INSTRUCTION MANUAL

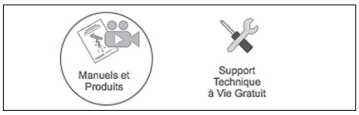
Orion® StarBlast™ 102mm Travel Refractor

#10283

Francais

❶Pour 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.

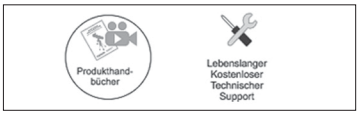
❷Cliquez ensuite sur le lien du manuel d'utilisation du produit sur la page de description du produit.



Deutsche

❶Wenn Sie das vollständige Handbuch einsehen möchten, wechseln Sie zu **OrionTelescopes.de**, und geben Sie in der Suchleiste die Artikelnummer der Orion-Kamera ein.

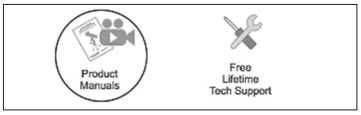
❷Klicken Sie anschließend auf der Seite mit den Produktdetails auf den Link des entsprechenden Produkthandbuches.



Español

❶Para ver el manual completo, visite **Orion-Telescopes.eu** y escriba el número de artículo del producto en la barra de búsqueda.

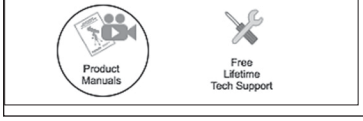
❷A continuación, haga clic en el enlace al manual del producto de la página de detalle del producto.



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

Copyright © 2019 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.

Congratulations on your purchase of a quality Orion product. The StarBlast 102mm Travel Refractor is a versatile and portable 102mm-aperture telescope designed for exploring the night skies for celestial treasures, and for gazing at terrestrial subjects in the daytime. A complete telescope with an extendable stainless steel tripod, great accessories, and a rugged case with shoulder strap that holds everything, the "StarBlast 102" makes a perfect companion for the explorer on the go.

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

Figure 1. ***Included items of the StarBlast 102mm Travel Refractor***

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.

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.***

Item List

A Tripod with Pan Head

B Accessory tray

C Optical tube

D Red dot finder scope

E 25mm Plossl eyepiece, 1.25"

F 10mm Plossl eyepiece, 1.25"

G Correct image 90-degree diagonal, 1.25"

H Accessory Case

I MoonMap 260

J Telescope case

K Dust cover

Assembly

1. With all items removed from the case (J), 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. First, turn the mounting bar lock knob counterclockwise to back out the bolt to make room in the saddle for the telescope's dovetail mounting bar **(Figure 4)**. Then slide the telescope's dovetail mounting bar into the saddle and retighten the lock knob to secure the bar in place.
5. Next, you will install the red dot finder scope (D) onto the optical tube. Slide the finder scope bracket into the finder scope base, as shown in **Figure 5**.
6. Insert the 90-degree correct-image diagonal (G) into the focuser drawtube and tighten it with the thumbscrew **(Figure 6)**.
7. Now insert an eyepiece into the diagonal and secure it with the thumbscrew **(Figure 7)**. We recommend starting with the 25mm eyepiece (E).

Assembly is now complete and the telescope should appear as in **Figure 8**.

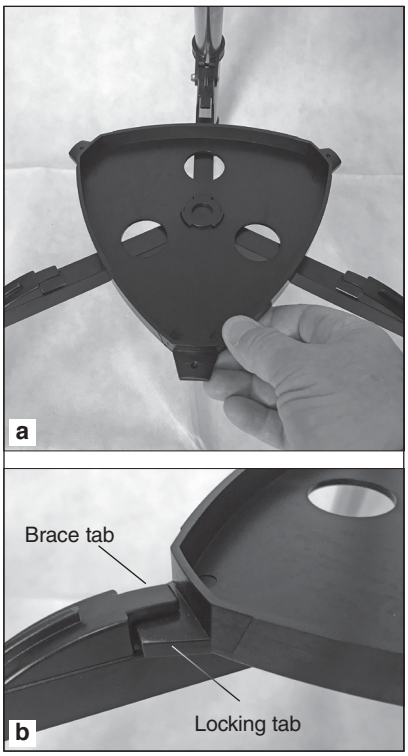


Figure 2. ***Attach the accessory tray to the tripod brace by*** **a)** ***registering the tray's center hole over the center of the brace, then*** **b)** ***twisting they tray while so that each of the three tray locking tabs seats underneath its respective brace tab.***

