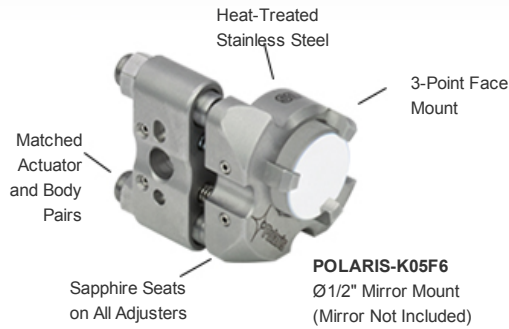


POLARIS-K1F6 - OCT 31, 2016

Item # POLARIS-K1F6 was discontinued on OCT 31, 2016. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

POLARIS™ LOW-DISTORTION KINEMATIC MIRROR MOUNTS

- ▶ Matched Actuator/Body Pairs Minimize Drift and Backlash
- ▶ Heat Treating Minimizes Temperature-Dependent Hysteresis
- ▶ Face Mount Reduces Distortion of the Optic
- ▶ Sapphire Seats Ensure Long-Term Stability



OVERVIEW

Options

- Low-Distortion Mirror Mounts Designed for Ø1/2", Ø1", or Ø2" Optics
- 3-Adjuster or 2-Adjuster Versions Available
- Knob- or Hex-Driven Designs
- Lock Nuts Available for Certain Models
- See the *Polaris Family* Tab for List of Complete Options
- Custom Mount Configurations are Available by Contacting Tech Support

Features

- Fabricated from Stress-Relieved Stainless Steel with Matched Coefficients of Thermal Expansion (CTE)
- Spring-Loaded, Indexed, Three-Point Contact Plate Secures Optic
- Hardened Stainless Steel Ball Contacts with Sapphire Seats for Durability
- Matched Actuator/Body Pairs Provide Smooth Kinematic Adjustment
- Symmetrical Edge Ideal for Low Incident Angles (See the *Usage Tips* Tab)
- Fabricated from Low-Outgassing and Vacuum-Compatible Materials
- Materials are Vacuum Compatible to 10^{-9} Torr at 25 °C with Proper Bake Out
- Ø2 mm Alignment Pin Holes Allow for Precise Mount Placement
- Patent-Pending Design

The Polaris™ Low-Distortion Kinematic Mirror Mounts offer low optical distortion as well as the long-term stability common to all of our Polaris™ mounts. Each mount features a three-point contact faceplate to mount the optic, which is green in the drawings to the right. This reduces optical distortion compared to standard setscrew or retaining ring optic mount designs while improving beam pointing stability. The indexed retention spring (red) eliminates bending moments on the optic and ensures the force on the optic remains constant over large temperature changes; Please see the *Low Distortion* tab for details. This spring is held in place with a retaining ring (blue) with a calibrated adjustment stop for easy optic installation. Please see the *Optic Installation* tab for more details.

The frame, matched adjuster screws, lock nuts, indexed spring, and retaining ring are all made from stainless steel with matched coefficients of thermal expansion (CTE) to reduce stress during temperature changes that causes thermal drift. Residual stress, which can cause micro-creep, is minimized by performing a final kiss cutting technique during machining, heat treating, acid etching, and final thermal stress relieving. The Polaris mounts utilize precision-matched adjusters and incorporate ball contacts and sapphire seats at all contact points.

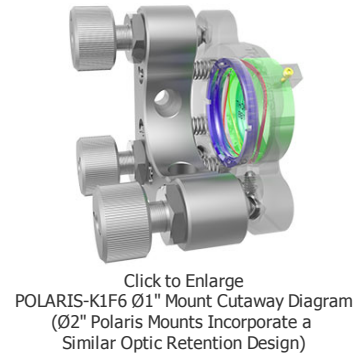
The indexed optic retention spring makes contact with the optic at three locations. This spring must be installed so that the indexing tab is in contact with the retaining ring in order to achieve the lowest optical distortion. Reversing the retention spring orientation will result in maximum distortion to the optic. Please see the *Usage Tips* tab for more details.

Polaris lens cells are precision machined to achieve a fit that will provide optimum beam pointing stability performance over changing environmental conditions such as temperature changes, transportation shock and vibration. These mounts have had their performance tested and verified with Ø1/2", Ø1", or Ø2" optics that have a diameter tolerance of up to +0/-0.1 mm, so this tolerance range is recommended for optimal performance. Note that the mounts are not intended for use with optics that have an outer diameter tolerance greater than zero or smaller metric mirror sizes (Ø12.5 mm, Ø25 mm, or Ø50 mm). To order a mount designed for metric optics, please contact Tech Support.

Cleanroom and Vacuum Compatibility

All Polaris mounts, retaining rings, and lock nuts sold on this page are designed to be compatible with cleanroom and vacuum applications. They are chemically cleaned using the Carpenter AAA passivation method to remove sulfur, iron, and contaminants from the surface. After passivation, they are assembled in a clean environment and double vacuum bagged to eliminate contamination when transported into a cleanroom.

The sapphire contacts are bonded into place using a NASA-approved low outgassing procedure. In addition, DuPont LVP High-Vacuum (Krytox) Grease, an ultra-high-vacuum-compatible, low outgassing PTFE grease, is applied to the adjusters. These features provide high vacuum compatibility and low outgassing performance. Please note that the 8-32 and M4 cap screws included with the Polaris mounts are not rated for pressures below 10^{-5} Torr.



| Quick Links |
|---|
| Ø1/2" Low-Distortion Mounts |
| Ø1" Low-Distortion Mounts |
| Ø2" Low-Distortion Mounts |
| Adjuster Accessories |
| Lock Nuts |



Guaranteed Performance

Our Polaris product line and supporting products bearing its logo are designed to provide the best commercial optomechanical solutions in the photonics industry. If you find another commercially available mount that performs better in your test application,* let us know, and we will accept the return of the Polaris mounts and refund 100% of the purchase price.

*Test applications utilizing up to 100 mounts are eligible for the refund. Please contact us to discuss a larger trial quantity.

S P E C S

| Item # Suffix ^a | -K05F6 | -K05F1 | -K05F2 | -K1F6 | -K1F1 | -K1F2 | -K2F | -K2F3 | -K2F1 | -K2F2 |
|---|--|--------------------------|--------------|--|--------------------|--------------|---|--------------|--------------------|--------------|
| Optic Size ^b | Ø1/2" | | | Ø1" | | | Ø2" | | | |
| Optic Thickness | 0.28" (7 mm) Max ^c | | | 0.15" (4 mm) Min ^d 0.32" (8 mm) Max ^d | | | 0.12" (3 mm) Min ^e 0.52" (13.3 mm) Max ^e | | | |
| Transmissive Clear Aperture | Ø0.36" (Ø9.1 mm) ^c | | | Ø0.83" (Ø21.0 mm) ^d | | | Ø1.73" (Ø43.9 mm) ^e | | | |
| Number of Adjusters | Three | Two | Two | Three | Two | Two | Three | Three | Two | Two |
| Adjuster Drive | 5/64" Hex | Low-Profile 5/64" Hex | 5/64" Hex | Removable Knobs | Removable Knobs | 5/64" Hex | Removable Knobs | 5/64" Hex | Removable Knobs | 5/64" Hex |
| Adjuster Pitch | 130 TPI Matched Actuator/Body Pairs | | | 100 TPI Matched Actuator/Body Pairs | | | | | | |
| Measured Point-to-Point Mechanical Resolution per Adjuster (Bidirectional Repeatability) | 5 µrad (Typical); 2 µrad (Achievable) | | | | | | | | | |
| Measured Adjuster Lock Mechanical Resolution per Adjuster | 5 µrad (Typical); 2 µrad (Achievable) | | | | | | | | | |
| Resolution ^f | ~11 mrad/rev | | | ~7 mrad/rev | | | ~5 mrad/rev | | | |
| Front Plate Translation (Max) | 5 mm (Nominal) | N/A | | 6 mm (Nominal) | N/A | | 3.175 mm (Nominal) | | N/A | |
| Mechanical Angular Range (Nominal) | ±5° | | | ±4° | | | ±3.4° | | | |
| Beam Deviation After Thermal Cycling ^g | <2 µrad | | | | | | | | | |
| Recommended Optic Mounting Torque | 6 - 24 oz-in | | | 4 - 24 oz-in | | | N/A ^h | | | |
| Mounting ⁱ | Two #8 (M4) Counterbores | | | | | | Four #8 (M4) Counterbores | | | |
| Alignment Pin Holes | Two at Each Counterbore ^j | | | | | | Two at Each Mounting Face ^k | | | |
| Vacuum Compatibility ^l | 10 ⁻⁹ Torr at 25 °C with Proper Bake Out; 10 ⁻⁵ Torr at 25°C without Bake Out Grease Vapor Pressure: 10 ⁻¹³ Torr at 20 °C, 10 ⁻⁵ Torr at 200 °C Epoxy Meets Low Outgassing Standards NASA ASTM E595, Telcordia GR-1221 | | | | | | | | | |
| Operating Temperature Range | -30 to 200 °C | | | | | | | | | |

