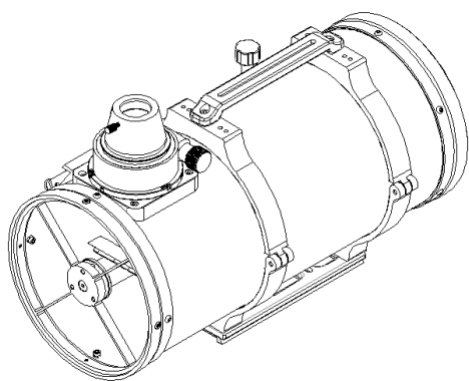


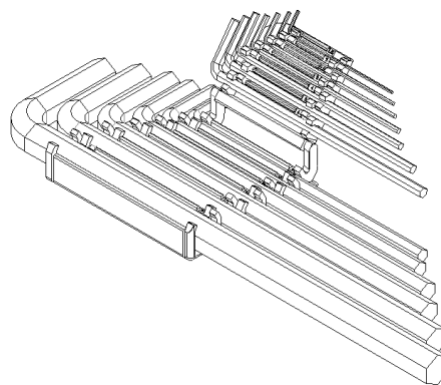
Collimation of the SharpStar 150HNT

【Preparation is Required before Collimation】

Sharpstar 150 Hyperboloid Newtonian Reflector, Allen Wrenches, Laser Calibrator, Crosshair Eyepiece, 150 Reducer-specific tool, Depth measuring tool.



