

Corrected Dall-Kirkham

Mewlon-250CRS

INSTRUCTION MANUAL

TAKAHASHI

Thank you very much for your purchase of Mewlon-250CRS. This telescope is one of Takahashi's originals and is a unique reflector design which combines an elliptical primary mirror and a spherical secondary plus a 3-element corrector.

The Mewlon-250CRS can be used at prime focus [with a corrected field], with the dedicated reducer or extender available optionally. Please read this instruction manual carefully and familiarize yourself with all the functions that your telescope offers. All the instruments are inspected, tested and collimated before shipment by skilled optical craftsmen.

Please inspect the instrument. If there is any problem with the condition of your telescope, please contact your authorized Takahashi dealer to remedy the situation immediately.



WARNING

NEVER TRY TO OBSERVE THE SUN THROUGH ANY TELESCOPE WITHOUT PROPER FILTER. IT WILL CAUSE PERMANENT BLINDNESS. KEEP CHILDREN AWAY FROM ANY TELESCOPE DURING THE DAY. EVEN A SMALL FINDER SCOPE CAN DELIVER A SUFFICIENT AMOUNT OF ENERGY TO CAUSE INSTANT BLINDNESS.



CAUTION

- When placing the M-250CRS on a mount, firmly hold the OTA and carefully place it on the tube holder attached to the mount.
- Always lay the tube assembly on a completely flat surface that totally supports it to protect it from damage if it rolls off the table.
- Keep the tube assembly out of the Sun. Otherwise, the tube assembly could heat up, causing possibly a fire at the focal point.
- Flammable materials such as styrofoam are used for packing. So, do not lie the packing material close to an open flame. Keep children away from the large vinyl bag used for packing the OTA and the peanuts also used for packing.

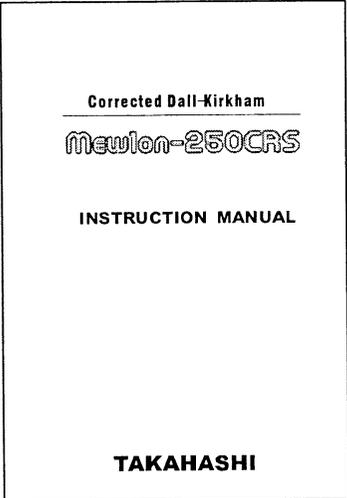
Table of Contents

Warning & Caution	2	Photo/visual application	15 -17
Specifications	3	System parts	18 -21
Standard accessories	4	Collimation	22 -27
Tube Assembly Layout	5	Care & Maintenance	28 -29
Optical system features	6	System Chart	30 -31
Installation	7 -14		

SPECIFICATIONS

Optical system	Corrected Dall-Kirkham
Effective aperture	250mm
Effective focal length	2500mm
Effective focal ratio	10.0
Secondary mirror	72mm
Resolving power	0.46"
Limiting magnitude	13.8
Light gathering power	1275X
Image circle	ϕ 40mm
Backfocus	180.8mm
Metal Back	115.5mm
<With Reducer-CR 0.73X>	
Effective focal length	1825mm
Effective focal ratio	7.3
Image circle	ϕ 35mm
Metal back	72.8mm
<With Extender-CR 1.5X>	
Effective focal length	3780mm
Effective focal ratio	15.1
Image circle	ϕ 44mm
Metal back	117.5mm
Diameter of main tube	280mm
Total length of main tube	945mm [37.2"]
Total weight of main tube	12kg [26.4 lbs] w/7x50 finder
Finder7x50 w/apparent field of 4.2° w/reticle illuminator	

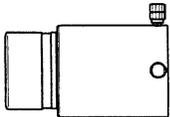
Standard Accessories



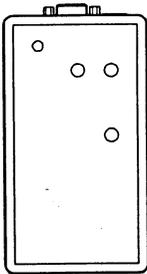
instruction manual



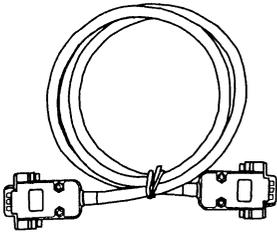
inspection certificate



50.8mm (2") extension tube



Hand control

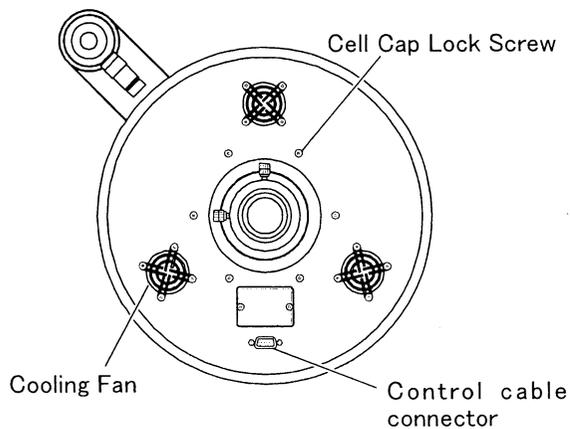
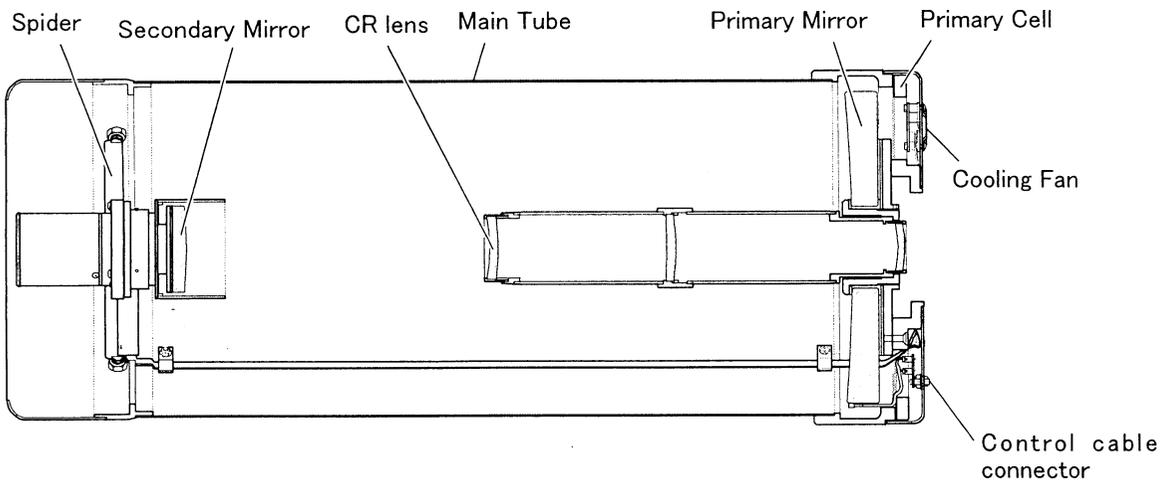
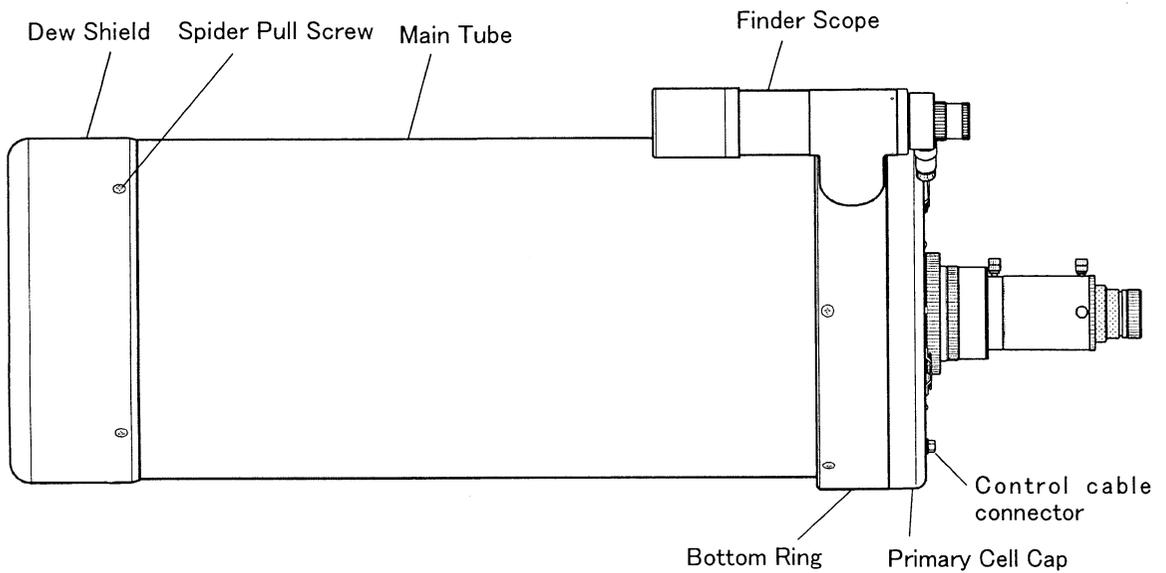


control cable



Allen wrenches
(1.5mm, 2mm, 2.5mm & 5mm)

Tube Assembly Layout



Features

The original Mewlon Dall-Kirkham design produces sharp high contrast images in the center of the field of view with some coma at the edges.

The newly developed M-250CR corrector corrects the entire field and flattens edge to edge surpassing the Ritchey-Chretien design.

The M-250CRS incorporates a computer controllable Active Focus system. The newly designed pulse motor, controls the auto and manual focusing. It also incorporates a backlash corrector. The manual focusing is controlled by the hand control provided.

Using the ASCOM driver [http://www.takahashijapan.com/support_e.html] from this link from Takahshi Japan, the M-250CRS can be controlled by FocusMax or MaxImDL for auto focusing. These programs will provide accurate and precise auto focusing for imaging.

These features make the M-250CRS an up to date Cassegrain optical system.

■ Active Focus

The Mewlon-250CRS uses a newly designed 4-vane spider to reduce diffraction spikes when compared to the 3 vane spider of the standard Mewlon-250. The Active focus system provides manual and auto focusing as well as control of the cooling system.

When the M-250CRS will be auto focused, attach the USB 2 cable to the hand control and PC. The secondary is controlled by the Active Focus system with a built in stepping motor.

The hand control provided can control manual focusing and the on/off operation of the fan system. When auto focusing is needed, connect the PC with a USB 2.0 and USB B connector on the hand control box. Auto focusing can be done with ASCOM compliant focusing software.

■ Electric Cooling Fans

The on/off operation of the cooling fans is controlled by the hand control. Three low vibration cooling fans are attached to the rear mirror cover. Each is controlled by three sensors located on the mirror, inside the tube and a third outside the tube. They constantly monitor the ambient temperature and feed this information to the fans to automatically cool the primary mirror to the ambient temperature.

Low vibration fans are used so as not to interfere with imaging or observing. The cooling system operates as soon as the sensors detect a temperature differential between the ambient temperature and the temperature of the primary mirror and turns off when ambient temperature has been equalized.

Installation

The WC* Plate is optionally available for mounting the tube rings when a dovetail and saddle plate are not used to mount the M-250CRS.

■ Mounting Holes

A. Holes are provided to mount the M-250CRS in 6 different positions are illustrated. This is used when a dove tail and saddle plate are not used for mounting the OTA.

B. The tube rings can be mounted with the standard 240mm with the bridge plate supplied or an optionally available 340mm bridge plate.

