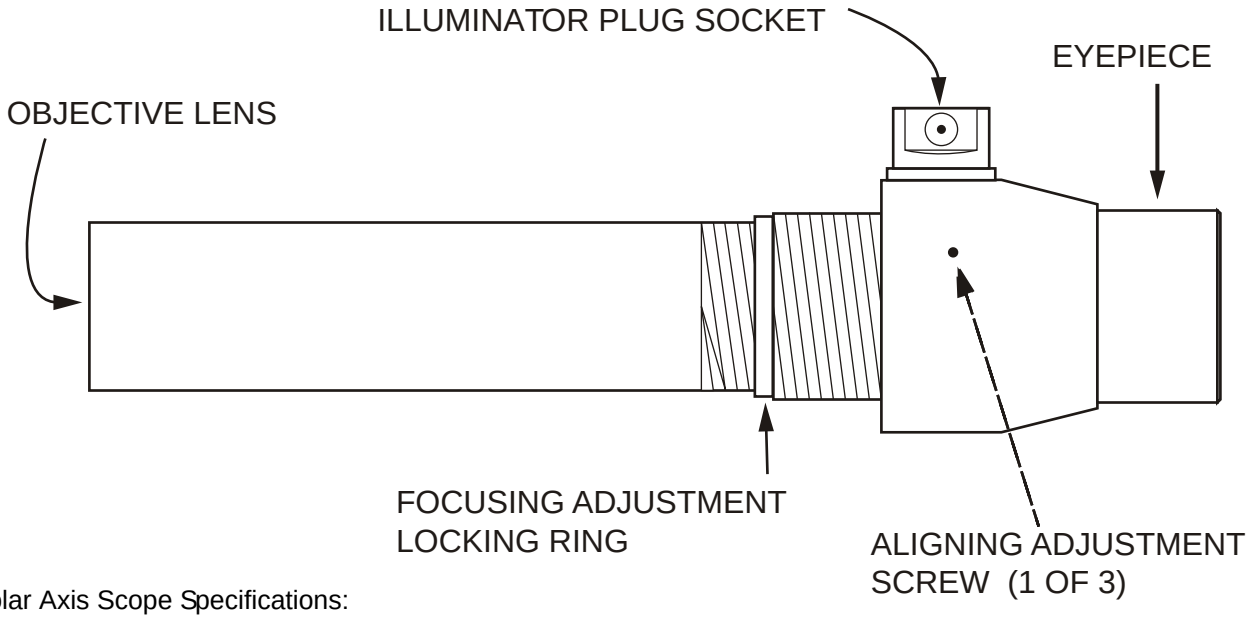
ASTRO-PHYSICS, INC.
POLAR ALIGNMENT TELESCOPE (PASILL2)

This model shipped from January 2001 through July 2002.
It fits all 400, 600, 600E, 800, 900 and 1200 models (except the original black 1200s).

Polar Alignment Telescope

This polar axis telescope will help you align your mount with the Celestial Poles. When your mount is properly aligned, your telescope's drive will accurately track celestial objects as they pursue their daily motion across the sky. This will allow you to keep the object you are viewing in the center of your field-of-view, and eliminate the need for manual adjustments. This polar axis scope can be used in both the Northern and Southern Hemispheres.



Polar Axis Scope Specifications:

Objective lens: 15 mm
Field of View : 10
Accessory : Allen wrench, included (0.89mm or 0.035 inch)

Battery and Cable Illuminators

The illuminator plug socket contains a red LED to light the reticle lines in the polar axis telescope. Either a battery or cable illuminator powers the reticle. Either one of these illuminators may be included with your shipment or both.

Battery Illuminator

The battery illuminator plugs into the illuminator plug socket on the polar axis telescope. Push in firmly to engage. Make sure the illuminator switch is in the *off* position before inserting or removing the plug.

Illuminator Specifications:

Rated voltage: 3 volts DC
Light: red LED

Batteries: 2 AA (To remove the batteries, remove the Phillips head screw in the back of the case, and slide the back of the case toward its wire end.)

