INSTRUCTION MANUAL

Orion VersaGo GX 80mm Atlazimuth Refractor

#52706

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IN 659 02/21

Congratulations on your purchase of an Orion telescope. Your new VersaGo GX 80mm Atlazimuth Refractor is a terrific instrument equally suited to exploring the world in the daytime and the starry sky at night. Designed to provide a wide field of view, sharp images, and excellent portability, the VersaGo GX 80 will provide many hours of enjoyment for the whole family.

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

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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.***

Figure 1. Parts of the VersaGo GX 80mm Altazimuth Refractor

I. Included Parts

Unpack all of the parts and lay them out on the floor. Make sure all the parts 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 telescope, you must use the original packaging. Initial assembly of the telescope is easy and should take only about 15 minutes.

Part		Qty
A	Optical tube assembly	1
B	Tripod	1
C	Extension cylinder	1
D	Altazimuth mount with handle	1
E	90-degree star diagonal	1
F	45-degree correct-image diagonal	1
G	Accessory tray	1
H	Dust cover	1
I	25mm Sirius Plossl eyepiece	1
J	10mm Sirius Plossl eyepiece	1
K	Finder scope bracket with O-ring	1
L	6x26 correct-image finder scope	1
M	Orion MoonMap 260	1

II. Assembly

Assembling the telescope for the first time should take about 15 minutes. No tools are needed.

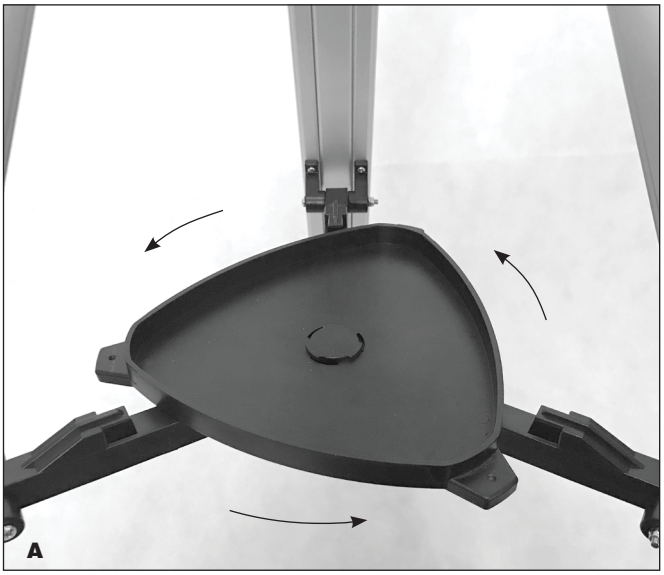
1. Extend the tripod legs as far as they will go. To do that, turn the leg lock knobs counterclockwise to release the inner leg section, then extend it until it stops. The retighten the leg lock knob. You can adjust the leg length later as desired.
2. Now spread the legs apart and attach the accessory tray. Install the accessory tray by aligning the center hole with the center of the tripod brace, as shown in **Figure 2A**. Then gently press the tray downward and rotate it while insuring that each of the three tray locking tabs seat underneath its respective brace tab, snapping into place (**Figure 2B**).
3. Now center the extension cylinder on the top of the tripod. Rotate the T-bar shown in **Figure 3** clockwise until the extension cylinder is tightened on the tripod.
4. Center the altazimuth mount over the extension cylinder and rotate the mount clockwise on the threaded post until the mount is tight (**Figure 4**).
5. Next, you will attach the optical tube assembly. Unthread the saddle lock knob until the bolt tip is not protruding into the saddle slot. Slide the telescope's dovetail bar into the saddle as shown in **Figure 5** and secure it by tightening the saddle lock knob.

Installing the Finder Scope

The VersaGo GX 80 comes with a 6x26 correct-image crosshair finder scope. The 6x26 descriptor means it has 6x magnifying power and a 26mm clear aperture. It produces a correctly oriented image, unlike a standard finder scope that produces an upside-down and mirror reversed image.

Before you can attach the 6x26 finder scope, you must assemble it in its bracket.