Sharpstar 150 Hyperboloid Newtonian Reflector



Allen Wrench

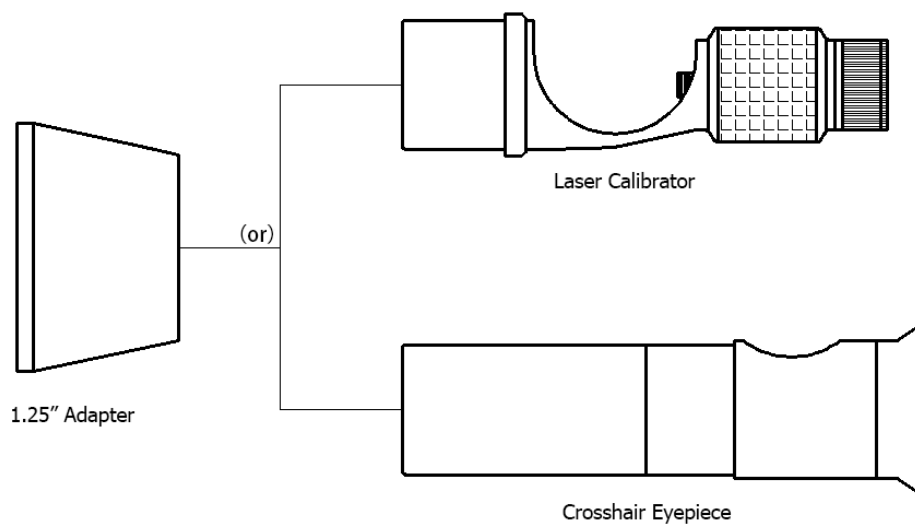


Laser Calibrator



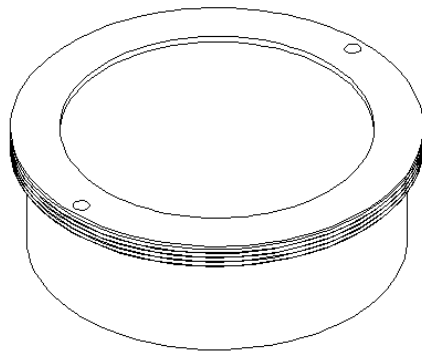
Crosshair Eyepiece

【Connection Way】

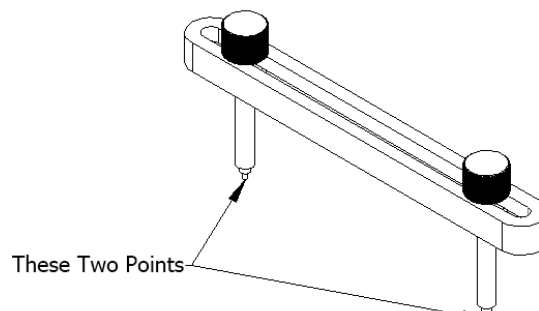


【Preparation for Collimation】

Owing to the existence of diopter in the reducer, the reducer assembly must be removed in order to collimate the 150HNT. Put the Reducer removing specific tool with its two sharp points into the two holes in the reducer group frame accordingly, and then turn the tool to take the reducer group off, now only unscrew Reducer assembly and Re-install connector ring to focuser and then conical 1.25" eyepiece adapter to focuser. Now follow the steps like collimating a Newtonian telescope but more precision adjustment required due to low focal ratio of Primary Mirror(F/2.8).



Reducer Group

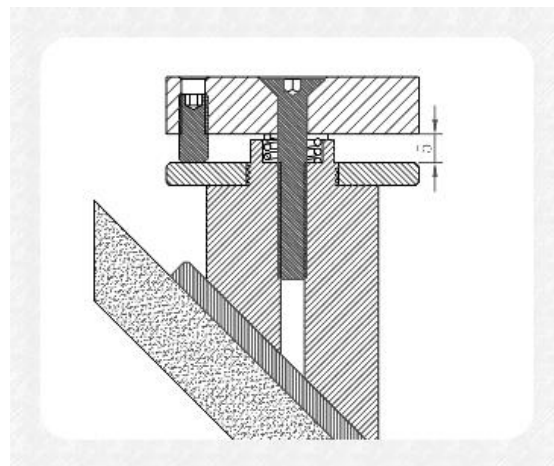


150 Reducer-specific Tool

STEP 1:

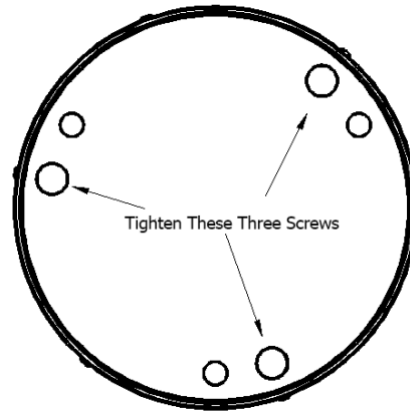
Collimation is critical to obtaining the best performance from your telescope. This telescope has already been collimated at factory but it might have change due to transportation, if the screws are not properly locking down the mirrors after collimation, or a component may be loose somewhere in the optical train.

Now at Secondary mirror collimating unit, Keep in mind that the secondary mirror has three degrees of freedom: Tilt, Rotation, and Longitudinal adjustment. ***For Longitudinal and Rotational adjustment of secondary mirror***, By adjusting the central screw, adjust how far the spider disk of the secondary mirror from the stainless steel top-surface, great if the distance is **5mm(Factory Set)** as the three set screws in the spider disk contact with the top-surface slightly. If not **5mm** then only use depth gauge or spacer gauge to reset to 5mm gap and lock the central screw. Tilt is controlled by three screws behind secondary mirror.



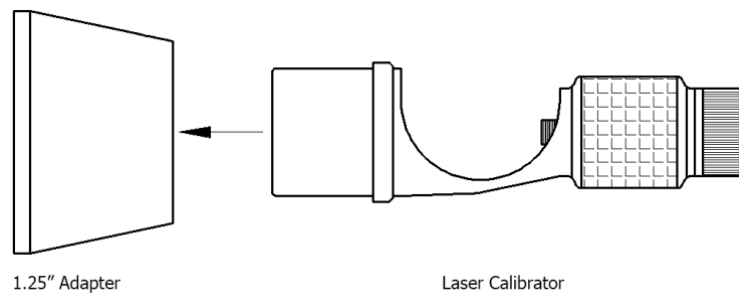
SETP 2: Primary Mirror cell Back plate.

