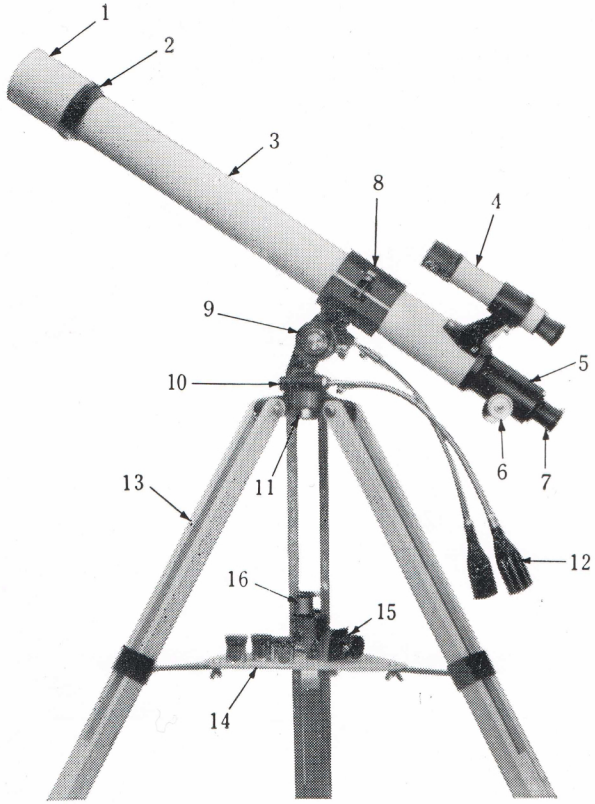
ASTRONOMICAL TELESCOPE

INSTRUCTION—HOW TO USE

REFRACTOR

MODEL CA—60





Parts List

1. Lens Hood
2. Objective Cell
3. Main Tube
4. Finder
5. Eye End
6. Focusing Knob
7. Eyepiece Adapter
8. Tube Holder
9. Hinge for Vertical Motion
10. Base for Horizontal Motion
11. Tripod Head
12. Flexible Handle
13. Tripod
14. Accessory Tray
15. Diagonal Prism
16. Erecting Prism

INSTRUCTIONS

Model CA-60 is a medium size, high quality telescope equipped with an altazimuth type mount. This altazimuth mount has the highest quality fine adjustment system, so that this model is very useful for terrestrial observation as well as for astronomical purpose. As an astronomical telescope, this is most useful for looking for a comet or a novae.

The altazimuth mount is an apparatus which moves horizontally and vertically, and is used to measure the direction and altitude of an object. The altazimuth mount of model CA-60 is equipped with coarse and fine adjustments for both horizontal and vertical motions. You may simply turn the telescope by hand for horizontal coarse adjustment, but, for vertical coarse adjustment, you must loosen the clamp, move the telescope to a rough position and tighten the clamp. If you have thus decided the rough direction and altitude of the telescope, you may direct it accurately to any object by turning the flexible handles for both horizontal and vertical fine adjustments.

Assembling

Telescope's field of view will be rather narrow when its mag-

nification is very high, while an object for observation is so distant and so small. Therefore only slight change of telescope's position causes considerable change of the field of view covered by the telescope. So, it is very important to place your telescope steady and secure.

1. Put the mount and the tripod on the table with the tripod legs suitably lengthened, and set the mount to the tripod by bolts and nuts.

2. Stand up the tripod and tighten the bolts and nuts setting mount and tripod.

3. Attach the accessory tray inside the tripod legs by bolts and nuts.

4. Fix the telescope on the mount.

Observation

It is not always true that the higher magnification gives you the better result of observation. You should remember that the highest effective magnification of telescope is limited by the diameter of its objective lens, and generally the telescope of the

larger objective lens has the higher limit effective magnification.

You may use your telescope roughly in three different power ranges, low, medium and high powers. Low power should be used for observing star clusters, nebulae, variable star, comets etc. which occupy rather wider field of view. High power should be used for observing the surface of planet, double stars etc. of which observation needs highest effective magnification. But the high power may not produce expected good result if the atmospheric condition is not good, when you should use medium power. Low power produces a clear image and wider field of view, high power enables you to see the minute part of object, and medium power is to be chosen when low or high power is not suitable enough.

You may use your telescope most effectively if you select the most suitable power according to the purpose of observation and the atmospheric condition.

Resolving Power

The most important part of the telescope will be the objective lens which mainly decides the efficiency of telescope. You may look at the double stars in order to measure the efficiency of telescope and your proficiency in handling the telescope. The efficiency of telescope is measured by the degrees between the

two stars which the telescope may distinguish one from the other, and this efficiency is called Resolving Power.