1. Remove the rubber O-ring from the finder scope bracket and slide it over the finder scope tube. Then roll it into the groove shown in **Figure 6A**.
2. Insert the finder scope tube into the bracket cylinder as shown in **Figure 6B**, making sure the two black alignment thumbscrews are backed out enough to allow clearance. Pull the metal spring pin back to allow the



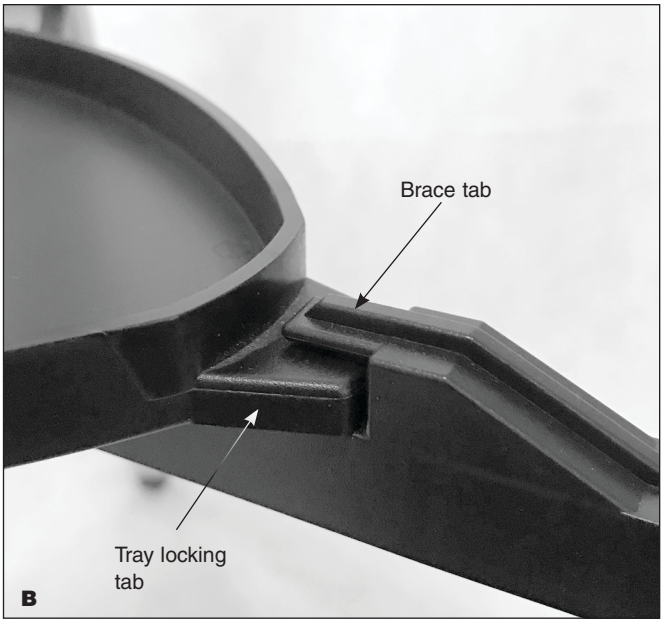


Figure 2. A) Center the tray over the tripod brace, then twist the tray until **B)** the locking tabs seat under the brace tabs.

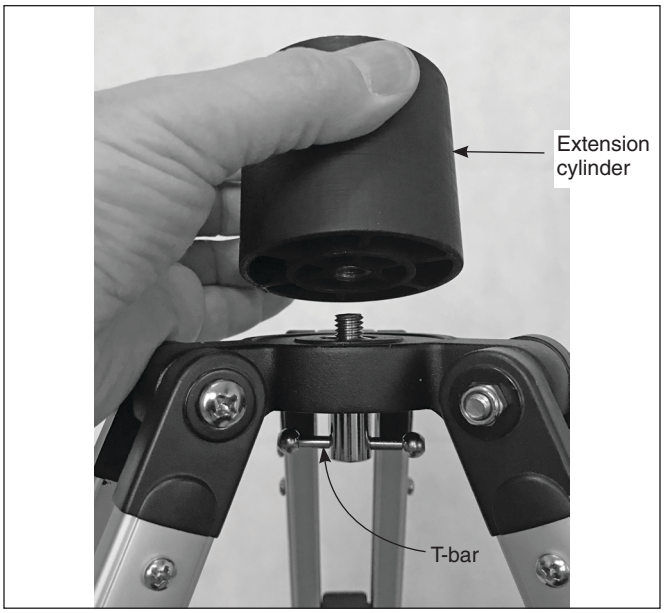


Figure 3. Thread the extension cylinder onto the tripod by turning the T-bar clockwise.

tube to insert until the O-ring seats inside the cylinder. Then rotate the two black thumbscrews clockwise so that they push the tube into the center of the cylinder. The assembled finder scope should now appear as in **Figure 6C**.

3. Now install the finder scope on the optical tube by sliding the bracket foot into the dovetail shoe, as shown in **Figure 7**. Secure the bracket with the thumbscrew on the shoe.

Installing a Diagonal and Eyepiece

1. To attach a diagonal, insert the diagonal's chrome barrel into the focuser drawtube collar, then tighten the two thumbscrews on the drawtube collar (**Figure 8**).
2. Then insert the 25mm eyepiece into the diagonal and secure it by lightly tightening the thumbscrew(s) on the diagonal.

Your VersaGo GX 80 telescope is now completely assembled! Before jumping right in and starting to use it, however, there are a couple of things you should do first to prepare the telescope for operation.

III. Getting Started

The next things to do are to align the finder scope with the telescope and focus the finder scope.

Aligning the Finder Scope

A finder scope makes it easier to find the subject you want to observe in the main telescope. That's because the finder scope has a much wider field of view than that of the main telescope. Before you use the finder scope, it must be precisely aligned with the telescope, so they both point to exactly the same spot.

