Ø1" Polaris® Low-Distortion Fixed Mount



POLARIS-B1F

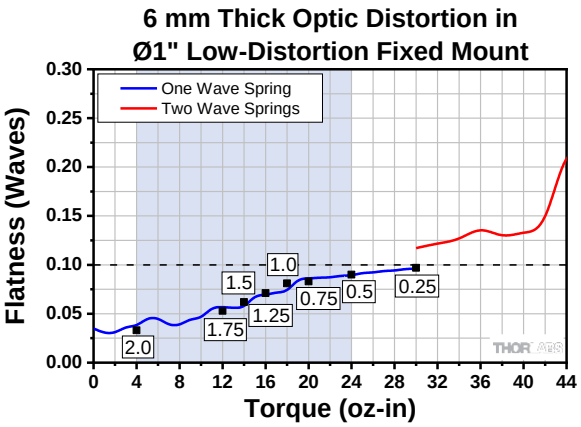
Specifications

POLARIS-B1F		
Optic Sizes Accommodated	Ø1" (Ø25.4 mm)	
Optic Thickness	0.15" (3.8 mm) Min	0.32" (8.0 mm) Max[a] 0.38" (9.7 mm) Max[b]
Transmissive Clear Aperture	Ø0.83" (Ø21.0 mm)[a] Ø0.90" (Ø22.8 mm)[b]	
Beam Deviation[c]	<2 µrad	
Vacuum Compatibility[d]	10^{-9} Torr at 25 °C with Proper Bake Out; 10^{-5} Torr at 25 °C without Bake Out	
Cleaning[e]	Passivated per ASTM-967	
Operating Temperature Range	-30 to 200 °C	
Mounting	One #8 (M4) Counterbored Hole Two Ø2 mm Alignment Pin Holes Around Center Mounting Hole	

a. When mounted using the included optic retention spring and the included POLARIS-SM1RRS40 retaining ring.
b. When mounted using only the POLARIS-SM1RR retaining ring (available separately).
c. After 12.5 °C temperature cycle, the beam typically returns to within 2 µrad of its original position for a Polaris mounted using a stainless steel Ø1" PLS post for Polaris mounts and a POLARIS-CA1 clamping fork.
d. All POLARIS-B1F mounts are vacuum-compatible, assembled in a clean environment, and double vacuum bagged. Contact techsupport@thorlabs.com for details.
e. Chemically cleaned using the AAA passivation method and ultrasonically cleaned in isopropyl alcohol.

Optic Installation

Ensure that there is no grease, dirt, or dust in the optic bore or on the optic itself. Remove any particulates with clean compressed air, which can be purchased from our website, and/or clean with acetone or methanol. The optic, indexed retention spring, and retaining ring are installed from the back of the mount. Be sure the index tab is in the key way, touching the retaining ring. Gently turn the retaining ring using the SPW606 or SPW602 Spanner Wrench until the optic makes contact with the three fingers on the front of the mount. Continue to tighten until the spring is fully compressed into the pocket of the retaining ring. At this point, the retaining ring will make slight contact with the back of the optic. Loosen the retaining ring 1.25 turns to allow the spring pressure alone to hold the optic in place. This will be equivalent to a torque of about 16 oz-in, resulting in an additional distortion of a few hundredths of a wave for a 6 mm thick optic compared to the unmounted optic.



The black dots represent the torque and flatness yielded by using a spanner wrench and then loosening the retaining ring the number of turns indicated under the dot.

Though we recommend using the installation method above, a TD24 Torque Driver and SPB1 Spanner Bit can also be used. The graph to the left shows the effect increasing amounts of torque have on the surface of a mounted 6 mm thick mirror. The shaded region indicates the torque range that can be achieved using the recommended optic installation method (detailed above) that does not use a torque driver. The dashed line indicates 0.10λ for reference.

Above 30 oz-in, the retaining ring contacts the optic; in situations where higher torque is desired, two wave springs may be stacked to achieve the flatness indicated by the red line.

