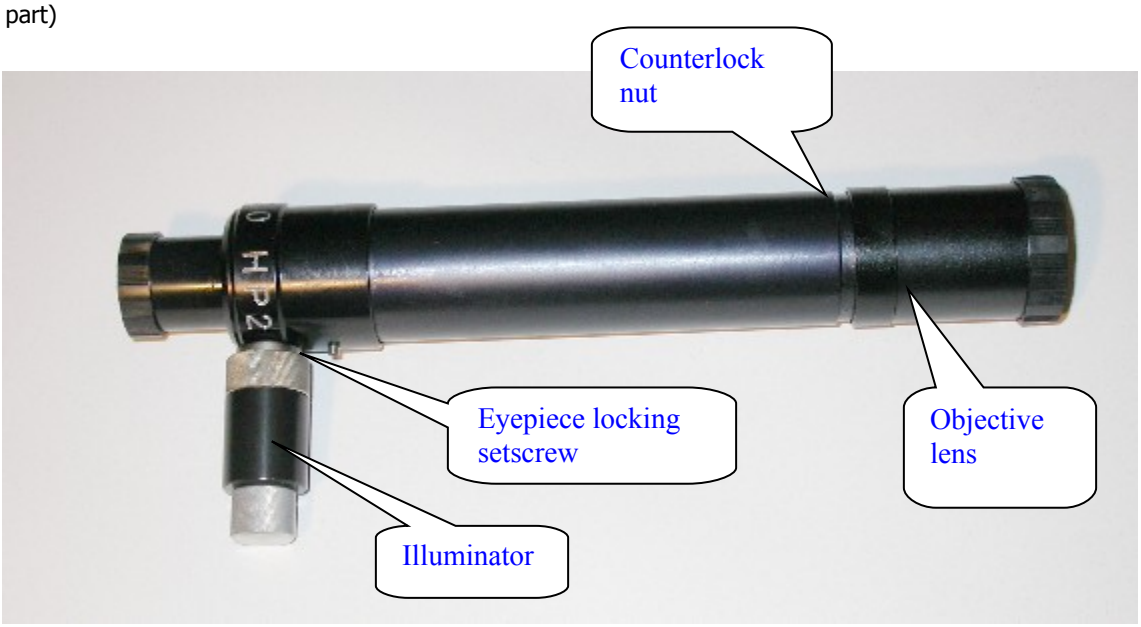
Gemini Telescope Design

Using the Gemini HP2 Polar finder

To take advantage of the GoTo function of a transportable mount, Gemini have developed a high precision Polar Scope (HP2). Compared to the previous model it has better eye relief and two concentric circles in the center to make the collimation easier. When used with care this product gives results comparable to a good drift alignment. (the illuminator is not a standard part)



To focus the reticle remove the eyepiece but mark the position first with a piece of tape! You must put it back exactly where it was, otherwise the starts (Polaris and the two companions) will not match the circles on the reticle. The reticle is glued to a threaded ring that can be adjusted in the housing (may differ with model variations).

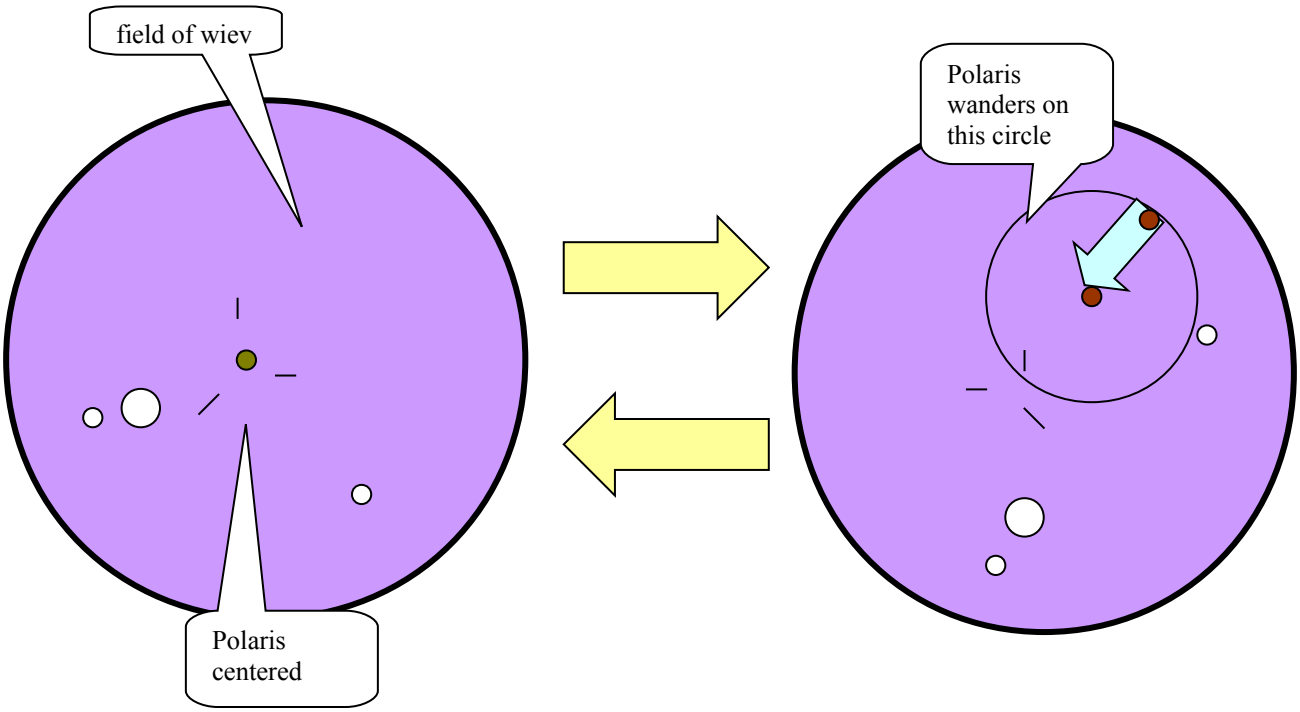
To focus the polar scope release the counter lock nut and rotate the objective lens!

