INSTRUCTION MANUAL

Orion® StarBlast™ 90mm Travel Refractor

#10282

Francais

❶ Pour obtenir le manuel d'utilisation complet, veuillez vous rendre sur le site Web **OrionTelescopes.eu/fr** et saisir la référence du produit dans la barre de recherche.

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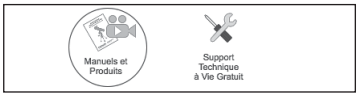

Deutsche

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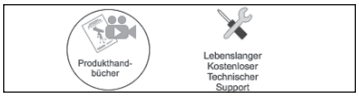
❷ Klicken Sie anschließend auf der Seite mit den Produktdetails auf den Link des entsprechenden Produkthandbuches.



Español

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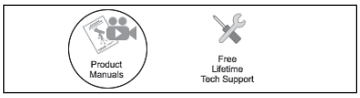
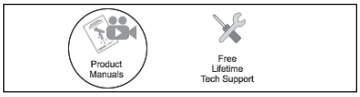
❷ A continuación, haga clic en el enlace al manual del producto de la página de detalle del producto.



Italiano

❶ Per accedere al manuale completo, visitare il sito Web **OrionTelescopes.eu**. Immettere the product item number nella barra di ricerca

❷ Fare quindi clic sul collegamento al manuale del prodotto nella pagina delle informazioni sul prodotto.



ORION®
TELESCOPES & BINOCULARS
AN EMPLOYEE-OWNED COMPANY

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

Congratulations on your purchase of a quality Orion product. The StarBlast 90mm Travel Refractor is a versatile and portable 90mm-aperture telescope designed for exploring scenic daytime vistas as well as scanning the night skies for celestial treasures. A complete telescope with an extendable stainless steel tripod, great accessories, and a rugged case with shoulder strap that holds everything, the "StarBlast 90" makes a perfect companion for the explorer on the go.

Figure 1. *Included items of the StarBlast 90mm Travel Refractor*

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.***

These instructions will help you set-up, properly use, and care for your instrument. Please read them over carefully before getting started.

Included Items

Unpack all of the items and lay them out in your workspace. Make sure all the items listed below and shown in **Figure 1** are present. Save the shipping box and packaging material. In the unlikely event that you need to return the product, you must use the original packaging. Assembly of the telescope is easy and should take only about 15 minutes.

Item List

A . . . . . Tripod

B . . . . . Accessory tray

C . . . . . Optical tube
D . . . . . 5x20 correct-image finder scope
E . . . . . 25mm Kellner eyepiece
F. . . . . 9mm Kellner eyepiece
G . . . . . Bolt case for 25mm eyepiece
H . . . . . Bolt case for 9mm eyepiece
I . . . . . Accessory Case
J . . . . . MoonMap 260
K. . . . . Telescope case

Assembly

1. With all items removed from the case (K), find the tripod (A) and spread the legs apart. Don't worry about extending the tripod legs yet; you will do that later.
2. Install the accessory tray (B) by aligning the center hole with the center of the tripod brace, as shown in **Figure 2A**.
3. Then gently press the tray downward and rotate it while insuring that each of the three tray locking tabs seats underneath its respective brace tab, snapping into place (**Figure 2B**). The tray should then appear as in **Figure 3**.
4. Now you will attach the optical tube (C) to the altazimuth pan head. Align the center hole of the telescope's mounting block with the ¼"-20 threaded post on the pan head's mounting platform (**Figure 4**). Then turn the knurled knob clockwise until the telescope is tight against the pan head's mounting platform.
5. Next, you will install the finder scope (D) onto the optical tube. Slide the finder scope bracket into the slot between the telescope optical tube and the focuser housing, as shown in **Figure 5**. Make sure the bracket is inserted as far as it will go **(5B)**.
6. Now insert an eyepiece into the eyepiece collar of the 45-degree diagonal **(Figure 6)**. We recommend starting with the 25mm eyepiece (E).

Assembly is completed and the telescope should now appear as in **Figure 7**.