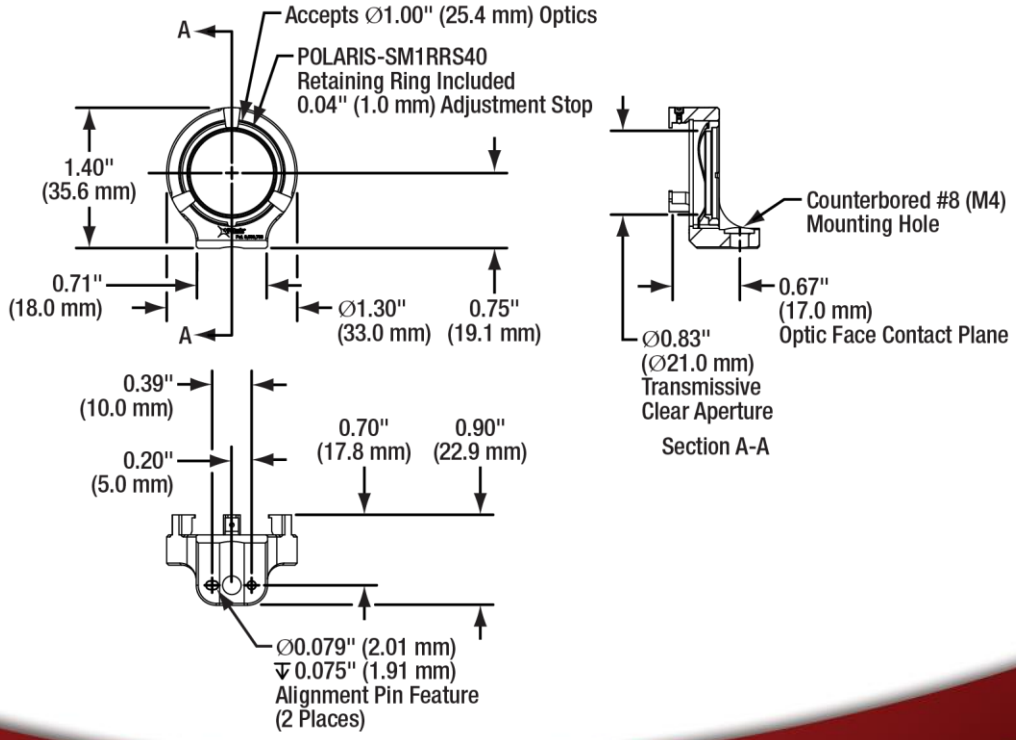
Usage Tips

When mounting the POLARIS-B1F, 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. When mounting the POLARIS-B1F, we recommend using components fabricated from the same material.
2) **Use a Wide Post:** The performance of the Polaris mount is optimized for use with a Ø1" stainless steel post. These posts provide two locations of contact with the mount along the same plane, which help 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:** All optics should be mounted with the Polaris out of the setup to ensure accurate mounting that will minimize misalignment effects.
4) **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 vertical translation caused by temperature variations and will minimize any movements caused by vibrations.

   For even better performance, the POLARIS-B1F can be mounted directly onto a flat surface such as a breadboard. Before mounting, ensure that the mounting surface is highly flat, polished, and free of debris and scratches. When securing the mount to a post or breadboard, we recommend applying 14 – 16 lb-in (1.6 – 1.8 N-m) of torque using our TD75 torque wrench.
5) **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). For best results, we recommend resting the post and mount on a flat surface.
6) **Allow the System to Settle:** Whenever a new system is built, the forces from the mounting hardware will create new stresses that will settle in over time, causing micro creep in the system. If possible, allow 24 hours for settling.

Drawing



The mount includes two Ø2 mm alignment pin features for setting a precise mounting location and angle. Standard DIN 7-m6 Ground Dowel Pins (Ø2.002 mm to Ø2.008 mm with an exposed height of 0.050" ± 0.005") are recommended.