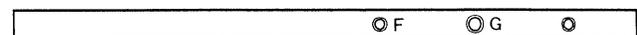
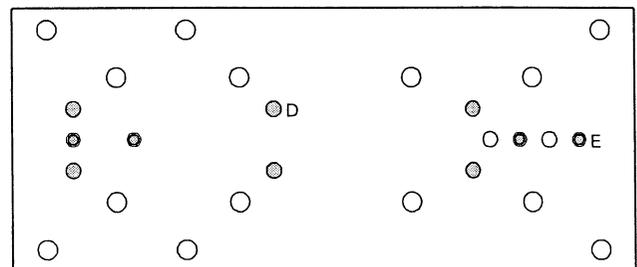
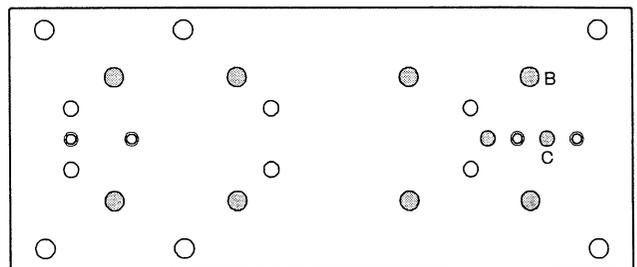
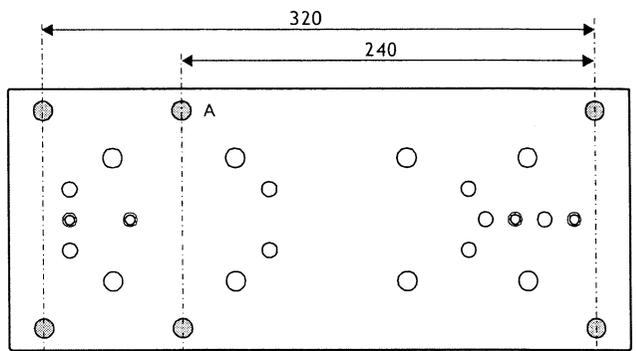
C. 2 holes to install on an EM-200 mount.

D. 4 holes to attach an extra weight

E. 8mm on both sides to mount a side plate

F. 10mm holes provided in 4 positions to attach counter weight shaft.

G. Extra 6mm holes provided in two positions.

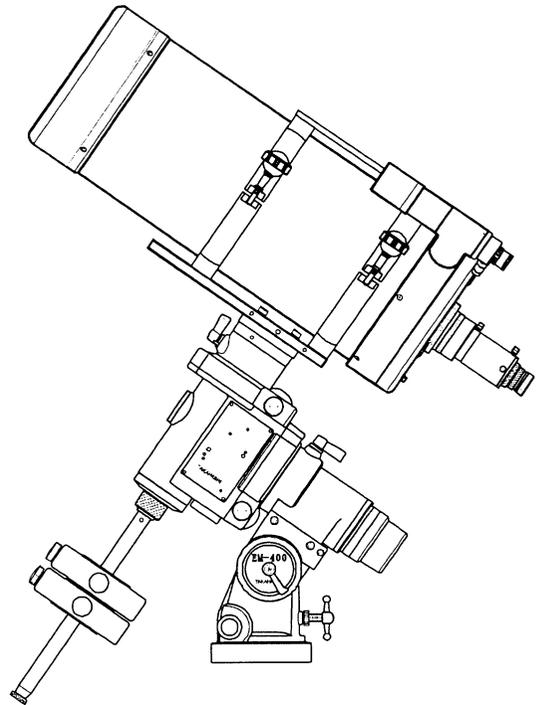
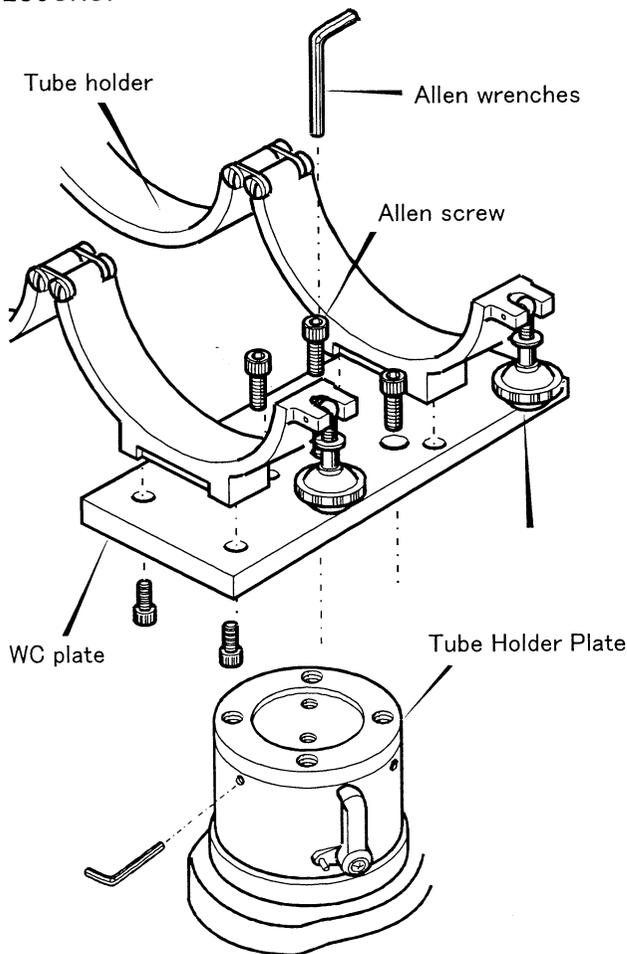
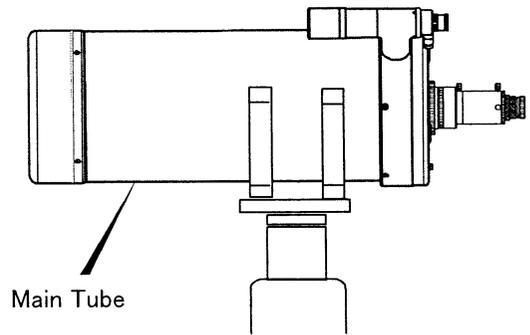


■ The EM-400 is a suitable mount for the Mewlon-250CRS.

First, assemble the tube holder and mounting plate with the Allen bolts provided for this purpose. If the *WC plate is used; attach the tube holder assembly to the plate as shown with the Allen bolts provided.

Open the tube holder and turn the mounting assembly parallel to the ground. Carefully place the tube assembly into the mounting rings and lock the assembly leaving a little space to move it for balance.

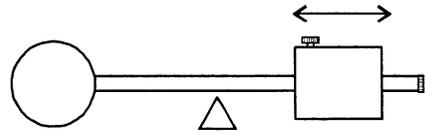
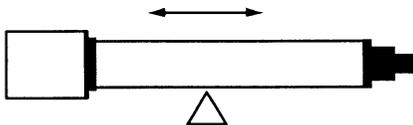
The WC Plate as mentioned previously will fit the EM-200, EM-400, NJP and EM-500. chose the mount that best supports the imaging or visual purposes of the Mewlon-250CRS.



■ Balancing

The balancing process begins when the tube assembly is placed into the tube holder. Remember that the OTA is heavier towards the mirror end. Tube balancing is necessary for the mount to track properly. An unbalanced tube will cause premature gear wear. Balancing should be done before any imaging or visual session. Set the tube assembly into the tube holder parallel to the ground. Leave the tube holder slightly loose to allow the OTA to be moved in either direction. Loosen the Dec. clamp.

Before it is done, one hand should hold the OTA in the event it moves abruptly. Let go of the tube, but keep the hand close by in the event it moves. The OTA will move and then the best balance point can be determined by sliding the tube back and forth, then tighten the tube clamps.

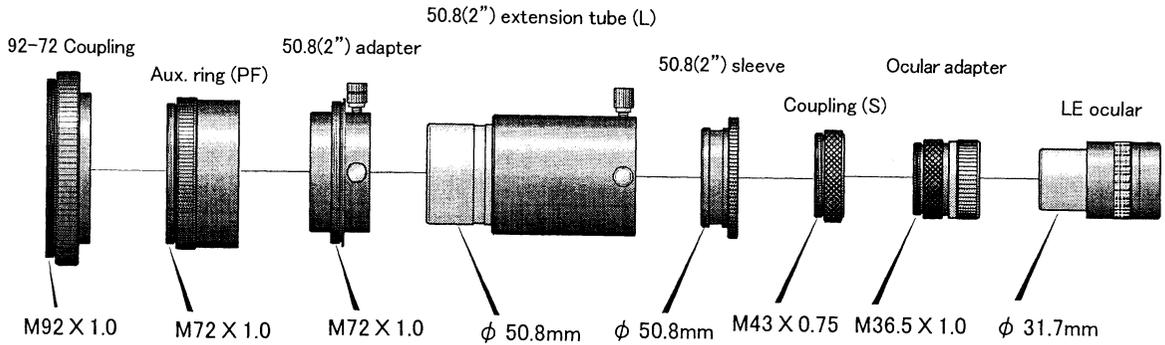


The next step is to place the tube assembly parallel to the ground with the counterweight shaft parallel. Holding the counterweight shaft with one hand, loosen the RA clamp. Let go of the counterweight shaft and see if the assembly moves. If the scope is not balanced, carefully slide the counterweights to a point where the telescope is balanced.

Reminder: The instrument should be rebalanced with the complete imaging package which should always be attached to achieve proper balance. The scope and package should always be rebalanced in each imaging position to insure perfect balance.

■ Visual Back Train

The following train is attached as standard accessories. The 2" adapter is removed and packed separately.

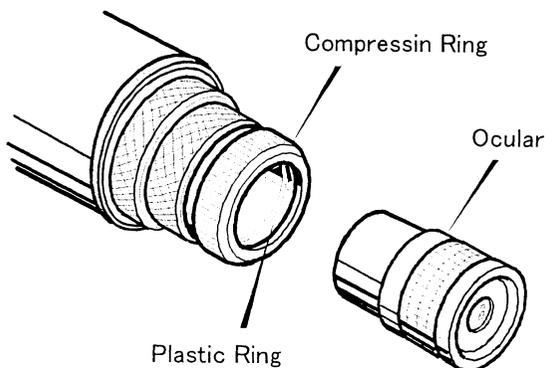


■ Takahashi Oculars

Takahashi offers a wide range of oculars from Hi LE-2.8mm to LE-50mm (2") which can be used for various visual and imaging applications.

■ Compression Ring

Remove the ocular adapter cover after the locking ring has been loosened by turning it counter-clockwise. Then, insert the desired ocular into the 1 1/4" diagonal prism and tighten the ocular ring by turning it clockwise.