- Given is the item number suffix. All item numbers in the Polaris line start with POLARIS.
- For best performance, use optics with a diameter tolerance of up to +0/-0.1 mm.
- When mounted using the included optic retention spring and the included POLARIS-SM05RRS40 retaining ring.
- When mounted using the included optic retention spring and the included POLARIS-SM1RRS40 retaining ring.
- When mounted using the included optic retention spring and the included POLARIS-SM2RRS70 retaining ring
- When the front plate is parallel to the back plate.
- After 12.5 °C temperature cycle, the beam returns to within 2 µrad of its original position for a Polaris mounted on a Ø1" post with a 2" beam height. Please see the *Test Data* tab for more details.
- We do not recommend using a torque wrench for mounting an optic into our Ø2" Polaris mounts. The increased diameter of the optic cell makes it difficult to get an accurate reading, which can lead to mounting an optic with too much pressure, resulting in increased distortion of the optic.
- The Ø1/2" Mounts come with 8-32 and M4 low-profile cap screws for mounting without obstructing the transmissive beam path. The Ø1" and Ø2" Mounts come with standard 8-32 and M4 cap screws.
- Standard DIN 7-m6 ground dowel pins are recommended. The recommended tolerance for the location of the mating dowel pin holes and threaded mounting hole is ±0.003".
- These mounts are vacuum compatible, assembled in a clean environment, chemically cleaned using the Carpenter AAA passivation method to remove sulfur, iron, and contaminants from the surface, and double vacuum bagged. The 8-32 and M4 cap screws included with the Polaris mounts are not rated for pressures below 10⁻⁵ Torr. Prior to placing any components in a sensitive vacuum system, a thorough pre-baking in a bake-out oven should be performed to remove all moisture and surface volatiles. Contact techsupport@thorlabs.com for details.



Click to Enlarge
Polaris Mounts are Shipped
Inside Two Vacuum Bag
Layers

Vacuum Compatible and Low Outgassing

Each vacuum-compatible Polaris mount is packaged within two vacuum bag layers after assembly in a clean environment, as seen in the image to the right. These vacuum bags do not contain any desiccant materials and tightly wrap the mount, preventing friction against the mount during shipping. This packing method protects the mount from corrosion, gas or liquid contamination, and particulates during transport. The first vacuum bag should be opened in a clean environment while the second vacuum bag should only be opened just prior to installation. When operating at pressures below 10⁻⁵ Torr, we highly recommend using an appropriate bake out procedure prior to installing the mount in order to minimize contamination caused by outgassing.

OPTIC INSTALLATION

Installing an Optic into a Polaris Low-Distortion Mount

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 (CA3) and/or clean with acetone or methanol. The optic, indexed retention spring, and retaining ring are installed from the back of the mount, as shown in the animation to the right. Be sure the index tab is in the key way and touching the retaining ring. Gently turn the retaining ring using a Spanner Wrench until the optic makes contact with the three fingers on the faceplate. For our Ø1/2" mounts, the SPW603 spanner wrench should be used; for the Ø1" mounts, either the SPW602 or SPW606 may be used; for our Ø2" mounts our SPW604 may be used.

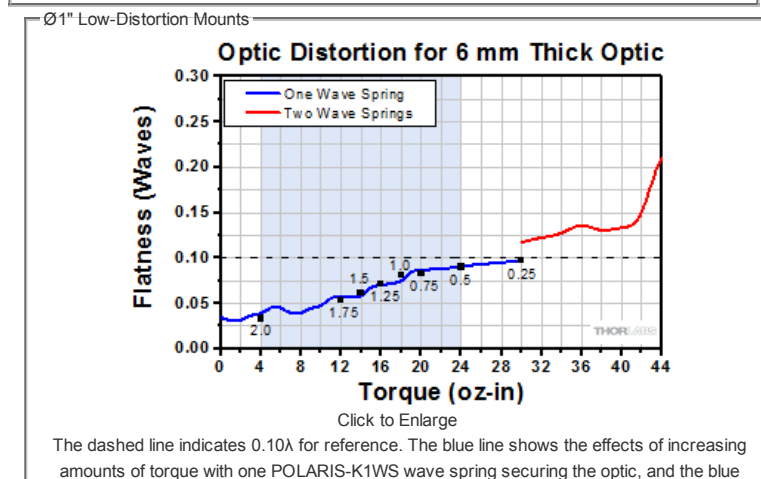
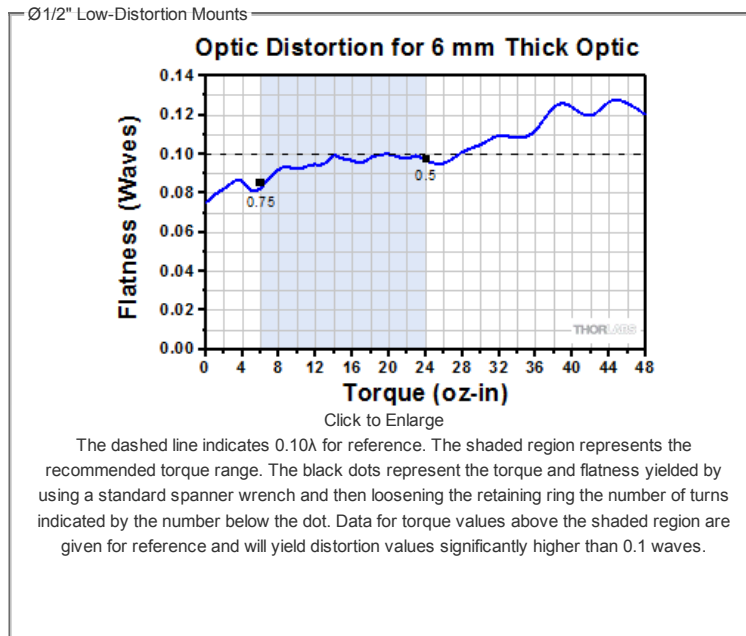
Ø1/2" and Ø1" Polaris Mounts

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. If you do not have a torque driver, loosen the retaining ring a half turn to allow the spring pressure alone to hold the optic in place. This will put the appropriate torque on the optic, resulting in an additional distortion of a few hundredths of a wave for a 6 mm thick optic compared to the optic in its unmounted state. The torque applied to the retaining ring translates to a force applied to the optic; this mounting process imparts a sufficient mounting force while minimizing the optic distortion. However, for highest accuracy, we recommend you use a torque driver (TD24) along with either the SPB05 Spanner Bit (for Ø1/2" Polaris Mounts) or the SPB1 Spanner Bit (for Ø1" Polaris Mounts).