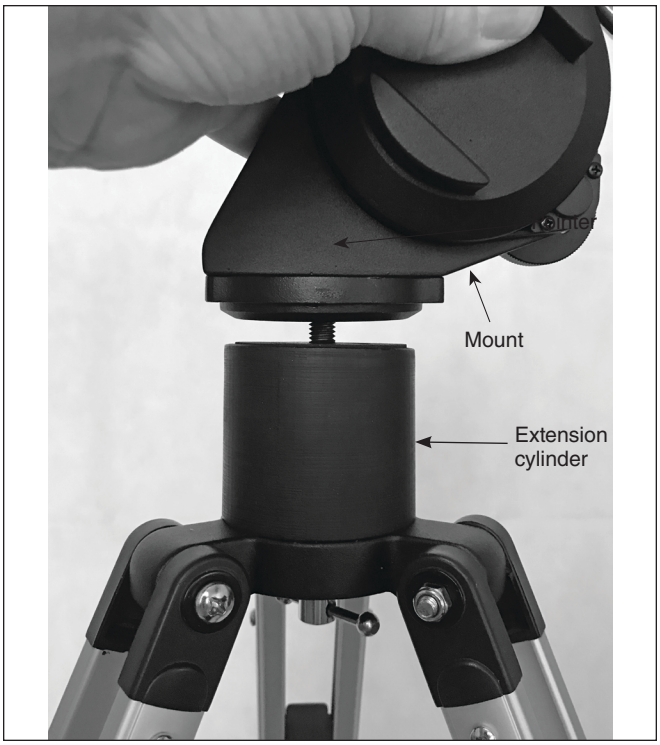


Figure 4. Thread the altazimuth mount onto the extension cylinder until tight.

Alignment is easiest to do in daylight, rather than at night under the stars. First, insert the lowest-power (25mm) eyepiece into the telescope's focuser. Then point the telescope at a discrete object such as the top of a telephone pole or a street sign that is at least a quarter-mile away. Move the telescope so the target object appears in the very center of the field of view when you look into the eyepiece. Now look through the finder scope. Is the object centered in the finder scope's field of view, i.e., on the crosshairs? If not, hopefully it will be visible somewhere in the field of view, so only fine adjustment of the two black nylon alignment screws will be needed. Otherwise you'll have to make coarser adjustments to the alignment screws to redirect the aim of the finder scope. Use the two alignment screws to center the object on the crosshairs of the finder scope. Then look again into the main telescope's eyepiece and see if it is still centered there as well. If it isn't, repeat the entire process, making sure not to move the main telescope while adjusting the alignment of the finder scope. Finder scopes can come out of alignment during transport of the telescope, so check the alignment before each observing session.

Focusing the Finder Scope

If, when looking through the finder scope, you notice that the images appear out of focus, you will need to refocus the finder scope for your eyes. First loosen the lock ring located behind the objective lens cell on the body of the finder scope (see **Figure 6C**). Back the lock ring off by a few turns, for now. Refocus the finder scope on a distant object by threading the objective lens cell in or out of the finder scope body. Precise focusing will be achieved by focusing the finder scope on a bright star. Once the image appears sharp, retighten the lock

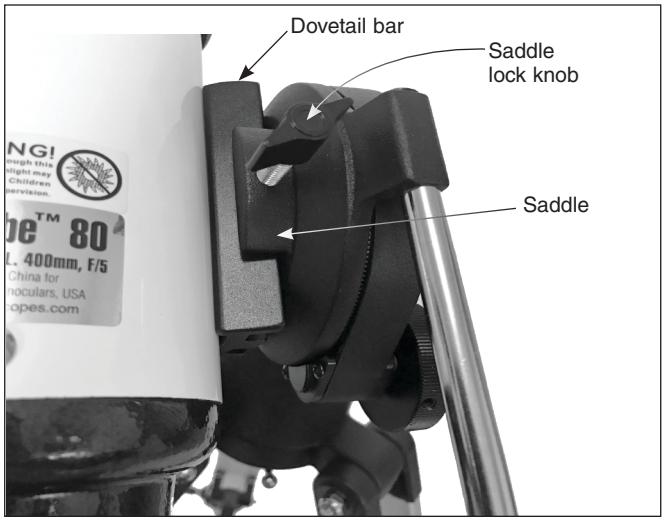


Figure 5. Slide the dovetail bar on the optical tube assembly into the mount's saddle and clamp it tight with the saddle lock knob.

ring behind the objective lens cell. The finder scope's focus should not need to be adjusted again.