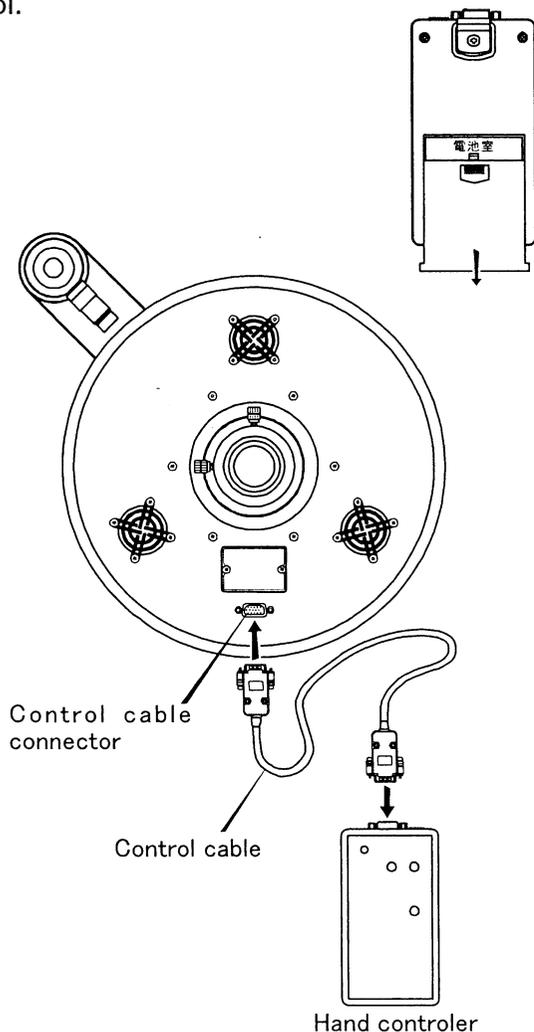


■ Hand Control

● Focusing

After inserting an ocular into the telescope, it is necessary to achieve the best possible focus. Remember the atmosphere will limit the highest magnification that can be used on any given night. Using the lowest power ocular, focus the image and then increase the magnification by using shorter and shorter focal length ocular until the desired magnification is reached. This procedure allows the centering of an object at high magnification.

The M-250CRS is equipped with an electric focuser which is activated by the hand control.

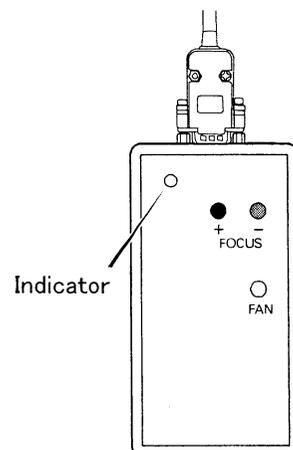


● Attaching the hand control

Remove the cover from the battery compartment and insert 4 AA batteries. Then, connect the cable to the hand controller and lock it with the two screws. Attach other end of the cable into the connector provided on the main tube. This is used for manual focusing and visual application only.

● How to use the hand control

Manual focusing: There is no on/off switch on the hand control. Manual focusing is made by pressing the FOCUS button. When FOCUS + (plus) button is pressed, the distance between the primary and the secondary gets wider, moving the focal plane closer to the mirror cell and when FOCUS - (minus) button is pressed, the distance between the primary and secondary narrows, moving the focal plane further behind the mirror cell. Pressing the FOCUS button will move the motor one step and holding on the button will make the focus motor ramp up in speed gradually. Using this procedure will permit the image to be focused precisely.



● Cooling Fan

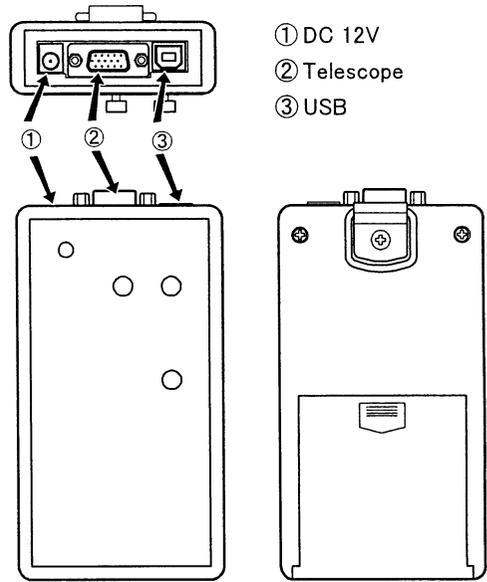
The fans will turn on when the FAN button is pressed and turn off when the button is held down over two seconds.

■ Preparation for Auto Focus by a PC

- * Set out a PC, a USB cable, and AC adapter.
- * Install software to control your camera connected to your PC.

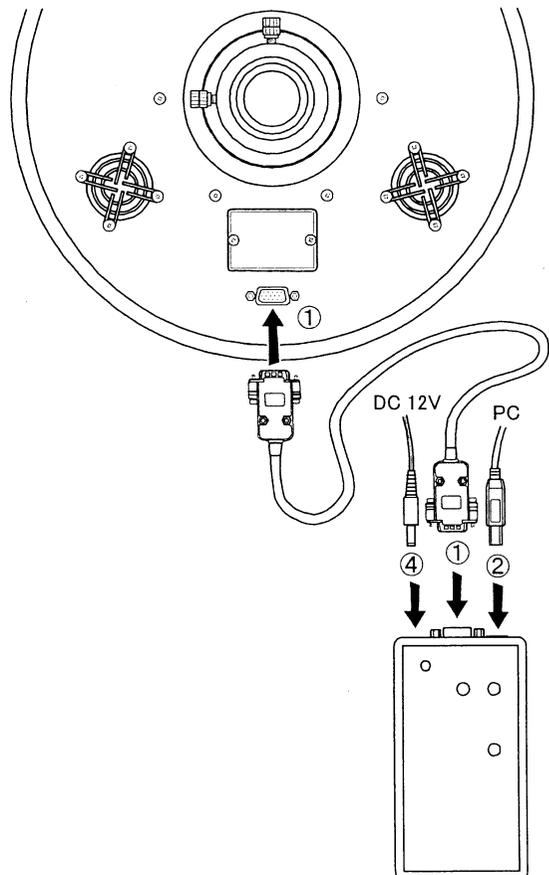
Procedures

1. Connect the control cable to the hand control box.
2. Connect the hand control box to your PC.
3. Initiate the software to control the camera connected to your PC.
4. Insert the AC adapter into the power source and connect it to the hand control box.



Hand controller

When the correct connections have been made, then the software can be attached to being the Auto Focus procedure.

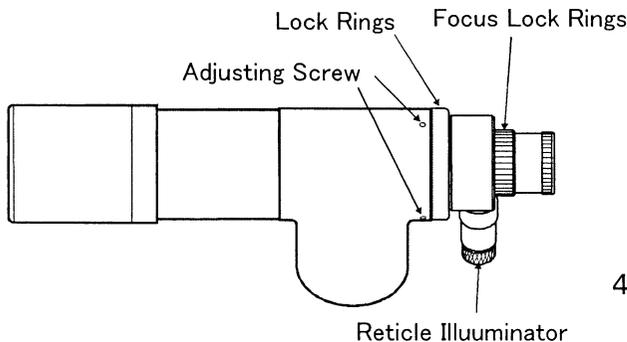


■ Finder Alignment

The field of view of the telescope is very narrow and makes it almost impossible to center an object in the sky. A 7x50 finder with an illuminated interrupted crosshair is provided to make the finding objects and placing them in the center of the field of view easy.

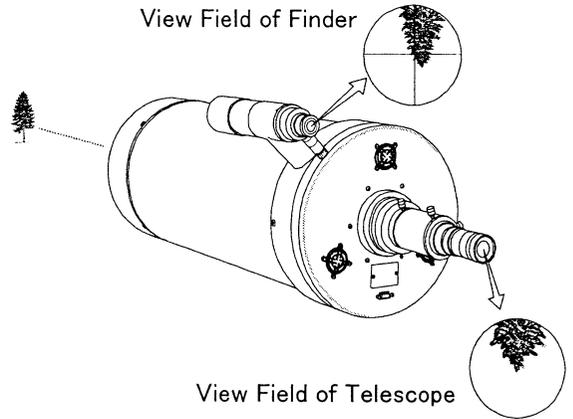
It is important to have the finder aligned precisely with the field of view in the 250CRS which makes finding and centering object to be viewed easier.

The finder scope must be precisely aligned with the center of the field of view of the main telescope. The finder of the Mewlon-250CRS can also be used as a carrying handle and is permanently attached to the main tube. This convenient feature can also cause a slight misalignment of the finder and scope. The optical alignment of the finder can be corrected by shifting the visual back of the finder scope with the adjusting screws. Once aligned, the optical axis of the finder scope will not lose its alignment.

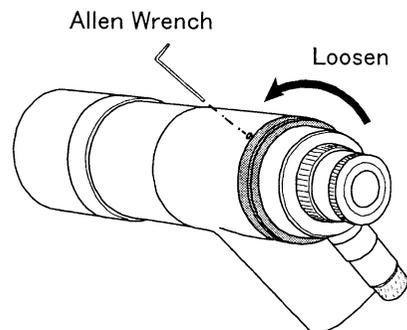


● Alignment Finder

1. Insert a low power ocular into the diagonal and focus the image and place the star in the center of the field of view. Make certain that the drive is engaged.

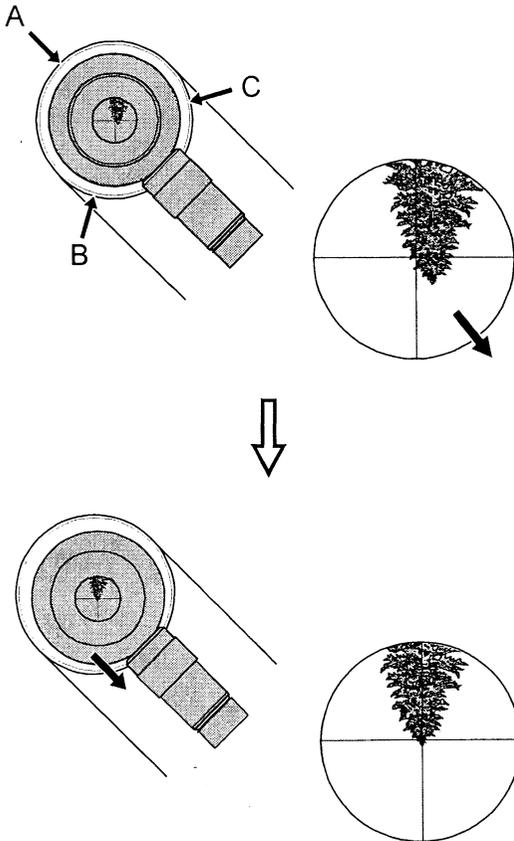


2. First, loosen the lock ring and then loosen all three adjusting screws to allow the visual back to move freely.
3. Hold the visual back with one hand and adjust the position of the visual back to place the star in the center of the view field of the finder and the main scope. Then, fasten the lock ring in half way with other hand.



4. With an Allen wrench provided, turn the three adjusting screws and place the star exactly at the center of the crosshairs. Then, fasten the lock ring firmly to set the visual back in place. Then check the main tube to see if the star is still centered in the field of view of the ocular.

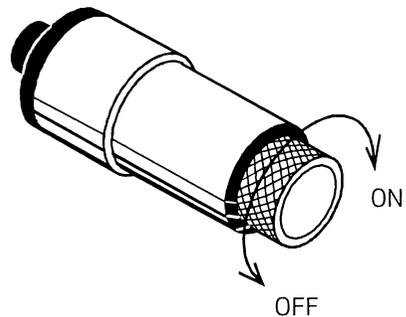
When the star is in the center of the field of the ocular and at the center of the crosshairs of the finder, continue this process by using shorter and shorter focal length oculars to increase the magnification and accuracy of the alignment.



■ Reticle Illuminator

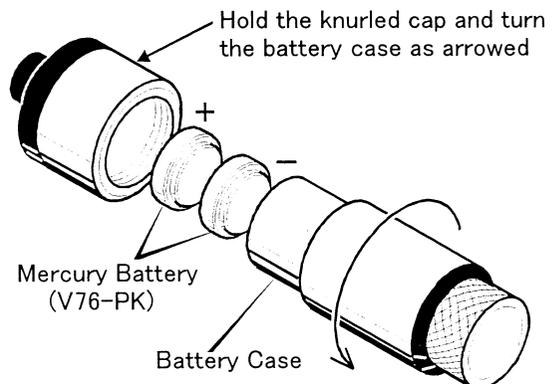
A reticle illuminator is provided with the 7x50 finder scope of the Mewlon-250CRS so you can easily center an object, seeing the reticle illuminated red against the dark sky. The interrupted crosshair allows the star to place precisely in the center of the finder. Turn the illuminator knob clockwise to turn on illuminator which will click when it is

turned on. Turning it further in the clockwise direction brightens the illumination. Conversely, turning the knob counter-clockwise will dim illumination until it is switched off with a clicking sound. Refer to the illustration. Adjust the brightness of the illumination so as to see the star and the reticle at the same time at the lowest possible illumination level.