Ø2" Polaris Mounts

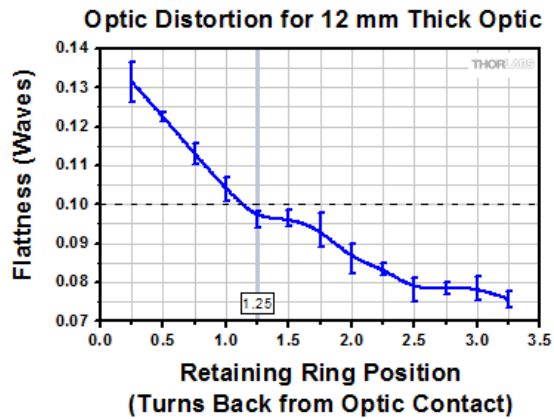
Continue to tighten until the spring is fully compressed into the pocket of the retaining ring. At this point, the retaining ring will make slight contact with the back of the optic. Loosen the retaining ring 1.25 turns to allow the spring pressure alone to hold the optic in place. This will put the appropriate torque on the optic, resulting in an additional distortion of a few hundredths of a wave for a 12 mm thick optic compared to the optic in its unmounted state. The torque applied to the retaining ring translates to a force applied to the optic; this mounting process imparts a sufficient mounting force while minimizing the optic distortion. Unlike our Ø1/2" and Ø1" low-distortion Polaris mounts, we do not recommend using a torque wrench for mounting an optic into our Ø2" Polaris mounts. The increased diameter of the optic cell makes it difficult to get an accurate reading, which can lead to mounting an optic with too much pressure, resulting in increased distortion of the optic.

The graphs below show the effect increasing amounts of torque or turns of the optic retaining ring have on the surface of a 6 mm thick mirror mounted in a Ø1/2" Polaris mount, a 6 mm mirror mounted in a Ø1" Polaris mount, or a 12 mm thick mirror mounted in a Ø2" Polaris mount. All flatness measurements are taken with a ZYGO interferometer, which uses a 633 nm beam. Please see the *Low Distortion* tab for more information on optic face distortion as a result of torque.



shaded region represents the recommended torque range. The black dots represent the torque and flatness yielded by using a standard spanner wrench and then loosening the retaining ring the number of turns indicated by the number above or below the dot. 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.

Ø2" Low-Distortion Mounts



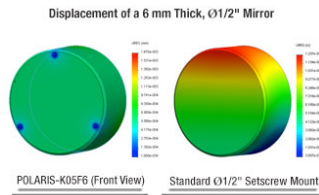
The dashed line indicates 0.10λ for reference. 1.25 turns back from optic contact is recommended for secure mounting with minimal additional distortion caused by the mount. The error bars signify the standard deviation of the test results at every 0.25 turn interval. The optic will begin to engage the mount at 3.25 turns back from optic contact.

LOW DISTORTION

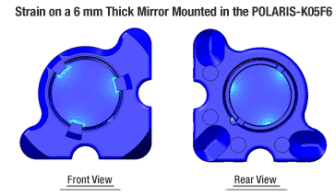
Mounting stresses are responsible for the strain on an optic that results in optic distortion. Minimizing distortion effects is crucial; any distortion to the optic is transmitted to the light that is reflected from it.

Placing the 3-point mounting forces perpendicular to the face of the optic and indexing them directly opposite each other minimizes bending moments on the optic, thus reducing optic distortion. Typical 360° face mounts and side-located setscrew mounts create bending moments that cause optic distortion as seen in the drawings below. Spring loading the optic allows one to gradually tune the retention force, dampening stresses caused by temperature changes, and it provides a soft means of compensating for variances in manufacturing that can further produce stress on the optic. The finite element analysis results shown below show the displacement, stress, and strain applied to the optic for 20 oz-in of torque applied to the retaining ring of our POLARIS-K05F6 and POLARIS-K1F6 mounts, and 10 oz-in of torque applied to the setscrew of the equivalent standard setscrew mount. The POLARIS-K05F1 and POLARIS-K05F2 use the same front plate as the POLARIS-K05F6 and will show similar performance. The POLARIS-K1F1, POLARIS-K1F2, and Ø2" low-distortion Polaris mounts also have a similar design and therefore will show similar performance to the POLARIS-K1F6.

Simulation Results for POLARIS-K05F6 Ø1/2" Low-Distortion Mount

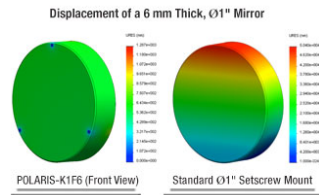


[Click for Details](#)

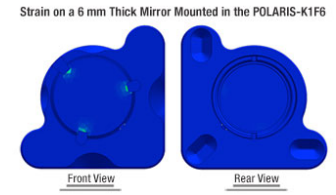


[Click for Details](#)

Simulation Results for POLARIS-K1F6 Ø1" Low-Distortion Mount*



[Click for Detail](#)



[Click to Enlarge](#)

* The POLARIS-K1F1, POLARIS-K1F2, and Ø2" low-distortion Polaris mounts will show similar performance to the POLARIS-K1F6.

Optical Distortion Testing Using a ZYGO Phase-Shifting Interferometer

A ZYGO Phase-Shifting Interferometer was used to perform wavefront distortion measurements on the Ø1/2" and Ø1" Polaris Low-Distortion Mirror Mounts. The results of these tests can be found below.

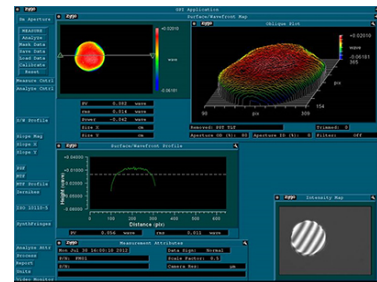
Ø1/2" Mounts

Procedure

A BB05-E02 Ø1/2" Broadband Dielectric Mirror was installed into a Polaris-K05F6 Low-Distortion Kinematic Mount using the procedure detailed in the *Optic Installation* tab; that is, the retaining ring was tightened until the spring was fully compressed, and then the retaining ring was loosened a half turn. The mount was then secured to a Ø1" stainless steel post using an 8-32 cap screw tightened to a torque of 16 in-lb. The Zygo interferometer aperture outer diameter was set to 80% for these measurements.

Results

As seen in the image to the right, the wavefront distortion was found to remain at or below 0.1λ.



[Click to Enlarge](#)

Ø1" Mounts

Procedure

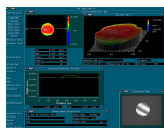
A BB1-E02 Ø1" Broadband Dielectric Mirror was installed into a Polaris-K1F6 Low-Distortion Kinematic Mount using the procedure detailed in the *Optic Installation* tab; that is, the retaining ring was tightened until the spring was fully compressed, and then the retaining ring was loosened. The test was repeated with the retaining ring at several locations as shown in the table to the right. The mount was then secured to a Ø1" stainless steel post using an 8-32 cap screw tightened to a torque of 16 in-lb.

Results

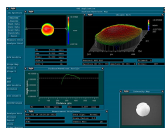
As seen in the image to the right, the wavefront distortion was found to remain at or below 0.1λ.

| Polaris-K1F6 Wavefront Distortion Test Results | |
|--|--|
| # of Turns the Retaining Ring was Loosened | Wavefront Distortion (Peak to Valley) ^a |
| 1/4 Turn | 0.097λ |
| 1/2 Turn | 0.09λ |
| 3/4 Turn | 0.083λ |
| 1 Turn | 0.081λ |
| 1.25 Turns | 0.071λ |
| 1.5 Turns | 0.062λ |
| 1.75 Turns | 0.053λ |
| 2 Turns | 0.033λ |

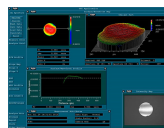
- The Zygo interferometer aperture outer diameter was set to 90% for these measurements.