Which Diagonal Should I Use?

The VersaGo GX 80 comes with two diagonals: a 90-degree mirror "star" diagonal and a 45-degree correct-image prism diagonal (**Figure 9**). Having two diagonals gives the VersaGo GX 80 tremendous versatility for use both in the daytime and at night.

For daytime use we recommend using the 45-degree correct-image diagonal. Its internal amici prism produces a correctly oriented image in the eyepiece, which is important for observing land-based scenes. And its 45-degree viewing angle is more appropriate for observing when the telescope is often oriented parallel to the ground (**Figure 10A**). For stargazing, when the telescope is often pointed upward, the 90-degree diagonal is recommended, as it provides a more comfortable viewing angle for high-altitude targets (**Figure 10B**).

Note that the 90-degree star diagonal, which contains mirrors, not a prism, produces an image that appears reversed left to right. This is normal for astronomical refractors that utilize a star diagonal. Note also that with the 90-degree star diagonal the image in the telescope eyepiece will be oriented differently from the image in the "correct-image" finder scope.

IV. Operating the VersaGo GX 80

The VersaGo GX 80 Altazimuth Refractor is designed for easy up-down and left-right manual panning. The panhandle can be used to move the telescope in any direction. While there is no tension adjustment on the azimuth (horizontal) axis, there is a tension adjustment knob on the altitude (vertical) axis (see **Figure 11**). Loosen the tension adjustment knob slightly to allow easier altitude motion, and tighten the knob to increase the friction to the desired level.