Now go to Primary mirror cell back plate as look like in figure below. PM cell back plate has the three small screws(For Tilt) and three large screws(For locking) for collimation, all six screws should be tight.

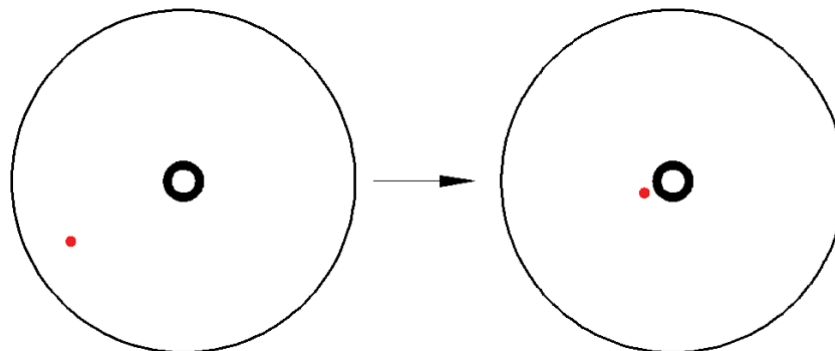


【Laser Collimation】

SETP 3: Insert the laser calibrator into the 1.25" adapter.

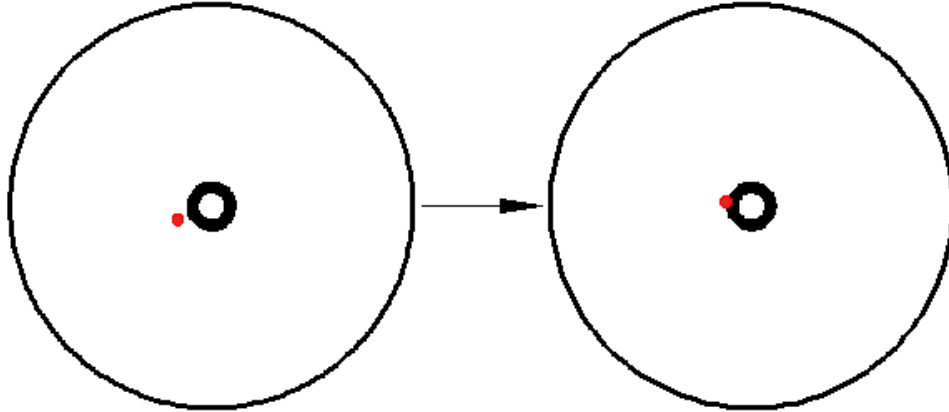


SETP 4: A laser produce a red dot will be shown near the primary mirror center dot. Using the wrench and hand adjust the three collimation screws on the cross of secondary mirror to change its position so that the laser dot should move and coincide with the dot marking the center of the circle in the primary mirror and pre-tighten them to hold the secondary mirror.(see figure below).



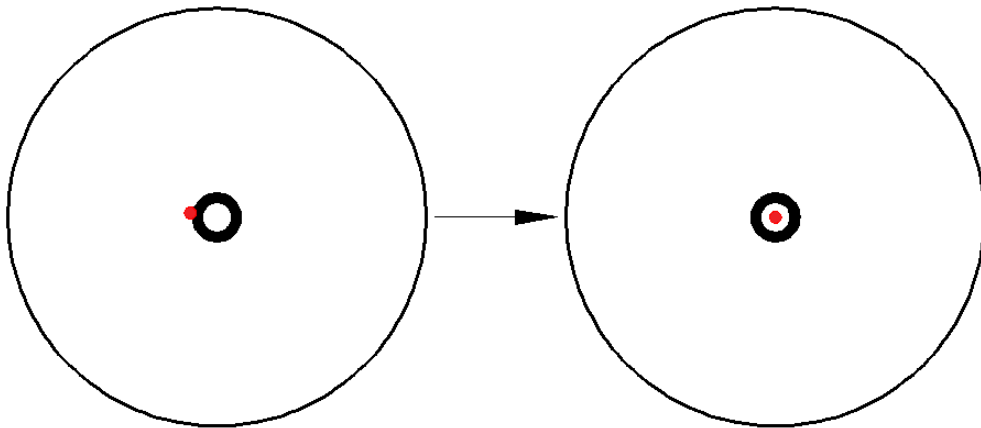
SETP 5:

Next, adjust the three set screws on the cross of secondary mirror to center the laser dot on the black circle(diagonal section on laser), and pre-tighten them to hold the secondary mirror (from slightly contact in Step 1).(see figure below).