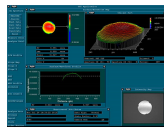
Click to Enlarge
Retaining Ring Loosened a
1/4 Turn



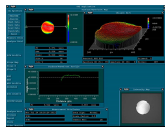
Click to Enlarge
Retaining Ring Loosened a
1/2 Turn



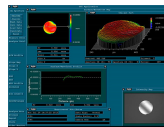
Click to Enlarge
Retaining Ring Loosened a
3/4 Turn



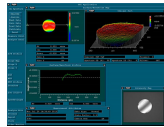
Click to Enlarge
Retaining Ring Loosened 1
Turn



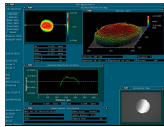
Click to Enlarge
Retaining Ring Loosened
1.25 Turns



Click to Enlarge
Retaining Ring Loosened
1.5 Turns



Click to Enlarge
Retaining Ring Loosened
1.75 Turns



Click to Enlarge
Retaining Ring Loosened 2
Turns

Ø2" Mounts

Procedure

A BB2-E02 Ø2" Broadband Dielectric Mirror was installed into a Polaris-K2F Low-Distortion Kinematic Mount using the procedure detailed in the *Optic Installation* tab; that is, the retaining ring was tightened until the spring was fully compressed, and then the retaining ring was loosened. The test was repeated with the retaining ring at several locations as shown in the table to the right. The mount was then secured to a Ø1" stainless steel post using an 8-32 cap screw tightened to a torque of 16 in-lb.

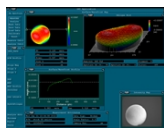
Results

As seen in the table to the right, the wavefront distortion was found to remain at or below 0.133λ.

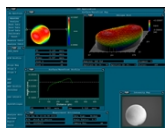
Polaris-K2F Wavefront Distortion Test Results

| # of Turns the Retaining Ring was Loosened | Wavefront Distortion (Peak to Valley) ^a |
|--|--|
| 1/4 Turn | 0.123λ to 0.133λ |
| 1/2 Turn | 0.122λ to 0.124λ |
| 3/4 Turn | 0.111λ to 0.116λ |
| 1 Turn | 0.100λ to 0.106λ |
| 1.25 Turns | 0.094λ to 0.098λ |
| 1.5 Turns | 0.095λ to 0.099λ |
| 1.75 Turns | 0.086λ to 0.094λ |
| 2 Turns | 0.082λ to 0.089λ |

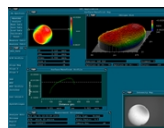
- The Zygo interferometer aperture outer diameter was set to 90% for these measurements.



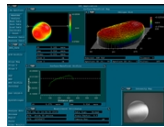
Click to Enlarge
Retaining Ring Loosened a
1/4 Turn



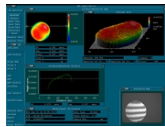
Click to Enlarge
Retaining Ring Loosened a
1/2 Turn



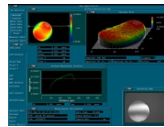
Click to Enlarge
Retaining Ring Loosened a
3/4 Turn



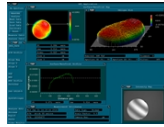
Click to Enlarge
Retaining Ring Loosened 1
Turn



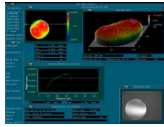
Click to Enlarge
Retaining Ring Loosened
1.25 Turns



Click to Enlarge
Retaining Ring Loosened
1.5 Turns



Click to Enlarge
Retaining Ring Loosened
1.75 Turns



Click to Enlarge
Retaining Ring Loosened 2
Turns

T H E R M A L T E S T D A T A

Positional Repeatability After Thermal Shock

This testing was done to determine how reliably the mount returns the mirror, without hysteresis, to its initial position so that the alignment of the optical system is unaffected by the temperature shock. During the testing phase, the Polaris kinematic mirror mount was attached to a Ø1" stainless steel post secured to a stainless steel optical breadboard in a temperature-controlled environment. Each mount was secured to the post by an 8-32 cap screw with 16 in-lb of torque. The mirror was mounted (not glued) in the mirror mount, and 8 oz-in of torque was applied to the retaining ring for the Ø1/2" and Ø1" mounts. The Ø2" mounts had the retaining ring backed out by 1.25 turns from optic contact; please see the *Optic Installation* tab for why a torque wrench was not used with our Ø2" mounts. The beam from an independently temperature-stabilized diode laser was reflected off the mirror's surface onto a position sensing detector.

Procedure:

The temperature of each mirror mount tested was raised to 37 °C. The elevated temperature was maintained in order to soak the mount at a constant temperature. Then the temperature of the mirror mount was returned to the starting temperature. The results of these tests are shown below.

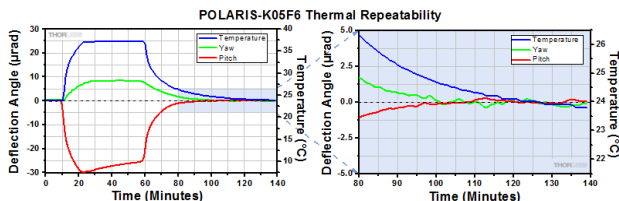
Results:

As can be seen in the plots below, when the Polaris low-distortion mounts were returned to the initial temperature, the angular position (both pitch and yaw) of the mirrors returned to within 2 µrad of the initial position. The performance of the Polaris mounts was tested further by subjecting each mount to repeated temperature change cycles. After each cycle, the mirror's position reliably returned to within 2 µrad of its initial position.

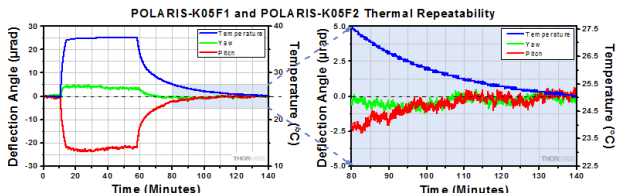
For Comparison:

To get a 1 µrad change in the mount's position, the 100 TPI adjuster on the POLARIS-K1F6 mount needs to be rotated by only 0.05° (1/7200 of a turn). A highly skilled operator might be able to make an adjustment as small as 0.3° (1/1200 of a turn), which corresponds to 6 µrad.

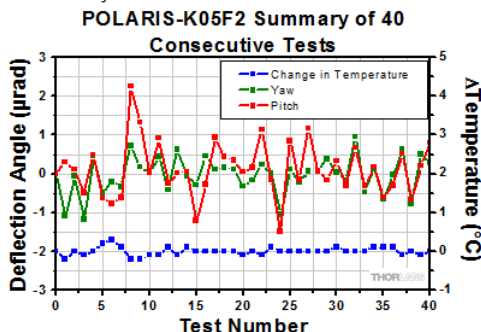
Ø1/2" Mounts



Click to Enlarge
3-Adjuster Low-Distortion Mount



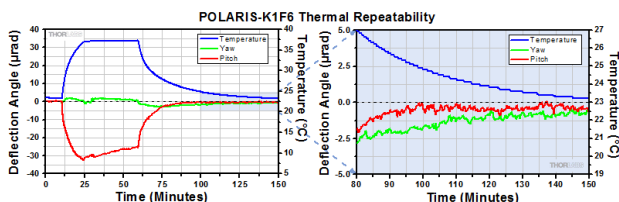
Click to Enlarge
2-Adjuster Low-Distortion Mount



Click to Enlarge

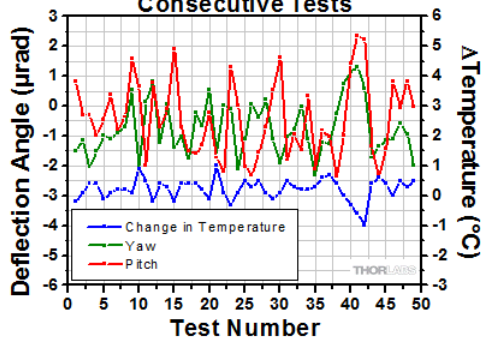
The plot above shows the final angular position of the POLARIS-K05F2 for 40 consecutive thermal shock tests. The change in temperature is the difference between the starting temperature and the temperature at the end of the test and includes factors such as the variation in room temperature.