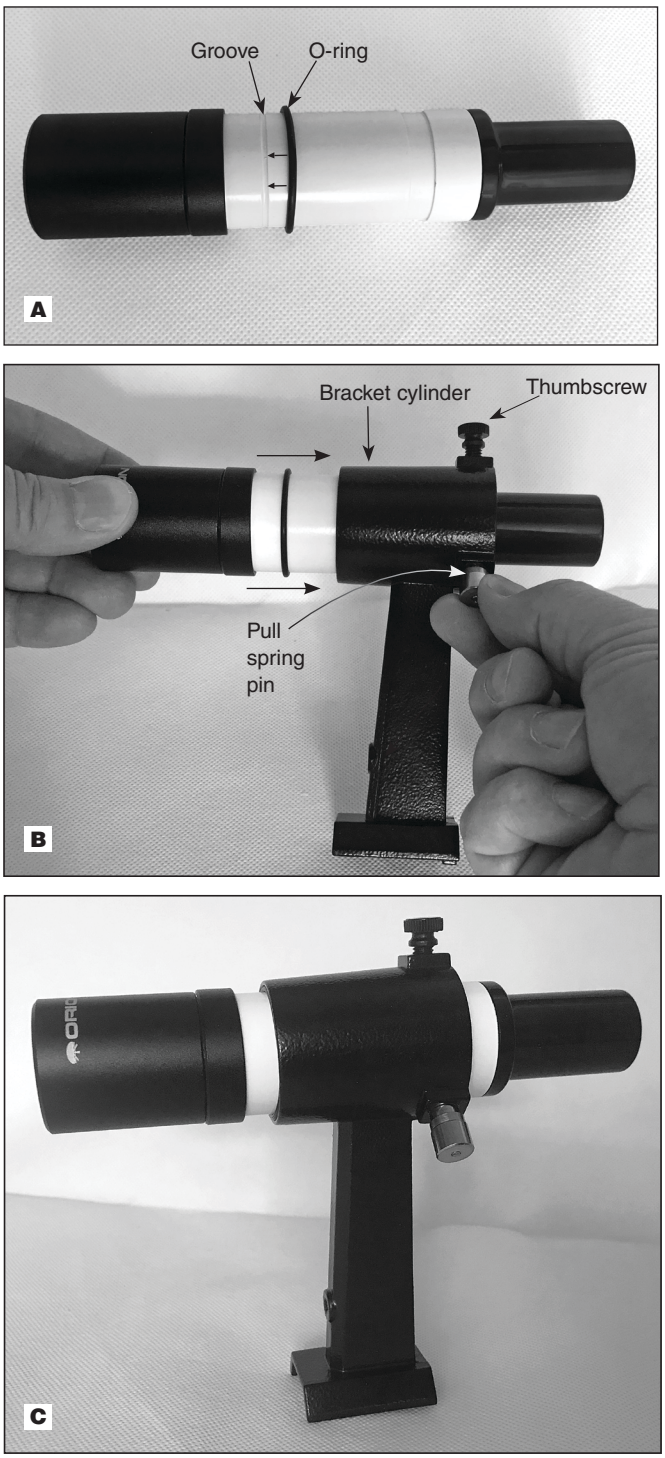


Figure 6. A) Place the rubber O-ring on the finder scope and push it into the groove. **B)** Slide the finder scope tube into the bracket as shown and, while pulling back the spring pin, push the tube until the O-ring seats just inside the bracket cylinder. **C)** The assembled finder scope.

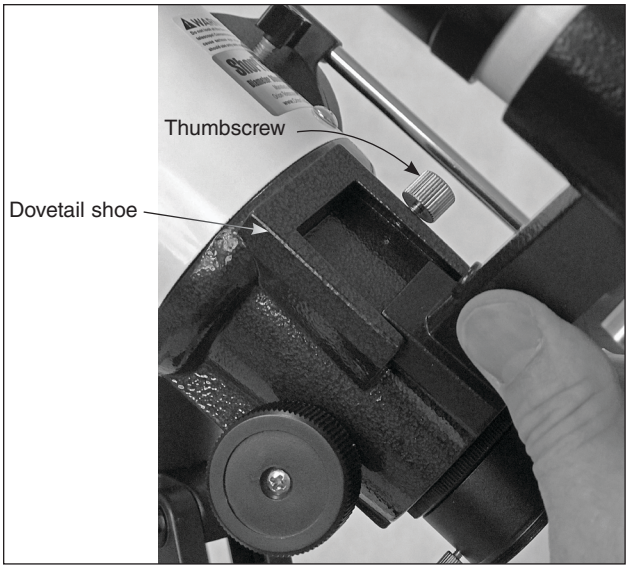


Figure 7. To install the finder scope, slide the bracket foot forward in the dovetail shoe, then tighten the thumbscrew on the shoe.

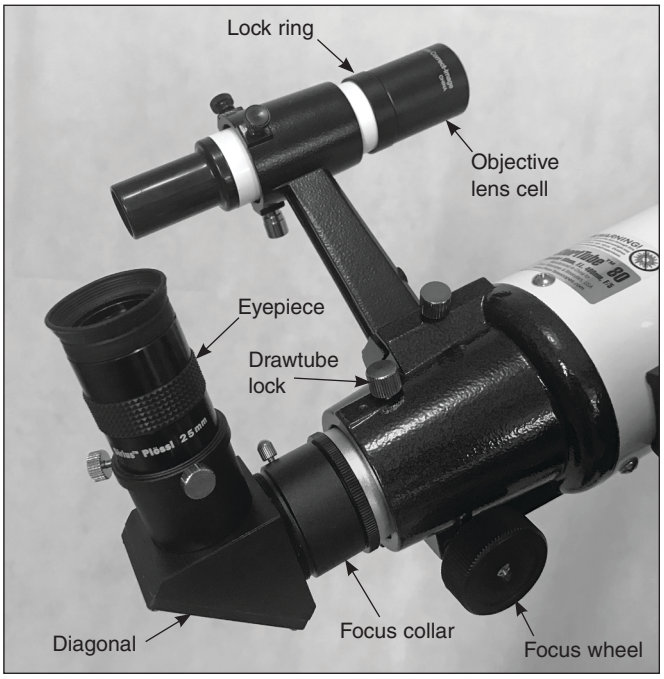


Figure 8. Install a diagonal (90-degree diagonal shown) in the focuser collar, then install an eyepiece in the diagonal.

Note that both the azimuth and altitude axes have a knurled "micro-motion" knob (**Figure 11**). Turning these knobs provides a controlled micro adjustment, which can be helpful for centering a target in the telescope's eyepiece.

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 VersaGo GX 80 refractor comes with 25mm and 10mm Sirius Plössl eyepieces, which will suffice nicely to begin with. You can purchase additional eyepieces later if you wish to have more magnification options.

