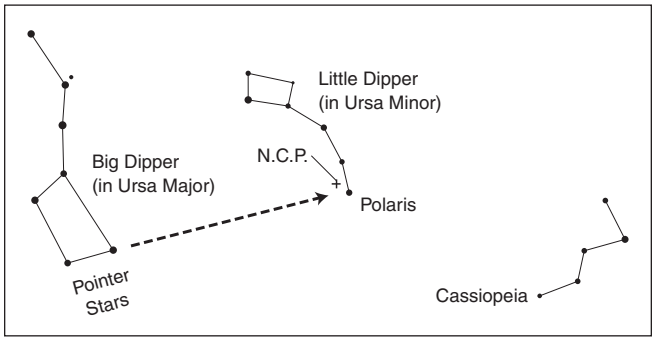

Figure 9. For northern hemisphere viewers, you can find the pole star, Polaris, by extending an imaginary line from the Big Dipper's "pointer stars," as shown. Polaris lies within 1 degree of the North Celestial Pole (NCP).

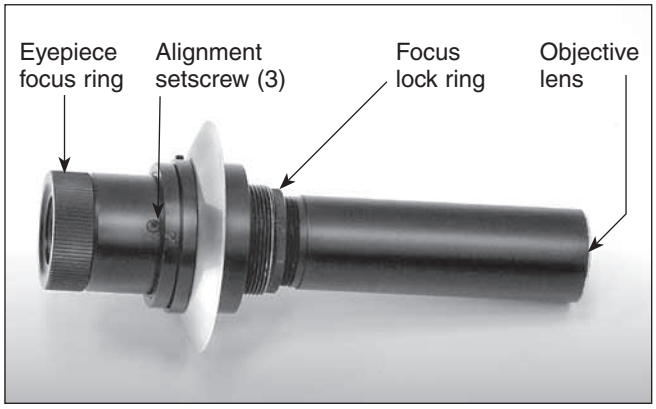

Figure 10. The polar axis finder scope

This is accomplished by slowly rotating the telescope on its right ascension (R.A.) axis, using the built in motor drive. But first the R.A. axis of the mount must be aligned with the Earth's rotational (polar) axis—a process called polar alignment.

Polar Alignment

For Northern Hemisphere observers, approximate polar alignment is achieved by pointing the mount's right ascension axis at the North Star, or Polaris. It lies within 1° of the north celestial pole (NCP), which is an extension of the Earth's rotational axis out into space. Stars in the Northern Hemisphere appear to revolve around the NCP.

To find Polaris in the sky, look north and locate the pattern of the Big Dipper (**Figure 9**). The two stars at the end of the "bowl" of the Big Dipper point right to Polaris.

Observers in the Southern Hemisphere aren't so fortunate to have a bright star so near the south celestial pole (SCP). The star Sigma Octantis lies about 1° from the SCP, but it is barely visible with the naked eye (magnitude 5.5).

For general visual observation, an approximate polar alignment is sufficient.

1. Level the equatorial mount by adjusting the length of the three tripod legs. Use the bubble level built into the base of the mount to determine when the mount is level.

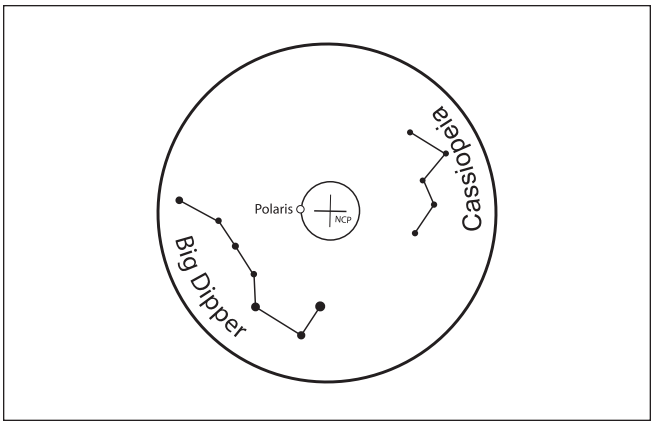

Figure 11. The reticle of the polar axis scope shows the positions of the Big Dipper and Cassiopeia relative to Polaris and the north celestial pole (NCP).