Ø1" Mounts



Click to Enlarge
3-Adjuster Low-Distortion Mount

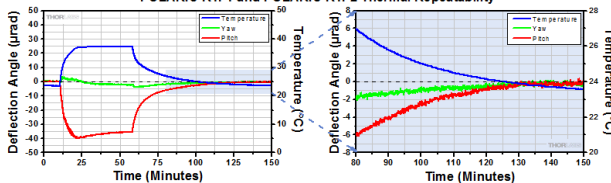
POLARIS-K1F6 Summary of 49 Consecutive Tests



Click to Enlarge

The plot above shows the final angular position of the POLARIS-K1F6 for 49 consecutive thermal shock tests. The change in temperature is the difference between the starting temperature and the temperature at the end of the test and includes factors such as the variation in room temperature.

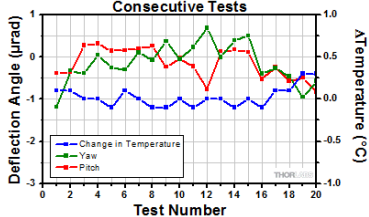
POLARIS-K1F1 and POLARIS-K1F2 Thermal Repeatability



Click to Enlarge

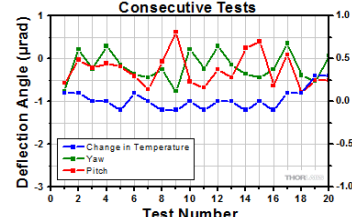
2-Adjuster Low-Distortion Mount

POLARIS-K1F1 Summary of 20 Consecutive Tests



Click to Enlarge

POLARIS-K1F2 Summary of 20 Consecutive Tests

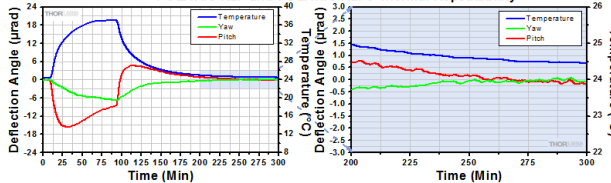


Click to Enlarge

The plots above show the final angular position of the POLARIS-K1F1 and POLARIS-K1F2 for 20 consecutive thermal shock tests. The change in temperature is the difference between the starting temperature and the temperature at the end of the test and includes factors such as the variation in room temperature.

Ø2" Mounts

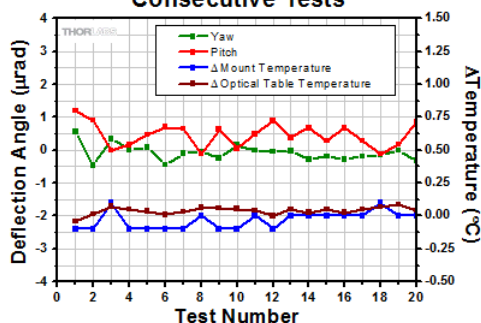
POLARIS-K2F and POLARIS-K2F3 Thermal Repeatability



Click to Enlarge

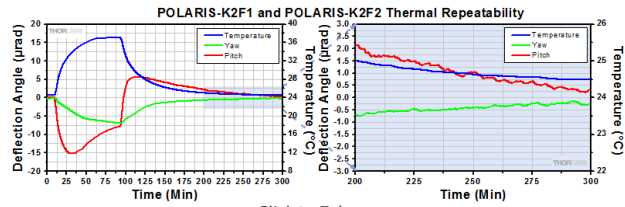
3-Adjuster Low-Distortion Mount

POLARIS-K2F Summary of 20 Consecutive Tests



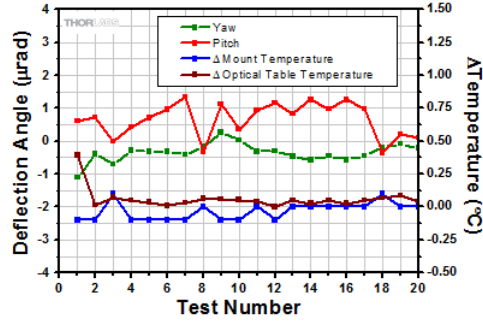
Click to Enlarge

The plot above shows the final angular position of the POLARIS-K2F for 20 consecutive thermal shock tests. The change in temperature is the difference between the starting temperature and the temperature at the end of the test and includes factors such as the variation in room temperature.



Click to Enlarge
2-Adjuster Low-Distortion Mount

POLARIS-K2F1 Summary of 20 Consecutive Tests



Click to Enlarge

The plot above shows the final angular position of the POLARIS-K2F1 for 20 consecutive thermal shock tests. The change in temperature is the difference between the starting temperature and the temperature at the end of the test and includes factors such as the variation in room temperature.

USAGE TIPS



Click to Enlarge
POLARIS-K05F6 mounted on a
Ø1", stainless steel
pedestal post.

Polaris™ kinematic mirror mounts are specifically designed to provide excellent performance under thermal changes and vibrations. Below are some usage tips to ensure that the mount provides optimal performance.

Match Materials

Due to its relatively low coefficient of thermal expansion, stainless steel was chosen as the material from which to fabricate the front back plates of the Polaris mounts. When mounting, we recommend using components fabricated from the same material, such as our Ø1" stainless steel posts of posts.

Mounting Options

If post mounting a Polaris mount, we recommend using a stainless steel post such as our Ø1" stainless steel posts or Ø1" post extensions with our POLARIS-CA1 Clamping Arm. By choosing components fabricated from the same material as the mount itself, all expansions and contractions will occur at the same rate. In addition, it is best to use the shortest post possible. Alternatively, mount the Polaris directly onto a flat surface such as a breadboard using a 1/4"-20 to 8-32 thread adapter (Item # AE8E25E) or M6 to M4 thread adapter (Item # AE4M6M), which results in even better performance. Ensure that the mounting surface is highly flat, polished, and free of debris or scratches.

Mount Alignment

During alignment, minimized deflection will be achieved if the mount's front plate is kept parallel to the base plate. This ensures even thermal expansion of all the adjustment screws, causing the mounted mirror to translate in the Z direction as opposed to rotating during temperature changes.

To install the POLARIS-LN1 lock nut without cross threading, gently place the lock nut against the end of the adjuster. "Unscrew" the nut until the threads of the nut and the adjuster align before threading the nut onto the adjuster.

Front Plate's Position

Although the mount is designed to allow adjustments of up to 6.8° for the Ø2" mounts, 8° for the Ø1" mounts, and 10° for the Ø1/2" mounts, 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.

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 using a polishing stone to clean the table's surface and a polishing pad for the top and bottom of the post as well as the bottom of the mount.

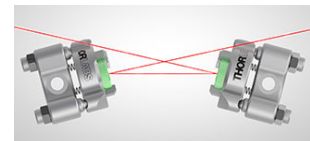
Not Recommended

We do not recommend taking the adjusters out of the body, as it can introduce contamination to the threading, which can consequently reduce the fine adjustment performance significantly. Also, do not pull the front plate away as it might stretch the springs beyond their operating range or crack the sapphire seats. Finally, do not over tighten the retaining ring that secures the indexed spring that holds the optic in place; only slight force is required to secure the optic in place. For more information, please see the *Low Distortion* tab. Do not adjust or remove the spring-loaded ball contact in the faceplate of the Ø1" or Ø2" Polaris mounts; the correct position is set at the factory.

Adjuster Lock Nuts

The 3-adjuster POLARIS-K05F6 and POLARIS-K1F6 come with lock nuts pre-installed, as does the 2-adjuster POLARIS-K05F2. However, the POLARIS-LN1 lock nuts for other Polaris mounts are available separately below. Lock nuts only need to be lightly tightened to a torque of approximately 4 to 8 oz-in (0.03 to 0.06 N·m). The beam can be held on target with the adjuster thumbscrew or hex key while lightly tightening the lock nut by hand or with a thin-head wrench or cone wrench. To avoid cross threading the lock nut, place it against the adjuster and "unscrew" the lock nut until you feel a slight drop; then thread the lock nut onto the adjuster. Each lock nut is pre-greased with the same ultra-high-vacuum-compatible, low-outgassing PTFE grease as the Polaris mounts and has been tested for adjuster fit.

