

## Orion® 70mm White-Light Solar Refractor Telescope

#10381

*Congratulations on your purchase of an Orion 70mm White-Light Solar Refractor Telescope. Your solar scope has been designed with high quality optics and excellent mechanical construction. The built in white-light solar filter has been designed to provide you with safe, high contrast views of the solar surface and sunspots. These instructions will help you set up and use your telescope tube.*

### Getting Started

**IMPORTANT!** This telescope comes with a white light filter built over the front of the objective lens. It is attached tightly to the front and provides a more secure attachment compared with add-on solar filters. Do not attempt to remove the filter, and always inspect the front glass for damage. The filter can be cracked with rough handling, and **NEVER** attempt to use the telescope to look at the sun if the filter is damaged.

The 70mm comes nearly fully assembled from the factory. The telescope's optics and filter have been installed and collimated, so you should not have to make any adjustments to them.

Please keep the original shipping box! In the unlikely event you should need to ship the telescope back to Orion for warranty repair service, you should use the original packaging. The box also makes a very good container for storing the telescope when it is not in use.

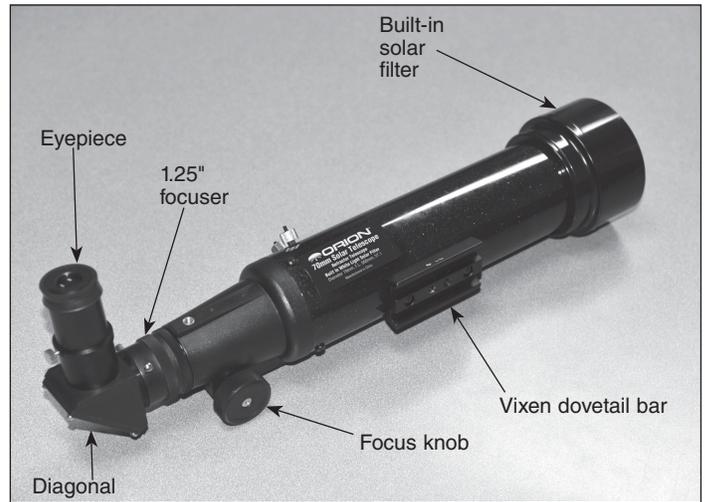
### Attaching the Solar Scope to a Tripod or Mount

The 70mm can be attached to a tripod or mount by way of the Vixen dovetail bar. Any mount that accepts a Vixen dovetail bar is compatible with this optical tube. In addition, the ¼"-20 shaft of a sturdy camera tripod will thread into the ¼"-20 holes drilled into the bottom of the Vixen dovetail bar.

### Included optical accessories

The 70mm comes standard with a 1.25" 90-deg star diagonal and two 1.25" eyepieces (20mm and 10mm).

The 70mm Solar Refractor can use almost any 1.25" diagonal or eyepiece. Please note that the telescope will not come to focus without the use of a diagonal or extension tube. To install a diagonal, unthread the thumbscrews on the 1.25" focuser (**Figure 1**) until they are flush with the interior of the adapter. Insert the diagonal or extension tube and secure it with the thumbscrew. Then insert the eyepiece into the diagonal or extension tube and secure it with the thumbscrew(s).



**Figure 1.** The 70mm White-Light Solar Refractor

Do not attempt to install a finderscope on this telescope, unless it is properly fitted with a solar filter of its own. The easiest way to locate the sun with the 70mm Solar Refractor telescope is not with a finder, but using the "shadow method." When the scope is pointing at the sun, the shadow of the scope that is cast on the ground will be at its smallest profile. Simply look at the shadow cast on the ground while you aim the telescope up towards the sun. When the scope produces a round, thin shadow profile on the ground, the scope is pointed very near the sun. Use a low power eyepiece in the scope and center the sun before moving to a higher power.

### Calculating Magnification (Power)

It is desirable to have a range of eyepieces of different focal lengths, to allow viewing over a range of magnifications. To calculate the magnification, or power, of a telescope, simply divide the focal length of the telescope by the focal length of the eyepiece:

$$\text{Telescope F.L.} \div \text{Eyepiece F.L.} = \text{Magnification}$$

For example, the 70mm White-Light Solar Refractor, which has a focal length of 500mm, used in combination with a 20mm eyepiece, yields a power of:

$$500 \div 20 = 25x$$

Every telescope has a useful limit of power of about 45x-60x per inch of aperture. Claims of higher power by some telescope manufacturers are a misleading advertising gimmick and should be dismissed. Keep in mind that at higher powers, an image will always be dimmer and less sharp (this is a fundamental law of optics).



