



Specifications

POLARIS-K05

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Optic Size Accommodated	Ø1/2" (Ø12.7 mm)
Optic Thickness (Min)	0.08" (2 mm)
Adjusters	130 TPI
Measured Point-to-Point Mechanical Resolution per Adjuster	5 µrad (Typical); 2 µrad (Achievable)
Resolution ^a	~11 mrad/rev
Front Plate Translation (Max)	5 mm
Mechanical Angular Range (Nominal)	± 5°
Front Plate Separation at Pivot Adjuster	1.5 ± 1 mm
Beam Deviation ^b	<2 µrad
Recommended Optic Mounting Torque	6 - 10 oz-in for a 6 mm UVFS Optic
Vacuum Compatibility ^c	Grease Vapor Pressure: 10 ⁻¹³ Torr at 20 °C, 10 ⁻⁵ Torr at 200 °C Epoxy Meets Low Outgassing Standards NASA ASTM E595 and Telcordia GR-1221
Operating Temperature Range	-30 to 200 °C
Mounting	#8 (M4) Counterbore

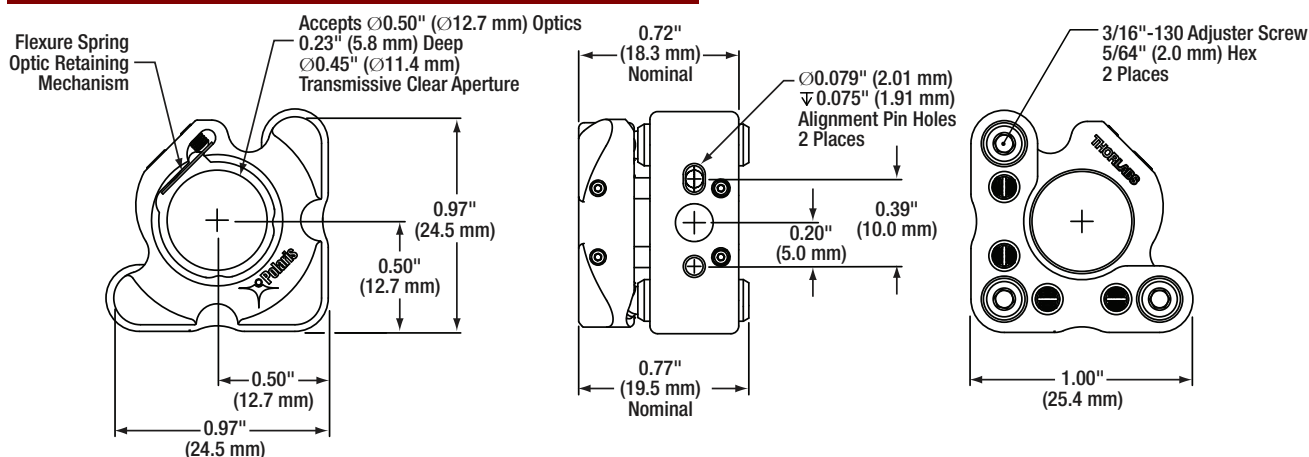
a. When the front plate is parallel to the back plate.

b. After 12.5 °C temperature cycle, the beam returns to within less than 2 µrad of its original position. Note: This value does not take into account effects caused by the method by which the Polaris is mounted.

c. Cleanroom-assembled mounts are also available for vacuum applications. Contact Techsupport@thorlabs.com for details.



Drawings



The mount includes two Ø2 mm alignment pin features for setting a precise mounting location and angle. A standard DIN-7M6 Ground Dowel Pin (Ø2.002 mm to Ø2.008 mm x 0.050" ± 0.005" deep) is recommended.

POLARIS-K05 Usage Tips

When mounting the POLARIS-K05, or any other high performance opto-mechanical device, it is important to follow a few principles:

- 1) **Match Materials:** Due to its relatively low coefficient of thermal expansion, stainless steel was chosen as the material from which to fabricate the Polaris mount. Whether mounting the POLARIS-K05 to a post, a block, or directly onto a table, we recommend using mounting components fabricated from the same material.
- 2) **Use a Wide Post:** The Polaris's performance is optimized for use with a Ø1" RS series of posts. These posts provide two planes of contact with the mount. These planes of contact help to confine the bottom of the mount during variations in the surrounding temperature, thereby minimizing potential alignment issues.
- 3) **Mount an Optic only when the Mount is out of a Setup:** Since an optic is prone to movement within its mounting bore, all optics should be mounted with the Polaris out of the setup to ensure accurate mounting that will minimize misalignment effects. First, ensure that there is no grease, dirt, or dust in the optic bore or on the optic itself. If any of these particulates are present, remove them with clean compressed air and/or clean the bore and optic with acetone or methanol. Next, with the mount orientated at ~45° so that it stands on its corner adjuster, place the optic into the bore. Lightly tap the edge of the faceplate with the plastic handle of a balldriver. This will adjust the optic's position so that it makes the correct contact with the two contact lines and the locating lip. Finally, use a balldriver or hex key to engage the optic retaining screw, preferably to the specific torque described in principal #5.
- 4) **Front Plate's Position:** Although the mount is designed to allow adjustments of up to 9.5°, to achieve the best performance, it is recommended that the front plate be kept as parallel as possible to the back plate. This ensures the highest stability of the adjustments.
- 5) **Mount as Close to the Table's Surface as Possible:** To minimize the impact of vibrations and temperature changes, it is recommended that your setup have as low of a profile as possible. Using short posts will reduce the Y-axis translation caused by temperature variations and will minimize any movements caused by vibrations. The POLARIS-K05 kinematic mirror mount can also be mounted directly onto an optical table surface. By doing so, the instability introduced by a post will be eliminated.
- 6) **Polish and Clean the Points of Contact:** We highly recommend that the points of contact between the mount and the post as well as the post and the table are clean and free of scratches or defects. For best results, we recommend polishing the table's surface with a polishing stone and then polishing the bottom and top of the post as well as the bottom of the mount using a polishing pad (Item # LFG1P).
- 7) **Try to Minimize Deflection Caused by the Hand while Adjusting:** When making adjustments, we recommend applying as little force as possible. There is no detectable play on the POLARIS-K05 screws by feel; however, one would still want to apply pure torque on the adjusters instead of torque and a directional force. This will ensure the shortest settling time and greatly reduce the chance of alignment change after adjustment.
- 8) **Use specified Torques for the Mount and the Mirror Clamping:** Since the mirror expands at a different rate than the mounting mechanism, it is essential to hold the optic firmly in place. A torque of 6 to 10 oz-in [0.375 to 0.625 lb-in; 0.04 to 0.07 N·m] applied to the optic's mounting setscrew (Torque Wrench Item # TD24) has been found to produce optimal results. Furthermore, when tightening the Polaris mount to a Ø1" post, a torque of 14 to 16 lb-in [1.6 to 1.8 N·m] (Torque Wrench Item # TD75) was found to be optimal and minimized the mount's slippage attributed to temperature changes.



Not Recommended:

- Do not take the adjusters out of the bushings as it can cause the threading to be contaminated, greatly reducing the mount's fine adjustment performance.
- Do not pull the front plate away as it might stretch the spring beyond their operating range or crack the sapphire seats.