Click to
Enlarge



Low Incident Angles

The recessed edge of our Polaris Low-Distortion Mounts make them ideal for applications requiring low angles of incidence. The illustration to the right shows two Polaris Low-Distortion Mounts with Ø1/2" mirrors (green) used at a near-normal incident angle.

POLARIS FAMILY

Thorlabs offers several different general varieties of Polaris mounts, including kinematic low drift, SM threaded, low optic distortion, piezo actuated, and glue-in optic mounts, as well as a fixed monolithic mirror mount and fixed optic mounts. The tables below compare the features of all of our Polaris mirror mounts. We also offer a line of accessories that have been specifically designed for use with our Polaris mounts; these are listed in the table to the right.

Accessories for Polaris Mounts

| |
|-------------------------------------|
| Ø1" Posts for Polaris Mirror Mounts |
| Polaris Clamping Arm |
| Polaris 45° Adapter |

| | |
|---------------------------------|----------|
| Polaris Mounts for Ø1/2" Optics | More [+] |
|---------------------------------|----------|

| | |
|---|----------|
| Polaris Mounts for Ø19 mm (3/4") Optics | More [+] |
|---|----------|

| | |
|-------------------------------|----------|
| Polaris Mounts for Ø1" Optics | More [+] |
|-------------------------------|----------|

| | |
|-------------------------------|----------|
| Polaris Mounts for Ø2" Optics | More [+] |
|-------------------------------|----------|

| | |
|----------------------------------|----------|
| Polaris Kinematic Platform Mount | More [+] |
|----------------------------------|----------|


Ø1/2" Low-Distortion Kinematic Mount, 3 Adjusters

- ▶ Hex-Driven Low-Distortion Mount Designed for Ø1/2" Optics^a
- ▶ 130 TPI Matched Actuator / Body Pairs
- ▶ Adjusters Feature Lock Nuts
- ▶ All-Stainless-Steel, Matched CTE Construction
- ▶ Less than 2 µrad Deviation after Temperature Cycling (See *Test Data* Tab)

This Ø1/2" Polaris Low-Distortion Mirror Mount is designed to minimize optic distortion and provide long-term stability. This mount is equipped with a three-point contact faceplate to mount the optic. The indexed optic retention spring makes contact with the optic at three locations, while the retaining ring has a calibrated adjustment stop to assist in providing the correct mounting torque. See the *Optic Installation* and *Low Distortion* tabs above for details.

The POLARIS-K05F6 kinematic mirror mount is sold with one indexed optic retention spring (POLARIS-K05WS) and one retaining ring (POLARIS-SM05RRS40). These items are also available below for purchase separately should replacements be required.

The 5/64" hex actuators may be adjusted with our HKTS-5/64 Hex Key Thumbscrew (sold below) or any other 5/64" hex wrench. The mount includes three adjuster lock nuts. Lock nuts only need to be lightly preloaded to a torque of approximately 4 to 8 oz-in. The beam can be held on target with a hex key while lightly tightening the lock nut by hand or with a 6 mm open-ended wrench.

Post mounting is provided by two #8 (M4) counterbored holes at 90°. Due to the shallow design of the counterbore, low-profile 8-32 and M4 cap screws are included for securing the mount to a post without obstructing the transmissive beam path. The 8-32 cap screw accepts a 5/64" hex wrench, while the M4 cap screw accepts a 2.5 mm hex wrench. For custom mounting configurations, Ø2 mm alignment pin holes are located on both sides of each counterbore for setting a precise location and mounting angle. Standard DIN 7-m6 ground dowel pins are recommended; see the Docs icon () below for details.

a. Please note that these mounts are designed for Ø1/2" Optics and are not intended for use with the Ø12.5 mm metric mirror size. To order a mount designed for metric optics, please contact Tech Support.

| Part Number | Description | Price | Availability |
|-------------------|---|----------|--------------|
| POLARIS-K05F6 | Customer Inspired! Polaris™ Low Distortion Ø1/2" Mirror Mount, 3 Hex Adjusters with Lock Nuts | \$195.00 | Today |
| POLARIS-K05WS | Replacement Ø1/2" Indexed Wave Spring for POLARIS-K05F Series | \$7.00 | Today |
| POLARIS-SM05RRS40 | Replacement Ø1/2" Retaining Ring with 0.040" Adj. Stop for POLARIS-K05F Series | \$12.00 | Today |

Ø1/2" Low-Distortion Kinematic Mounts, 2 Adjusters

- ▶ 2-Adjuster Low-Distortion Mounts Designed for Ø1/2" Optics^a
- ▶ Hex-Driven Design
- ▶ 130 TPI Matched Actuator / Body Pairs
- ▶ Low-Profile or Standard-Profile Adjusters
- ▶ All-Stainless-Steel, Matched CTE Construction
- ▶ Less Than 2 μ rad Deviation after Temperature Cycling (See *Test Data* Tab)



Click to Enlarge
POLARIS-K05F1 2-Low-Profile-Adjuster, Low-Distortion Mount

These 2-adjuster Ø1/2" Polaris Kinematic Mirror Mounts are similar to the standard 3-adjuster version sold above but feature a hardened steel ball in place of the third adjuster. They use an integrated, stainless-steel, matched adjuster/body design for greater durability than standard mirror mounts. The POLARIS-K05F2 mount has standard-profile 5/64" hex adjusters and includes two adjuster lock nuts. For fitting into tight spaces, the POLARIS-K05F1 mount is equipped with low-profile hex actuators that are 0.15" (3.8 mm) shorter than the adjusters on the POLARIS-K05F2; due to the shorter actuators, the POLARIS-K05F1 does not include lock nuts.

Our Polaris 2-adjuster mounts are sold with one indexed optic retention spring (POLARIS-K05WS) and one retaining ring (POLARIS-SM05RRS40). These items are also available below for purchase separately should replacements be required.

The 5/64" hex actuators may be adjusted with our HKTS-5/64 Hex Key Thumbscrew (sold below) or any other 5/64" hex wrench. Lock nuts on the POLARIS-K05F2 only need to be lightly preloaded to a torque of approximately 4 to 8 oz-in. The beam can be held on target with a hex key while lightly tightening the lock nut by hand or with a 6 mm open-ended wrench.

Post mounting is provided by two #8 (M4) counterbored holes at 90°. Due to the shallow design of the counterbore, low-profile 8-32 and M4 cap screws are included for securing the mount to a post without obstructing the transmissive beam path. The 8-32 cap screw accepts a 5/64" hex wrench, while the M4 cap screw accepts a 2.5 mm hex wrench. For custom mounting configurations, Ø2 mm alignment pin holes are located on both sides of each counterbore for setting a precise location and mounting angle. Standard DIN 7-m6 ground dowel pins are recommended; see the Docs icon (📄) below for details.

a. Please note that these mounts are designed for Ø1/2" Optics and are not intended for use with the Ø12.5 mm metric mirror size. To order a mount designed for metric optics, please contact Tech Support.

| Part Number | Description | Price | Availability |
|-------------------|--|----------|--------------|
| POLARIS-K05F1 | Polaris™ Low Distortion Ø1/2" Mirror Mount, 2 Low-Profile Hex Adjusters | \$150.00 | Today |
| POLARIS-K05F2 | Polaris™ Low Distortion Ø1/2" Mirror Mount, 2 Hex Adjusters with Lock Nuts | \$170.00 | Today |
| POLARIS-K05WS | Replacement Ø1/2" Indexed Wave Spring for POLARIS-K05F Series | \$7.00 | Today |
| POLARIS-SM05RRS40 | Replacement Ø1/2" Retaining Ring with 0.040" Adj. Stop for POLARIS-K05F Series | \$12.00 | Today |

Ø1" Polaris Low-Distortion Kinematic Mount, 3 Adjusters

- ▶ Knob-Driven Low-Distortion Mount Designed for Ø1" Optics^a
- ▶ 100 TPI Matched Actuator / Body Pairs
- ▶ Adjusters Feature Removable Knobs and Lock Nuts
- ▶ All-Stainless-Steel, Matched CTE Construction
- ▶ Less Than 2 μ rad Deviation after Temperature Cycling (See the *Test Data* Tab)

This Ø1" Polaris Low-Distortion Mirror Mount is designed to minimize optic distortion and provide long-term stability. This mount features a three-point contact faceplate to mount the optic. The indexed optic retention spring makes contact with the optic at three locations, while the retaining ring has a calibrated adjustment stop to assist in providing the correct mounting torque. See the *Optic Installation* and *Low Distortion* tabs above for details. One of the three contact points of the faceplate incorporates a spring-loaded ball contact that also provides an adjustable mounting surface to further limit optic distortion; this is pictured in yellow in the cutaway diagram in the top of the *Overview* tab. Please note that this ball contact is factory set and it should not be adjusted or removed.