■ Replacing the Battery in the Illuminator

In case the battery must be replaced, take out the case, turning it counter-clockwise as illustrated. Before replacing the batteries, clean the surface of the batteries and place them into the battery holder, checking the polarity. Use two silver cell 1.5v batteries S76 or equivalent.



Observation

■ Visual Observation

The Mewlon-250CRS is highly capable for a wide range of uses for observing the moon, planets, star clusters, and nebulae, but NOT for solar observation. In order for you to use your telescope at its best performance, you are recommended to operate your telescope on the nights when seeing is fine and after the telescope has been equalized to the ambient temperature of the observing site. The Mewlon-250CRS is equipped with a system of cooling using low vibration cooling fans and temperature sensors to measure the temperature of the mirror, the outside air and the temperature inside the tube.

● Magnification

Magnification can be calculated with the following formula.

$$\frac{(\text{focal length of a telescope})}{(\text{focal length of an ocular})}$$

Therefore, the shorter the focal length of an ocular is used, the higher the magnification. On the other hand, the longer the focal length of an ocular that is used, the magnification will be lower. It is general rule that the upper limit of the magnification is 20x to the aperture in "cm" of a telescope and the lower limit is 1.4x to it. The former is the highest effective magnification and later the lowest effective magnification. Therefore, the highest effective magnification of your Mewlon-250CRS will be 500x and the lowest 35x.

● Diagonal Prism and Diagonal Mirror

A diagonal prism or a diagonal mirror makes it easy to observe comfortably. These are 90 degree diagonals. A 1 1/4 " diagonal prism and 2" diagonal mirror are available from Takahashi.

■ Astro Imaging

The Mewlon-250CRS includes a 3 element ED corrector that flattens the field and corrects the image. This makes the Mewlon-250CRS a highly effective instrument for visual and imaging uses.

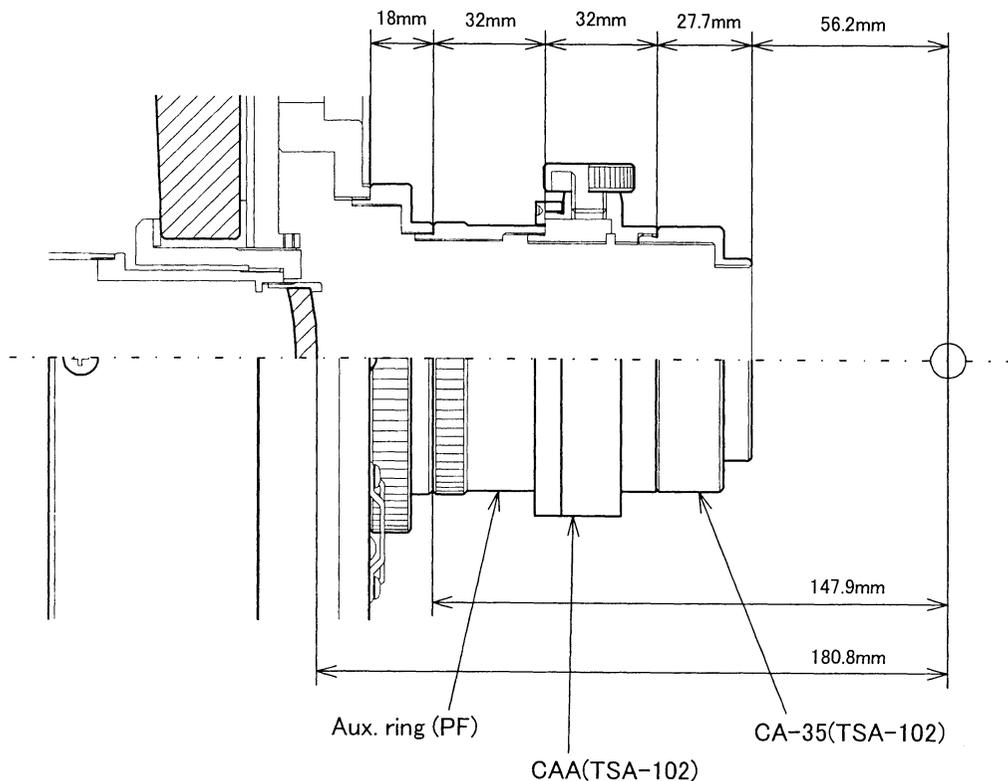
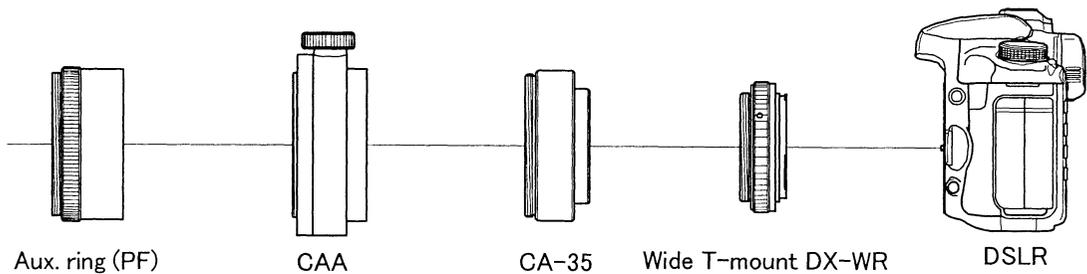
● Imaging at prime focus

The flat corrected field of the M-250CRs is ideal for imaging at the prime focus of 2500mm. This long focal length is perfect for imaging of the Moon, planets and smaller deep sky objects such as galaxies. . A digital SLR camera or a CCD camera is suitable for imaging with the Mewlon-250CRS.

● Imaging at prime focus

When you want to image craters on the Moon or the planets, you need to use the TCA-4 eyepiece projection device, because the scale of the image made at prime focus is too small.

When imaging the Moon, it is possible to use different magnifications due to the intensity of the light the Moon produces. It is best to image at the highest usable magnification the seeing conditions will allow. Wide T-mounts and T-mounts are available to attach a DSLR camera and a CCD camera to the Mewlon-250CRS.



■ Back Focus

The back focus (the distance from the corrector lens to the focal plane) of Mewlon-250CRS is fixed. The focal plane of the imaging device must be set at the metal back distance of the corrector for best imaging results.

The metal back distance is the distance from the rearmost metal surface of the corrector to the focal plane of the imaging device. This will ensure the best possible image.

■ Focusing

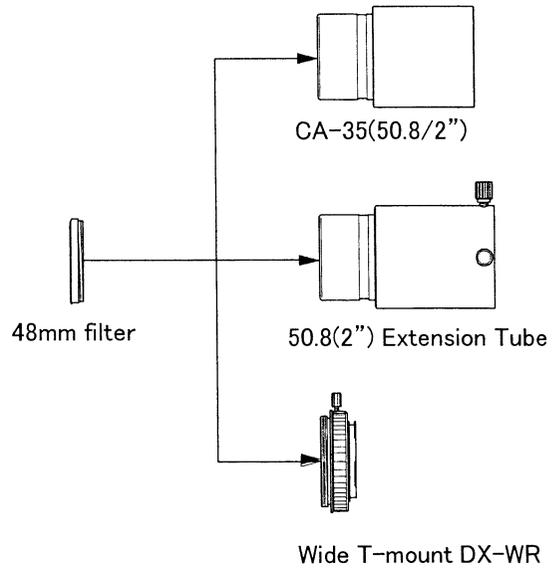
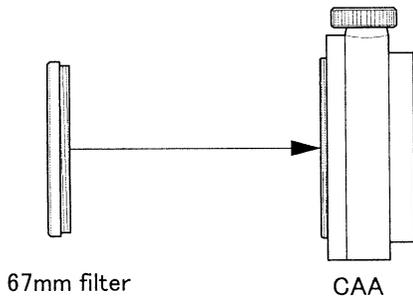
The Mewlon -250CRS uses an ASCOM com-

pliant Activ Focus focusing system that can be controlled with popular focusing software. This software allows the Mewlon-250CRS to use computer controlled focusing. An ASCOM download is available on the Takahashi Japan website as well a Takahashi America website. When an object is set to be imaged, connect your PC with your Mewlon-250CRS and focus by using an ASCOM compliant software focusing software available. For further details, refer to the instruction manual attached with the software that is used.

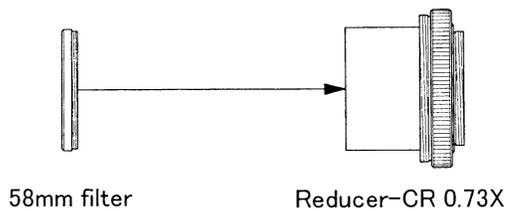
■ Filter Application

A number of filters are available in the market that can be attached to the Mewlon-250CRS for various applications.

- A 67mm filter can be attached to the CAA.



- A 58mm filter can be attached to Reducer-CR 0.73X.



- A 48mm filter can be attached to CA-35(50.8/2"), 50.8 (2") Extension tube, And Wide T-mount DX-WR.

Caution

When taking high magnification images of the Moon and planets, pay careful attention to balance. Rebalance the telescope each time a different object is imaged.

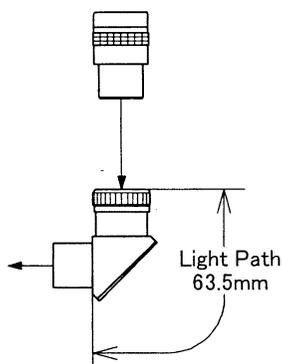
If the telescope is moved to another object, then rebalance it in the position in which the imaging will be done.

Accessories for visual and imaging applications

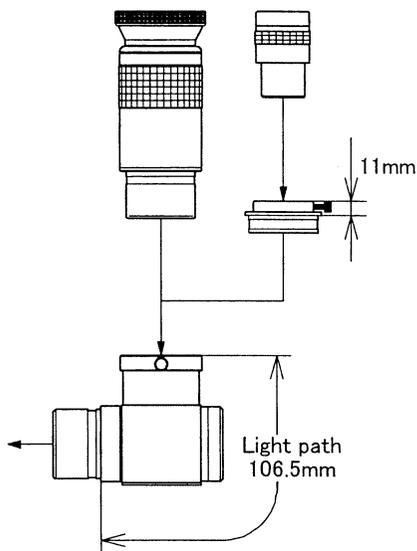
■ Diagonal Prism & Diagonal Mirror

When either of these diagonals with an ocular, the light path is longer to set the secondary closer to the primary. To obtain the sharp focus, use these diagonals as indicated in the system chart. Refer to the illustration of the light path length.

When the accessories other than oculars are used, the Diagonal Mirror is recommended to use because the light pass length is same to that of 50.8(2") Extension Tube (L) and thus it is almost not necessary to refocus.