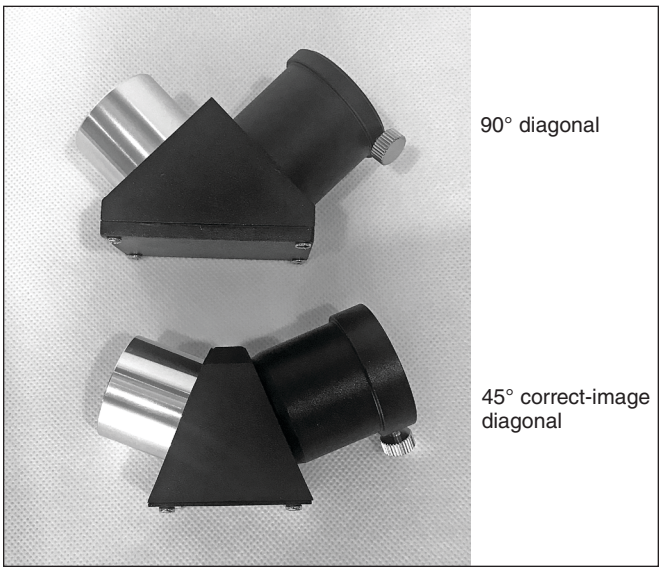


Figure 9. Two 1.25" diagonals are included with the VersaGo GX 80: a 90-degree mirror star diagonal that's recommended for astronomical observing, and a 45-degree correct-image prism diagonal that is recommended for daytime terrestrial use.

Magnification is calculated as follows:

Telescope Focal Length (mm) / Eyepiece Focal Length (mm) = Magnification

For example, the VersaGo GX 80 has a focal length of 400mm, which when used with the supplied 25mm eyepiece yields::

400mm / 25mm = 16x

The magnification provided by the 10mm eyepiece is:

400mm / 10mm = 40x

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 VersaGo GX 80 telescope has an aperture of 80mm, or 3.1 inches, so the maximum magnification would be about 155x (3.1 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 by using the 25mm eyepiece, then try switching to the 10mm eyepiece later if you want to boost the magnification.

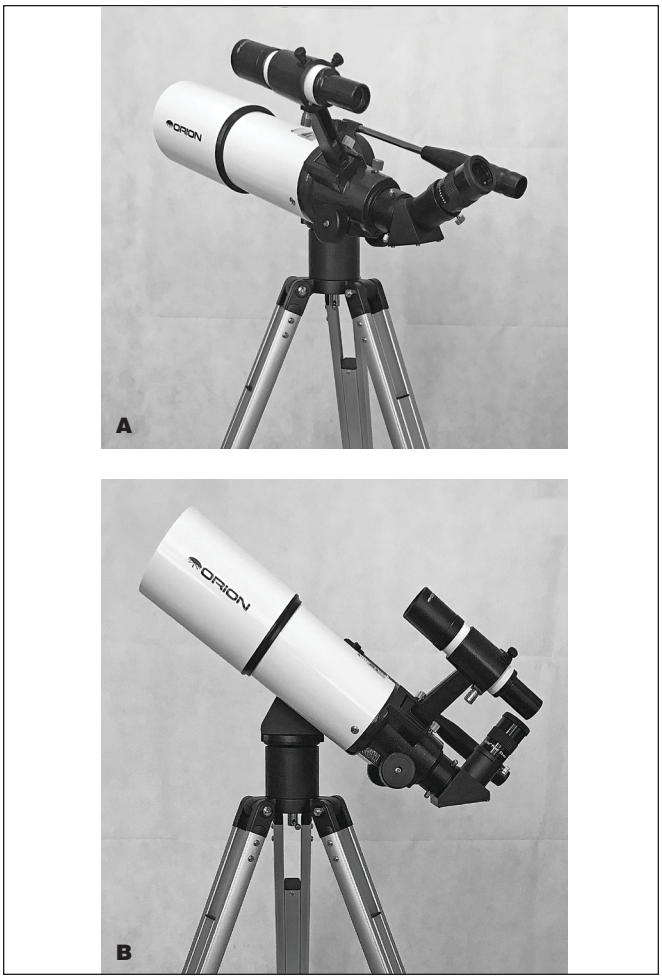


Figure 10. A) The VersaGo GX 80 outfitted for daytime terrestrial viewing and, **B)** equipped for stargazing.