The POLARIS-K1F6 kinematic mirror mount is sold with one indexed optic retention spring (POLARIS-K1WS) and one retaining ring (POLARIS-SM1RRS40). These items are also available below for purchase separately should replacements be required.

The 5/64" hex actuators may be adjusted with our HKTS-5/64 hex key thumbscrew, or any other 5/64" hex wrench. The mount includes three adjuster lock nuts that are also available separately below. Lock nuts only need to be lightly preloaded to a torque of approximately 4 to 8 oz-in (0.03 to 0.06 N-m). The beam can be held on target with the adjuster thumbscrew or hex key while lightly tightening the lock nut by hand or with a 12 mm hex open-ended wrench.

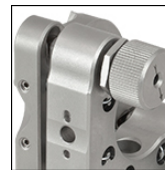
Post mounting is provided by two #8 (M4) counterbored holes at 90°. 8-32 and M4 cap screws are included. For custom mounting configurations, Ø2 mm alignment pin holes are located on both sides of each counterbore for setting a precise location and mounting angle. Standard DIN 7-m6 ground dowel pins are recommended; see the Docs icon (📄) below for details.

a. Please note that these mounts are designed for Ø1" Optics and are not intended for use with the Ø25 mm metric mirror size. To order a mount designed for metric optics, please contact Tech Support.

| Part Number | Description | Price | Availability |
|------------------|---|----------|--------------|
| POLARIS-K1F6 | Customer Inspired! Polaris™ Low Distortion Ø1" Mirror Mount, 3 Adjusters with Lock Nuts | \$299.00 | Lead Time |
| POLARIS-K1WS | Replacement Ø1" Indexed Wave Spring for POLARIS-K1F Series | \$8.00 | Today |
| POLARIS-SM1RRS40 | Replacement Ø1" Retaining Ring with 0.040" Adj. Stop for POLARIS-K1F Series | \$18.00 | Today |

Ø1" Polaris Low-Distortion Kinematic Mounts, 2 Adjusters

- ▶ 2-Adjuster Low-Distortion Mount Designed for Ø1" Optics^a
- ▶ Knob- or Hex-Driven Design
- ▶ 100 TPI Matched Actuator / Body Pairs
- ▶ All-Stainless-Steel, Matched CTE Construction
- ▶ Less Than 2 µrad Deviation after Temperature Cycling (See *Test Data* Tab)
- ▶ Knobs are Removable



Click to Enlarge POLARIS-K1F1 with POLARIS-LN1 lock nut installed. Two dowel pin holes on either side of the #8 counterbore are visible on the side of the mount.



POLARIS-K1F2 Mirror Not Included
Click to Enlarge POLARIS-K1F2 2-Adjuster, Hex-Driven, Low-Distortion Mount

These 2-adjuster Ø1" Polaris Kinematic Mirror Mounts are similar to the standard 3-adjuster version sold above but feature a hardened steel ball in place of the third adjuster. They use an integrated matched adjuster/body design for greater durability. Both knob- and hex-driven versions of the 2-adjuster mount are available. These mounts have undergone extensive testing to ensure high-quality performance.

Each of these Polaris 2-adjuster kinematic mirror mounts is sold with one indexed optic retention spring (POLARIS-K1WS) and one retaining ring (POLARIS-SM1RRS40). These items are also available below for purchase separately should replacements be required.

The knobs on the POLARIS-K1F1 100 TPI adjusters are removable; with the knobs removed, the position can be adjusted with our HKTS-5/64 hex key thumbscrew (sold below), or any other 5/64" hex wrench. The adjusters can be locked using POLARIS-LN1 Lock Nuts, which are available below. Post mounting is provided by two #8 (M4) counterbored holes at 90°. 8-32 and M4 cap screws are included. For custom mounting configurations, Ø2 mm alignment pin holes are located on both sides of each counterbore for setting a precise location and mounting angle. Standard DIN 7-m6 ground dowel pins are recommended; see the Docs icon (📄) below for details.

a. Please note that these mounts are designed for Ø1" Optics and are not intended for use with the Ø25 mm metric mirror size. To order a mount designed for metric optics, please contact Tech Support.

| Part Number | Description | Price | Availability |
|------------------|---|----------|--------------|
| POLARIS-K1F1 | Polaris™ Low Distortion Ø1" Mirror Mount, 2 Adjusters | \$219.00 | Lead Time |
| POLARIS-K1F2 | Polaris™ Low Distortion Ø1" Mirror Mount, 2 Hex Adjusters | \$204.00 | Lead Time |
| POLARIS-K1WS | Replacement Ø1" Indexed Wave Spring for POLARIS-K1F Series | \$8.00 | Today |
| POLARIS-SM1RRS40 | Replacement Ø1" Retaining Ring with 0.040" Adj. Stop for POLARIS-K1F Series | \$18.00 | Today |

Ø2" Polaris Low-Distortion Kinematic Mount, 3 Adjusters

- ▶ 3-Adjuster Low-Distortion Mount Designed for Ø2" Optics^a
- ▶ Removable Knob- or Hex-Driven Design
- ▶ 100 TPI Matched Actuator / Body Pairs
- ▶ All-Stainless-Steel, Matched CTE Construction
- ▶ Less Than 2 µrad Deviation after Temperature Cycling (See the *Test Data* Tab)
- ▶ Adjusters can be Locked Using POLARIS-LN1 Lock Nuts



Click to Enlarge POLARIS-K2F with POLARIS-LN1 lock nut installed. Two dowel pin holes and #8 counterbores are visible on the side of the mount.



POLARIS-K2F3 Mirror Not Included
Click to Enlarge POLARIS-K2F3 3-Adjuster, Low-Distortion Mount

This Ø2" Polaris Low-Distortion Mirror Mount is designed to minimize optic distortion and provide long-term stability. This mount features a three-point contact faceplate to mount the optic. The indexed optic retention spring makes contact with the optic at three locations, while the retaining ring has a calibrated adjustment stop to assist in providing the correct mounting torque. See the *Optic Installation* and *Low Distortion* tabs above for details. One of the three contact points of the faceplate incorporates a spring-loaded ball contact that also provides an adjustable mounting surface to further limit optic distortion; this is pictured in yellow in the cutaway diagram in the top of the *Overview* tab. Please note that this ball contact is factory set and it should not be adjusted or removed.

Each kinematic mirror mount is sold with one indexed optic retention spring (POLARIS-K2WS) and one retaining ring (POLARIS-SM2RRS70). These items are also available below for purchase separately should replacements be required.