2. There are two latitude adjustment L-bolts (see **Figure 8**); loosen one while tightening the other. By doing this you will adjust the latitude, or altitude angle, of the mount. Continue adjusting the mount until the pointer on the latitude scale is set at the latitude of your observing site. If you don't know your latitude, consult a geographical atlas or the Internet to find it. For example, if your latitude is 35° North, set the pointer to 35. The latitude setting should not have to be adjusted again unless you move to a different viewing location some distance away.
3. Loosen the Dec. lock lever and rotate the telescope's optical tube until it is parallel with the right ascension axis, as it is in **Figure 8**.
4. Move the tripod so the telescope tube and right ascension axis point roughly at Polaris. If you cannot see Polaris directly from your observing site, consult a compass and rotate the tripod so the telescope points north.

The equatorial mount is now polar aligned for casual observing. More precise polar alignment is recommended for astrophotography. For this we recommend using the polar axis finder scope.

From this point on in your observing session, you should not make any further adjustments to the latitude or azimuth of the mount, nor should you move the tripod. Doing so will undo the polar alignment. The telescope should be moved only about its R.A. and Dec. axes.

The Polar Axis Finder Scope

The Atlas mount comes with a polar axis finder scope (**Figure 10**) housed inside the right ascension axis of the mount. When properly aligned and used, it makes accurate polar alignment quick and easy to do. The polar scope included with the Atlas mount can be used for polar alignment in the Northern Hemisphere. That is, the polar scope's reticle graphic has reference star patterns that are useful for aligning in the Northern Hemisphere (**Figure 11**). Remove the cap from the eyepiece of the polar scope to view through it, and be sure to remove the cap on the front opening of the mount housing.

Aligning the Polar Axis Scope to the R.A. Axis

Before using the polar scope for polar alignment, the polar scope itself must be aligned to the mount's R.A. axis. At the center of the reticle is a cross, which you'll use in the procedure below to align the polar scope to the R.A. axis.

1. Loosen the Dec. lock lever and rotate the optical tube about the declination axis until you have a clear view through the polar axis finder scope (**Figure 12**). Tighten the Dec. lock lever.
2. Look through the polar finder at a distant object (during the day) and center it in the cross hairs. You may need to adjust the latitude adjustment L-bolts and the azimuth adjustment knobs to do this. Focus the polar finder by rotating the eyepiece.
3. Rotate the mount 180° about the R.A. axis. It may be convenient to remove the counterweights and optical tube before doing this.
4. Look through the polar finder again. Is the object being viewed still centered on the cross hairs? If it is, then no further adjustment is necessary. If not, then look through the polar finder while rotating the mount about the R.A. axis. You will notice that the object you have previously centered moves in a circular path. Use the 1.5mm Allen key to adjust the three alignment set-screws on the polar axis finder (**Figure 10**) move the object HALF the distance back to the cross. Then you will re-center the object on the cross as in Step 2 using the latitude adjustment L-bolt and azimuth adjustment knobs.
5. Repeat this procedure until the position that the cross hairs point to does not rotate off-center when the mount is rotated in R.A.

Notes:

- When adjusting the Allen screws, loosen one screw only ¼ of a turn, and then tighten the other two.

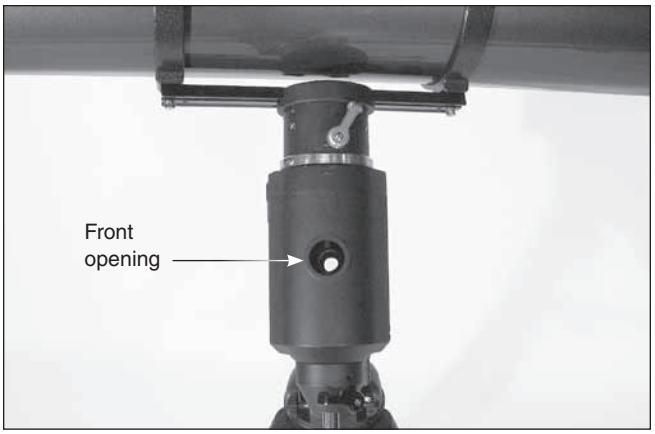

Figure 12. Rotate the declination axis until the hole in the declination shaft lines up with the front opening of the housing.

- Do not over tighten the Allen screws as it might damage the reticle plate in the polar scope.
- Do not loosen one screw completely or loosen more than one screw at a time, or the reticle plate in the polar scope will be disengaged and further adjustment is impossible.
- If the reticle plate does disengage, remove the polar scope's eyepiece by turning the knurled ring counterclockwise and engage the reticle plate again.