Notes:
Remove the batteries from the illuminator when not in use. It could be damaged if the batteries leak. Extreme cold may affect the brightness of the illuminator.

Cable Illuminator

The cable illuminator plugs into the illuminator plug socket on the polar axis telescope and is powered from the reticle output connector on your Astro-Physics mount. The brightness of the LED can be adjusted by the knob on the controller of the HDA and QMD models or through the software menu of keypad of the GTO mounts.

This part is also sold as a separate item, part # CABPAS.

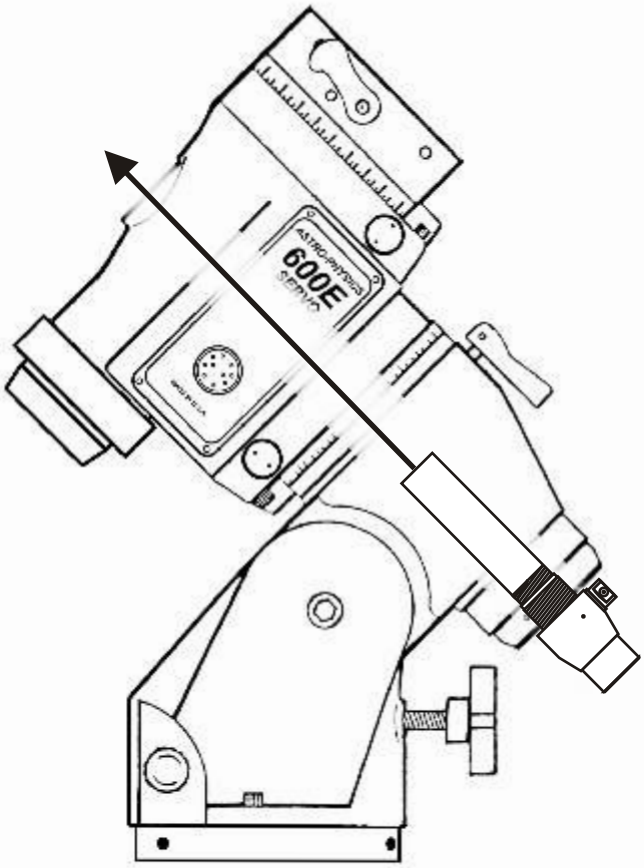
Initial Adjustments

Adjusting the Focus

- Turn the diopter eyepiece until the reticle is in focus.
- Loosen the focusing adjustment locking ring. Turn the objective tube until distant objects are sharply focused. Tighten the locking ring.

Installing the Polar Alignment Scope

- Remove the polar axis front and rear caps.
- Loosen the declination axis knobs.
- Turn the declination axis until the hole in the axis is aligned with the polar axis holes. You will be able to look through the mount along the dotted line shown in the diagram below.
- Tighten the declination axis knobs.
- Carefully screw your polar alignment telescope into the rear of your mount's polar axis. If you find that the threaded hole in the base of your mount is too large, you are missing a piece of your mount. Call Astro-Physics to order part # M4037 (polar axis shaft plug).



Optically Centering the Reticle in Your Mount's Polar Axis

To properly align the telescope's polar axis with the north celestial pole, the reticle in the polar alignment scope must be precisely centered within the polar axis. A mis-centered reticle will result in excessive tracking error. These steps only need to be performed before your first use. We suggest that you follow this procedure during the daytime.