To adjust image scale,

if the stars fall outside of the relative circles, please move the eyepiece inwards a few mm and refocus as described above, then check again,

if the stars fall inside of the relative circles, please move the eyepiece outwards a few mm and refocus as described above, then check again.

Collimating the Polar Scope



0. Sight Polaris through the Hour Axis bore! Attach the Polar Scope with the off-axis plate!
1. Center Polaris and focus the polar scope (by rotating the objective lens)! Use the elevation and azimuth controls only! (see fig. above, left) Fix the objective lens (counternut). Rotate the Hour Axis cca.180 degrees! Stop where Polaris goes farthest from the center!
2. Move Polaris halfway towards the center as shown (above, right)! Use only the Polar Scope collimation thumbscrews now!
3. Repeat from 1 (except focusing) until Polaris stays in the center when the Hour axis is rotated 180 degrees! Until now you have been collimating the Polar Scope.

5 Rotate **and** adjust (in Az and Elev.) the Hour Axis until Polaris is in the large circle and the two fainter stars around are in the smaller circles. Pay particular attention to the correct position of the far-off-the pole star!

Note: you can go through steps 1-4 in daytime using a terrestrial object a few hundred meters away. Do NOT remove or rotate the polar finder's eyepiece after the alignment was done! You will lose collimation. If the polar finder is stored carefully it will keep good collimation for a long period. In this case you need to repeat step 5 only during the next setup.

You find a video tutorial here www.astronomy.hu/polalign.wmv or follow the link on our page dedicated to manuals!

GoTo Problems and Cures

This is a brief description of possible causes of imprecise goto slews in general and with a Pulsar1 or Pulsar2 controller in particular.

1) Polar alignment. The most common reason.
   How can you tell? Dec error of different direction on opposite sides of the meridian. Dec drift at high declinations (50 degree and above). Not having a drift near the celestial equator is NOT a sign of good polar alignment.
   How do I cure it? Use King's method or your preferred sw tool. Drift methods give good results for azimuth only. Goto error based methods may give better gotos but you still can have drift.

2) Inconsistent or imprecise coordinates. Pulsar has no precession correction built in. Using J2000 coordinates for initializing and Jnow for slews gives errors. Databases may contain errors.
   How do I cure it? Sync after the first goto in a planetarium sw and use that for goto commands afterward.

3) Meridian flips. If the optical axis is not perpendicular (more the rule than the exception) to the declination axis it results in large errors in RA after a meridian flip.
   How do I cure it? Use flip correction (Mount Parameters menu) or align the optical axis with shims. Flip correction will not work with a poor polar alignment. Flip correction will never work at all near the pole.

4) Ra axis is not perpendicular to the Dec axis. This shows up in a small RA error when you do large movement in DEC. You normally cannot cure this unless with „mapping".

5) Atmospheric refraction. This can be several arcminutes under 30 degrees of altitude. Use refraction correction (User Parameters).

6) Flexture of mechanical parts. A not properly fixed camera can tilt several arcminutes after a meridian flip. Use conic collars and 3 setscrews on drawtubes.

7) **Diagonals. They are practically never exactly „diagonal" and introduce huge errors when they are rotated for a more comfortable view.**