Aligning and Using the Finder Scope

The included 5x20 correct-image finder scope makes locating your observing target easier. It provides 5x magnification and has a 20mm lens diameter (aperture) – hence the "5x20" designation. It provides a wide field of view, and right-side-up image orientation – the same orientation as the main telescope – to allow you to center your target easily in the main telescope's field of view.

Alignment

To use the finder scope properly, it must be first be aligned with the main telescope. This is easiest to do during daylight hours, before observing at night. Follow this procedure:

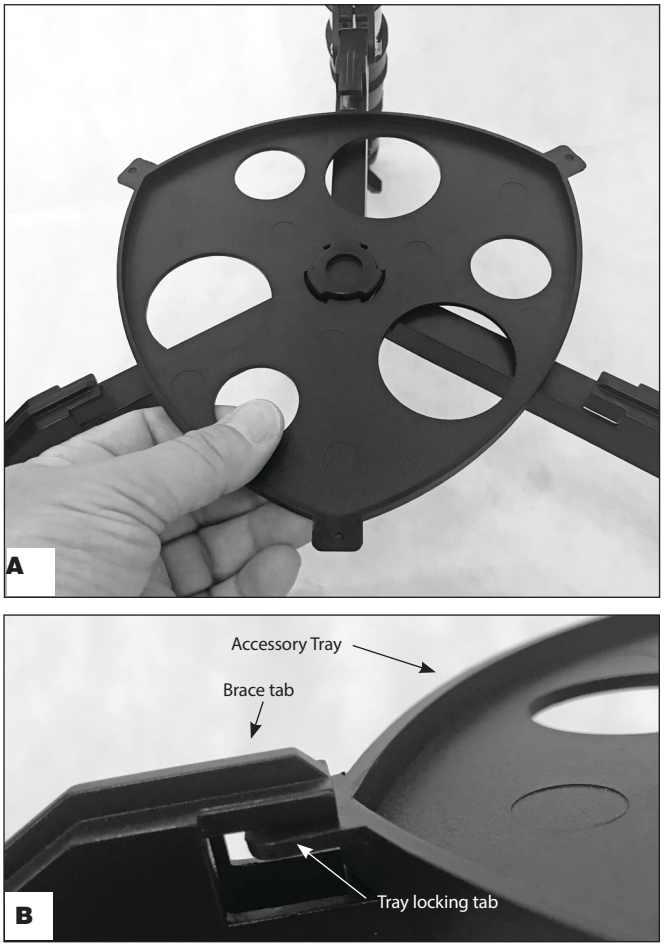


Figure 2. ***Attach the accessory tray to the tripod brace by* A)** ***registering the tray's center hole over the center of the brace, then* B)** ***twisting they tray so that each of the three tray locking tabs seats underneath its respective brace tab.***

1. With the 25mm eyepiece already installed in the 45-degree diagonal, point the telescope at a well-defined land target (e.g., the top of a telephone pole) that's at least a quarter mile away. Center the target in the telescope eyepiece by moving the optical tube using the pan handle. Make sure the altitude and azimuth tension knobs are slightly loosened to allow easy movement in both axes.
2. Now that a distant target is centered in the main telescope's eyepiece, look into the finder scope. Is the object visible? Ideally, it will be somewhere in the finder's field of view. If it is not, some coarse adjustments of the three finder scope alignment thumbscrews will be needed to get the finder scope roughly parallel to the main tube. By loosening or tightening the alignment thumbscrews, you change the line of sight of the finder scope. Continue making adjustments to the alignment thumbscrews until the image in both the finder scope and the telescope's eyepiece is centered.

The finder scope alignment needs to be checked before every observing session. This can easily be done at night, as well, before a stargazing session. Choose any bright star or planet,

center the object in the telescope eyepiece, and then adjust the finder scope's alignment screws until the star or planet is also centered in the finder's field of view.

The finder scope bracket has a tilt joint that allows the finder scope to be tilted at a desirable angle relative to the main telescope tube. Just loosen the thumbscrew on the bracket a bit and tilt the finder scope to the desired position, then retighten the thumbscrew.

Focusing the Finder Scope

To ensure a sharp image in the finder scope, simply aim it at a target and rotate the finder's knurled eyepiece until the image appears in focus.

