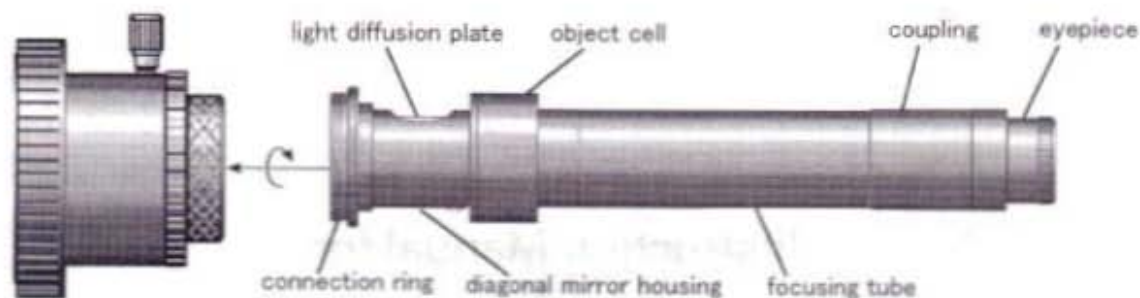


# Instruction Manual for Collimating Scope



**TAKAHASHI**



This is a device specially designed for collimating Cassegrain type telescopes. So this can be used for collimating CN-212, Mewlons from Takahashi and other Cassegrains. However, this cannot be used for such type of telescope that a relay lens is used in the middle way of the optical system. Before using this device, it is necessary to provide a black mark on the center of the mirror.

#### ◆ Collimating Cassegrain Type Telescope

- Point the telescope toward the bright and plain place just like white wall.
- Attach the collimating scope to the coupling(S).
- Point the diffusion plate toward the bright place(fluorescent light).
- Focusing tube is kept in place.

#### (1) Collimating the Secondary Mirror [Ex. CN-212]

- ① Look into the eyepiece and then you can see the spider and the secondary mirror dimly in the dark.
- ② Slide the focus tube and stop it when the spider can be seen clearly. (Fig. 2-a)

The center mark of the secondary mirror is dimly seen.



Focus the center of the collimating scope.

Take a good look of the black circle at the center of the collimating scope. When the optical axis is correctly adjusted, it can be seen as in the Fig.3. (The center mark can be seen dimly behind the center of the collimating scope)

- ③ Extend the focusing tube a little bit fore position from the focal point and then it focuses the mark of the secondary mirror. (Fig. 2-b)

When the center of the collimating scope lays on the center mark, the optical axis is correctly adjusted. If their position are shifted, the collimation of the secondary mirror is necessary. (Fig. 2-a, b)

(Move the focusing tube forward and backward and make certain of the shifting between the center and the mark.)

- ④ At first, loosen the lock nut of the adjusting screw. When the shifting is seen as in the Fig. 2, loosen the screws A and C, and push the screw B. Then, the center mark of the secondary mirror will come close the center of the collimating scope. Seeing the movements of these marks, lay them completely. Now the collimating procedures for the secondary mirror has been finished.

Focus the center mark of the secondary mirror.



The center of the collimating scope is dimly seen.

[Fig.2]

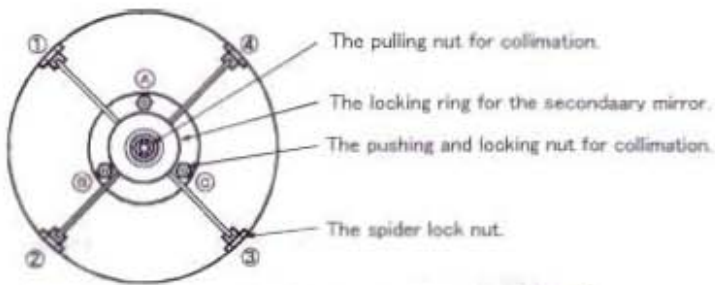


Figure seen from the opening of the tube

[Fig.3]

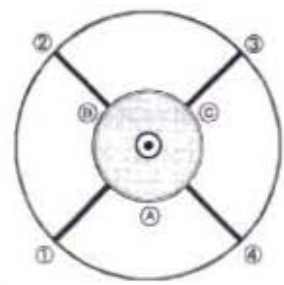


Figure seen from the collimating scope

## (2) Adjusting the Spider

① Focus the collimating scope to the spider. Carefully looking the outer circle of the secondary mirror baffle, thin and white circle (the outer circle of the primary mirror baffle) can be seen a bit inside as in the Fig.3. If that is seen as a concentric circle with the secondary mirror baffle, there is no need to adjust the spider. If not, the spider is needed to be adjusted.

