Company Seven

ASTRO-OPTICS DIVISION

CRITERION

Model RV Series Dynascope Manual

Contents circa 1977, by Criterion Manufacturing Co.

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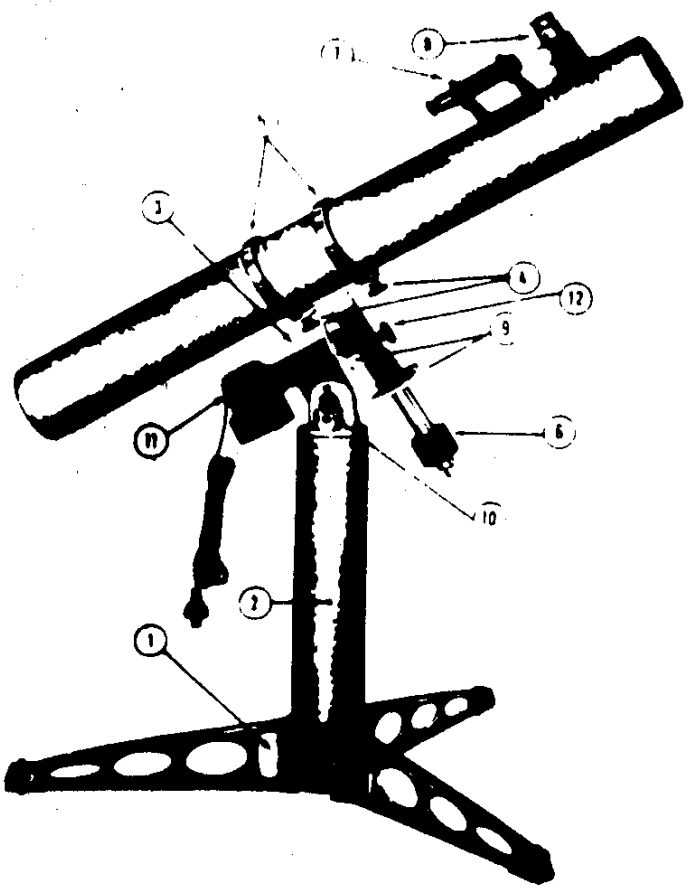
INSTRUCTIONS FOR MODEL RV SERIES DYNASCOPES

When assembled, the complete instrument should appear as shown in the photograph at left.



(1). Three outriggers are assembled to the pier by means of wing nut at this point.

(2). Pier. When outriggers are secured pier should be solid Adjust riggers till most stability is reached.

(3). Equatorial Head complete. This head is packed in some instances, separately and should be fastened to base at top of pier. The entire head should be adjusted at (10), to correspond with the latitude at your observing station. With Electric Drive Housing falling South, the Equatorial Head and the telescope should point North and lie in a north to south line as in photo. When lined up on the North Star, the Head is locked in position and ready for celestial operation. If mount is moved to another location, readjustment may be needed.

(4) Saddle and locks. The telescope is fastened to the Saddle at this point and can be removed whenever desired.

(5) Adjustable circular cradle. Permits moving the telescope into the best position for balance and eye level. As accessories or various eyepieces are added, which cause an unbalanced condition, you need only to loosen the adjusting nuts and reposition the telescope tube so it is at proper balance. It is a good idea to mark the positions of best balance if rings are removed from the telescope.

(6) Counterweight. Balances entire weight of telescope. Should never be removed while telescope is mounted as the telescope would fall. A number of weights are provided and altho they have been adjusted to the shaft, should be checked and readjusted for telescope weight.

(7) 6 X 30 Finderscope and adjusting bracket. The adjustments on bracket will enable you to align the finder so it points at exactly the same point as the telescope proper. When object seen in center of eyepiece of telescope is also in center of cross hairs in finder, alignment is OK.

(8) Double draw eyepiece holder. Has inner section which should be withdrawn part way to hold 18MM eyepiece. Focus then by rack and pinion. Long focal length eyepieces as well as negative ones can thus be used.

Also available at extra cost are many other sizes. Consult accessories booklet. In addition, we can supply [redacted] which triples the power of any eyepiece used with it, or our special CP4 Achromatic Barlow at $[illegible].50 which doubles eyepiece powers.