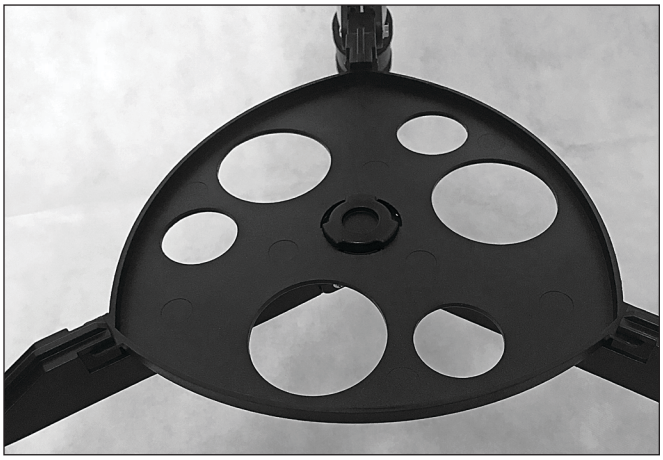


Figure 3. *The tray is now locked in place.*

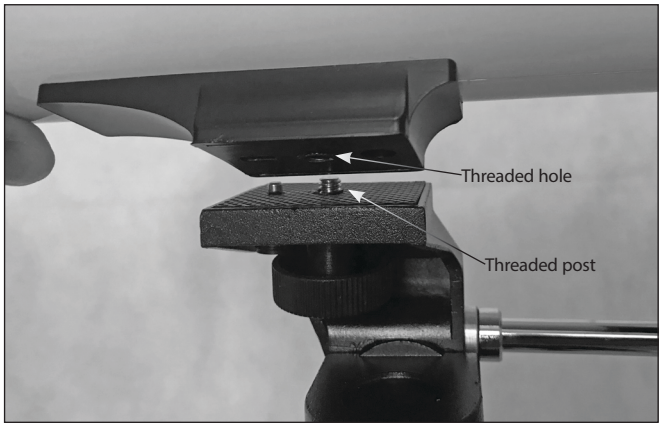


Figure 4. *Attaching the optical tube to the pan head.*

Using the Finder Scope

Once the finder scope has been properly aligned with the main telescope's optical tube, you are ready to locate objects to view. The finder scope provides a wide, correctly oriented image that matches the orientation of the much more highly magnified image viewed through the main telescope. The idea is to move the telescope on its mount to center the subject you want to observe in the wide-field finder scope first, then when you look into the main telescope's eyepiece, the subject will be centered in it as well.

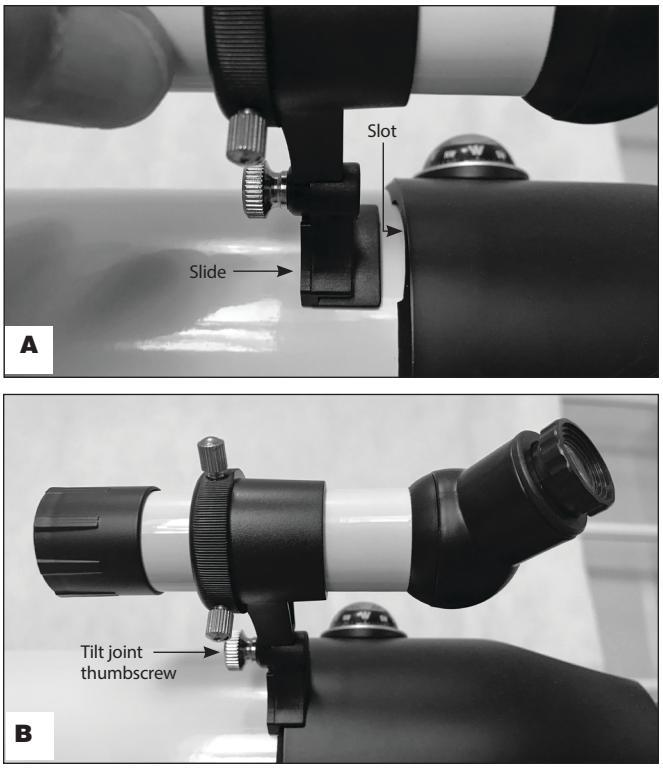


Figure 5. A) *Slide the base of the finder scope bracket into the slot between the optical tube and the focuser housing.* **B)** *Slide it in as far as it will go.*

When transporting the telescope in its case, we recommend removing the finder scope and bracket assembly from the optical tube. (No need to remove the finder scope from its bracket!) Store the finder scope and bracket assembly in the included small accessory case (I) for safe keeping **(Figure 8)**.