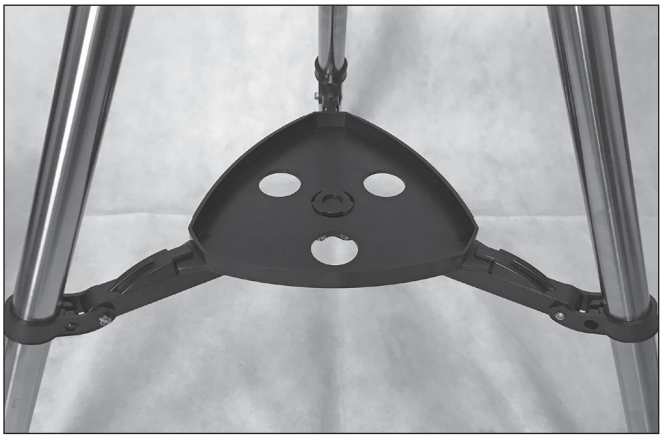


Figure 3. ***The tray is now locked in place.***

Aligning and Using the Red Dot Finder Scope

The included red dot finder scope **(Figure 9)** makes pointing your telescope almost as easy as pointing your finger! It's a non-magnifying aiming device that superimposes a tiny LED red dot on the sky, showing exactly where the telescope is pointed. It permits easy object targeting prior to observation in the higher-power main telescope. Before you can use the red dot finder scope, you must remove the small plastic tab sticking out from the battery compartment **(see Figure 9)**. Doing so will allow the pre-installed 3V CR-2032 battery to power the red LED when the device is turned on. The tab can then be discarded.

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

1. First, remove the dust cover (K) from the front of the telescope.
2. With the 25mm eyepiece and 90-degree diagonal already installed from the steps above, 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. When pointing the telescope, be sure to loosen the azimuth lock knob so the telescope can rotate left and right, and twist the pan handle counterclockwise a bit to free up movement in altitude.
3. Center the target in the telescope eyepiece.
4. Turn on the red dot finder scope by sliding the power switch to ON (refer to **Figure 9**). The "1" position provides dim illumination while the "2" position provides brighter

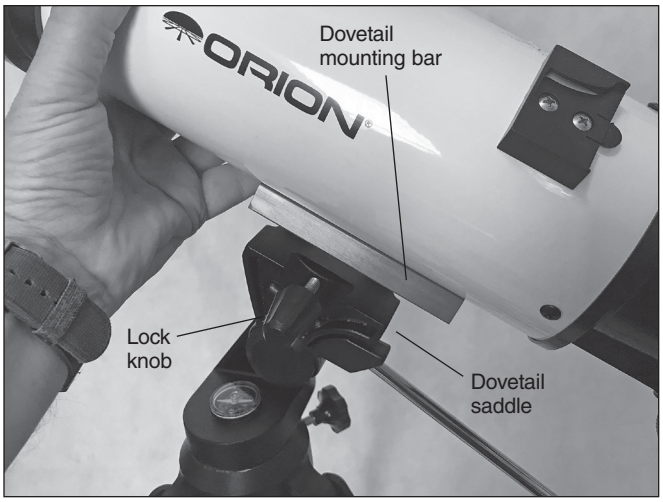


Figure 4. ***Attaching the optical tube to the mount.***

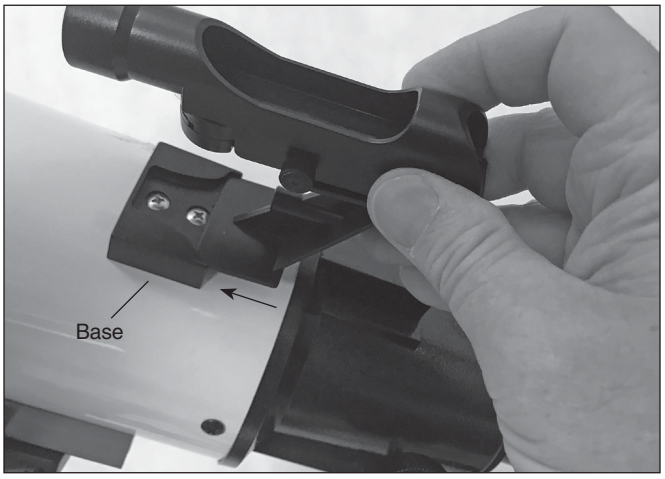


Figure 5. ***Install the red dot finder scope by sliding it into the finder base all the way.***