Note that the eyepiece barrels and the diagonal barrels have internal threads that can accommodate optional Orion 1.25" filters.

Focusing the Telescope

The VersaGo GX 80 is outfitted with a 1.25" rack and pinion focuser. To focus the image you will use the black focus wheels (see **Figure 8**). Assuming you have installed a diagonal and eyepiece to acquire a target image, turn the focus wheels to rack the focuser drawtube in and out, changing the focal distance of the light path. To ensure the sharpest focus go slightly past your perceived focus point and then reverse directions until you have a sharp focus.

You will have to readjust the focus when aiming at subjects of varying distances, or after changing eyepieces. Make sure the drawtube lock thumbscrew is loosened before focusing. After focusing, you can tighten it to lock the telescope's focus into place if desired.

"Play" in the Focuser Drawtube? Here's How to Adjust it Out

If your telescope that has a little bit of "play", or looseness, in the focuser drawtube, rest assured that you can make a quick

Figure 11. The VersaGo GX altazimuth mount features geared micro-motion knobs for both axes and an altitude tension adjustment knob.

Figure 12. To take out any "play" in the focuser drawtube, use a 1.5mm Allen wrench to lightly tighten the setscrews in the two holes indicated by the arrows.

adjustment to remove it. Ideally, you don't want any drawtube play as it could produce some shifting of the image in the eyepiece as you rack the focuser in or out using the focus wheels. Such play could also throw a sharp image out of focus.

If you feel any wiggling of the drawtube in the focuser housing when you grab the end of the drawtube and tug it up and down, then do the following. You will need a 1.5mm metric Allen key to make this adjustment.

Locate the two tiny holes on the top of the focuser (pointers in **Figure 12**). Insert the end of a 1.5mm Allen key into the hole closest to the drawtube and turn the setscrew clockwise about 1/8 of a turn. Now try tugging the drawtube up and down again. Usually that 1/8 turn of tightening does the trick, but if there is still some looseness in the drawtube, tighten the setscrew another 1/8 turn. You could also try tightening the other setscrew 1/8 turn as well, but usually it only requires tightening one. You should only have to make this adjustment once.

V. Astronomical Observing

For many, this will be your first foray into the exciting world of amateur astronomy. The following information and observing tips will help get you started.

Choosing an Observing Site

When selecting a location for observing, get as far away as possible from direct artificial light such as street lights, porch lights, and automobile headlights. The glare from these lights will greatly impair your dark-adapted night vision. Set up on a grass or dirt surface, not asphalt, because asphalt radiates more heat. Heat disturbs the surrounding air and degrades the images seen through the telescope. Avoid viewing over rooftops and chimneys, as they often have warm air currents rising from them. Similarly, avoid observing from indoors through an open (or closed) window, because the temperature difference between the indoor and outdoor air will cause image blurring and distortion.

If at all possible, escape the light-polluted city sky and head for darker country skies. You'll be amazed at how many more stars and deep-sky objects are visible in a dark sky!

"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.

What to Expect

So what will you see with your telescope? You should be able to see bands on Jupiter, the rings of Saturn, craters on the Moon, the waxing and waning of Venus, and many bright deep-sky objects such as star clusters and nebulas. Do not expect to see colors in faint objects as you do in photographs, however. Most galaxies and nebulas will appear gray in color. Unlike a camera, which can record colors of faint objects in long exposures, our eyes are not sensitive enough to see such color except in a few of the brightest ones.

Objects to Observe

Now that you are all set up and ready to go, what is there to look at in the night sky?

A. The Moon

With its rocky surface, the Moon is one of the easiest and most interesting objects to view with your telescope. Lunar craters, maria, and even mountain ranges can all be clearly seen from a distance of 238,000 miles away! With its ever-changing phases, you'll get a new view of the Moon every night. The best time to observe our one and only natural satellite is during a partial phase, that is, when the Moon is not full. During partial phases, shadows are cast on the surface, which reveal more detail, especially right along the border between the dark and light portions of the disk (called the "terminator"). A full Moon is too bright and devoid of surface shadows to yield a pleasing view. Make sure to observe the Moon when it is well above the horizon to get the sharpest images.