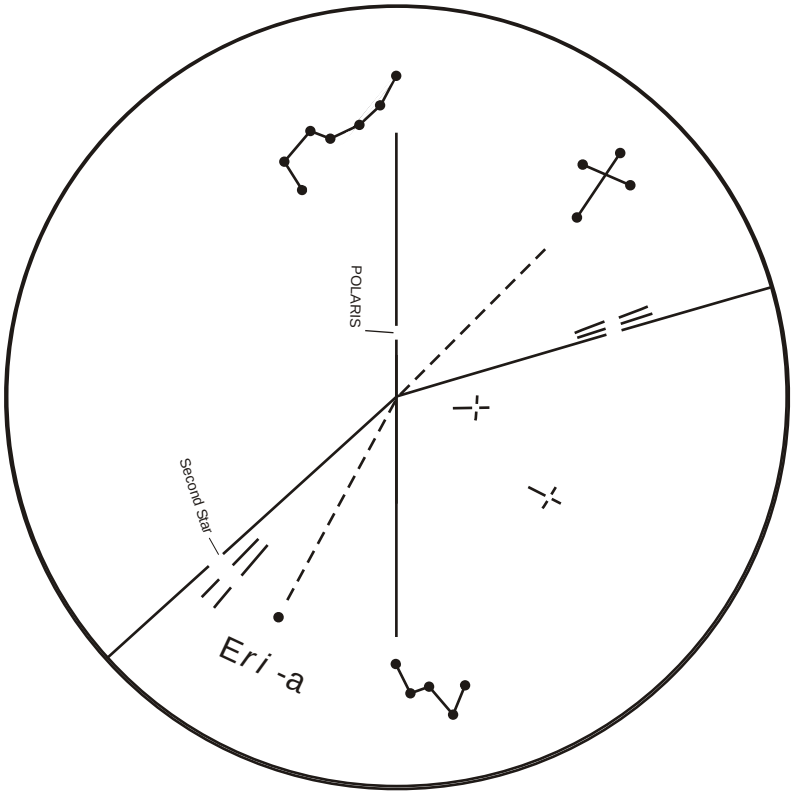
- Using your mount's azimuth adjustment knobs and altitude fine adjustment, aim your polar axis scope at a distant object, placing the object in the center of the field where the reticle lines meet. Choose some discreet point, such as the top of a telephone pole. (Be careful not to lower the altitude enough for the motor housing to hit the mount when turning the right ascension axis.) Tighten the adjustment knobs.

- Loosen the right ascension axis knobs, and turn the right ascension axis while looking through the polar axis scope. The point where the reticle lines meet will probably move off the object and travel in a circle. Try to imagine where the center of that circle is, and then tighten the right ascension axis knobs.

- Using the Allen wrench provided, adjust the three setscrews on the barrel until the point where the reticle lines meet reaches the center of the imagined circle described in the previous step. Be sure all three setscrews are gently tightened when you are finished.

- Repeat steps B and C until an object placed where the reticle lines meet remains stationary when the right ascension axis is turned.