**Corporate Offices:** 89 Hangar Way, Watsonville CA 95076 - USA  
**Toll Free USA & Canada:** (800) 447-1001  
**International:** +1(831) 763-7000  
**Customer Support:** support@telescope.com

Copyright © 2020 Orion Telescopes & Binoculars. All Rights Reserved. No part of this product instruction or any of its contents may be reproduced, copied, modified or adapted, without the prior written consent of Orion Telescopes & Binoculars.

The steadiness of the air (the “seeing”) will limit how much magnification an image can tolerate.

Always start viewing with your lowest-power (longest focal length) eyepiece in the telescope. After you have located and centered the sun, you can try switching to a higher-power eyepiece to ferret out more detail, if atmospheric conditions permit. If the image you see is not crisp and steady, reduce the magnification by switching to a longer-focal-length eyepiece. As a general rule, a smaller but well-resolved image will show more detail and provide a more enjoyable view than a fuzzy, over-magnified image.

### Photography with the 70mm Solar Refractor

With an optional camera adapter and t-ring, the 70mm becomes a 500mm f/7.1 telephoto lens for a single-lens reflex camera. Steady-Pix adapters are also available for smartphones and point-and-shoot cameras. For DSLRs, a t-ring for the specific brand of camera is needed, along with a universal 1.25" camera adapter. Contact Orion for more details regarding these accessories.

Use the camera’s viewfinder to frame the picture. Use the telescope’s focuser to focus the image. Tighten the focuser tension thumbscrew to make sure the camera does not slip out of focus.

You may want to consider using a remote shutter release instead of the shutter release on the camera. Touching the camera can vibrate the system and blur the resulting photographic image. Also, be sure to use a solid tripod.

### Care & Maintenance

Give your telescope reasonable care and it will last a lifetime. When not in use, keep its dust cover on as well as the dust cap on the eyepiece opening. Store it indoors or in a dry garage. Do not leave the telescope outside except when using it. The optical tube is aluminum and has a smooth painted surface that should resist scratches and smudges. If a scratch does appear on the tube, it

will not harm the telescope. Smudges on the tube can be wiped off with standard mild strength household cleaners.

Any quality optical lens tissue and cleaning fluid specifically designed for multi-coated optics can be used to clean the telescope’s objective lens as well as the lenses of the eyepieces and finder scope. Never use regular glass cleaner or cleaning fluid designed for eyeglasses. Before cleaning with fluid and tissue, however, blow any loose particles off the lens with a blower bulb or compressed air, or lightly brush the lens with a soft camel hair brush. Apply some cleaning fluid to a tissue, never directly on the optics. Wipe the lens gently in a circular motion, then remove any excess fluid with a fresh lens tissue. Oily fingerprints and smudges may be removed using this method. Use caution; rubbing too hard may scratch the lens! Clean only a small area at a time, using a fresh lens tissue on each area. Never reuse tissues.

### Specifications

<b>Solar filter:</b>	Built-in white light filter
<b>Optical diameter:</b>	70mm (2.76")
<b>Objective lens:</b>	Achromatic doublet
<b>Objective lens coating:</b>	Anti-reflection coated
<b>Focal length:</b>	500mm
<b>Focal ratio:</b>	f/7.1
<b>Length:</b>	17"
<b>Weight:</b>	2.15 lbs
<b>Focuser:</b>	1.25" rack and pinion gear
<b>Mounting:</b>	Vixen dovetail bar or ¼"-20 photo tripod threads

**WARNING:** *Never look directly at the Sun through your telescope—even for an instant—without a professionally made solar filter that completely covers the front of the instrument, or permanent eye damage could result. Young children should use this telescope only with adult supervision.*

## One-Year Limited Warranty

This Orion product is warranted against defects in materials or workmanship for a period of one year from the date of purchase. This warranty is for the benefit of the original retail purchaser only. During this warranty period Orion Telescopes & Binoculars will repair or replace, at Orion’s option, any warranted instrument that proves to be defective, provided it is returned postage paid. Proof of purchase (such as a copy of the original receipt) is required. This warranty is only valid in the country of purchase.

This warranty does not apply if, in Orion’s judgment, the instrument has been abused, mishandled, or modified, nor does it apply to normal wear and tear. This warranty gives you specific legal rights. It is not intended to remove or restrict your other legal rights under applicable local consumer law; your state or national statutory consumer rights governing the sale of consumer goods remain fully applicable.

For further warranty information, please visit [www.OrionTelescopes.com/warranty](http://www.OrionTelescopes.com/warranty).



**Corporate Offices:** 89 Hangar Way, Watsonville CA 95076 - USA  
**Toll Free USA & Canada:** (800) 447-1001  
**International:** +1(831) 763-7000  
**Customer Support:** [support@telescope.com](mailto:support@telescope.com)

Copyright © 2020 Orion Telescopes & Binoculars. All Rights Reserved. No part of this product instruction or any of its contents may be reproduced, copied, modified or adapted, without the prior written consent of Orion Telescopes & Binoculars.