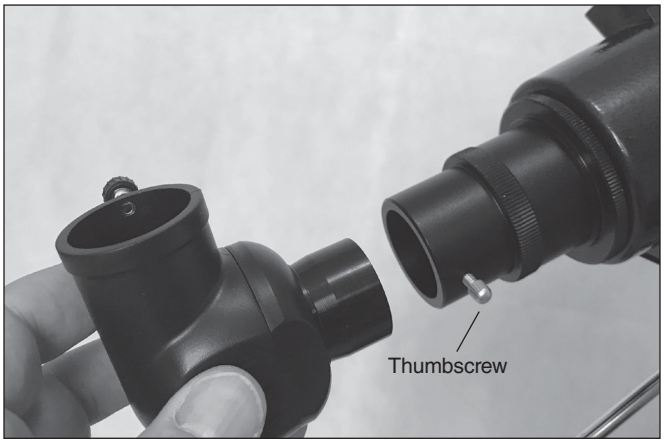


Figure 6. ***Insert the barrel of the correct-image 90-degree diagonal into the focuser drawtube and secure it with the thumbscrew.***

illumination. Typically the dimmer setting is used under dark skies and the brighter setting is used under light-polluted night skies or in daylight. Position your eye at a comfortable distance from the rear of the unit. Look through the rear of the finder scope with both eyes open to see the illuminated red dot. The target object should appear in the field of view somewhere near the red dot.

5. You'll want to center the red dot on the target object. To do so, without moving the telescope, use the red dot finder scope's vertical and horizontal adjustment knobs (shown in **Figure 9**) to position the red dot on the object.
6. When the red dot is centered on the distant object, check to make sure the object is still centered in the telescope's eyepiece. If it isn't, re-center it then adjust the red dot scope's alignment again. When the object is centered in the telescope eyepiece and on the finder scope's red dot, the finder scope is properly aligned with the telescope. The red dot finder scope's alignment should be checked before every observing session. At the end of your observing session, be sure to slide the power switch on the red dot finder scope to OFF to preserve battery life.

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. 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 102mm 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 8**), 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

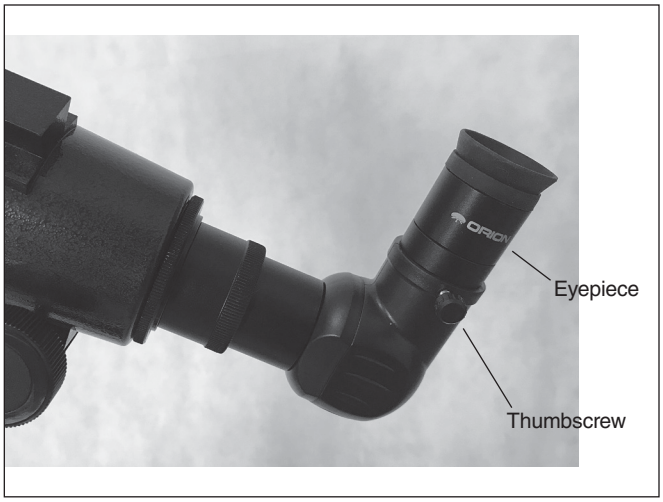


Figure 7. ***Insert the 25mm eyepiece into the 90-degree diagonal and secure it with the thumbscrew.***

viewing conditions. Your StarBlast 102mm refractor comes with 25mm (E) and 10mm (F) Plossl eyepieces, which will suffice nicely to begin with. You can purchase additional eyepieces later if you wish to have more magnification options.

Magnification is calculated as follows:

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

For example, the StarBlast 102mm has a focal length of 600mm, which when used with the supplied 25mm eyepiece yields:

$$\frac{\textbf{600mm}}{\textbf{25mm}} = \textbf{24x}$$

The magnification provided by the 10mm eyepiece is:

$$\frac{\textbf{600mm}}{\textbf{10mm}} = \textbf{60x}$$

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 102mm refractor has an aperture of 102mm, or 4 inches, so the maximum practical magnification would be about 200x (4 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 10mm eyepiece later if you want to boost the magnification.