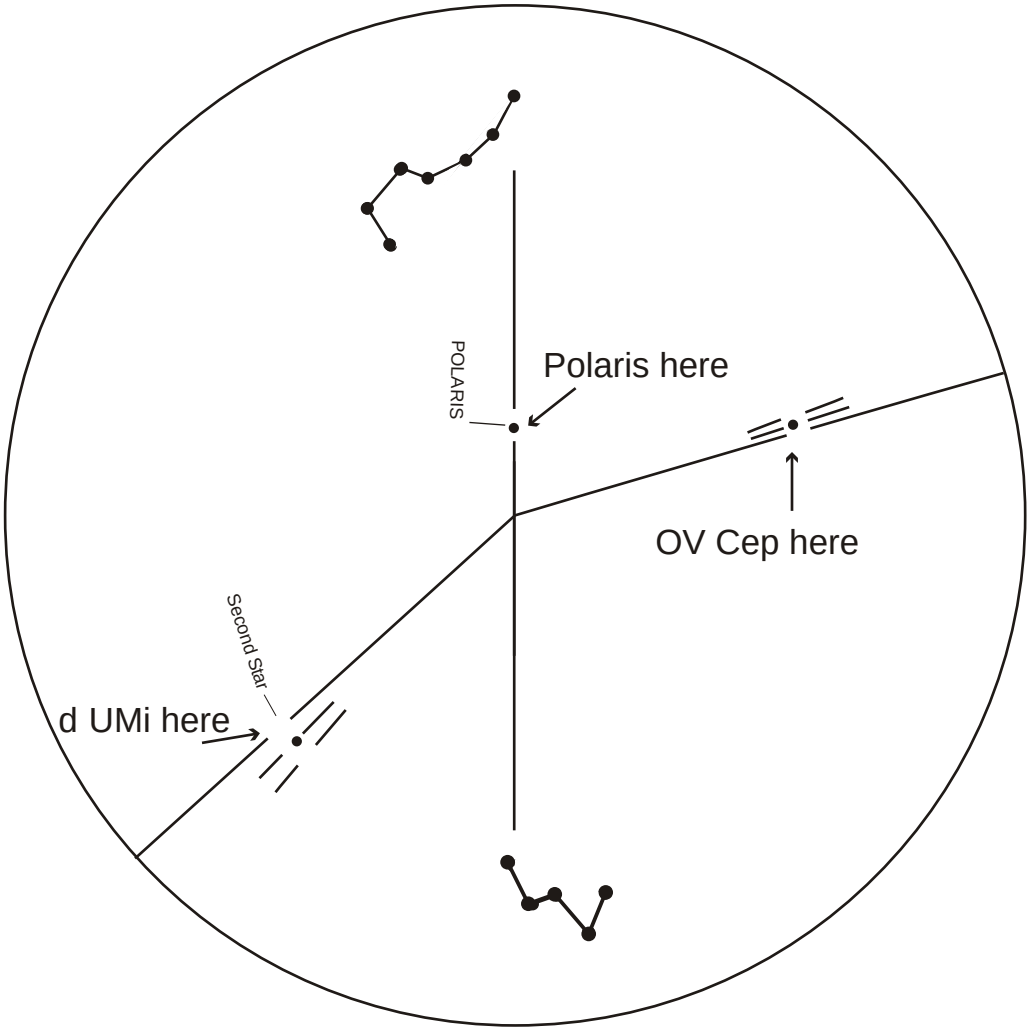
- Don't forget to turn off the illuminator when you're finished. You're now ready for nighttime polar alignment.



Using Your Polar Axis Telescope

Northern Hemisphere

- Set up your mount so that the polar axis is roughly aligned in azimuth toward Polaris.
- Slightly loosen the bolt(s) that lock the polar axis of the mount in place. Adjust the elevation angle of the polar axis so that the polar axis is roughly pointed at Polaris in altitude. It is easier to adjust the polar axis if you turn the fine altitude knob with one hand while using the other hand to move the axis manually.
- Adjust the declination axis so that you can look through the polar axis. (See step C of *Installing the Polar Alignment Scope*.) Clamp the declination axis in place. Thread the polar scope into the polar axis.
- Make sure the power switch on the illuminator is in the "off" position. Plug the illuminator into the plug receptacle on the polar axis scope. Turn the switch to the "on" position.