(9) Setting Circles are fully adjustable. Knurled lock screws. (10) Polar axis should be adjusted to your latitude. This can be done by adjusting the head angle to point at North Star Easy way is to sight on the North Star thru the telescope and lock in position. When scope is rotated about the polar axis, it will be following objects in their respective paths. Declination axis, locked by adjustment (12) is for altitude and is locked when scope is used about the polar axis.

(11) Electric Drive motor is housed in this unit and has been completely adjusted and tested at the factory and should require no attention whatever. See attached sheet on "Operation" which also covers adjustment if ever possibly needed.

TELESCOPE COLLIMATION (Mirror alignment).... This instrument was carefully aligned at the factory and locked in alignment. However, it pays to check this in case transportation has caused the elements to become misaligned. By looking into the open eyepiece holder(8) you should be able to see the following reflections all perfectly concentric: the main mirror reflected directly in the center of the smaller diagonal mirror with your eye in the center, and all these directly in the center of the eyepiece holder tube. If not, the main mirror may have to be adjusted. Have someone turn the spring loaded adjusting screws at mirror cell till the mirror reflection becomes concentric. It is unlikely that the small diagonal mirror will require adjusting. If by the rarest of chance this mirror is at fault, adjustments are provided about its holder for the same purpose. But you will find it will always be the main mirror which would require the adjustment if necessary. If the quality of images seen is not satisfactory, assuming no other factors such as poor observing conditions, the fault would be due entirely to misalignment of the mirrors. The optical elements have been exhaustively tested and were installed only when they would perform perfectly. The entire instrument was shipped to you only after it had performed excellently. Asymmetrical star images or astigmatic images will be due to poor alignment as stated. Poor location site or observing conditions of the upper atmosphere will be responsible if the instrument is properly aligned.

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Made of Pyrex, a high silica glass, one may expect the optical surface to last indefinitely. The aluminized and overcoated coating is the most delicate part of the mirror; however, with reasonable care and usage it can be expected to last up to ten years. Somewhat shorter life expectancy may be experienced in atmospheres containing corrosive salts and contaminates.

CARE OF COATING:

1. Do not touch the mirror with hands or any object unless cleaning as described later.
2. If very dusty remove by gently brushing with a camelhair brush. (Be sure the hair ends are not cut, but are of a natural taper. Use of cut hair produces fine sleeks on coating.)
3. Keep telescope capped when not in use. Store tube in a horizontal position to prevent settling of particles on surface.

4. When mirror becomes excessively dirty, clean as follows: Caution: Do not use laundered towels or cloths for wiping the mirror. The contaminates will cause residual water spots and a film that is impossible to remove without re-coating. Do not clean anyother way than described below. Anyother method will produce inferior results. Do not use lens cleaners.

Materials Needed:-

1 lb. surgical or engravers cotton. (Engravers cotton is less expensive).
1 qt. Isopropyl alcohol, Tide or Basic H detergent.

Procedure:

With the mirror resting face up on a towel in the sink, turn on the cold water and play a stream of water on it's face. This will loosen some of the particles and wash off unattached dust. Dip a wad of cotton in a mild solution of detergent. (¼ teaspoon to 1 pint of water). Then gently swab the entire surface. Keep the water going while doing this so as it'll wash off the detergent solution as you clean.
Very important: Do not let the surface dry or bead as water marks will be formed. Keep the stream of water going.

After swabbing the surface with detergent solution, the mirror is now covered with a stream of water. Make ready three wads of cotton for the following: Next dip one half of the cotton swab into Isopropyl alcohol. At the time you place the swab on the surface of the mirror, turn off the water. Now swab the <u>entire</u> surface with this swab. Caution: do not turn swab over or dissolved skin oils will deposit on the mirror. Immediately take a dry swab and wipe gently. Keep changing cotton swabs until the surface is totally dry.

This method used for many years by us has shown itself to be the best.

