Quantum 100 Refractor

(Equatorial Mount not included)

INSTRUCTION MANUAL

MODELS S11160
• Never look directly at the Sun with the naked eye or with a telescope (unless you have the proper solar filter). Permanent and irreversible eye damage may result.

• Never use your telescope to project an image of the Sun onto any surface. Internal heat build-up can damage the telescope and any accessories attached to it.

• Never use an eyepiece solar filter or a Herschel Wedge. Internal heat build-up inside the telescope can cause these devices to crack or break, allowing unfiltered sunlight to pass through to the eye.

• Never leave the telescope unsupervised, either when children are present or with adults who may not be familiar with the correct operating procedures of your telescope.
QUANTUM IS CONVENIENTLY PACKAGED IN ONE REUSABLE SHIPPING CARTON THAT CONTAINS THE FOLLOWING ACCESSORIES:

QUANTUM 100

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>100mm</td>
</tr>
<tr>
<td>Focal Length</td>
<td>500mm (f/5.0)</td>
</tr>
<tr>
<td>Eyepiece</td>
<td>28mm - 2”</td>
</tr>
<tr>
<td>Finderscope</td>
<td>9x50, erect-image, 90°</td>
</tr>
<tr>
<td>Diagonal</td>
<td>2” mirror diagonal with dielectric coatings</td>
</tr>
<tr>
<td>Field Flattener</td>
<td>Built-in</td>
</tr>
<tr>
<td>Case</td>
<td>Aluminum, Foam Lined</td>
</tr>
<tr>
<td>Technical Specs</td>
<td></td>
</tr>
<tr>
<td>Highest Useful Magnification</td>
<td>236 x</td>
</tr>
<tr>
<td>Lowest Useful Magnification</td>
<td>14 x</td>
</tr>
<tr>
<td>Limiting Stellar Magnitude</td>
<td>12.5</td>
</tr>
<tr>
<td>Resolution: Rayleigh</td>
<td>1.39 arc seconds</td>
</tr>
<tr>
<td>Dawes Limit</td>
<td>1.16 arc seconds</td>
</tr>
<tr>
<td>Light Gathering Power</td>
<td>204 x</td>
</tr>
<tr>
<td>Optical Coatings - Standard</td>
<td>Fully multi-coated</td>
</tr>
<tr>
<td>Optical tube length</td>
<td>17 in (432 mm)</td>
</tr>
</tbody>
</table>

FIGURE 1-1 – QUANTUM REFRACTOR
REMOVING THE QUANTUM 100 CARRYING CASE

1. The Quantum 100 is shipped in an aluminum spring-loaded frame to ensure safety during transportation. To remove the aluminum case from the frame:
2. Remove all accessories from the shipping box so that the aluminum case is accessible.
3. Remove the spring-loaded frame from the box.

4. Turn the lever on the fastening clamps in all four corners of the frame.

5. Remove the top portion of the frame that holds the case in place.
6. Lift the telescope case from the frame.
7. The Quantum 100 can now be removed from its carrying case.

ATTACHING THE MOUNTING RINGS

Before mounting the telescope onto an Equatorial mount you must first attach the tube rings around the tube:

1. Loosen the two Tube Ring Locking Clamps on the tube ring assembly. See Figure 1-1.
2. Open the tube rings and place the telescope tube inside the rings so that the dovetail mounting bar is positioned at the bottom of the telescope tube.

It may be necessary to extend the lens shade to make room for the tube rings. To extend the lens shade:
3. Loosen locking screws on the silver ring around the lens shade (See Figure 1-1).
4. Fully extend the lens shade and re-tighten the locking screws.
ATTACHING VISUAL ACCESSORIES

INSTALLING THE STAR DIAGONAL
The star diagonal is a prism or mirror that diverts light at a right angle to the light path of the telescope. This allows you to observe in positions that are physically more comfortable than if you looked straight through.

TO ATTACH THE 2" STAR DIAGONAL onto the OPTICAL TUBE:
1. Loosen the adapter ring set screws located on the end of the focuser.
2. Slide the 2" barrel end of the star diagonal into the focuser adapter ring.
3. Tighten the set screw on the adapter ring to hold the star diagonal in place.

If you wish to change the orientation of the star diagonal, loosen the thumb screw on the focuser draw tube. This will allow the diagonal (or camera for photography) to rotate freely. Rotate the diagonal to the desired position and tighten the screw.

