STELLARVUE®

TELESCOPE OPERATORS MANUAL

SVX80T-25SV APO TRIPLET

The mission of Stellarvue is to inspire a healthy interest in science and astronomy by handcrafting the finest telescopes on the planet.

STELLARVUE®
SEEING IS BELIEVING

A Division of Auburn Precision Optics
WWW.STELLARVUE.COM
11802 KEMPER ROAD, AUBURN, CA 95603 U. S. A
PHONE (530) 823-7796, FAX (530) 823-8121

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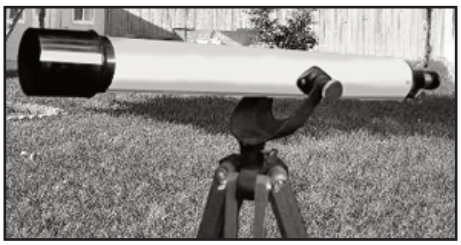
A MESSAGE FROM STELLARVUE FOUNDER VIC MARIS

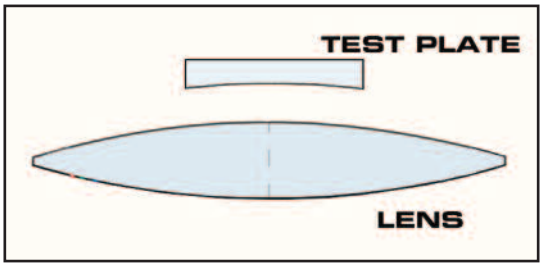


When I was a child, I developed a love for astronomy. My parents wanted to encouarge my interest, so they bought me a 60 mm refractor. Like many store-bought telescopes it was poorly made, showed very little detail, and was difficult to use. I struggled for months and became very discouraged. Then, I learned it was possible to make a telescope. Using my allowance, I saved and purchased parts, ground and polished a 6” mirror, and made my first handcrafted telescope.

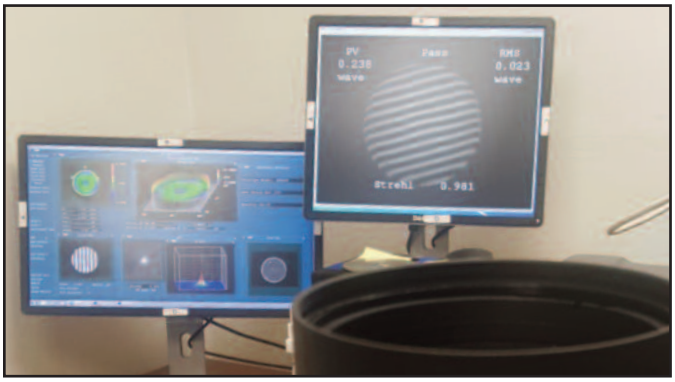
At the age of 16, I went on to grind and polish a two-element, 5” achromatic lens. I learned a great deal in these early years and discovered first-hand the importance of excellent optics combined with mounts that were mechanically stable. Viewing the night sky using my handcrafted telescopes fed my interest, and inspired me to continue learning more about astronomy and making telescopes.

Realizing that there was a need for high-quality refractor telescopes on the market, I began Stellarvue in 1998. We have since invested in computer numeric controlled equipment and a state of the art testing facility. I am proud to say that each employee currently working at Stellarvue is committed to making the best telescopes possible. Today, we deliver the finest apo-triplet refractors available, and we strive to maintain a very high standard of customer service.

Stellarvue telescopes are individually made, and each optic is tested multiple times to ensure perfection. Please store and use it as you would any optical device. If dust accumulates on the lens, you may use a bulb type blower to remove it. Always be careful to avoid marring the lens.



Stellarvue refractor lenses are fully multi-coated to increase light transmission and contrast. Lenses are accurately hand-figured and glass test plates are used to ensure accuracy. A test plate is a separate optic that is figured to the precise curve required for a particular optical surface. We make test plates for every surface on every optic we make. These plates are placed on top of the surface of the lens to ensure it is polished to the exact curve. When the curve on the lens matches the curve on the test plate, straight lines will show under an intense testing light. Placing these glass plates on the surface of the lens may result in some very fine cosmetic lines or marks which do not affect performance in any way. This is normal in a high Strehl lens that is continually tested during polishing.