ASSEMBLY OF TELESCOPE PEDESTAL

The telescope pedestal consists of one steel pipe and three cast aluminum legs. To assemble:

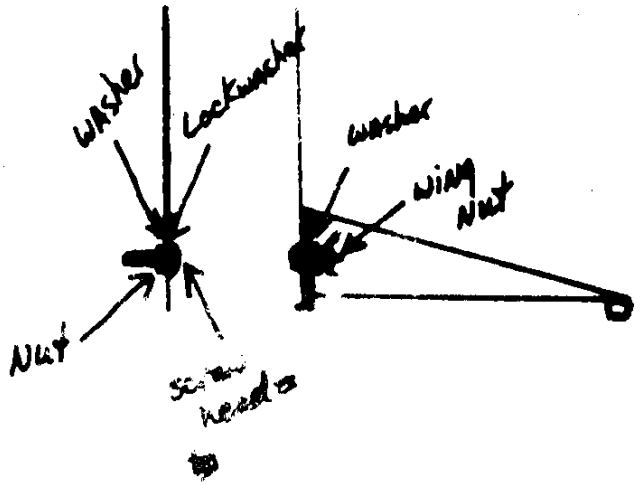
1. Examine the steel pipe and locate the three threaded holes provided. Screw the enclosed 1/4 - 20 cup point set screws into these holes.

2. Turn the pipe on end so that the three unthreaded holes are at the top end of the pipe. Next, locate the three 1/4 - 20 round head screwsin the enclosed envelope. Place one lockwasher on each screw and fit the screws through the holes provided,(the screw heads and lockwashers must be on the inside portionof the pipe). Then, simply place one flat washer on each screw along with one nut and secure firmly in place with an appropriate wrench.

At this point, the pipe is ready to accept the three legs. The three protruding screws should be left permanently in placeand only the aluminum legs should be removed at each observing session if the telescope is to be transported.

Each leg has a hole through its thickest portion. Simply place each leg onto the pipe by resting it on each protruding screw (using the hole provided).

Finally, place a flat washer on each screw and tighten the leg in place by means of the wing nuts provided.



To balance the instrument, position the axes of the mount so that both the declination shaft and the telescope tube are parallel to the floor or ground. Then position the weight on the declination shaft and slide it up and down until it takes the same exact amount of force to move the declination shaft up as it does to move it down. A postal scale can come in handy as a guage of fprce applied. If it takes the same amount of force to move the declination shaft up as it does down, then perfect equilibrium has been reached, and you have a precisely balanced telescope (especially if force has been measured to oz. on a small scale). The same process is used to balance the tube in declination, with the exception that there is no counterweight. Instead, one merely slides the tube either back or forth in it's rings until balance is reached.

HOW TO USE THE SETTING CIRCLES

Attached to the Polar Axis is a graduated circle marked off in hours and minutes. This is an Hour Circle (sometimes referred to as "RA CIRCLE"), and its figures correspond to the co-ordinates of right ascension of celestial objects.

Attached to the Declination Axis is a graduated circle marked off in degrees, minutes, and seconds. These figures correspond to the co-ordinates of declination of celestial objects.

Note: Before the setting circles can be used correctly, the equatorial head of the telescope must be properly set to the latitude of the observing site. With the polar axis pointing at the true pole and fixed in that position (pointing the main telescope at Polaris is sufficient for most purposes) the declination circles should be set and fastened at 90 degrees.

The hour circle is "slip ring" type. To use the slip ring circle to locate stars you must first have a star chart or ephemeris giving the RA (right ascension) and declination co-ordinates of celestial objects.

Locate a bright known star, such as Vega, and note its right ascension at any given time. Train the main telescope so that this star is in the center of the field. Set the hour circle reading to correspond to the right ascension time of the known star. The hour circle is now in proper position for observing and need not be touched again for the rest of the night. The declination can also be checked at this time to make sure it is properly indicating correct declination. The same ephemeris, table, or chart should also be used for other settings. From these, the position of other stars can be determined and brought into view by setting the instrument to the proper right ascension time on the slip circle and proper declination reading on the declination circle.