INSTALLING THE EYEPIECE
The eyepiece is an optical element that magnifies the image focused by the telescope. To ensure that your telescope properly reaches focus, the eyepiece should be inserted into the star diagonal. To install an eyepiece:
1. Loosen the set screw on the star diagonal until the tip no longer extends into the inner diameter of the eyepiece end of the diagonal.
2. Slide the chrome portion of the eyepiece into the star diagonal.
3. Tighten the set screw on the star diagonal to hold the eyepiece in place.

To remove the eyepiece, loosen the set screw on the star diagonal and slide the eyepiece out.

INSTALLING THE FINDERSCOPE
Quantum telescopes come with a 9x50 finderscope. The specifications for the finderscope refer to the magnification and aperture (in millimeters). Therefore, a 9x50 finderscope magnifies objects nine times and has a 50 mm objective lens.

FINDERSCOPE INSTALLATION
1. The finderscope comes attached to the dovetail finderscope bracket and is ready to be attached to the telescope.
2. Loosen the thumbscrew on the side of the dovetail mount.
3. Slide the base of the finderscope bracket into the dovetail mount and lock down the thumbscrew to hold in place.

ALIGNING THE FINDERSCOPE
The finderscope is adjusted by using the six adjustment screws located on the rings of the finderscope bracket. To make the alignment process a little easier, you should perform this task in the daytime when it is easier to locate objects in the telescope without the finderscope. To align the finderscope:
1. Choose a visible object that is in excess of one mile away. This will eliminate any possible parallax effect between the telescope and the finderscope.
2. Point your telescope at the object you selected and center it in the eyepiece of the telescope.
3. Check the finderscope to see where the object is located in the field of view.
4. Thread the knurled locking nut away from the finderscope bracket rings.
5. Adjust the thumb screws on the finder bracket until the cross hairs are centered on the target.
6. Thread the knurled locking nut down to hold the finderscope securely in its bracket.
USING YOUR TELESCOPE FOR ASTROPHOTOGRAPHY

Quantum telescopes come with a built-in field flattening lens design to provide pinpoint images while imaging. To configure your Quantum refractor for astrophotography:

1. Remove all visual accessories (eyepiece, diagonal) from the focuser.
2. Unthread the focuser adapter ring from the end of the focuser (see image 1-4).
3. Thread the camera adapter onto the end of the focuser.
4. Now attach the camera ring onto the other end of the camera adapter.

- DSLR photography requires a model specific camera ring for your model of camera. SkyWatcher makes a model for Canon (S20300), Nikon (S20301) and Sony (S20302). Once attached, your DSLR body (not included) will mount onto the telescope just as it would attach to a camera lens.

FIGURE 1-6

FRAMING YOUR CELESTIAL OBJECT FOR ASTROPHOTOGRAPHY

Quantum refractors give you two ways to rotate your camera for the purposes of framing celestial objects on the camera chip.

- As described above, your camera can be rotated by simply loosening the thumb screw on the focuser draw tube (see Fig 1-4) and rotating the camera body to the desired position.

- Additionally, you can rotate the entire focuser (with camera attached) in order to frame your object. This method will ensure that the camera body will always have the same orientation relative to the focuser. To rotate the focuser:

1. Loosen the focuser retaining ring by rotating the entire ring one-quarter turn counterclockwise. Use the small torque handles to achieve a secure grip. Note: Do not remove the focuser retaining ring or else the focuser will become disengaged from the telescope tube.
2. Slowly rotate the entire focuser to the desired location.
3. Re-tighten the focuser retaining ring by rotating clockwise.

FOCUSING

Dual Speed Focuser – Your Quantum refractor is equipped with a dual speed focuser with both course and fine adjustments.

Focus Lock – On the bottom side of the focuser is a focus lock that will disengage the focuser mechanism so that the position will not change once the desired focus is achieved.

In addition to the focus lock, there is a 2.5 mm set screw that can be tightened in order to increase the tension on the focuser draw tube. This can be tightened to reduce slippage when attaching heavy accessories to the focuser. Remember to remove all accessories before making any adjustments to the tensioning screw.
TELESCOPE MAINTENANCE

While your telescope requires little maintenance, there are a few things to remember that will ensure your telescope performs at its best.

CARE AND CLEANING OF THE OPTICS

Occasionally, dust and/or moisture may build up on the objective lens of your telescope. Special care should be taken when cleaning any instrument so as not to damage the optics.