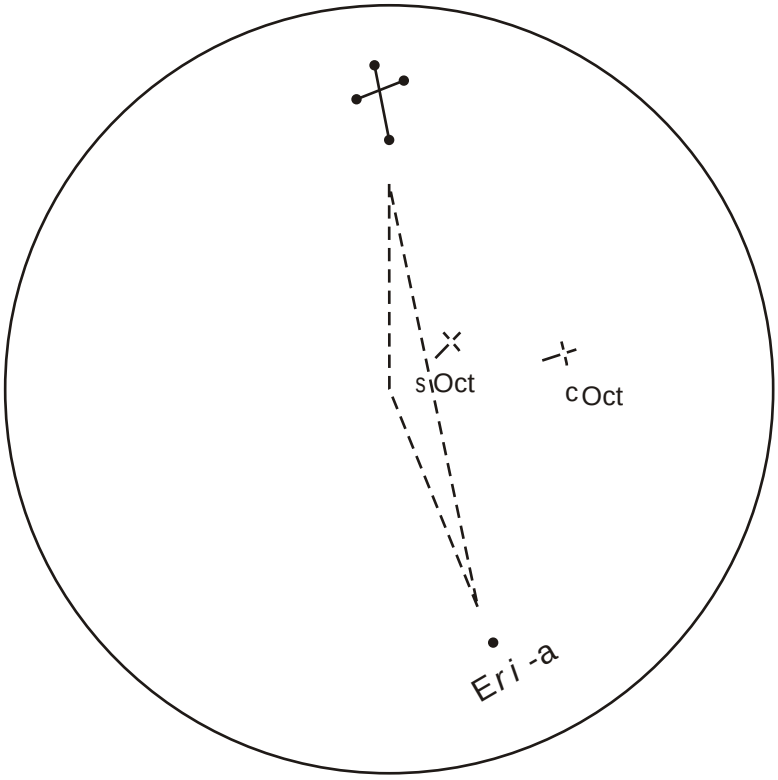


This diagram shows only the reticle lines used for Northern Hemisphere alignment.
The 3 sets of lines for UMi and OV Cep represent the Epochs 1990, 2000, and 2010. The gap in the longest line is for 1990, the gap in the middle segment is for 2000, and the remaining gap is for 2010. The stars are diagramed in their Epoch 2000 positions.

- Rotate your right ascension axis so that the constellation reference line on the reticle approximately matches the current sky orientation of the Big Dipper and Cassiopeia. Note that these constellations will not actually be visible through the polar scope.
- Use the mount's azimuth adjustment knobs and altitude fine adjustment knob to move Polaris into the gap in the reticle line that points to the Big Dipper. Place Polaris approximately as shown in the diagram, not in the center of the gap.
- Rotate the right ascension axis to put Delta () Ursae Minoris somewhere along the appropriate line for the current Epoch.
- Readjust the altitude and azimuth to bring Polaris back to the appropriate position in its gap.
- Repeat steps 7 and 8 until Polaris and UMi appear properly positioned in their respective gaps. Both stars will be off-center in their gaps, as shown in the diagram.
- You now have good polar alignment. If you can see a faint third star (OV Cephei) near the remaining set of gaps, you can fine tune the alignment a little further. Initially, you might need to turn the illuminator off to spot this star. If OV Cephei lies anywhere along its line for the current Epoch, no further adjustment is necessary. If OV Cep is offset clockwise, place Polaris a little farther inward along the Polaris line. If OV Cep is offset counter-clockwise, place Polaris a little farther outward along the Polaris line. Repeat steps 7 through 10 until all three stars lie along their respective lines.
- Turn off the illuminator, remove the polar axis scope, if you wish, and observe!

Southern Hemisphere

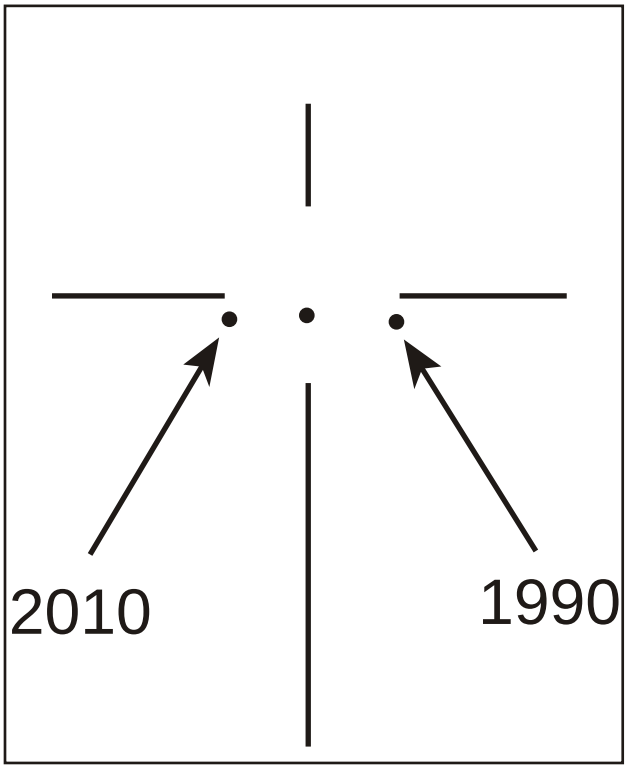
- Set up your mount so that the polar axis is roughly aligned in azimuth toward the South Celestial Pole. Due to the lack of bright stars in the south polar region, you might prefer to do your initial rough alignment with the aid of a compass.
- Slightly loosen the bolt(s) that lock the polar axis of the mount in place. Adjust the elevation angle of the polar axis so that the polar axis makes an angle above the horizon roughly equal to your latitude. (If you know the approximate position of the South Celestial Pole, you can just sight along the polar axis to see if you have the altitude about right.) It is easier to adjust the polar axis if you turn the fine altitude knob with one hand while using the other hand to move the axis manually.