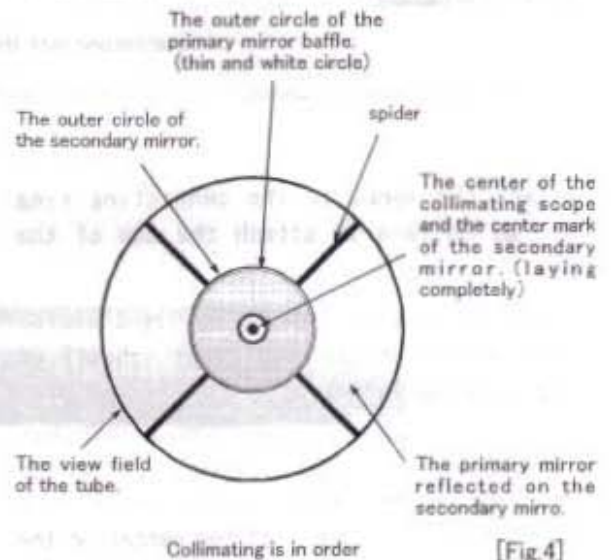
② Take the Fig.5 where the secondary mirror baffle is shifted to the left, for example. Loosen the pulling screws ①② of the spider by an Allen wrench and tighten the screws ③④

③ When they are seen as a rough concentric circle, check the collimation of the secondary mirror. Adjusting the spider will make the optical axis of the secondary mirror shifted so that it must be recollimated. Then, slight adjustment of the spider will be required. Do this procedure alternatively until the collimation is achieved as show in the Fig.4.

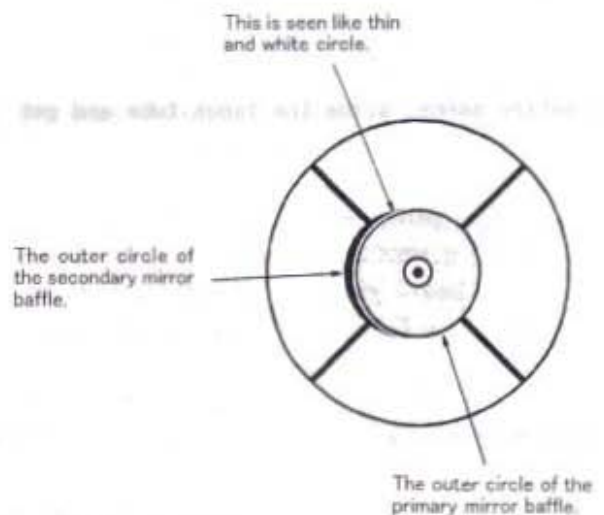
Make certain that the lock nuts of the secondary mirror and of the spider are properly tightened.

\* In those telescopes which have no spider, do the collimating only for the secondary mirror.

\* Some Mewlons have a little amount of the spider adjustment. The perfect collimation for these will be so difficult. Then, do it at the utmost condition.



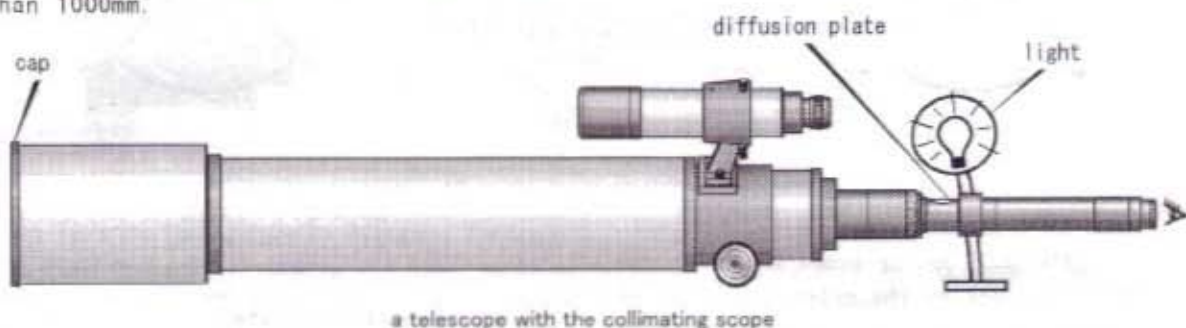
[Fig.4]



[Fig.5]

## ◆ Collimating Procedure for Refractors

Takahashi collimating scope can be used for collimating refractors. This is most suited for doing it for a long focus length of more than 1000mm.



a telescope with the collimating scope

- Attach the scope to the connecting ring and be certain to attach the cap of the dew shield.
- Light the diffusion plate by light source and make the reflecting image (ghost) on the lens surface bright.

As the focus tube is being extended, the diffusion plate (white circle) and the center hole (black) reflected (ghost) at the center on the lens surface are focused. Refer to the Fig. A.

In the doublet as shown in the diagram, there are four faces to reflect. The size of the ghost will be different up to the radius of the lens. When looking these ghosts with the collimating scope, slide the focus tube and get focus on each face of the lenses.

As the focal points move, the first large ghost is getting dimmer as shown in the Fig. B and then, the small ghost at the center of the large ghost is focused. If they are of concentric circle, the optical axis is in order. If not and shifted, adjust them so as to become concentric circle.

- \* The four ghosts are not always seen together. If the radius of the lens is same or the distance of the lens is closer, the ghosts are seen laid together.

