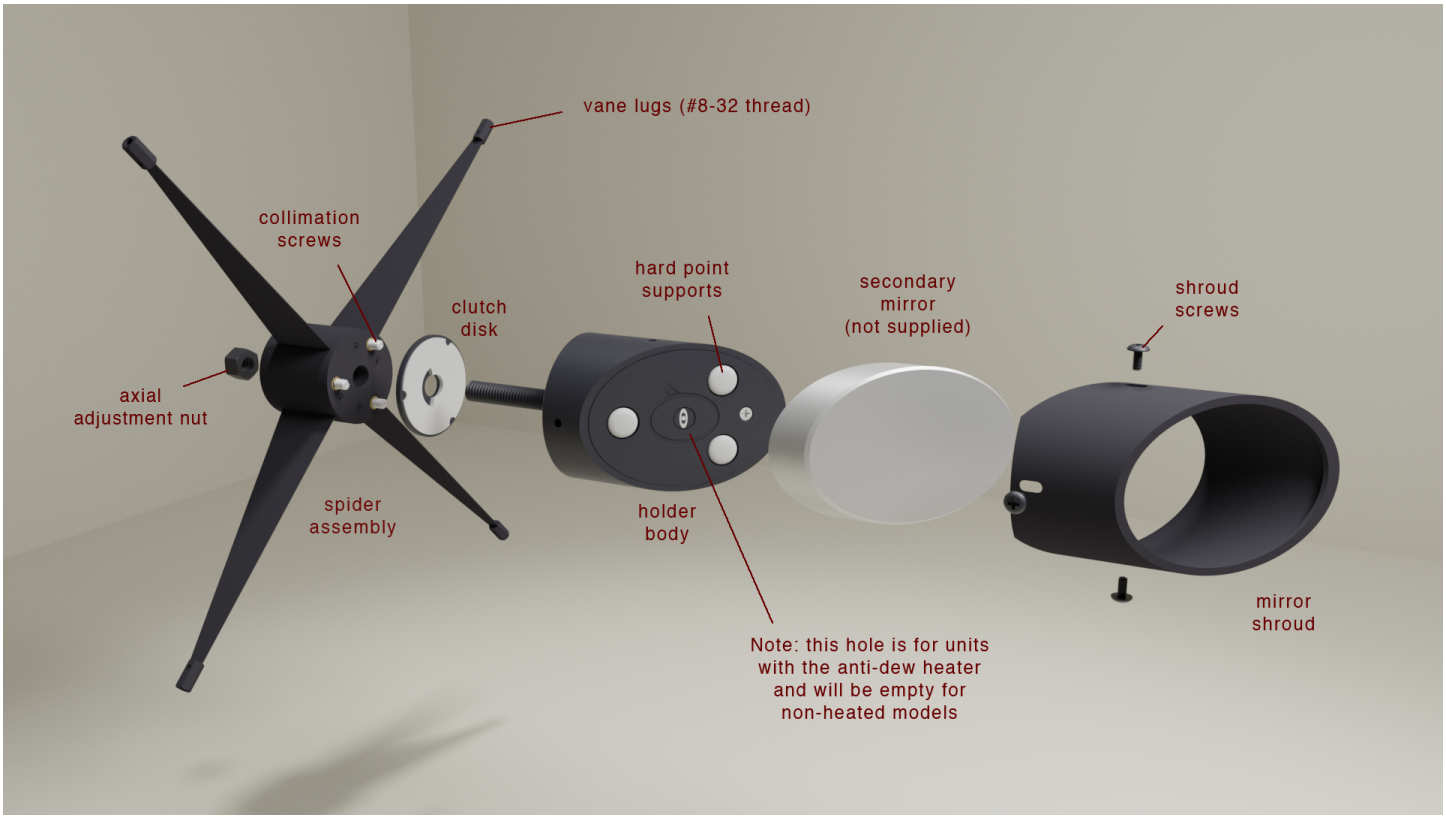
Model 2 Straight-vane Spider
Installation & Use Guide

Rev 6/23



Step 1: Install your secondary mirror into the holder

1. Remove the shroud screws and shroud.

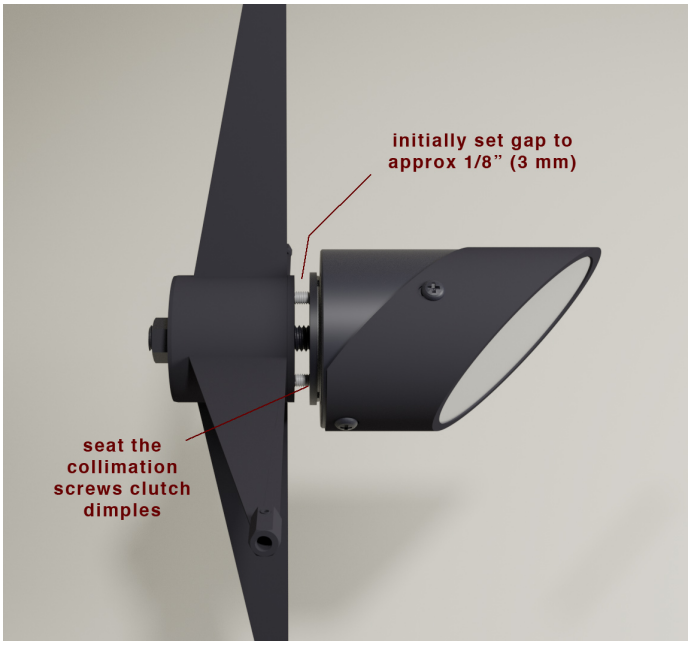
2. Wash your hands and trial fit the secondary mirror into the shroud. The mirror should slide freely within the shroud. If it does not, contact us (**protostar@fpi-protostar.com** or **614-375-3146**). Secondary mirrors are sometimes slightly larger than advertised, and we can provide a custom shroud. ***Forcing the mirror to fit can cause severe optical problems.***