Stellarvue strives to ensure the highest optical accuracy. While many companies producing mass-produced lenses rely solely on test plates, we confirm the accuracy of each optical surface using our Zygo phase-shifting laser interferometer and extremely high precision test spheres that measure the entire clear aperture of the objective lens.

MAKING WORLD-CLASS OPTICS

At Stellarvue we believe you 'get what you pay for,' and cater to those who are looking for a high-quality product with reliable optics. While making commercial grade mass-produced optics is relatively easy and fast, it results in unreliable products. That's why we take the time to make each apo-triplet lens as close to perfect as possible. To demonstrate our commitment to excellence, we provide our customers with their lens' individual report card in the form of an interferometric test report.

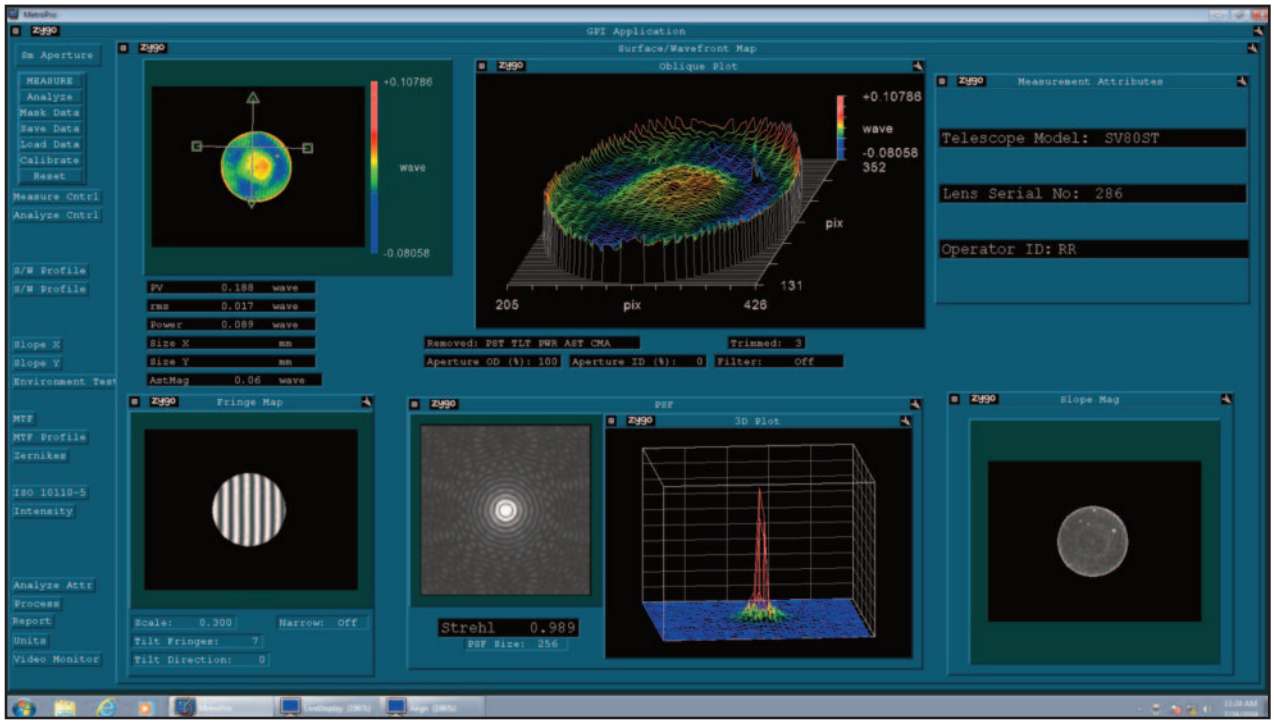
Alex our Production Manager using Stellarvue's Zygo Phase Shifting Laser Interferometer to test and adjust Stellarvue objectives.

People often ask us what type of glass we use, which is the wrong question. While we use the best, lowest-dispesion glass made, glass type says nothing of its consistency or homogeneity. Bad glass makes bad optics, which is why it is important to test each optic individually.