Telescope Operation

Extending the Tripod Legs

To extend the tripod legs to the desired length, simply turn the leg lock knob counterclockwise to release the leg, then retighten the knob after extending the leg. Each leg has two extendable sections, each with a lock knob **(Figure 9)**. Do not overtighten the lock knobs or you could damage the leg collars or strip the threads of the bolt or its receptacle.

Using the Pan Head

The StarBlast 90mm refractor features a standard "altazimuth" pan head mount, which permits motion along two perpendicular axes: altitude (up/down) and azimuth (left/right). This makes pointing the telescope easy and intuitive. To move the telescope in the azimuth direction, loosen the azimuth tension knob a little (refer to **Figure 7**), then take hold of the pan handle and gently move it left or right.

To move the telescope in altitude, first twist the pan handle counterclockwise, then move the telescope up or down to the

desired position. Then twist the pan handle clockwise to lock that position. You may be able to find a suitable azimuth and altitude axis tension to allow the telescope to be moved freely without having to make any adjustments to the tension every time you move the telescope.

Eyepiece Selection

Magnification, or power, is determined by the focal length of the telescope and the focal length of the eyepiece being used. Therefore, by using eyepieces of different focal lengths, the resultant magnification can be varied. It is quite common for an observer to own five or more eyepieces to access a wide range of magnifications. This allows the observer to choose the best eyepiece to use depending on the object being viewed and viewing conditions. Your StarBlast 90mm refractor comes with 25mm (E) and 9mm (F) Kellner eyepieces, which will suffice nicely to begin with. You can purchase additional eyepieces later if you wish to have more magnification options.

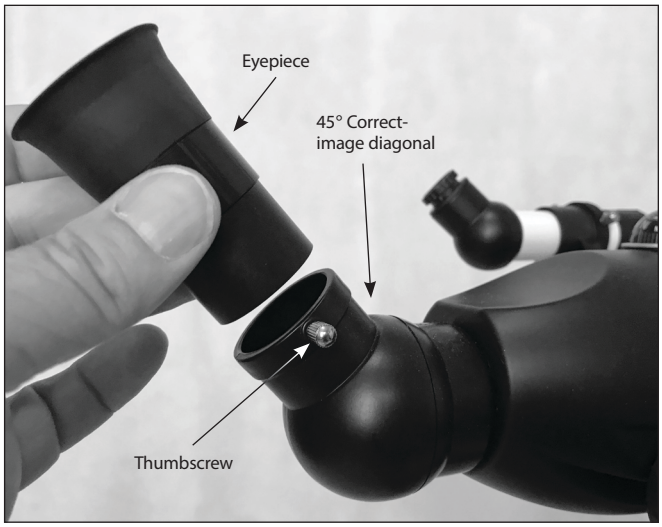


Figure 6. ***Insert an eyepiece into the 45-degree diagonal and secure it with the thumbscrew.***

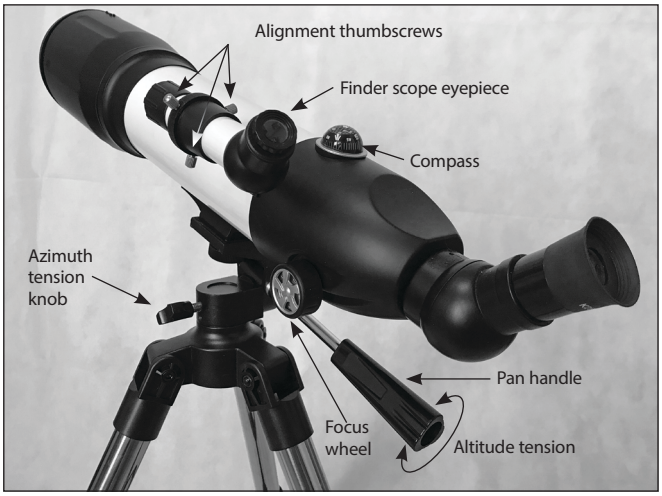


Figure 7. ***The telescope is now mounted and ready for action!***

Magnification is calculated as follows:

$$\frac{\textbf{Telescope Focal Length (mm)}}{\textbf{Eyepiece Focal Length (mm)}} = \textbf{Magnification}$$

For example, the StarBlast 90mm has a focal length of 500mm, which when used with the supplied 25mm eyepiece yields:

$$\frac{\textbf{500 mm}}{\textbf{25mm}} = \textbf{20x}$$

The magnification provided by the 9mm eyepiece is:

$$\frac{\textbf{500 mm}}{\textbf{9mm}} = \textbf{56x}$$

The maximum attainable magnification for a telescope is directly related to how much light it can gather. The larger the aperture, the more magnification is possible. In general, a figure of 50x per inch of aperture is the maximum attainable for most telescopes. Going beyond that will yield simply blurry, unsatisfactory views. Your StarBlast 90mm refractor has an aperture of 90mm, or 3.5 inches, so the maximum practical magnification would be about 175x (3.5 x 50). This level of magnification assumes you have ideal atmospheric conditions for observing (which is seldom the case).

Keep in mind that as you increase magnification, the brightness of the object viewed will decrease; this is an inherent principle of the laws of physics and cannot be avoided. If magnification is doubled, an image appears four times dimmer. If magnification is tripled, image brightness is reduced by a factor of nine!

So start with low power by using the 25mm eyepiece, then try switching to the 9mm eyepiece later if you want to boost the magnification.

Focusing the Telescope

To focus the telescope, turn the focus wheels **(Figure 7)** forward or back until you see your target object in the eyepiece. Then make finer adjustments until the image is sharp. If you're having trouble achieving initial focus, rack the focuser drawtube all the way in using the focus wheels, then while looking into the eyepiece slowly turn the focus wheels so that the drawtube extends outward. Keep going until you see your target object come into focus. Note that when you change eyepieces you may have to adjust the focus a bit to get a sharp image with the newly inserted eyepiece.

Terrestrial and Celestial Viewing with the StarBlast 90mm

The Orion StarBlast 90mm is equipped with a built-in, 45-degree "correct-image" diagonal, which provides an upright, "normal" view. Because of this, the StarBlast is an excellent terres-

trial telescope for viewing Earth-based scenes during daylight hours. More powerful than binoculars, it can get you visually "up close" to your target for vivid, detailed views. For best results, however, DO NOT VIEW OUT WINDOWS. The glass in a window is approximately 1000 times less accurate than the optics of your StarBlast 90mm – so it will soften your views, and things

Figure 8. *The small accessory case holds the two eyepieces and the finder scope.*

will seem to be slightly out of focus. If you must view through a window, use the lowest power available (and open the window!).

The StarBlast 90mm also excels for nighttime viewing, enabling you to see hundreds of craters on the Moon, Jupiter and its four major moons, the rings of Saturn, and much more! If you take the telescope to a location away from city lights (the darker, the better), you will be able to spot most of the famous "M objects," or Messier objects, which include open star clusters, globular star clusters, gaseous nebulas, and even galaxies outside our own Milky Way galaxy. You'll need a star map or a planisphere (the Orion Star Target plansiphere is a great one) and some patience, but the rewards are endless.