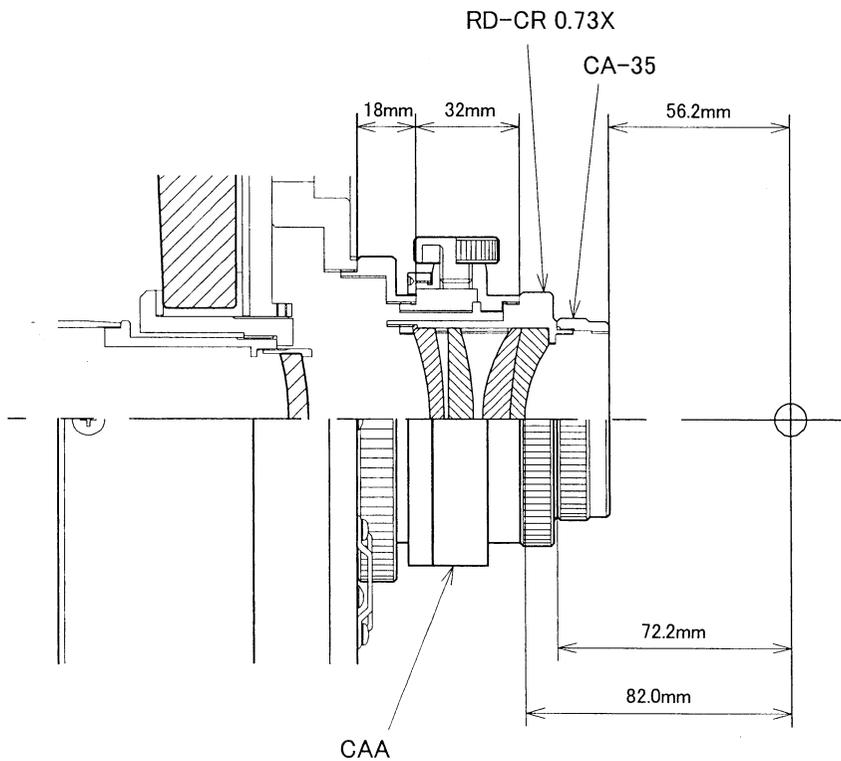
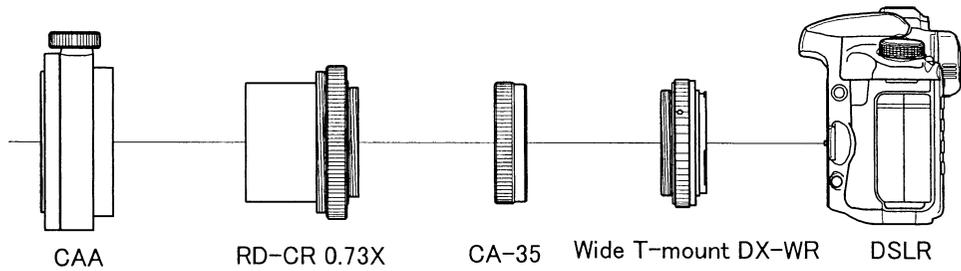
Diagonal Prism (31.7mm/1 1/4")



Diagonal Mirror (50.8mm/2")

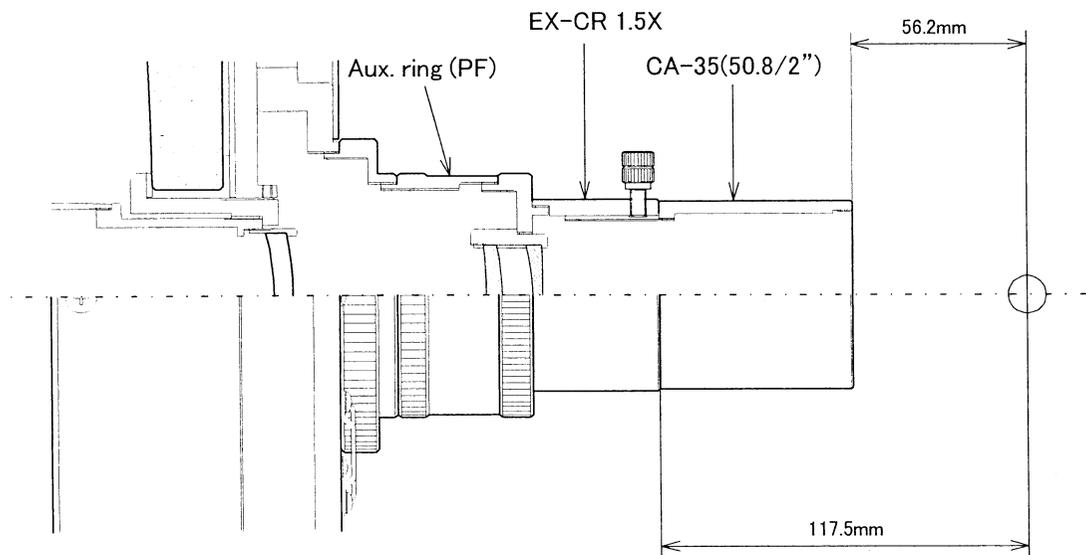
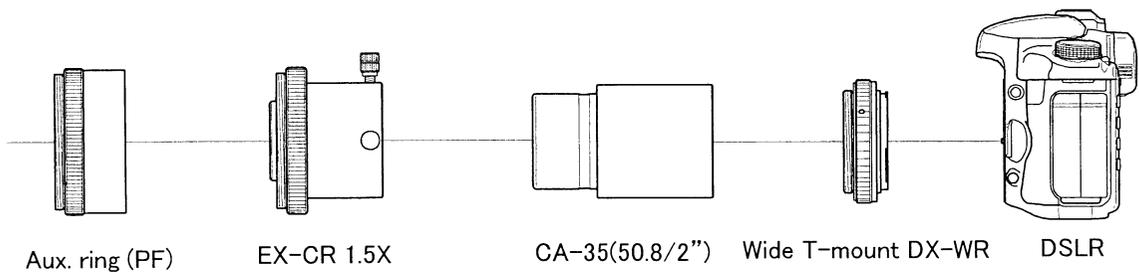
■ Reducer-CR 0.73X

This is the reducer to make the effective focal length shorter by 27% (1825mm f/7.3).
The image circle is 35mm APS size image.
Refer to the system chart for connection.
The reducer can be attached to a digital SLR or CCD camera.



■ Extender-CR 1.5x

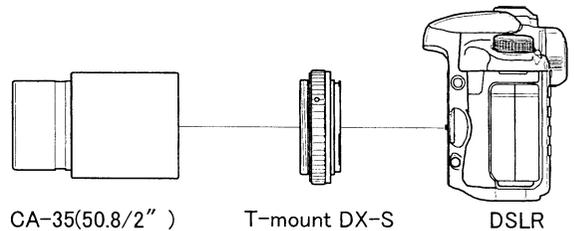
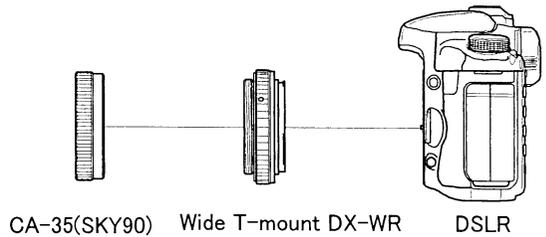
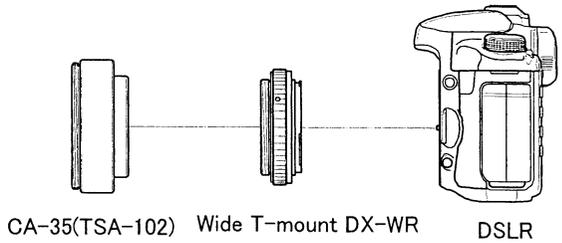
This is the newly designed 2-element ED extender. The Extender-CR increases the effective focal length by 1.5x to 3780mm with sharp images corrected for the 44mm image circle. The Mewlon-250CRS ideal for the lunar and planetary imaging using a DSLR or CCD camera. You can change visual and imaging set-ups very easily because a 2" sleeve adapter is used first in the imaging train.



■ CA-35

To attach a DSLR camera, CA-35 is needed.
3 types of CA-35 are available for imaging.

- CA-35(TSA-102) for prime focus imaging
- CA-35(SKY90) for imaging with RD-CR 0.73X
- CA-35(50.8/2") for imaging with EX-CR-1.5X



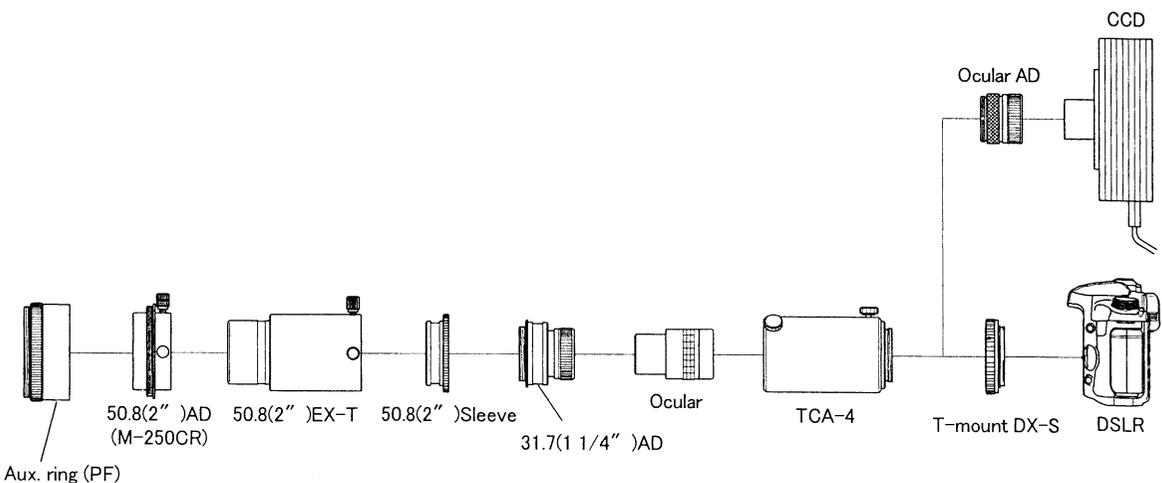
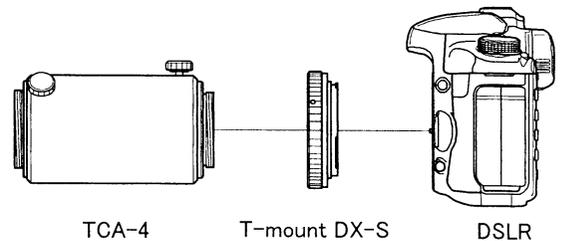
■ T-Mount DX & DX-S

To attach a DSLR camera on your Mewlon-250CRS, you can use T-Mount DX-WR for imaging at the prime focus, with RD-CR 0.73X, and with EX-CR 1.5X.

In case of magnifying imaging with TCA-4, you can use T-Mount DX-S.
These are available for Canon/EOS & Nikon.

■ TCA-4

This variable eyepiece projection device can be attached easily to the M-250CRS for high magnification imaging the surface of the Moon and planets with a DSLR camera or a CCD.



Collimation

When a 3rd magnitude star or brighter star is defocused and the intra and extra focal images show an off center image, then the telescope is decollimated and must be aligned for peak performance. Do not attempt collimation unless you have spoken to your local distributor. They can offer advice on this complicated procedure.

1. If the M-250CRS is collimated, the diffraction rings are seen as a concentric circle.
2. If the telescope is decollimated, the diffraction rings are seen in an eccentric circle. In this case, the telescope must be recollimated.