3. Slide the mirror and shroud together over the holder body. Reinstall the shroud screws, and only lightly tighten the shroud retaining screws.

4. Wiggle the shroud to ensure the mirror is seated on the hard point supports and the shroud's slotted holes line up with the holes in the holder body.

5. Tighten the shroud screws.

Step 2: Join the holder and spider assemblies



6. Using the suppled L-wrench, adjust the three collimation screws until they are protruding from hub by approximately 1/8" (3 mm).

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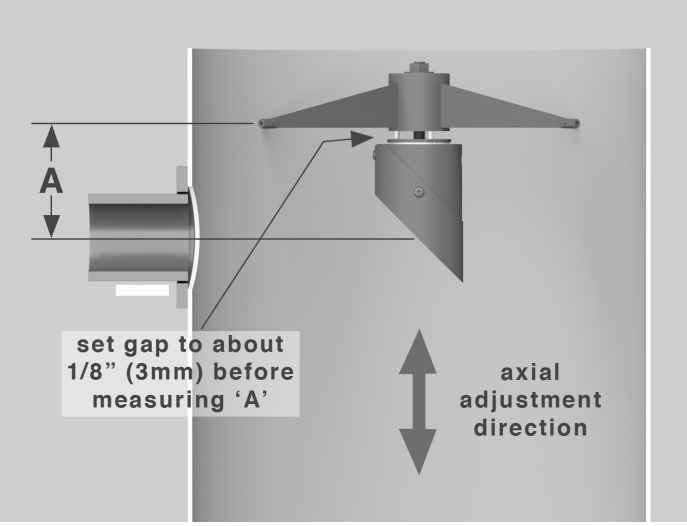
7. Insert the secondary holder into the spider. The collimation screw tips should be seated in the dimples on the clutch disk.

If your model is heated, pull the heater wire all the way out to more easily connect the micro-plug. Then push the heater wire into the holder body as you join the two assemblies.

8. Install the axial adjustment nut and finger tighten.

Step 3: Measure the overhang dimension



9. Measure your 'A' dimension with a ruler along the side of the spider and holder. This is the distance from the center of the mirror to the vane lugs. High precision isn't necessary since there is about 1/2" of total axial travel available for adjustment later. Larger spiders have two lugs for each vane, so also measure the spacing between the lugs.

10. Drill your tube or upper cage holes based on your measurements using a #19 (0.166") drill size.

Step 4: Install the spider

11. Install the spider and holder into the telescope using the supplied #8-32 screws. Use the screw lengths that permit the most engagement into the lugs at the tips of the vanes. Small amounts of spider offset can also be achieved by using a combination of the longer and shorter screws.

After installation and roughly centering the secondary mirror under the focuser, *the gap between the mirror holder and the spider's hub should be between 3 and 13 millimeters*. If the gap exceeds this then collimation stability may be adversely affected or you could run out of threads on the central stem. Please check this gap before proceeding!

For heated models...

If you're installing a heated spider in a **metal** tube, use the supplied plastic isolator bushings. Refer to the supplemental instructions **Anti-Dew Heater Installation & Use**.

First-time collimation

First-time collimation includes the extra steps of making the secondary mirror's axial and rotational adjustments. After the initial collimation, only minor tip-tilt tweaks with the collimation screws are typically needed in the field.

1. Using a sight tube or laser projection collimation tool, adjust the axial position of the secondary holder until it appears centered in the focuser. This is done by either tightening or loosening the axial adjustment nut to permit the mirror hold to slide to the proper position. It's important that the height of your eye be approximately where the focal plane is (usually just an inch or so above the focuser drawtube) or the perspective illusion will fool you. Finger tighten the axial adjustment nut to hold the mirror's position.

2. Rotate the mirror holder until the secondary mirror appears circular. When the secondary mirror appears circular and centered under the focuser, tighten all three collimation screws about one full turn to create tension in the holder's stem.

3. The telescope is now ready for your standard collimation practice. Tip-tilt adjustments with the collimation screws can be made independently (i.e., you don't have to loosen one in order to tighten another). Maintaining tension in the holder's central stem keeps your precise adjustments locked into place, and it works well under a wide range of stem tension.

Note to users more familiar with traditional "ball-and-socket" type holders: The purpose of the axial adjustment nut is to set the axial position (i.e., the direction to/from the primary mirror) of the secondary mirror to get it centered under the focuser. It only needs to be finger tightened. *It is not necessary to tighten this nut after you've achieved collimation.* This is an advantage of the Protostar design, since tightening the center nut on other designs usually throws off the collimation.