# USING THE POLAR SCOPE FOR EQ6

The pole-finder telescope supplied with the EQ-6 Mount can be used for accurate polar alignment. This method of polar alignment is sufficient for virtually all visual use of the telescope.

To use the Polarscope with the EQ-6 mount, the declination axis must be rotated such that the hole in the shaft is in front of the Polarscope. If possible, this procedure should be carried out while the telescope and counterweights are on the mount. This prevents the mount from becoming mis-aligned when the load on the tripod is changed. Be sure that the tripod is level. This will make it easier to use the Azimuth and Altitude adjustments on the mount when trying to center the stars in the polar scope. The tripod can be made level by using a bubble level or carpenter's level. Remove the caps from the upper and lower ends of the Right Ascension (R.A.) axis (Fig.h). Looking through the polar scope, lines should be seen super-imposed on the sky. If these lines are not visible, shine a red flashlight down the upper end of the RA axis to illuminate the top end of the pole finder.

**Aligning the Polarscope**

The optical axis of the polar scope is already aligned with the rotation axis of the mount. The optical axis of the polar scope can not be adjusted. This is set permanently at the factory. The reticle in the polar scope must be centered on the optical axis of the polar scope. If this is not the case, the polar alignment will not be accurate.

Locate Polaris and place it in the center of the Polarscope by adjusting the Altitude and Azimuth of the mount. Place Polaris directly under the cross in the center of the reticle (Fig.h-1). Rotate the mount one half turn about the R.A. axis. Polaris should remain under the cross in the center of the reticle. If it does not, the reticle is not centered on the R.A. axis of the mount.

To move the reticle, adjust the three small Allen screws (Fig.h-2) on the polar scope. Make small adjustments by moving only two of the screws at a time. Adjust the screws to move Polaris ***half*** the distance back to the center of the reticle. This is because Polaris started in the center of the reticle. By rotating the mount 180 degrees, Polaris moved exactly twice the distance between the center of the reticle and the center of rotation. The center of rotation lies midway between the center of the reticle and the new position of Polaris. Do not turn any of the set screws more than one quarter turn at a time or the reticle will disengage from the set screws. Do not tighten these screws too much or the stress will fracture the lenses in the polar scope.

Now re-center Polaris under the cross in the middle of the reticle using the azimuth and altitude adjustments. Repeat the entire procedure until Polaris remains in the center of the reticle when the mount is rotated about the R.A. axis.

Fig.a

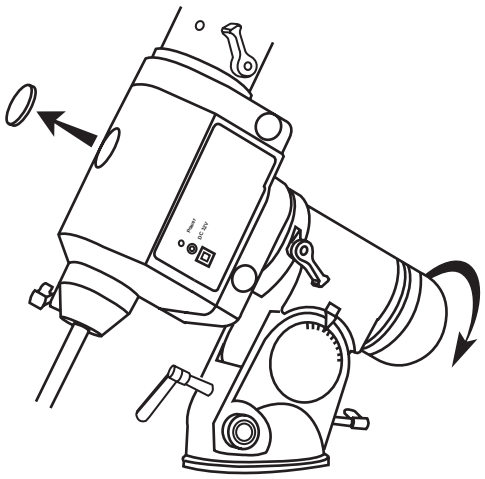


Fig.b

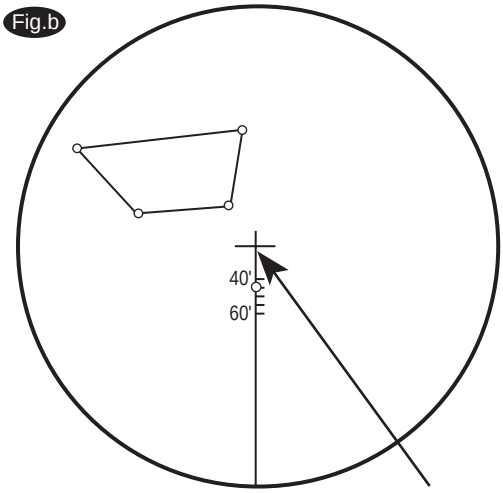
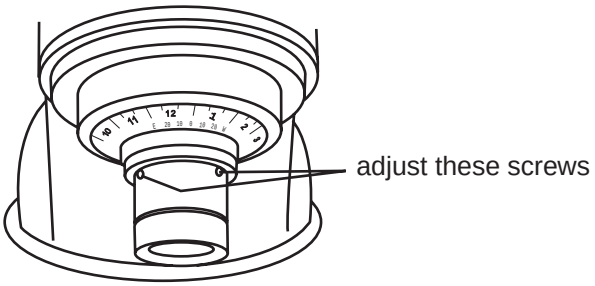