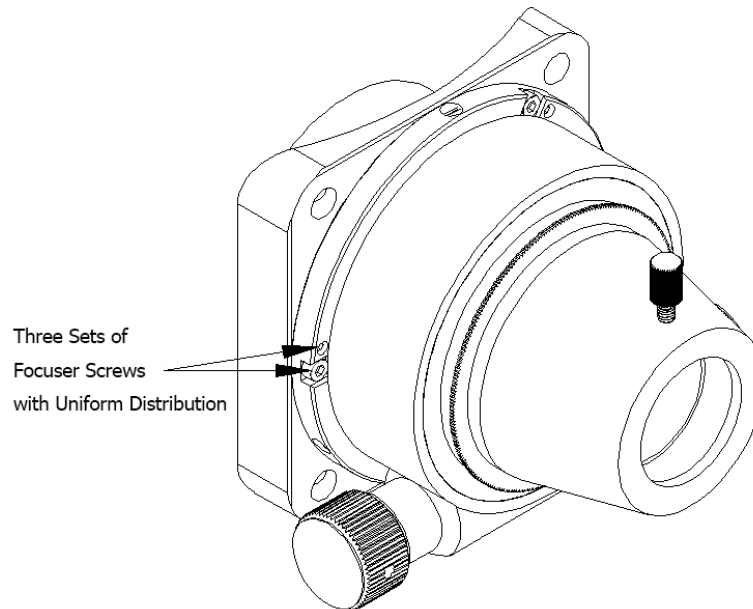
SETP 6:

It then becomes necessary to Go to PM cell back plate and loosen very little the three large screws and adjust carefully little movement the three small screws to further center the dot, and tighten the three large screws to hold this adjustment. Note the location of the red dot should be at center, in relation to the black circle or the location of the feedback red dot provided by laser calibrator in relation to the central hole at primary mirror.



STEP 7: (This step may not be required)

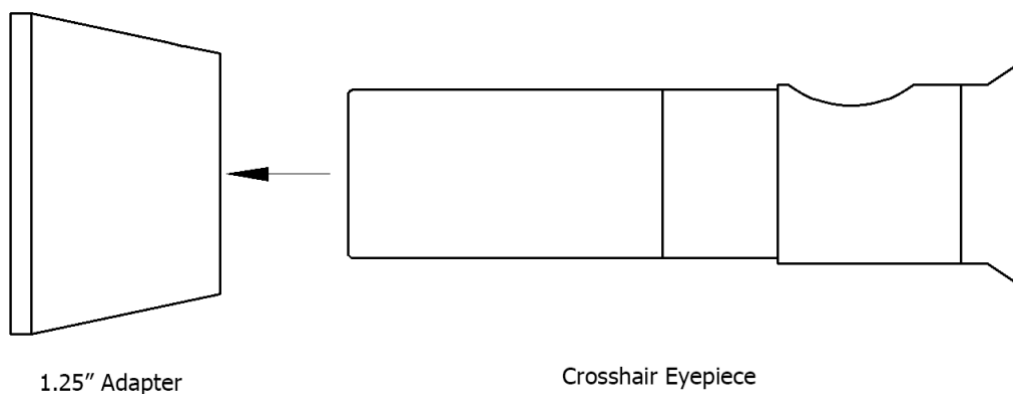
Because the short focal ratio($F/2.8$) can lead to a more sensitive light axis, and thus the adjusted axis in Step 6 may be offset again in the process of tightening the small screws on the back circle. Now further fine adjustment is required at focuser collimating screws to re-center the dot.



【Crosshair Eyepiece Collimation】

See **STEP 1** and **STEP 2** in Laser Collimation, which aren't repeated here.