Polar Alignment Using the Polar Scope

1. Set up the Atlas EQ-G mount. It is recommended to load the mount with the counterweights and telescope (in that order!) and level the mount prior to polar alignment.
2. Move the tripod so the telescope tube and right ascension axis point roughly at Polaris (for Northern Hemisphere). You may need to adjust the latitude adjustment L-bolts and azimuth adjustment knobs to accomplish this.
3. Loosen the Dec. lock lever and rotate the optical tube until the hole in the Dec. shaft lines up with the front opening

of the housing (**Figure 12**), and you have a clear, unobstructed view through the polar scope. Then retighten the Dec. lock lever.

4. Turn on the power to the mount to illuminate the polar scope. The reticle pattern should now be visible in the polar scope. If the image appears blurred, rotate the polar scope's knurled eyepiece to focus it.
5. Now, sight Polaris in the polar axis finder scope. If it's not in the field of view, move the mount left or right using the azimuth adjustment knobs, and adjust the altitude up or down using the latitude adjustment L-bolt until Polaris is visible in the polar scope.
6. Note the constellation Cassiopeia and the Big Dipper in the reticle. They do not appear in scale, but they indicate the general positions of Cassiopeia and the Big Dipper relative to the NCP in the sky. Rotate the reticle so the star patterns depicted match their current orientation in the sky when viewed with the naked eye. To do this, release the R.A. clutch and rotate the main telescope around the R.A. axis until the reticle is oriented with the sky. For larger optical tubes, you may need to remove the tube from the mount to prevent it from bumping into the mount during this procedure.
7. Now use the azimuth adjustment knobs and the latitude L-bolt on the mount to position Polaris inside the tiny circle on the finder's reticle. You must first loosen – only very slightly! – the knob underneath the mount head on the center support shaft to use the azimuth adjustment knobs. Once Polaris is properly positioned within the reticle, you are precisely polar aligned. Retighten the knob under the mount and lightly tighten the altitude lock knobs on the sides of the mount.

Additional Note Regarding Focusing the Polar Axis Finder Scope

The polar axis finder scope is normally focused by simple rotation of the eyepiece focus ring. However, if after adjusting the focus ring you find that the image of the reticle is sharp, but the stars are out of focus, then you must adjust the focus of the polar axis finder's objective lens. To do this, first remove the polar axis finder from the mount by unthreading it. Look through the polar axis finder at a star (at night) or distant object at least 1/4 mile away (during daylight). Use the eyepiece focus ring to bring the reticle into sharp focus. Now, loosen the focus lock ring (**Figure 10**) and thread the entire objective end of the finder inward or outward until images appear sharp. Re-tighten the focus lock ring. Once the polar axis finder's objective lens is focused, it should not need to be adjusted again.

Powering the Atlas EQ-G

The Atlas EQ-G requires a 12V DC power supply (tip positive) capable of producing continuous current of 2 amps. We recommend using a portable rechargeable field battery such as the Orion Dynamo Pro, or an AC-to-12V DC adapter if you will be using the mount near a 120V wall outlet.

If using a field battery, use the supplied 12V DC power cable, which has a male cigarette lighter plug on one end, which plugs into the battery, and a 5.5/2.1mm right-angle connector on the other end, which plugs into the power port on the mount (**Figure 14**). turn on the battery, then press the power switch on the mount to the ON position.

Note: The power indicator LED on the mount will begin to blink slowly when the battery power is low, and rapidly when the battery power gets extremely low. Recharge or replace the battery as needed.

7. The SynScan GoTo Hand Controller

The Atlas EQ-G mount equipped with the SynScan GoTo hand controller (**Figure 13**) provides easy, computerized location of thousands of night sky objects such as planets, nebulae, star clusters, galaxies, and more for viewing through your telescope. The SynScan GoTo Hand Controller and internal dual-axis motors and optical encoders allow you to automatically point your telescope at a specific object, or tour the skies with pushbutton simplicity. The user-friendly menu allows automatic slewing to over 42,000 objects. Even inexperienced astronomers will find themselves quickly mastering the variety of features the GoTo hand controller offers in just a few observing sessions.

For detailed information about the SynScan GoTo Hand Controller, see the manual for the SynScan.

Autoguiding with the Atlas EQ-G

The Atlas mount is equipped with an ST-4 compatible port for connecting an autoguiding camera, for use in astrophotography. The guide cable supplied with your guide camera will have an RJ-12 connector that plugs into the autoguider modular jack on the mount's drive panel (**Figure 14**).