Fig. 1



Fig. 2

■ Collimating the Secondary

There is a collimating circle in the center of the secondary mirror. Using the optional

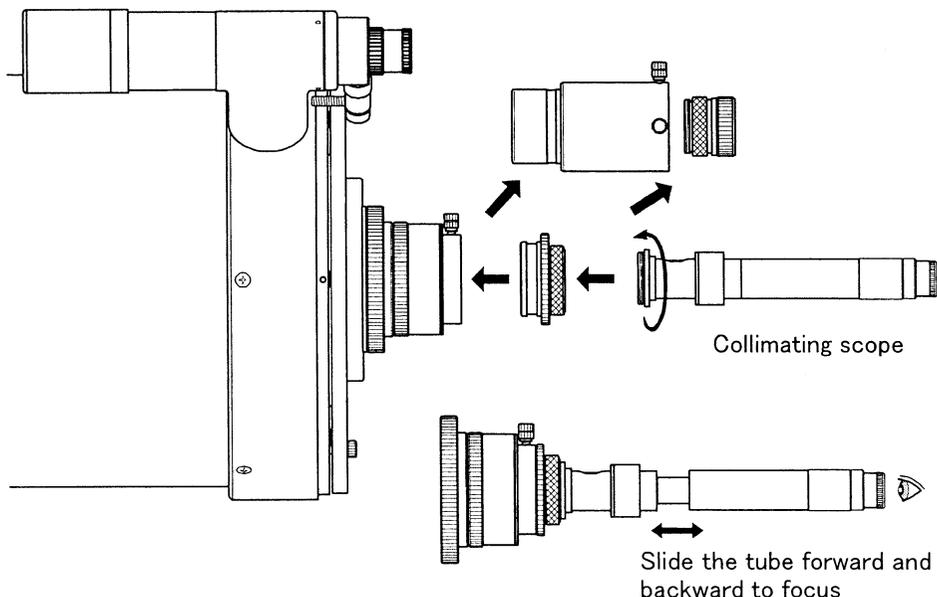


Fig. 3

collimating scope, check if the ring is directly in the center or not. If it is off center, then collimation is needed.

First, remove the 50.8(2") extension tube and the ocular adapter from the visual back and attach the collimating scope. Refer to the illustration.

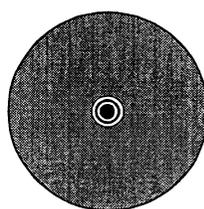


Fig. 4

Reflected image of collimating scope

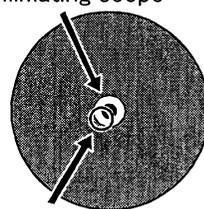


Fig. 5

Secondary mark

Focus the secondary, viewing into the collimating scope. Refer to the fig 4.

If the ring is seen as shown in the fig. 5, the optical axis is correctly collimated. If the ring and the reflection image of the collimating scope is not seen in a concentric circle, the optical axis is off and recollimation is required.

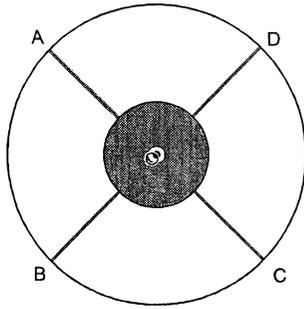


Fig. 6

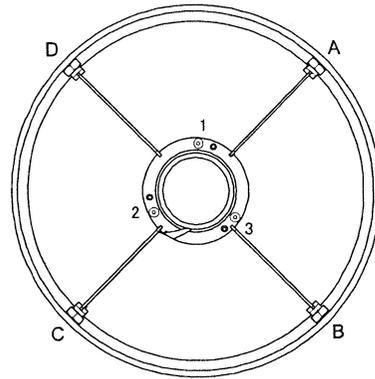


Fig. 7

The Fig. 6 shows how the center mark is seen through the collimating scope.

The Fig.7 shows how the spider and the secondary holder is seen from the top of the tube. In the Fig. 6, the mark is seen shifted toward the spider wing B.

The adjusting screws for the secondary are provided as shown in the Fig. 8 and 9: the large head one is the pulling screw and another small one is the pushing screw. They are paired and located at the three places as shown. Here is the adjusting procedure when the reference mark is seen as in the Fig. 6.

Basically loosen the pushing screws located at the B wing (making the gap narrower as in the Fig.9)(No.3 screws in the Fig. 8). Or loosen the pushing screws (No.1 & 2) located at the opposite side (making the gap wider). In the Fig. 7, No.3 screws are located. Loosen the pushing screw and tighten the pulling screw to bring the mark toward the center. Repeat this procedure until the mark becomes a concentric circle with the view field of the collimating scope. Then, the gap shown in the Fig. 9 becomes narrower so the distance between the primary and the secondary becomes wider, making the focal point shorter.

Adjustment must be done so that the focal point is kept constant. This will be achieved,

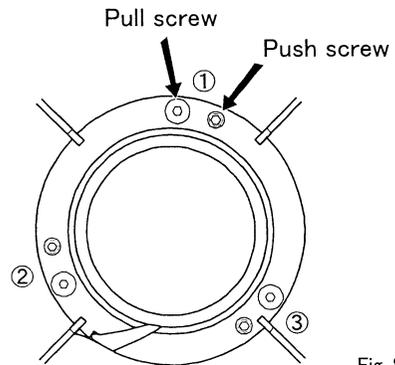


Fig. 8

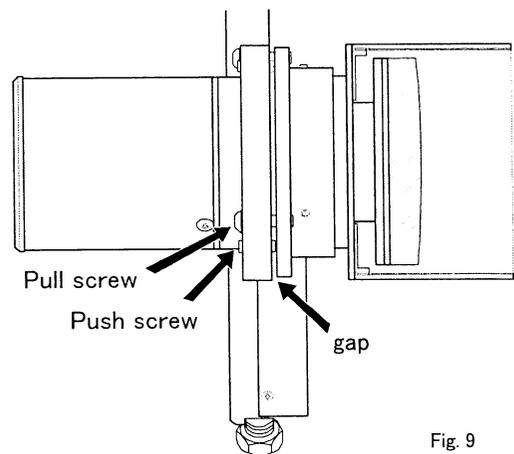


Fig. 9

not only by using a pair of screws in a place, but by using the other pair of screws. In the Fig. 7, loosen the No. 3 pushing screw and tighten the pulling screw. When the mark approach half-way the center, loosen No.1 and 2 pulling screws, and tighten push screws. This means the optical adjustment for the secondary can be made by using all three pairs of screws.

Caution: The procedure must be made by one pair of screws in a time and do the next after the first ones are firmly tightened.

After the secondary mirror adjustment has been completed, check the optical axis by using a star. If the axis is still out of collimation, the primary mirror adjustment must be done.

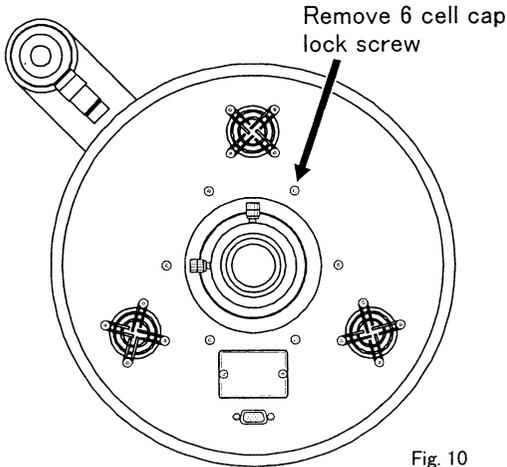


Fig. 10

■ Collimating the primary

At first, remove the primary cell cap carefully because wirings for focusing motor and temperature sensor are attached on the cell cap.

Collimation for the primary is made by using a star. After the cell cap has been removed, the electric focuser can not be used. So, before collimation, focus on a star

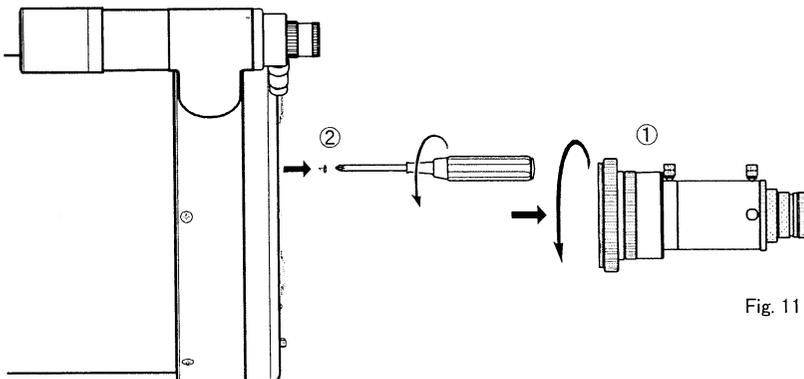


Fig. 11

and then move the focal point out by 2 - 3mm for optical axis adjustment which is made by attaching and detaching eyepiece, viewing a star.

Removing the cell cap: At first, remove all visual back. Refer to the Fig.11.

The cell cap is attached with 6 screws as shown in the Fig. 10. Remove these screws by a driver available in the market.

After all screws have been removed out, take out the cell cap slowly by both hands. The tube and the cell cap are connected with wiring and connectors.

The length of wirings is about 200mm. So be careful not pull these wirings more than total length.

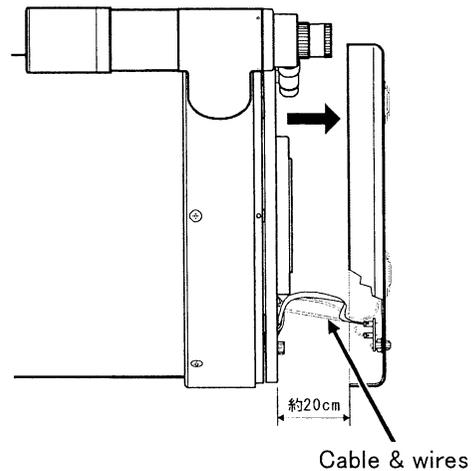


Fig. 12

Tilt the cell cap as shown in the Fig. 13 and remove the wiring and cables from their connectors. Pay careful attention while doing this procedure. So, please read these instructions carefully.

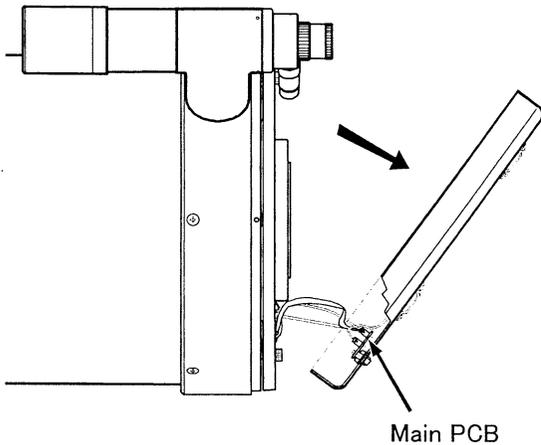


Fig. 13

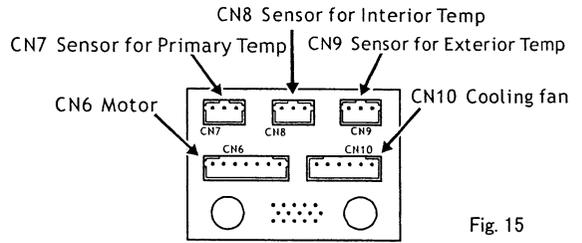


Fig. 15

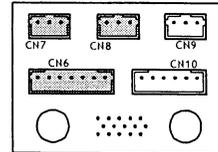


Fig. 16

On the main PC board, the connectors are provided with the layout as shown in the Fig. 15. Remove the wirings from the connectors shown in black. Other wirings remain as they are. When removing the wirings, grip the arrowed part and pull it out. Now collimation is ready.