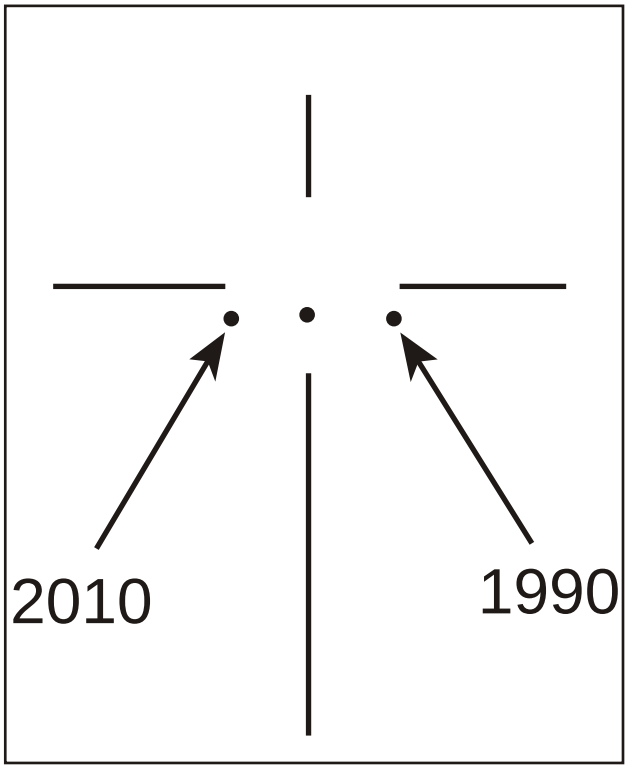
This diagram shows only the reticle lines used for Southern Hemisphere alignment.

- Rotate your right ascension axis so that the dotted constellation reference line on the reticle approximately matches the current sky orientation of the Southern Cross and the star Alpha () Eridani. Note that the Southern Cross and Eridani will not actually be in the field of view of the polar telescope.

- Adjust your mount's altitude and azimuth to place Sigma () Octantis in its cross. The left-hand diagram below shows a close up of an alignment cross with three star positions. The center position is for Epoch 2000. For Epochs 1990 and 2010, position the stars as labeled. Notice that the star positions are a little below the crossbar.



Approximate positions for Octantis



Approximate positions for Octantis

- Rotate your right ascension axis to place Xi () Octantis somewhere along a radial line that would pass from the point where the dotted reticle lines meet through the appropriate star position for the current Epoch. Octantis should appear a little farther below its crossbar than Octantis did. (See the diagrams above.)
- Readjust altitude and azimuth to bring Octantis back to the appropriate spot in its cross.
- Repeat steps 5 and 6 until both stars lie at the appropriate spots for the current Epoch.
- Turn off the illuminator, remove the polar axis scope, if you wish, and observe!

Troubleshooting

The polar scope will not thread into my mount.
This could be due to excess buildup of the anodizing sealer on the threads of the polar scopes causing the threads to be tight. If you experience any difficulty threading it onto place, use a tiny amount of WD40, 3 in 1 household oil or any similar oil to provide a little lubrication. We suggest that you put a small amount onto your finger or cloth and rub it around the threads. If you apply the oil directly to the polar scope, you are likely to use too much causing an unnecessary mess.
After you apply the oil, carefully thread the polar scope in place. Be careful that you do not cross thread the unit. Thread it in and out several times. Wipe the threads of the polar scope and mount clean with a cloth or swab between threadings until the scope threads in without resistance (otherwise buildup of removed anodizing particles could cause damage to the threads).

If this is not effective, please call Astro-Physics. Do not try to force the polar scope into place since the very fine threads could be damaged.

For questions or comments, contact:

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