Finder :

Finder is a guide telescope for catching an object easily before using the main telescope. There is a cross-hair in the eyepiece of the finder, and when the object is seen at the center of this cross hair, the object must be seen at the center of the main telescope. In order to adjust the position of the finder properly, you may look at a chimney or something about 500 m distant at the center of the main telescope and adjust the finder by turning its set screws so that the object may come to the center of the finder.

Sun Glass may be attached to the edge of the ocular of Finder so that the sun may be observed safely through Finder. Sun Glass of the same size may be commonly used either for the eyepiece of main Telescope and for the ocular of Finder.

Accessories :

Eyepiece :

The eyepiece magnifies the image produced by the objective lens. The magnification of the telescope is got by deviding the focal length of the objective by that of the eyepiece. The eye-

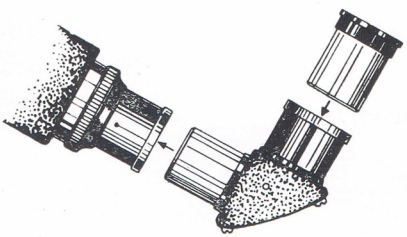
piece may be inserted into the eyepiece adapter which may be moved by turning the fine focusing knob. The letter H on the eyepiece is the abbreviation of Huygen Type, a type of eyepiece, and HM; Huygen Mittenzwey, OR; Orthoscopic, SR; Special Ramsden, AH; Achromatic Huygen respectively. The number beside the letter denotes the focal length of the eyepiece.

If you approach the eye too closely to the eyepiece, it may be made dirty by the eyelashes or eyelid, or obscured by your breath. In such case you should wipe the eyepiece with soft cloth carefully.

The user with spectacles should take them off before looking into the telescope, but the spectacles for astigmatism should be kept on.

Diagonal Prism :

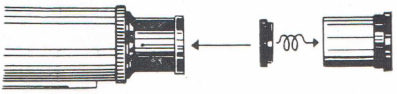
This prism is also called Zenith Prism and is used to change the direction of light 90° so that you may observe the stars around the Zenith in a comfortable position. Diagonal Prism is inserted between eyepiece adapter and eyepiece as shown by the figure. In this case you must pull in the draw tube of eyepiece adapter about 60 mm.



Sun Glass (Moon Glass)

Sun Glass absorbs some of the heat and light of the sun so that

you may observe the sun safely. Sun Glass might be cracked because of the heat



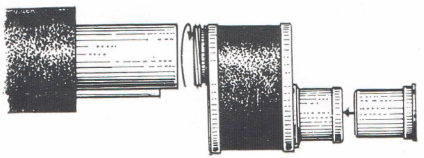
of the sun unless you turn the telescope off the sun after observing the sun for 10 minutes or so. If this care is neglected, Sun Glass might be cracked and the eye might be hurt. *Never observe the sun without Sun Glass!!*

(Moon Glass is used for observing the moon just like Sun Glass for the sun.)

Erecting Prism :

The image of astronomical telescope is up-side-down, so you must use Erecting Prism in order to erect the image for terrestrial observation.

For setting Erecting Prism, unscrew and remove Eyepiece Adapter from Draw Tube, and Erecting Prism may be set in the place of Eypiece Adapter to Draw Tube. Then Eyepiece may be attached to the end of Erecting Prism, and Draw Tube must be pulled in about 100mm for getting corret focusing.



Maintenance

It happens frequently that the life span of optical instrument

or lens is made unreasonably short because of neglect of proper keeping. You must know proper ways of keeping so that you may maintain your telescope at its best condition for the longest possible life span. Don't shake nor give a shock to the telescope. Keep it from dust, moisture and sudden change of temperature.

After using, the mechanical parts should be wiped clean with dry cloth and the surface of lens also should be cleaned. For cleaning the lens, you may blow the dust off its surface with blower (or spurt) or brush off with dry feather or a brush. If you wipe off such dirt as is not to be blown nor brushed off, you should use clean and dry cotton cloth or gauze with very little alcohol.

You should avoid unnecessarily disassembling your telescope to a very small part, because it is difficult for an amateur to reassemble the disassembled instrument exactly to the original state. When disassembling is necessary, you had better mark on each part so that you may know which parts connect with each other when you reassemble those parts.

Above all the moisture is not good for the lens, so you should store your Telescope in a shaded, well aircirculated place.

Optical Specifications

Achromatic Objective Lens

Lens aperture	62 mm
Clear aperture	60 mm
Focal length	800 mm
Resolving power with respect to double stars	2.0″
Light collecting power for naked eye	73×
Faintest discernible star	10.7 m

Mount

Altazimuth type with vertical and horizontal micromotion adjustments by flexible handles.



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