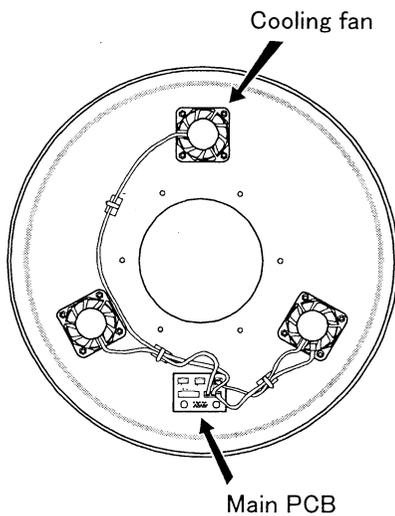


Fig. 14

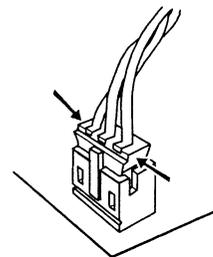


Fig. 17

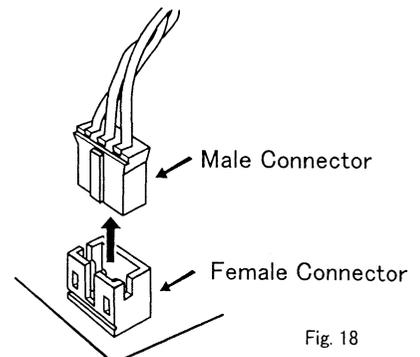


Fig. 18

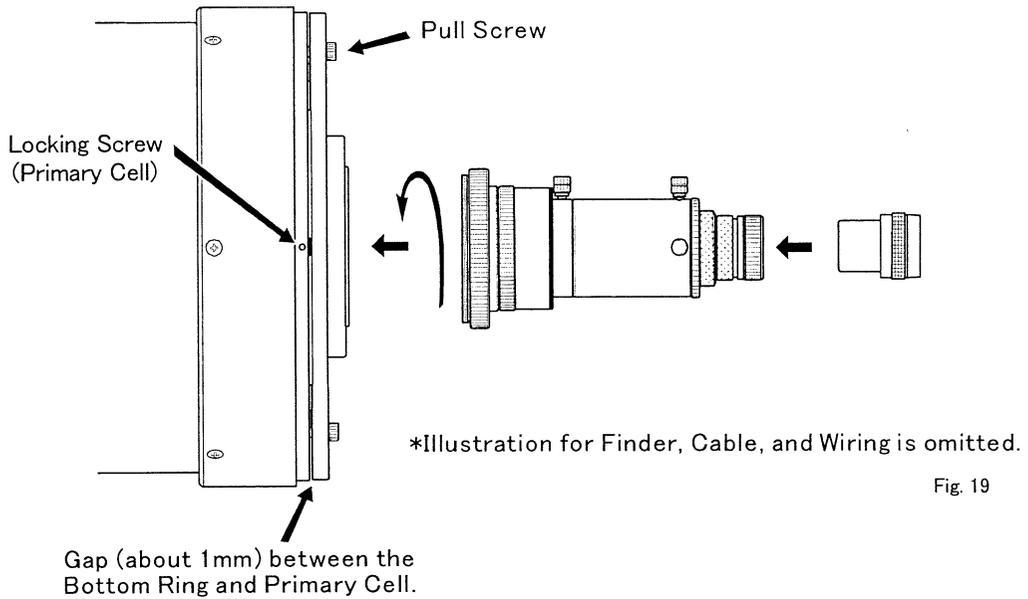


Fig. 19

In case the inner and outer image of a star does not become a concentric circle after the secondary has been collimated, collimation for the primary can be done with the following procedure.

Preliminary Set-Up to Start Collimation.

1. Set the tube assembly on the mount.
2. Attach the visual back.
3. Attach a 12.5mm or an 18mm eyepiece.
4. Loosen 3 sets of the primary cell locking screws provided on the the bottom ring. Refer to the Fig. 20.

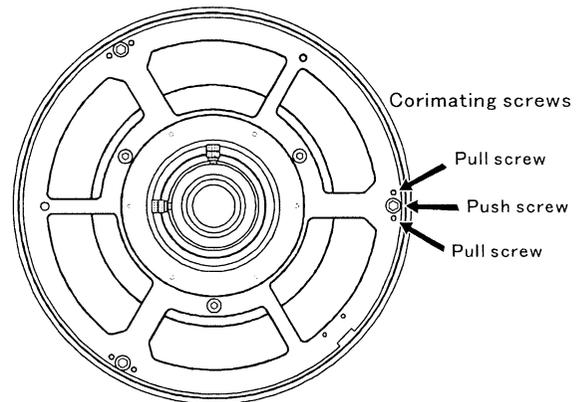


Fig. 20

The collimation for the primary axis is made with 3 sets of the pull screws and 6 sets of the push screws, by using Allen wrenches provided. Refer to the Fig. 20.

At first, center a 2-3 magnitude star at the field. Focus it, exchanging eyepieces.

View the inner and outer image of the star. If it is not a concentric circle as shown in the Fig. 21, collimate the primary axis so the star image becomes a concentric circle as shown in the Fig. 22.



Fig. 21



Fig. 22

The primary axis is collimated with the pulling and pushing screws located at 1 - 3 positions in the Fig. 23. Here is how to adjust the axis in case the center of an eccentric circle shifted toward the right underneath as shown in the Fig. 23. Basically, the adjustment is done with the adjusting screws located at the arrowed position. Loosen the pushing screw and tighten the pulling screw and then, the eccentric circle will become gradually a concentric one.

If you do the same with the screws located at the opposite position, you can have the same result.

Adjusting Procedure

1. Loosen a bit 2 pushing screws at No.3 position and tighten the pulling screw. Refer to the Fig. B to check shifting.

2. Similarly loosen 2 pushing screws at No.2 position and tighten the pulling screw. Refer to the Fig. C to check shifting.

* With the above procedures, you can adjust the primary axis.

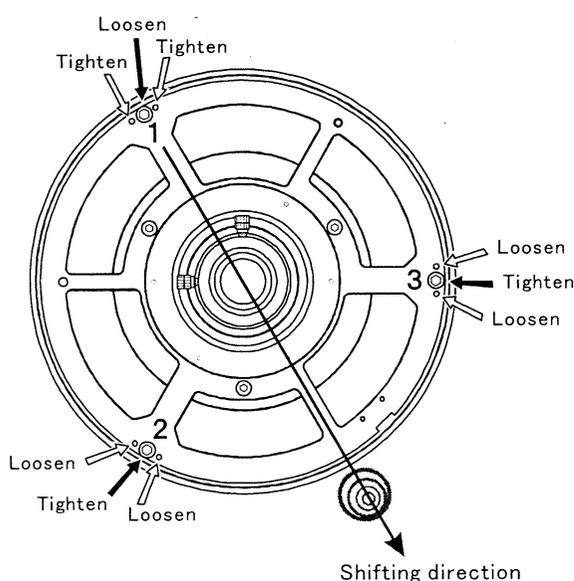


Fig. 23

3. Or loosen the pulling screw at No.1 and tighten the pushing screw to adjust the axis.

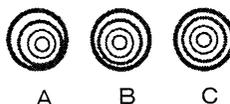
* When the axis is shifted widely, adjust it by using the screws located at 3 positions so the distance between the primary and secondary is kept constant as explained in the procedures for adjusting the secondary.

* Adjustment with the screws should be made bit by bit and one of the screws located at 1 - 3 position should be used one at a time and firmly locked. Then, adjustment with another one should be made. The pushing screws located at both side of the pulling screw should be tightened equally.

* During adjusting process, the star is getting away from the center of the view field. So, for further adjusting, center it again in the field, using the equatorial mount.

* If the screws are used to adjust the optical axis largely to one direction, the gap between the primary and the secondary becomes wider. Basic distance should be kept 1mm. If this gap is changed, the distance between the primary and the secondary is changed, making the focal point shifted.

* After the adjustment has been achieved, make sure that all the screws are firmly locked. The weight of the visual back will load on the cell. All the locking screws must be totally tightened.



Care & Maintenance

The primary mirror of your Mewlon-250CRS is exposed directly to the open air.

If the surface of the mirror is left covered with dusts and dew, it will become dim and make the contrast of images worse. With the following procedure, clean up dusts from the surface of the mirror by a blower at the regular interval.

When you set the tube back on to the mirror, set it precisely in place with the cell. Then, the optical axis will be hardly out of order.

1. Stand the tube assembly with its opening to the bottom on the level place.
2. Cable and wiring are attached on the cell by biding wire. Remove this biding wire or cut it out to release the cell from the bottom ring. Refer to the Fig. 25. Do not lift up the cell with cable and wiring. Otherwise the primary might touch the inside and possibly be damaged.
3. Remove the 3 pulling screws by using Allen wrench provided. Refer to the Fig. 24.
4. Hold the rib (A) and lift up the cell slowly with care not touching it on the inside. Refer to the Fig.25.

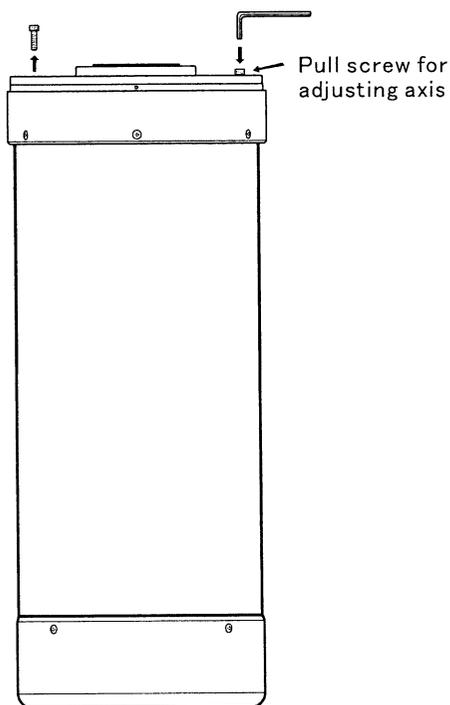


Fig. 24

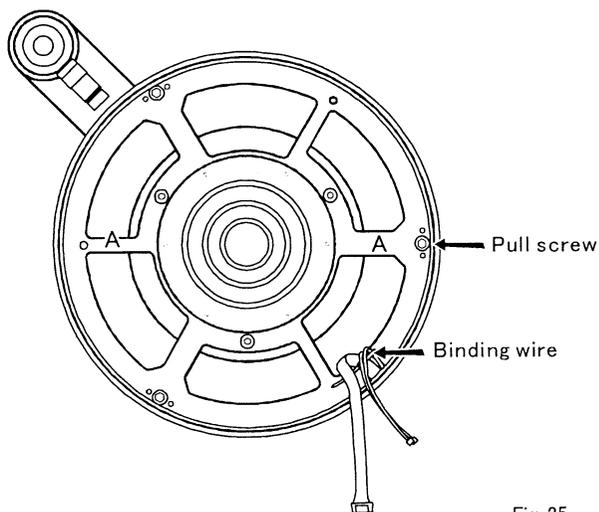


Fig. 25

5. The primary will be in view while lifting the cell. As the corrector tube is long so the primary mirror should be put aside after well cleared. Refer to the Fig. 26 and 27.