For more information about autoguiding, please refer to the manual that came with your guide camera.

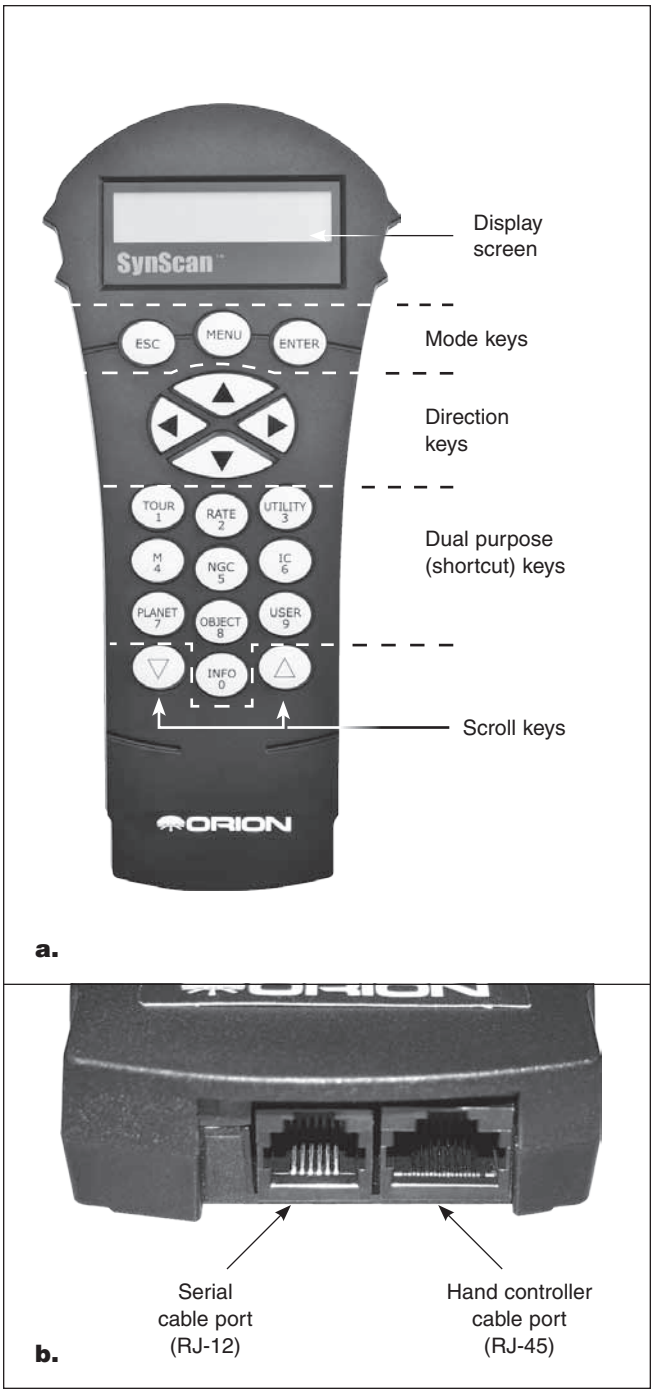

Figure 13. a) The SynScan GoTo hand controller, **b)** Hand controller cable and serial cable ports on the bottom end of the controller.

Figure 14. The Atlas EQ-G mount's drive panel

8. Technical Specifications

Mount:	German equatorial
Tripod:	Steel
Weight:	54 lbs.
Counterweights:	Quantity 2, 11 lbs. each
Polar axis latitude adjustment:	10° to 65°
Polar axis finder scope:	Included, illuminator built into mount
Motor drives:	Dual-axis, GoTo computerized, internally housed
Operation:	Northern or Southern hemisphere
Power requirement:	12V DC, 2A (tip positive)
Motor type and resolution:	Microstep driven 1.8° stepper motors
Resolution:	0.144 arc sec (or 9,024,000 steps/rev)
Gear ratio:	705

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device nay not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes of modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will no occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ***Reorient or relocate the receiving antenna.***
- ***Increase the separation between the equipment and receiver.***
- ***Connect the equipment into an output on a circuit different from that to which the receiver in connected.***
- ***Consult the dealer or an experienced radio/TV technician for help.***

A shielded cable must be used when connecting a peripheral to the serial ports.

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.**

Orion Telescopes & Binoculars

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

Customer Support: **www.OrionTelescopes.com/contactus**