The knobs on the POLARIS-K2F 100 TPI adjusters are removable; with the knobs removed, the position can be adjusted with our HKTS-5/64 hex key thumbscrew (sold below), or any other 5/64" hex wrench. The adjusters can be locked using POLARIS-LN1 Lock Nuts, which are available below. Post mounting is provided by four #8 (M4) counterbored holes. 8-32 and M4 cap screws are included. For custom mounting configurations, Ø2 mm alignment pin holes are located on both sides of each counterbore for setting a precise location and mounting angle. Standard DIN 7-m6 ground dowel pins are recommended; see the Docs icon (📄) below for details.

a. Please note that these mounts are designed for Ø2" Optics and are not intended for use with the Ø50 mm metric mirror size. To order a mount designed for metric optics, please contact Tech Support.

| Part Number | Description | Price | Availability |
|------------------|---|----------|--------------|
| POLARIS-K2F | Polaris™ Low Distortion Ø2" Mirror Mount, 3 Adjusters | \$305.00 | Today |
| POLARIS-K2F3 | Polaris™ Low Distortion Ø2" Mirror Mount, 3 Hex Adjusters | \$290.00 | Today |
| POLARIS-K2WS | Replacement Ø2" Indexed Wave Spring for POLARIS-K2F Series | \$16.00 | Today |
| POLARIS-SM2RRS70 | Replacement Ø2" Retaining Ring with 0.070" Adj. Stop for POLARIS-K2F Series | \$18.00 | Today |

Ø2" Polaris Low-Distortion Kinematic Mount, 2 Adjusters

- ▶ 2-Adjuster Low-Distortion Mount Designed for Ø2" Optics^a
- ▶ Removable Knob- or Hex-Driven Design
- ▶ 100 TPI Matched Actuator / Body Pairs
- ▶ All-Stainless-Steel, Matched CTE Construction
- ▶ Less Than 2 µrad Deviation after Temperature Cycling (See the *Test Data* Tab)
- ▶ Adjusters can be Locked Using POLARIS-LN1 Lock Nuts



Click to Enlarge POLARIS-K2F1 with POLARIS-LN1 lock nut installed. Two dowel pin holes on either side of the #8 counterbore are visible on the side of the mount.



Click to Enlarge POLARIS-K2F2 2-Adjuster, Low-Distortion Mount

These 2-adjuster Ø2" Polaris Kinematic Mirror Mounts are similar to the standard 3-adjuster version sold above but feature a hardened steel ball in place of the third adjuster. They use an integrated matched adjuster/body design for greater durability. Both knob- and hex-driven versions of the 2-adjuster mount are available. These mounts have undergone extensive testing to ensure high-quality performance.

Each kinematic mirror mount is sold with one indexed optic retention spring (POLARIS-K2WS) and one retaining ring (POLARIS-SM2RRS70). These items are also available below for purchase separately should replacements be required.

The knobs on the POLARIS-K2F1 100 TPI adjusters are removable; with the knobs removed, the position can be adjusted with our HKTS-5/64 hex key thumbscrew (sold below), or any other 5/64" hex wrench. The adjusters can be locked using POLARIS-LN1 Lock Nuts, which are available below. Post mounting is provided by four #8 (M4) counterbored holes. 8-32 and M4 cap screws are included. For custom mounting configurations, Ø2 mm alignment pin holes are located on both sides of each counterbore for setting a precise location and mounting angle. Standard DIN 7-m6 ground dowel pins are recommended; see the Docs icon (📄) below for details.

a. Please note that these mounts are designed for Ø2" Optics and are not intended for use with the Ø50 mm metric mirror size. To order a mount designed for metric optics, please contact Tech Support.

| Part Number | Description | Price | Availability |
|------------------|---|----------|--------------|
| POLARIS-K2F1 | Polaris™ Low Distortion Ø2" Mirror Mount, 2 Adjusters | \$290.00 | Today |
| POLARIS-K2F2 | Polaris™ Low Distortion Ø2" Mirror Mount, 2 Hex Adjusters | \$280.00 | Today |
| POLARIS-K2WS | Replacement Ø2" Indexed Wave Spring for POLARIS-K2F Series | \$16.00 | Today |
| POLARIS-SM2RRS70 | Replacement Ø2" Retaining Ring with 0.070" Adj. Stop for POLARIS-K2F Series | \$18.00 | Today |

1/4"-100 Large Adjustment Knob

- ▶ Ø0.925" Knob for Additional Angular Resolution
- ▶ Clearance Hole Allows Access to Hex Socket of the Adjuster

This removable adjustment knob is compatible with our 1/4"-100 adjusters, including those used in the Ø1" and Ø2" Polaris Kinematic Mounts and our Polaris Kinematic Platform Mount. The larger Ø0.925" size provides additional angular resolution over the standard Polaris knobs.



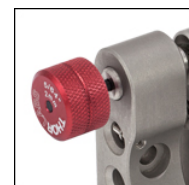
Click to Enlarge The F25USK2 Knob is Compatible with our Polaris Mounts

| Part Number | Description | Price | Availability |
|-------------|--|--------|--------------|
| F25USK2 | Ø0.925" 1/4"-100 Removable Adjuster Knob | \$8.20 | Today |

5/64" Hex Key Adjusters

- ▶ For Convenient Adjustment of 5/64" and 2 mm Hex-Driven Actuators
- ▶ Red Anodized Adjustment Knob with Engraved Hex Size
- ▶ Replaceable Hex Tip
- ▶ Sold in Packages of 4

These 5/64" Hex Key Adjuster Thumbscrews allow for quick adjustment of many 5/64" and 2 mm hex-driven actuators (or standard actuators with the knobs removed). These temporary knobs can be left in the screw's hex socket between adjustments for convenience (see photo to the right). An 8-32 setscrew (5/64" hex) secures the replaceable hex bit, which can be reversed if the tip is stripped. Contact Tech Support to order replacement hex key bits.



Click for Details POLARIS-K1-2AH with HKTS-5/64 Adjuster

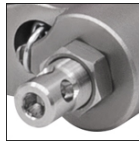
We offer hex key thumbscrews in sizes from 0.050" to 3/16" and 2 mm to 5 mm.

| Part Number | Description | Price | Availability |
|-------------|---|---------|--------------|
| HKTS-5/64 | Customer Inspired! 5/64" (2 mm) Hex Key Thumbscrew (4 Pack) | \$22.50 | Today |

Adjuster Lock Nuts for Polaris Mounts

- ▶ Lock Nuts for Long-Term Adjuster Stability
- ▶ Compatible with Select Polaris Mounts

These lock nuts are designed for use with any Polaris kinematic mount that does not contain low-profile adjusters. Designed for long-term adjuster stability or applications that are exposed to shock and vibration, these lock nuts are pre-greased with the same ultra-high-vacuum-compatible, low-outgassing PTFE grease as the Polaris mounts and have been tested for adjuster fit.



Click to Enlarge
POLARIS-LN05 Lock
Nuts on a POLARIS-
K19S4 Mount

To install a lock nut without cross threading, gently place the lock nut against the end of the adjuster. "Unscrew" the nut until the threads of the nut and the adjuster align before threading the nut onto the adjuster. This animation shows the installation of a POLARIS-LN1 lock nut on a POLARIS-K1F1 low distortion mount.

To secure the lock nut on an adjuster, lightly tighten to a torque of approximately 4 to 8 oz-in (0.03 to 0.06 N·m). The beam can be held on target with the adjuster thumbscrew or hex key while lightly tightening the lock nut by hand or with a thin-head wrench or cone wrench; POLARIS-LN05 lock nuts require a 6 mm hex tool for tightening, while POLARIS-LN1 lock nuts require a 13 mm hex tool. To avoid cross threading the lock nut, place it against the adjuster and "unscrew" the lock nut until you feel a slight drop; then thread the lock nut onto the adjuster.

| Part Number | Description | Price | Availability |
|---------------------|--|----------------|--------------|
| POLARIS-LN05 | 3/16"-130 Lock Nut, 6 mm Hex, Stainless Steel | \$12.00 | Today |
| POLARIS-LN1 | 1/4"-100 Lock Nut, 13 mm Hex, Stainless Steel | \$8.00 | Today |

Visit the *Polaris™ Low-Distortion Kinematic Mirror Mounts* page for pricing and availability information:
https://www.thorlabs.us/newgrouppage9.cfm?objectgroup_id=6356