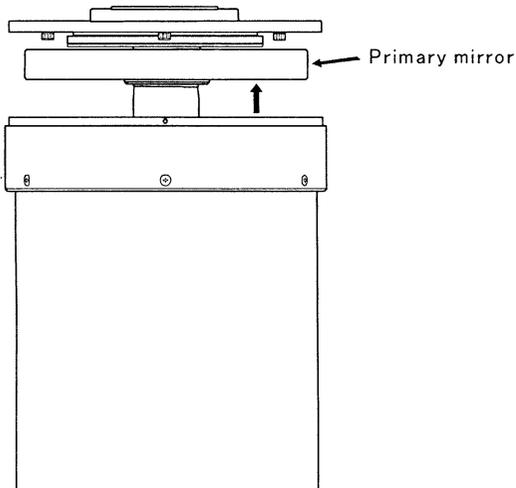


Fig. 26

6. The primary should be placed on the desk and blow particles from the surface by a blower. Refer to the fig. 28.

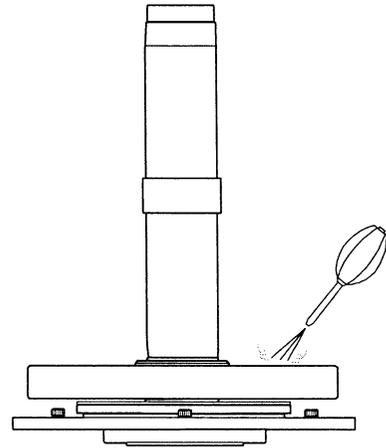


Fig. 28

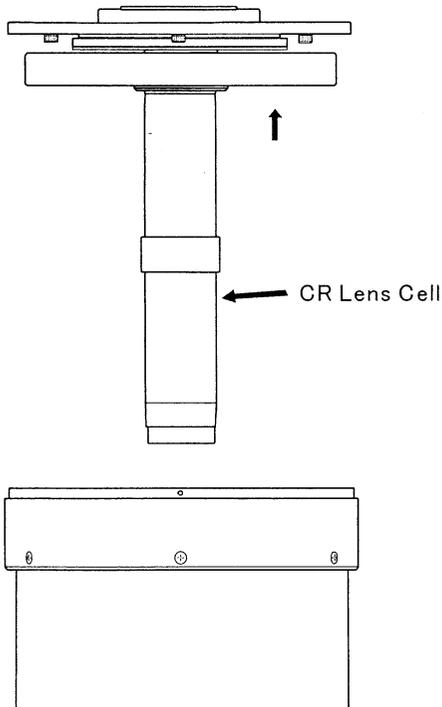
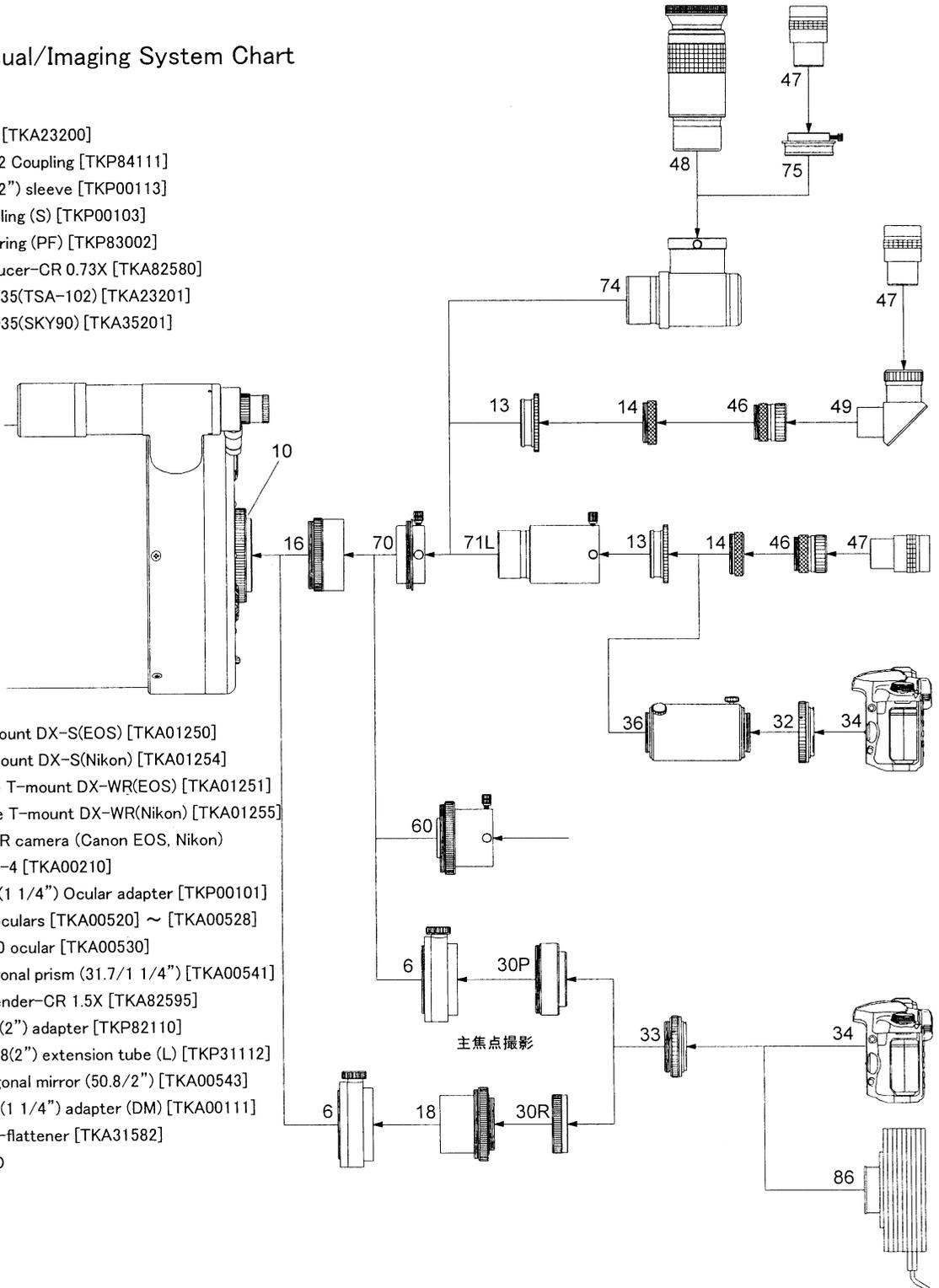


Fig. 27

System Chart

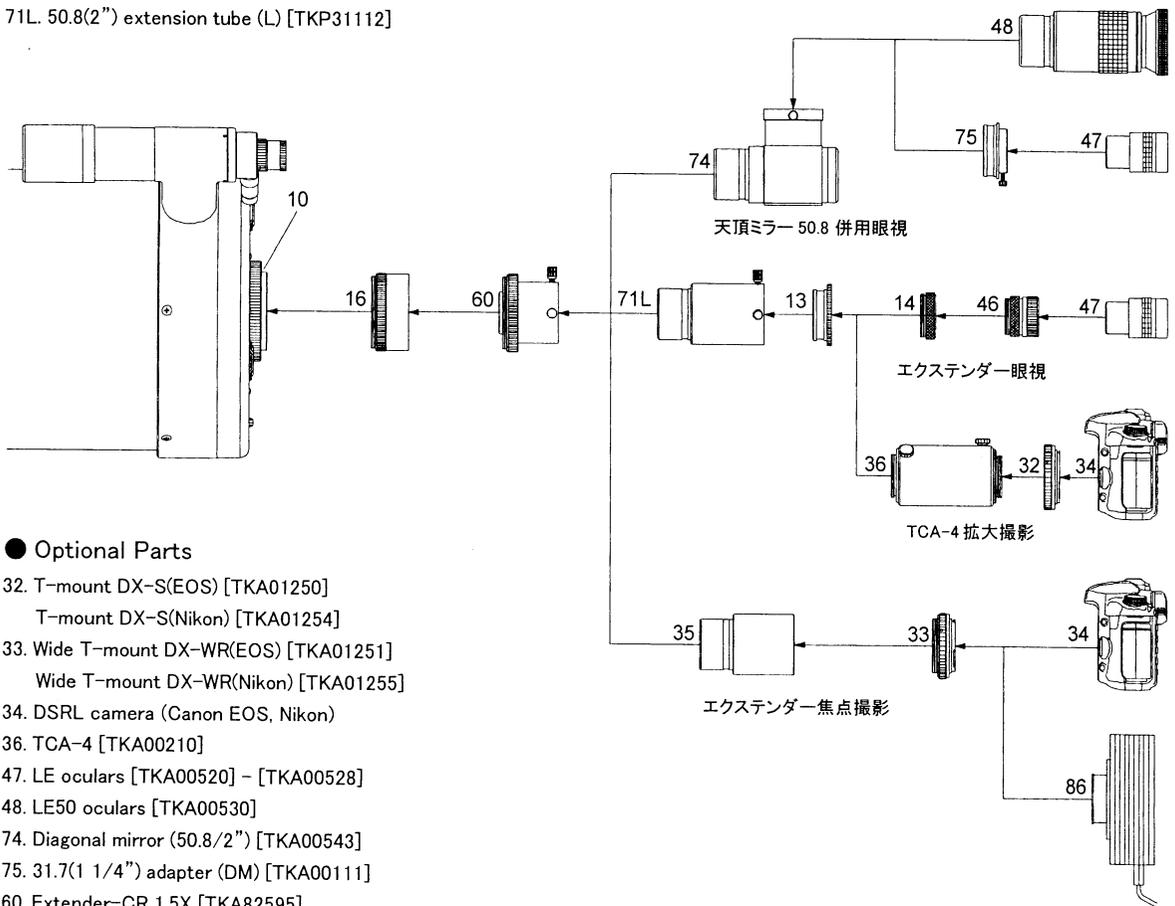
Visual/Imaging System Chart

- 6. CAA [TKA23200]
- 10. 92-72 Coupling [TKP84111]
- 13. 50.8(2") sleeve [TKP00113]
- 14. Coupling (S) [TKP00103]
- 16. Aux. ring (PF) [TKP83002]
- 18S.Reducer-CR 0.73X [TKA82580]
- 30P.CA-35(TSA-102) [TKA23201]
- 30R.CA-35(SKY90) [TKA35201]



■ Extender-CR 1.5X System Chart

- 10. 92-72 Coupling [TKP84111]
- 13. 50.8(2") sleeve [TKP00113]
- 14. Coupling (S) [TKP00103]
- 16. Aux. ring (PF) [TKP83002]
- 46. 31.7(1 1/4") ocular adapter [TKP00101]
- 71L. 50.8(2") extension tube (L) [TKP31112]



● Optional Parts

- 32. T-mount DX-S(EOS) [TKA01250]
T-mount DX-S(Nikon) [TKA01254]
- 33. Wide T-mount DX-WR(EOS) [TKA01251]
Wide T-mount DX-WR(Nikon) [TKA01255]
- 34. DSRL camera (Canon EOS, Nikon)
- 36. TCA-4 [TKA00210]
- 47. LE oculars [TKA00520] - [TKA00528]
- 48. LE50 oculars [TKA00530]
- 74. Diagonal mirror (50.8/2") [TKA00543]
- 75. 31.7(1 1/4") adapter (DM) [TKA00111]
- 60. Extender-CR 1.5X [TKA82595]
- 86. CCD

Note: Some 35mm DSLR cameras cannot be attached to T-rings or to Wide T-rings.

TAKAHASHI SEISAKUSHO Ltd.

41-7 Oharacyo Itabashi Tokyo 174-0061, JAPAN
PHONE: +81-3-3966-9491 FAX: +81-3-3966-9524