Use an optional Moon filter to dim the Moon when it is very bright. It simply threads onto the bottom of the eyepieces (you

must first remove the eyepiece from the focuser to attach a filter). You'll find that the Moon filter improves viewing comfort, and helps to bring out subtle features on the lunar surface.

B. The Planets

The planets don't stay put like the stars, so to find them you should refer to the monthly star charts at OrionTelescopes.com, or to charts published monthly in *Astronomy, Sky & Telescope*, or other astronomy magazines. Venus, Mars, Jupiter, and Saturn are the brightest objects in the sky after the Sun and the Moon. Other planets may be visible but will likely appear star-like. Because planets are quite small in apparent size, optional higher-power eyepieces or a Barlow lens are recommended and often needed for detailed observations.

B. The Sun

You can change your nighttime telescope into a daytime Sun viewer by installing an optional full-aperture solar filter over the front opening of the telescope. The primary attraction is sunspots, which change shape, appearance, and location daily. Sunspots are directly related to magnetic activity in the Sun. Many observers like to make drawings of sunspots to monitor how the Sun is changing from day to day.

Important Note: Do not look at the Sun with any optical instrument without a professionally made solar filter, or permanent eye damage could result.

D. The Stars

Stars will appear like twinkling points of light. Even powerful telescopes cannot magnify stars to appear as more than a point of light. You can, however, enjoy the different colors of the stars and locate many pretty double and multiple stars. The famous "Double-Double" in the constellation Lyra and the gorgeous two-color double star Albireo in Cygnus are favorites. Defocusing a star slightly can help bring out its color.

E. Deep-Sky Objects

Under dark skies, you can observe a wealth of fascinating deep-sky objects, including gaseous nebulas, open and globular star clusters, and different types of galaxies. Most deep-sky objects are very faint, so it is important you find an observing site well away from light pollution.

To find deep-sky objects with your telescope, you first need to become reasonably familiar with the night sky. Unless you know how to recognize the constellation Orion, for instance, you won't have much luck locating the Orion Nebula. A simple planisphere, or star wheel, can be a valuable tool for learning the constellations and seeing which ones are visible in the sky on a given night. Once you have identified a few constellations, a good star chart, atlas, or astronomy app will come in handy for helping locate interesting deep-sky objects to view within the constellations.

VI. Optional Accessories

- Moon Filter – A 1.25" Moon filter will cut down the strong glare of sunlight reflected from the Moon, making Moon viewing more comfortable and revealing more surface detail. The filter threads into the bottom of the eyepieces that came with your telescope.
- Barlow Lens – A 2x Barlow lens doubles the magnifying power of any eyepiece it's used with, giving you a big power boost to get in closer to your target object. You just insert it between the diagonal and the eyepiece.
- Planisphere – A nifty "star wheel" that shows what stars and constellations are visible in the sky at any time of any night. Just set the date and time see a mini representation of your local night sky. Great for identifying constellations and planning an evening's observing session.
- Solar Filter – We offer special "safety film" and coated glass solar filters that fit over the front of the telescope to allow safe viewing of the Sun. Check out the ever-changing pattern of sunspots!
- Smartphone Photo Adapter – Holds your smartphone up to the telescope's eyepiece so you can take consistently sharp, well focused, high-magnification photos through the telescope.

VII. 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. Small components like eyepieces and other accessories should be kept in a protective box or storage case. Keep the dust cover on the front of the telescope when it is not in use.

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.

VIII. Specifications

Objective lens:	80mm (3.1") diameter, achromatic
Focal length:	400mm
Focal ratio:	f/5
Lens coatings:	Multi-coated
Focuser:	Rack-and-pinion, accepts 1.25" accessories
Eyepieces:	25mm and 10mm Sirius Plossl, 1.25" barrel diameter, threaded for Orion filters
Eyepiece coatings:	Multi-coated
Eyepiece magnification:	16x (with 25mm eyepiece) and 40x (with 10mm eyepiece)
Diagonal:	90-degree mirror diagonal, 1.25", threaded for Orion filters
	45-degree correct-image prism diagonal, 1.25", threaded for Orion filters
Finder scope:	6x26 correct-image
Mount:	VersaGo GX altazimuth
Tripod:	Aluminum, channel-style legs
Total assembled weight:	8 lbs. 14 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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