Fig.c



With some practice, you should be able to align the reticle with the R.A. axis to within about 2 or 3 arc-minutes. You should never have to make this adjustment again, unless the polar scope has been dropped, disassembled, or if the polar scope is to be used on another mount. If Polaris is not visible from your area, you can use a distant object such as the top of a telephone pole, or a distant mountain-top. These objects are larger than the image of a star, so they will not provide as accurate an alignment.

**Using the Polarscope in the Northern Hemisphere**

There is only one easily visible star near the North Celestial Pole. This star is Polaris. The rest of the stars in Ursa Minor are around Magnitude 5 and require very dark skies to become visible (Fig.h-3).

Since Polaris is not exactly on the North Celestial Pole, you need to offset the telescope's R.A. axis from Polaris by a small amount in the correct direction. There is a radial line in the Polarscope. Along this line, there are tick marks and a circle. Rotate the mount in R.A. until this line points towards Beta-Ursa Minoris (Fig.h-4). If this star can not be seen, Mizar, the second star in the Big Dipper's handle, can be used. If these stars can not be seen, point the line in the pole finder away from the constellation Cassiopeia. Set the lock on the R.A. axis so the mount does not rotate.

Adjust the mount in Altitude and Azimuth again, until Polaris is in the circle on the line in the pole finder (Fig.h-4).

The polar alignment is now complete. This should get the mount's R.A. axis within 5 arc-minutes of the celestial pole. Due to its proper motion, Polaris can be seen to move with respect to the Pole from year to year. The tick marks in the Polarscope can be used to compensate for this motion. Fig.h-5 can be used to determine the current position of Polaris along the line in the polarscope.

**Using the Polarscope in the Sorthern Hemisphere**

There is a 4-star pattern in the polar scope, which resembles the bucket of the Big Dipper. In the Southern Hemisphere, there is an Asterism in Octans, which has this shape. By rotating the R.A. axis and by adjusting the altitude and azimuth of the mount, the four stars in the Asterism can be placed in the circles in the Pole Finder (Fig.h-6). This procedure can be somewhat difficult in the city because all four of these stars are fainter than Magnitude 5.

Fig.d

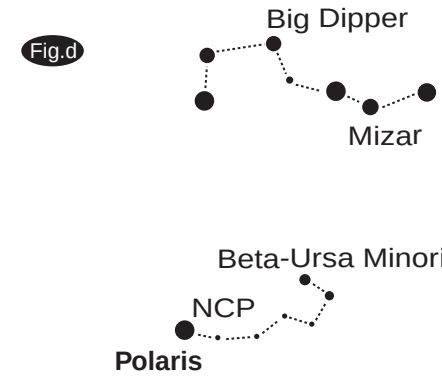



Fig.e

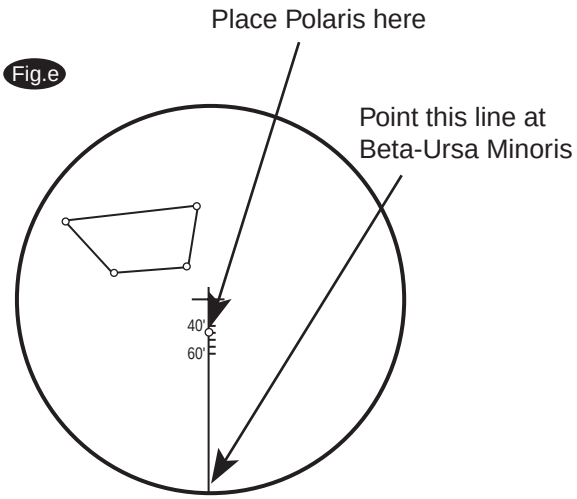



Fig.f

| Year | Distance |
|---|---|
| 2000 | 45' |
| 2002 | 44' |
| 2004 | 44' |
| 2006 | 43' |
| 2008 | 43' |
| 2010 | 42' |
| 2012 | 42' |
| 2014 | 41' |
| 2016 | 40' |
| 2018 | 40' |
| 2020 | 39' |

Fig.g