Stellarvue is a division of Auburn Precision Optics (APO). We make optics for defense, industry, and space science. We also manufacture the larger Stellarvue lenses. Lenses that are used in our smaller telescopes are currently outsourced, but are made to our much higher optical standard. These lenses are extensively tested, and approved for sale only if they reach our high optical standard.

Mechanical quality is of extreme importance in making a world-class instrument. Using CNC machines and high-quality materials makes a substantial difference. Our mounting rings for the 80 mm and bigger, for example, are machined in our shop using 6061-6 aluminum and stainless steel. These rings are far stronger than imported cast aluminum rings.

We provide our Apochromatic triplet refractors with a Zygo interferometric test report like the one shown below. Our optics must reach a Strehl ratio of .95 or higher, and they are individually corrected to eliminate spherical error, on-axis astigmatism, and coma. This is significantly more accurate than many competitive lenses we have tested here, some of which show a Strehl ratio in the lower .8 range. You will see/image far less in a telescope with a low optical rating. As your "report card" shows, with a Stellarvue you have a very accurate optic that will show you everything the atmosphere will allow you to see (or image with your camera).



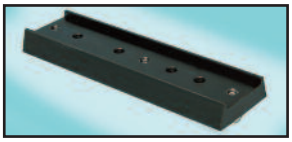
UNPACKING

Stellarvue telescopes are securely boxed or double boxed in a padded case. Be careful when using a blade to open the shipping box. This will avoid damaging the case inside with your knife. Carefully remove the telescope from the cardboard box, and set it on a secure surface. Unzip or unlatch the case to reveal the telescope inside.

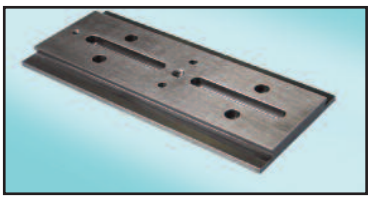
WHATS INSIDE THE CASE

ATTACHING THE MOUNTING RAIL

The telescope attaches to the telescope mount using a dovetail mounting rail. The dovetail mounting rail screws to the bottom of the mounting rings using 1/4-20 socket cap head screws. Generally telescope mounts use one of two different style mounting rails.



Smaller mounts use the Vixen-style mounting rail, which is about 1 3/4" wide. Mounts using this size rail include the Celestron AVX mount, Vixen mounts The Stellarvue M1V, M002C and many Chinese import mounts. The TP014 shown at the left works well with this telescope when a Vixen-style rail is needed. .



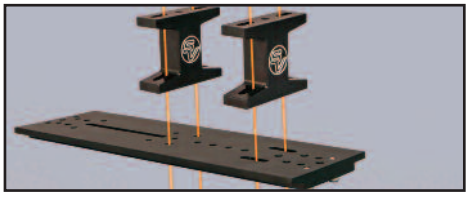
Most larger mounts use the larger Losmandy-style rail, which is 4" wide. Mounts using this size rail include the Stellarvue mounts with our TDLV shoes, Para-mount, Losmandy, Mathis, Ten Micron, Discmounts, and larger Celestron mounts.

Screw the rail securely to the bottom of the rings. Vixen rails use one screw per ring, Losmandy rails use either one or two screws per ring. Using two screws in one ring and one in the other as shown in the picture to the left will securely hold the telescope in place.

RISERS

This telescope is relatively short and light. Adding heavy visual accessories or imaging cameras can make the telescope heavy in the back. This may create a balancing issue if you mount the telescope with a rail alone. For this reason we created riser blocks that can be used with a longer rail. Using a riser block system with two blocks and a long rail will allow you to shift the telescope forward and balance the load.

RSS-V Vixen style rail and riser block system.



RSS-L Losmandy style rail and riser block system.

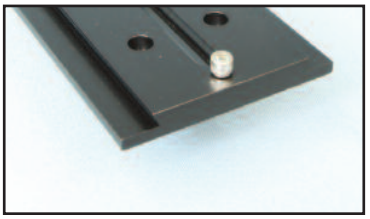
ATTACHING THE TELESCOPE TO THE MOUNT

With the mounting rail securely attached to the rings, slide the rail into the dovetail shoe on the telescope mount. Make sure you secure the rail to the mount with the hand screws on the mount. If you do not secure the rail tightly, the telescope may slide out of the mount, causing serious damage to the telescope.