Best Targets

Best night sky targets from the city:

- The Moon
- Venus
- Jupiter
- Saturn

Best targets from rural locations (everything above, plus):

- **The Great Nebula in Orion** – a spectacular glowing cloud of gas in Orion's sword; this is a "stellar maternity ward," a place where new stars are forming.
- **The Summer Milky Way** – the GoScope is well suited to scanning the Milky Way to "discover" dozens of star clusters.
- **The Pleiades (M45)** – a bright open star cluster
- **The Andromeda Galaxy (M31)** – the brightest external galaxy
- **The Double Cluster in Perseus**
- **M11, M6 & M7** – three bright, summer star clusters
- **The Beehive Cluste**r – A big, open star cluster in the spring sky
- **The Great Cluster in Hercules M13** – a wonderful globular star cluster, spring & summer
- **M22** – another grand globular star cluster in Sagittarius, a summer constellation

"Seeing" and Transparency

Atmospheric conditions vary significantly from night to night. "Seeing" refers to the steadiness of the Earth's atmosphere at a given time. In conditions of poor seeing, atmospheric turbulence causes objects viewed through the telescope to "boil." If you look up at the sky and stars are twinkling noticeably, the seeing is poor and you will be limited to viewing at lower magnifications. At higher magnifications, images will not focus clearly. Fine details on the planets and Moon will likely not be visible.

In conditions of good seeing, star twinkling is minimal and images appear steady in the eyepiece. Seeing is best overhead, worst at the horizon. Also, seeing generally gets better after midnight, when much of the heat absorbed by the Earth during the day has radiated off into space.

Especially important for observing faint objects is good "transparency"—air free of moisture, smoke, and dust. All tend to scatter light, which reduces an object's brightness. Transparency is judged by the magnitude of the faintest stars you can see with the unaided eye (5th or 6th magnitude is desirable).

Cooling the Telescope

All optical instruments need time to reach "thermal equilibrium." The bigger the instrument and the larger the temperature change, the more time is needed. Allow at least 30 minutes for your telescope to acclimate to the temperature outdoors before you start observing with it.

Let Your Eyes Dark-Adapt

Don't expect to go from a lighted house into the darkness of the outdoors at night and immediately see faint nebulas, galaxies, and star clusters—or even very many stars, for that matter. Your eyes take about 30 minutes to reach perhaps 80% of their full dark-adapted sensitivity. As your eyes become dark-adapted, more stars will glimmer into view and you'll be able to see fainter details in objects you view in your telescope.

To see what you're doing in the darkness, use a red-filtered flashlight rather than a white light. Red light does not spoil your

eyes' dark adaptation like white light does. A flashlight with a red LED light is ideal. Beware, too, that nearby porch, streetlights, and car headlights will ruin your night vision.

Everything Fits in the Carrying Case!

The StarBlast 90mm refractor comes complete with a soft case that neatly holds all its components (K). The telescope optical tube and tripod both fit inside the case, separated by a protective divider to keep them from contacting each other. The tripod accessory tray fits in a pocket inside the case. The case is equipped with both hand straps and a shoulder strap for convenient transport of your telescope wherever you go! The eyepieces and finder scope should be kept in the included small

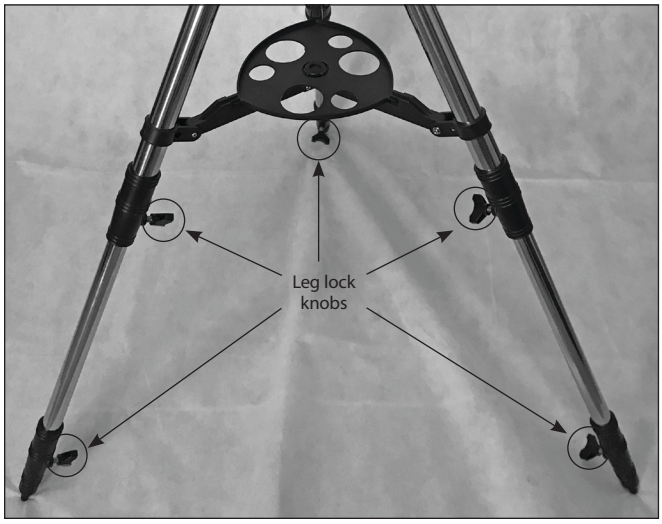


Figure 9. ***Adjust the legs to the desired height, then lock them by turning the leg lock knobs clockwise.***

accessory pouch (I) inside the larger case. Each eyepiece comes with a white plastic "bolt case" (G and H) designed to protect and keep the eyepiece clean when it's not in use.

