

FLAMSTEED ASTRONOMY SOCIETY

ROYAL OBSERVATORY, GREENWICH

Instructions for the use of the CORONADO Hydrogen-alpha solar viewing telescope

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Instructions for the Coronado H-alpha Solar Viewing Telescope

1. The storage location for the telescope may have to change during the Time and Space Project while the South building is a construction site.
 - 1.1 There must be at least two volunteer operators for the telescope to be used for public viewing.
 - 1.2 When you arrive at the Observatory, report to the Steward on the gate and ask him to contact the Site Manager. Explain what you will be doing, whether the session has been planned or not. The Site Manager will arrange access to collect the telescope from its current storage location.
2. Enter the date and time the telescope is being taken out, and the names of the two volunteer operators in the record sheet at the back of this book.
3. Set up the tripod.
 - 3.1 The tripod will usually be found with the equatorial mount fixed on top. It may be necessary to fold the tripod up for compact storage, in which case the first thing is to set the legs to roughly half their extended length, open out the legs and secure them by pressing down the central spreader. The attachment ring and visual aiming sight for the Coronado telescope are permanently mounted onto the equatorial head.

- 3.2 Check that the latitude setting is at $51^{\circ} 28'$ for the ROG location. This is normally locked at the correct angle and will not need to be touched unless it has been deliberately disturbed.
 - 3.3 Remove the two long screws securing the top half of the split mounting collar and lift off the top half of the ring.
4. Open the telescope box and note that it contains the Coronado telescope and two eyepieces (25mm and 18mm) and that plastic caps are in place over all the apertures.
5. Remove the telescope from the case and fit it into the bottom half of the mounting collar on the tripod roughly half way along the gold anodised length of the main tube. The telescope must be set pointing upwards.
6. Fit the top half of the split mounting over the telescope tube, making sure that the pinhole end of the sighting device is at the same end as the objective of the telescope. Hold the telescope tube securely to make sure that it does not slip or fall off. It is easier to do this with one person holding the telescope and another fitting the top ring and re-tightening the fixing screws.
8. Slacken the two nylon screws **D** and draw out the focus tube to its full extent. Adjust the angle of the eyepiece tube and re-tighten the nylon screws.
9. Undo the eyepiece clamping screw, remove the plastic blanking piece and insert the 18 mm eyepiece. Tighten the clamping screw but do not over-tighten it as this may damage the eyepiece.
10. Remove the cover from the objective lens at the front of the telescope and put it carefully to one side.

11. Adjust the tripod so that the Right Ascension axis is pointing towards the North Celestial Pole. There is a letter 'N' at the top of the tripod, which should be oriented towards the North. The Declination axis will already be set correctly for the latitude of Greenwich, $51^{\circ}28'$.
12. Adjust the position of the counterweight on the long projecting arm to balance the telescope so that it has no tendency to rotate about the Right Ascension axis.
13. Point the telescope towards the Sun. The finder tube mounted on top of the telescope will show a small spot of light in the centre of the screen when it is correctly pointed. The pointing of the telescope can also be checked by removing the eyepiece and viewing the prime focus image which should be centred in the tube. As a last resort, if you cannot find the Sun image, temporarily replace the eyepiece with a 25 mm eyepiece which will give a wider field of view. Replace the 18 mm eyepiece for viewing, to give a larger image of the Sun.
14. The telescope is now fitted with a motorised drive, which has complicated the set-up procedure a bit. There is no longer a manual fine adjust on the Right Ascension axis (side to side), although there is still a manual adjust on the Declination axis (up and down). Even at the highest speed setting, the motor drive is not fast enough to search for the Sun if it is out of the field of view. You may have to slacken the clamping screw for RA and carefully adjust the angle about the polar axis by light pressure with your fingers. Once you have located the Sun anywhere in the field of view, don't try to centre it manually. Lock the RA clamp screw immediately and centre the image using the motor controls as described in the next section.
15. The Motor Drive.
 - 15.1 The hand-held control unit has two leads coming out from the bottom. One is labelled "Dec." for declination (a movement up and down the North-South Meridian) and the other "R.A." for right ascension (a movement East-West across the Meridian). These two leads must be plugged into the appropriate labelled sockets on the equatorial head on the tripod.
 - 15.2 Make sure that the switch at the top left of the control unit is in the middle OFF position, and plug the power lead from the battery pack into the socket on the control unit.
 - 15.3 Move the OFF switch up to the "N" position. This is for the correct motion in the Northern Hemisphere. (The "S" position is for Australia). As soon as you set this switch the telescope is tracking. If you have set

the tripod correctly oriented North-South and vertical, the motor will track the Sun for half an hour or more. If there is a small error in the position of the tripod, then the Sun will slowly move out of the field of view and will have to be re-set using the four buttons on the control unit.

- 15.4 The arrows associated with these buttons give the direction the image of the Sun will move within the field of view when that button is pressed, when you are standing behind the telescope provided that the right-angle eyepiece is pointing upwards, not to the side. The movement of the image is not fast, even on the x8 setting, and is not fast enough to use to find the Sun when it is outside the field of view. It is quite adequate for occasional centring of the image, however.
 - 15.5 As there is no manual adjustment on the RA axis, if the batteries are flat there will be no fine adjustment at all to keep the Sun tracking in the centre of the field. If the batteries are satisfactory, you should be able to hear the rapid drive pulses if you put your ear to the motor and press an appropriate fast button. There is also a battery check on the battery charger (see later).
 - 15.6 If you are stuck with flat batteries, there is an emergency set of four ordinary “D” cells which can be used in place of the re-chargeable cells in the battery pack. **THESE ARE FOR EMERGENCY USE ONLY.** Do not leave them in the battery pack when you are finished, but take whatever steps are necessary to get the normal batteries charged up again for the next time the telescope is used.
16. Care of the batteries
 - 16.1 There is a battery charger for use when they need re-charging. This also incorporates a tester and a discharger.
 - 16.2 Testing the battery.

The cells can be tested one at a time. Make sure the charger is unplugged from the mains and insert the cell into the first position. Move the switch to the right (T for testing) and if the cell is fully charged the indicator light will shine brightly. If the cell is fully discharged, it will not light up at all. A weakly charged cell will make the light shine only dimly.
 - 16.3 Discharging the battery.

Ni-Cd cells have a ‘memory’ which means that they can only take a full charge if fully discharged first. Before charging the battery it is recommended that they should be fully discharged first. Make sure that the unit is not plugged into the mains, insert all four cells (or as many as you want to discharge), and move the switch to “D” on the left. The white indicator light will come on. When the light goes out the battery is fully discharged and ready to take a new charge.
 - 16.4 Charging the battery

Move the switch to “C” in the centre, and insert all four cells. Plug the unit into the mains, and the two red LEDs will come on to confirm that the cells are the right way round and that charging has begun. A full charge will take 20 hours, after which the cells should be removed and returned to the battery case. Do not leave the battery in the charger for longer than the recommended time or the cells may be permanently damaged.

17. After use, dismantle the telescope in the reverse order and return it to its case. Check that all lens covers are in place and all the components are present.

18. Return the telescope to its storage location and complete the entry in the log book. Record the time the telescope was replaced and an estimate of how many people looked through it during the public session. Use the ‘Comments’ section to make any notes about the weather (cloud cover etc.) and record any details which might be useful to the next person using the telescope.

ALWAYS LEAVE THE TELESCOPE AS YOU WOULD WISH TO FIND IT