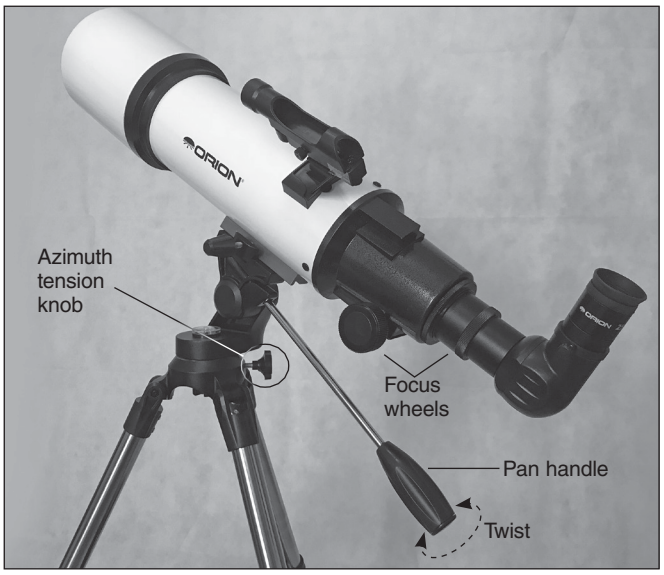


Figure 8. ***The telescope is now mounted and ready for action!***

Focusing the Telescope

To focus the telescope, turn the focus wheels **(Figure 8)** 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 102mm

The Orion StarBlast 102mm is equipped with a 90-degree "correct-image" diagonal (G), which provides an upright, "normal" view. Because of this, the StarBlast is an excellent terrestrial 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 102mm – so it will soften your views, and things 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 102mm 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):

- **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.
- **Summer Milky Way** – the StarBlast is well suited to scanning the Milky Way to "discover" dozens of star clusters.
- **Pleiades (M45)** – a bright open star cluster
- **Andromeda Galaxy (M31)** – the brightest external galaxy
- **Double Cluster in Perseus**
- **M11, M6 & M7** – three bright summer star clusters
- **Beehive Cluster** – a big, open star cluster in the spring sky
- **Great Cluster in Hercules (M13)** – a wonderful globular star cluster, spring & summer

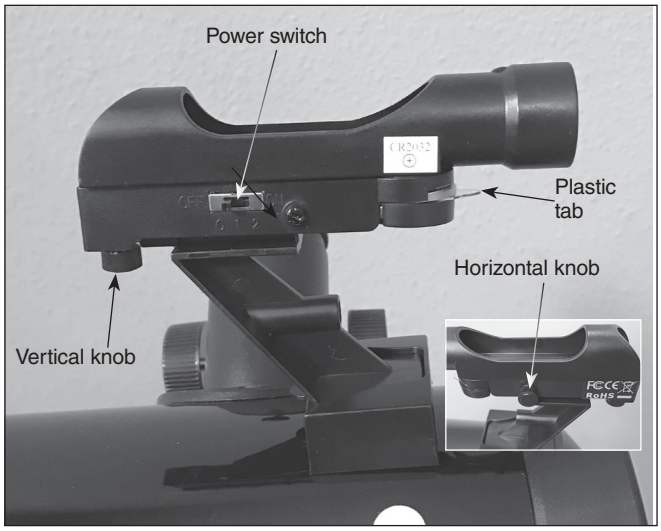


Figure 9. The red dot finder scope has vertical and (inset) horizontal adjustment knobs for aligning it with the telescope.

- **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 hinder your night vision.

Using the MoonMap 260

Included with your StarBlast 102mm refractor telescope is Orion's exclusive MoonMap 260 (I). 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.

Figure 10. ***All included components of the StarBlast 102mm fit neatly in the included carrying case.***

Figure 11. ***When not in use, store the two eyepieces in their bolt cases, the diagonal, and the red dot finder scope in the zippered accessory pouch.***

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.

Everything Fits in the Carrying Case!

The StarBlast 102mm refractor comes complete with a soft case (J) that neatly holds all its components **(Figure 10)**. 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 red dot finder scope should be kept in the included small accessory pouch (H) inside the larger case **(Figure 11)**. Each eyepiece comes with a white plastic "bolt case" designed to protect and keep the eyepiece clean when it's not in use.

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.

Specifications

Objective lens:	102mm (4") diameter, achromatic
Effective focal length:	600mm
Focal ratio:	f/5.9
Lens coatings:	Antireflection coated
Focuser:	Rack-and-pinion, accepts 1.25" accessories
Eyepieces:	25mm and 10mm Plossl, 1.25" barrel diameter, threaded for Orion filters
Eyepiece coatings:	Fully antireflection coated
Diagonal:	90-degree correct-image, 1.25"
Eyepiece magnification:	24x (with 25mm eyepiece) and 60x (with 10mm eyepiece)
Finder scope:	Red dot type, non-magnifying
Tripod:	Stainless steel, 2-section tube legs
Pan head:	Two-way (altitude, azimuth)
Max eyepiece height:	51.5"
Assembled weight:	10 lbs. 10 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*.

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

Copyright © 2019 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.