Using MoonMap 260

Included with your StarBlast 90mm refractor telescope is Orion's exclusive MoonMap 260 (J). It depicts the locations and names of over 260 features on the Moon such as craters, mountains, valleys, "seas" and more. It is a great tool for beginning astronomers. This detailed map will even show you where various spacecraft from past space missions have landed on the Moon's surface!

The great thing about the Moon is that its phase changes every night. Focus your attention on the border between the illuminated and dark portions or the surface, called the "terminator". Shadows cast along the terminator help to reveal the rugged relief of the landscape. Note that the worst time to view the Moon is during the full Moon phase. That's because sunlight shines directly downward on the lunar surface, so no shadows are cast by the moon's topography.

Telescope Care and Maintenance

If you give your telescope reasonable care, it will last a lifetime. Store it in a clean, dry, dust-free place, safe from rapid changes in temperature and humidity. Do not store the telescope outdoors, although storage in a garage or shed is okay.

Keep the dust cover on the front of the telescope when it is not in use. It's the rubber cap tethered to the front of the telescope.

Your refractor telescope requires very little mechanical maintenance. The optical tube has a smooth painted finish that is fairly scratch-resistant. If a scratch does appear on the tube, it will not harm the telescope. If you wish, you may apply some auto touch-up paint to the scratch. Smudges on the tube can be wiped off with a soft cloth and household cleaning fluid.

Cleaning Optics

Any quality optical lens cleaning tissue and optical lens cleaning fluid specifically designed for multi-coated optics can be used to clean the lenses of your telescope and eyepieces. Never use regular glass cleaner or cleaning fluid designed for eyeglasses. Before cleaning, remove any loose particles or dust from the lens with a blower bulb or soft brush. Then 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. On larger lenses, clean only a small area at a time, using a fresh lens tissue on each area. Never reuse tissues.

When bringing the telescope inside after an evening's viewing it is normal for moisture to accumulate on the lenses due to the change in temperature. We suggest leaving the telescope and eyepieces uncovered overnight to allow the condensation to evaporate.

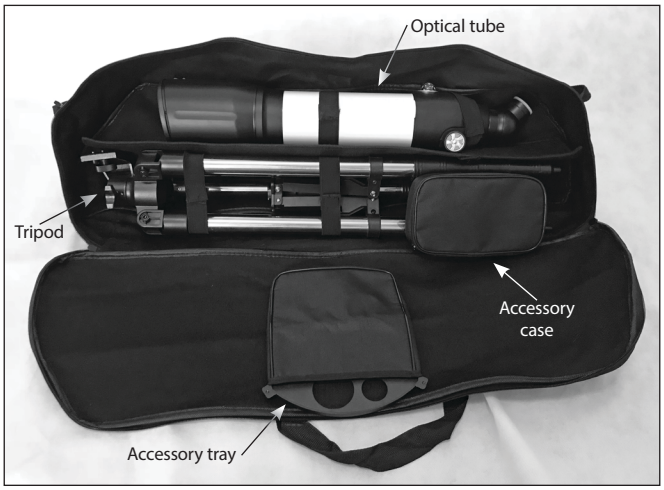


Figure10. ***All included components of the StarBlast 90mm fit neatly in the included soft case.***

Specifications

Objective lens:	90mm (3. 5") diameter, achromatic
Effective focal length:	500mm
Focal ratio:	f/5.6
Lens coatings:	Antireflection coated
Focuser:	Rack-and-pinion, accepts 1.25" accessories
Eyepieces:	25mm and 9mm Kellner, 1.25" barrel diameter, threaded for Orion filters
Eyepiece coatings:	Antireflection coated
Diagonal:	Integrated 45-degree correct-image, 1.25"
Eyepiece magnification:	20x (with 25mm eyepiece) and 56x (with 9mm eyepiece)
Finder scope:	5x20 correct-image, 45-degree eyepiece angle
Tripod:	Stainless steel, 3-section tube legs
Pan head:	Two-way (alt-azimuth)
Max height, legs extended:	54.5"
Total weight:	8 lbs. 11.8 oz

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.**

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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