In order to pick up the second star, first look up and note its RA and Dec. Now, from this RA time, subtract the total amount of elapsed time since the first setting of circle on the known star to the moment. The result will be the correct new RA time of the second star. Now move the telescope so that the slip ring circle indicates this new RA time, and also adjust the declination to properly indicate the correct declination setting for the star. The second star should now be in the field of view.

You must keep track of the total elapsed time between the first setting of the night to the moment of change and subtract this total from the known RA time of each new star you are seeking. For example: let us say you have been observing the first star for 1/2 hour since the first setting, and you now wish to locate the second star which has an RA of 6h. Subtract the 1/2 hr from 6h and the new setting would be 5.5h. The Declination is always clamped firmly in its declination reading whereas the polar axis alone must move freely during observation.

 Criterion Manufacturing Company - Hartford, Conn.

OPERATION OF AN ELECTRIC DRIVE TELESCOPE MADE BY CRITERION

Simply plug the power cord into ordinary household current outlet of 110/120 volts AC 60 cycles.

With drive so connected, use the telescope in normal manner, pointing it wherever you wish. When you come onto object you want to observe, drive takes over. It is a good idea to come onto object from West to East and then remove your hands from the telescope when object is in field. This eliminates any backlash in the system, and the drive action starts immediately at point of release. It is not necessary to disconnect drive for manual use at any time; an automatic clutch incorporated into the drive is self-acting.

IMPORTANT : Accurate drive rate requires that the mount be exactly lined up on the North Star or oriented for equatorial use in the preliminary setting up of the telescope and mount before the observing session. Improper latitude setting will cause a seemingly slower or faster following rate indicated by a drift in Declination. If Polar Axis is properly set and a drift in RA occurs, check the balancing of the telescope and also the latitude setting. The drive rate of the motor CANNOT vary, will be absolutely steady and vary only to the extent that your current supply varies. These motors are rigidly tested and proven and you should expect many years of trouble free use.

Please do not tamper with the adjustments on the drive as made at the factory and as delivered. The drive has been run for a number of hours and carefully adjusted. Adjusting the gears and changing gear alignment and fits , if done improperly and tightening, can cause the gears in the electric motor to strip and void the guarantee.

NOTE: Do NOT expect to see the telescope moving when the drive is in action. This movement is so slow it cannot be seen. It is like trying to see the hour hand moving on your watch. The drive will make approximately one revolution in 24 hours! On telescopes equipped with setting circles, this movement can be checked. The pointer on the POLAR Axis would move one line in 10 minutes, 2 lines in 20 minutes, etc. provided the telescope itself is not over weighted and out of balance causing the clutch to slip. Of course, the pointer on the Declination setting circle will show no movement as it is not being driven. To test, please be sure the telescope is on the mount and is correctly balanced. Should heavy camera equipment be added to the telescope, you must adjust the counterweight accordingly or add extra weight if necessary.
For field use, an inverter taking power from your car cigarette lighter is available. Also available: Variable electronic drive speed changer and slow motion. Ask for bulletins# C412 and #E 6.

Note: Model RV-6 is now equipped with single counterweight instead of with two weights. Also the base of the equatorial head section can now be turned in asimuth by loosening the three allen screws in top of stand pier. Levelers are not provided any longer as a design change.

IMPORTANT

THIS INSTRUMENT WAS PROPERLY ALIGNED AT THE FACTORY. TRANSPORTATION COULD HAVE CAUSED SLIGHT MISALIGNMENT. BEFORE USING, TEST ALIGNMENT AND RESET, IF NECESSARY, TO INSTRUCTIONS BELOW.

TO TEST ALIGNMENT . . .

1. Point the open end of the tube at the daytime sky, a white ceiling or lightly illuminated object. Do NOT point it at the Sun.
2. With eyepiece removed, look into eyepiece holder tube center.
3. Reflections of mirrors and support should be concentric. If small mirror appears to be in EXACT center as in Figure 1, it is correct and ready for use. Perfect alignment gives proper performance.
4. If the reflections appear as in Figure 2, adjust the MAIN mirror (not the small mirror) as below.