- If dust has built up on the lens, remove it with a brush (made of camel's hair) or with a can of pressurized air. Spray at an angle to the lens for approximately two to four seconds. Next, use an optical cleaning solution and white tissue paper to remove any remaining debris. Apply the solution to the tissue and apply the tissue paper to the lens. Low pressure strokes should go from the center of the corrector to the outer portion. **Do NOT rub in circles!**

You can use a commercially made lens cleaner or mix your own. A good cleaning solution is isopropyl alcohol mixed with distilled water. The solution should be 60% isopropyl alcohol and 40% distilled water. Or, liquid dish soap diluted with water (a couple of drops per one quart of water) can be used.

- Occasionally, you may experience dew build-up on the lens of your telescope during an observing session. If you want to continue observing, the dew must be removed, either with a hair dryer (on low setting) or by pointing the telescope at the ground until the dew has evaporated.

- If moisture condenses on the inside of the lens, remove the accessories from the rear cell of the telescope. Place the telescope in a dust-free environment and point it down. This will remove the moisture from the telescope tube.

To minimize the need to clean your telescope, replace all lens covers once you have finished using it. Since the rear cell is NOT sealed, the cover should be placed over the opening when not in use. This will prevent contaminants from entering the optical tube.

CELESTRON TWO YEAR LIMITED WARRANTY

Celestron warrants your telescope to be free from defects in materials and workmanship for two years. Celestron will repair or replace such product or part thereof which, upon inspection by Celestron, is found to be defective in materials or workmanship. As a condition to the obligation of Celestron to repair or replace such product, the product must be returned to Celestron together with proof-of-purchase satisfactory to Celestron.

The Proper Return Authorization Number must be obtained from Celestron in advance of return. Call Celestron at (310) 328-9560 to receive the number to be displayed on the outside of your shipping container.

- All returns must be accompanied by a written statement setting forth the name, address and daytime telephone number of the owner, together with a brief description of any claimed defects. Parts or product for which replacement is made shall become the property of Celestron.

- The customer shall be responsible for all costs of transportation and insurance, both to and from the factory of Celestron, and shall be required to prepay such costs.

- Celestron shall use reasonable efforts to repair or replace any telescope covered by this warranty within thirty days of receipt. In the event repair or replacement shall require more than thirty days, Celestron shall notify the customer accordingly. Celestron reserves the right to replace any product which has been discontinued from its product line with a new product of comparable value and function.

- This warranty shall be void and of no force of effect in the event a covered product has been modified in design or function, or subjected to abuse, misuse, mishandling or unauthorized repair. Further, product malfunction or deterioration due to normal wear is not covered by this warranty.

**CELESTRON DISCLAIMS ANY WARRANTIES, EXPRESS OR IMPLIED, WHETHER OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE, EXCEPT AS EXPRESSLY SET FORTH HEREIN: THE SOLE OBLIGATION OF CELESTRON UNDER THIS LIMITED WARRANTY SHALL BE TO REPAIR OR REPLACE THE COVERED PRODUCT, IN ACCORDANCE WITH THE TERMS SET FORTH HEREIN. CELESTRON EXPRESSLY DISCLAIMS ANY LOST PROFITS, GENERAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM BREACH OF ANY WARRANTY, OR ARISING OUT OF THE USE OR INABILITY TO USE ANY CELESTRON PRODUCT. ANY WARRANTIES WHICH ARE IMPLIED AND WHICH CANNOT BE DISCLAIMED SHALL BE LIMITED IN DURATION TO A TERM OF TWO YEARS FROM THE DATE OF ORIGINAL RETAIL PURCHASE.**

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitation on how long an implied warranty lasts, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Celestron reserves the right to modify or discontinue, without prior notice to you, any model or style telescope.

If warranty problems arise, or if you need assistance in using your telescope, contact:

**Celestron**

Customer Service Department
2835 Columbia Street
Torrance, CA 90503
Tel. (310) 328-9560
Fax. (310) 212-5835
Monday-Friday 8AM-4PM PST

NOTE: This warranty is valid to U.S.A. and Canadian customers who have purchased this product from an authorized Celestron dealer in the U.S.A. or Canada. Warranty outside the U.S.A. and Canada is valid only to customers who purchased from a Celestron’s International Distributor or Authorized Celestron Dealer in the specific country. Please contact them for any warranty service.