STEP 3: Insert the crosshair eyepiece into the 1.25" adapter. Insert white paper in telescope tube under focuser.

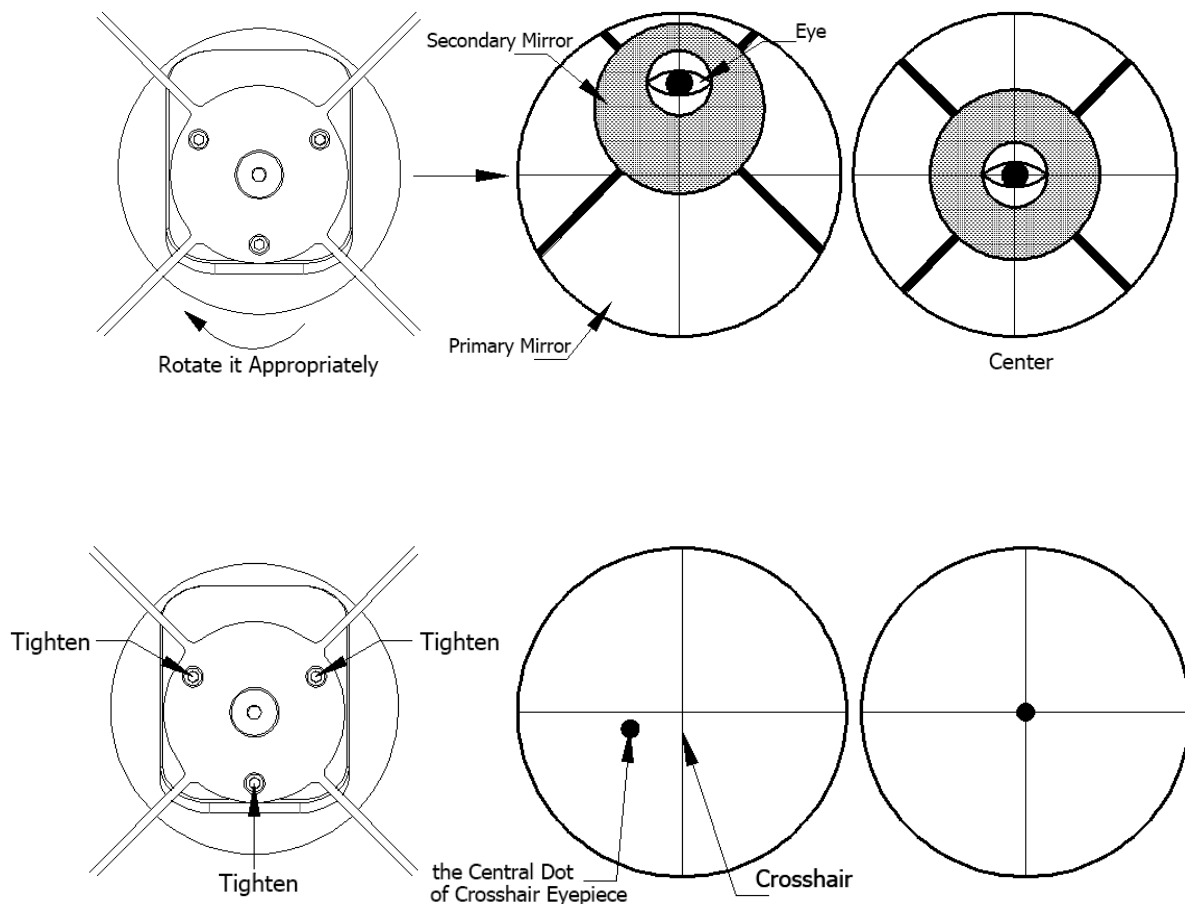


STEP 4:

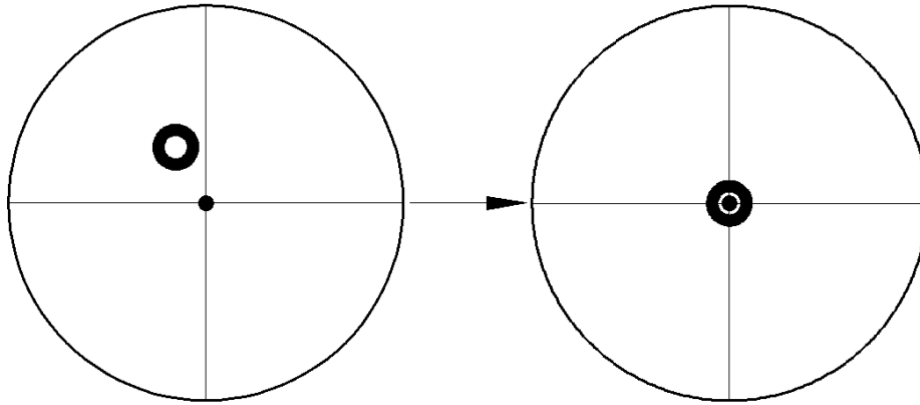
Looking through focuser Crosshair Eyepiece.

Point of interest for Perfectly collimated telescope: collimation eyepiece crosshairs, primary mirror clips or edge, primary mirror center dot, secondary mirror reflection Spider and focuser drawtube in your field should be concentric. If not then,

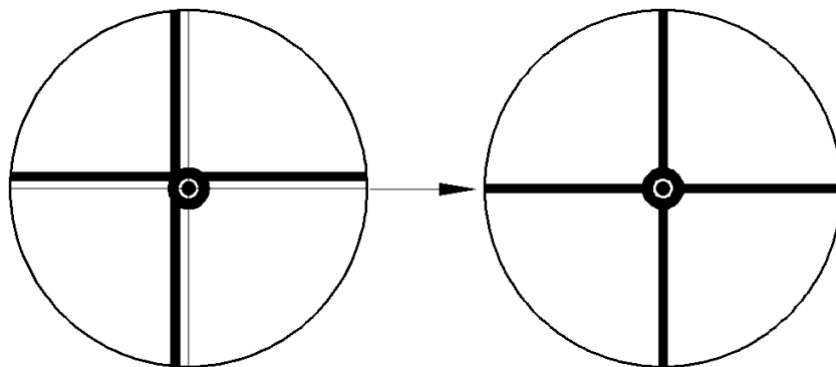
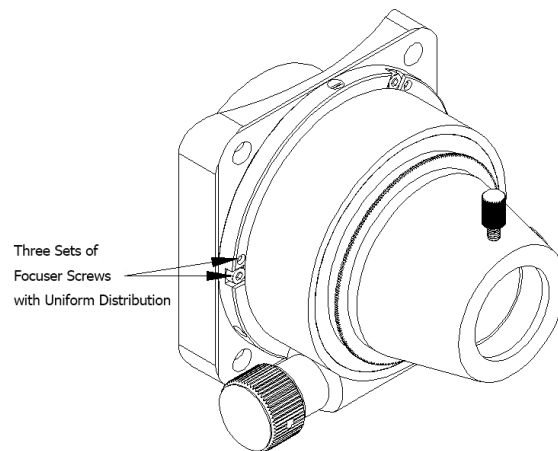
Adjustment of the secondary mirror group and using the wrench with set screws on the cross to control the position of the secondary mirror so that the circle of the primary mirror is moved to be concentric with the circle of the secondary mirror as seen through the collimating eyepiece, and the center reflection of the eyepiece is centered over the crosshair. After this is done, make certain that the adjustment has been locked in place though tightening the set screws.



STEP 5: Now go back to Primary mirror back plate, It's now necessary loosen the three large screws to center the primary mirror mark on hole placed on the collimating eyepiece. Then tighten the small screws.



STEP 6: Turn the focuser or the crosshair eyepiece, as seen the crosshair of crosshair eyepiece and the crosshair of secondary mirror have the same center. If not, adjust the three screws on the focuser until the desired pattern is obtained and then tighten them.



STEP 7: Put the reducer group back into the focusing barrel.