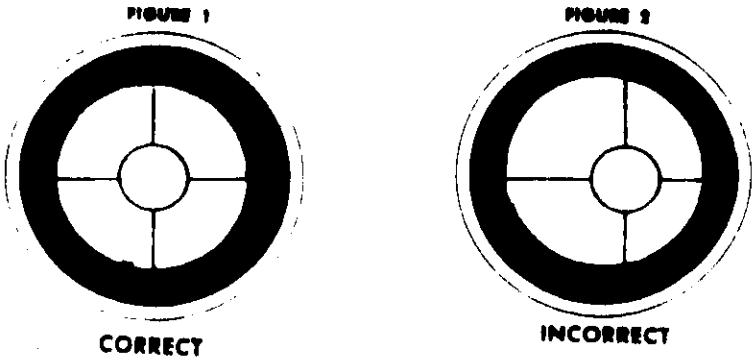


Figure 2 indicates main mirror out of adjustment.

HOW TO ALIGN . . .

Look down into the open end of the eyepiece holder, keeping eye central. If you cannot reach the mirror adjusting screws at the other end of the telescope while looking into the eyepiece holder, have an assistant SLOWLY turn one of the adjusting screw heads on the main mirror cell and note in which direction the small mirror reflection moves. By trying the same slow adjustment on the other screw heads, you will be able to see which adjustment requires more and which requires less turning in order to bring the reflections to exact center as in Figure 1. The slightest amount of turning will result in considerable movement so do this carefully. [An accessory eyepice alignment gage is available at $4.95 for those who desire it.] Under normal conditions, this adjustment, when set, will not be affected by transport or handling. For the kind of performance this optical system can give, alignment is extremely important and when the mirrors are not correctly aligned, you will not get top optical performance.

IMPORTANT:: DO NOT adjust the small diagonal mirror in its cell at the front end of the telescope. This adjustment is most critical and has been very carefully done at the factory and should never need adjustment. If the optical system does not perform well it will always be due to the alignment of the large mirror.

CRITERION MFG. COMPANY
331 CHURCH STREET HARTFORD 1, CONN.

Service Department Bulletin

CRITERION MANUFACTURING COMPANY
Manufacturers of Quality Optical Instruments
331 CHURCH STREET HARTFORD CONNECTICUT

SUBJECT: Electric Drive Operation #ED3

In order to achieve accurate following of astronomical objects with telescopes equipped with electric drives, the following conditions must be rigidly met.

1. To follow equatorially, you must have mount set for equatorial motion. Therefore, THE EQUATORIAL MOUNT MUST BE ACCURATELY ALIGNED TO THE NORTH STAR. This will be equal to the latitude at your observing session station. If this is not done correctly or no attention is given to it, the telescope will not follow and objects will appear to drift in various manner depending on the extent of error in the direction to which the telescope points and to where it should be pointed. To align correctly, follow closely the instructions on the attached sheet, which describes the setting of an equatorial mount.

2. Do not align the optics of the telescope after the mount has been set for proper equatorial action. Optics of telescope should be in alignment when the mount setting is being made and if necessary, should be done BEFORE adjusting mount.

3. It is impossible for the drive to vary its speed, however a drop in your local current supply would affect it slightly but in no way would it be as great as that caused by improper latitude setting as described in (1).

4. It is a good idea to come onto object from West to East as in this way, drive takes over precisely at time you have object in field, and any movement of fits is overcome.

5. Make sure that counterweight on mount is adjusted so that telescope is in good balance. If weight is set too "light", telescope will have tendency to run ahead when on downside.

PROBLEMS

Drift in Declination faster or slower.
Cause.....Improper latitude setting.

Drift in right ascension faster or slower.
Cause.....Telescope not properly balanced. Clutch tension is too light.

IMPORTANT....Drive rate has been checked before shipment on all DynoMatic Drives. If telescope does not follow properly, review the foregoing taking particular care in setting the equatorial mount for your latitude by adjusting to the North Star. This must be done every time mount is moved to new location.
If drive is attached by owner rather than by factory, instructions for attaching should be carefully followed.
Do NOT expect to see the telescope moving when the drive is in use. This movement is so slow it will not be apparent.
Turn drive on at beginning of session and do not connect or disconnect while looking for new objects.

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