Step 1: Loosen the hand knob(s) on the mount's dovetail shoe.

Step 2: Slide the mounting rail into the shoe.

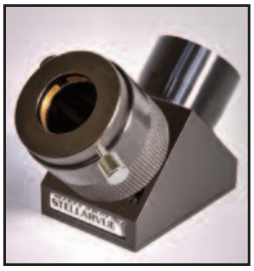
Step 3: Tighten the knob(s) securely.



We supply our Losmandy-style rails with a safety screw on one end. Position this screw on the side of the telescope facing the sky. If the hand knobs loosen this screw head may protect your telescope from falling.

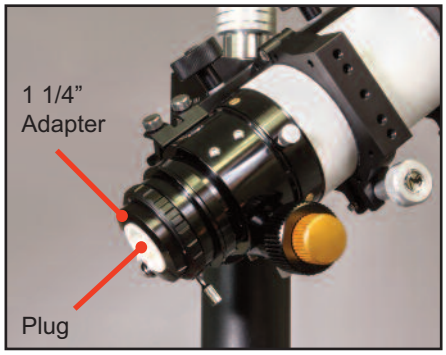
SETTING UP FOR VISUAL USE

Now that you have securely attached the telescope to the mount, you will need to balance it in both axes. The mount manual explains how to do this. If you are using an equatorial and/or go-to computerized mount, you will need to align the telescope according to the mount manual to get it ready for use. Once the telescope is balanced and the mount aligned, you are ready to observe!

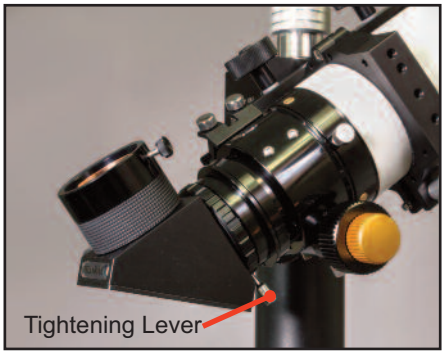


Two additional optical components are necessary to be able to view through your telescope at night: a star diagonal and an eyepiece.

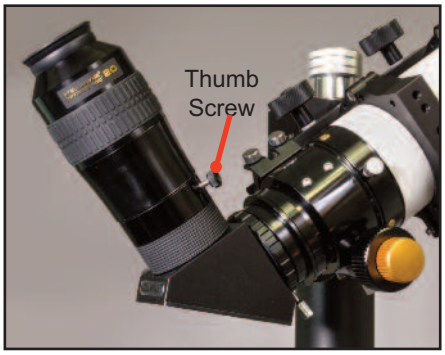
* The star diagonal reflects the light 90 degrees. Without it the viewer would be forced to look upward when observing and this would be extremely uncomfortable.
* The eyepiece is needed to focus the image and magnify it.



Remove the plug. If using a 2" star diagonal, remove the 1 1/4" adapter.



Insert the star diagonal into the focuser. Secure it using the tightening lever.



Insert the eyepiece into the star diagonal. Tighten the thumb screw.

Stellarvue #D1040Q two inch dielectric quartz star diagonal

The Star Diagonal: The Stellarvue D1040Q diagonal uses a thick and accurate 1/10 wave low expension quartz mirror with a 99% dielectric coating. These diagonals are assembled and tested here at Stellarvue to ensure they maintain your telescope's performance.

Astronomers prefer mirror star diagonals over prisms because they are sharper an provide the highest contrast. Mirror star diagonals present an image that is right side up but reversed left to right. For newbies this takes a little practice, but it is worth the effort because it will allow you to see more detail at night.

Erecting Prism: You may convert your instrument to a razor-sharp terrestrial telescope by replacing the star diagonal with an erecting prism. Unlike the star diagonal, the erecting prism will provide a correctly oriented view through the eyepiece. So while we do not recommend an erecting prism for viewing at night, we highly recommend them only for daytime viewing.

Stellarvue #D1035 two inch correct-image erecting prism

Eyepieces: While the telescope's light-gathering power depends on the size of the telescopes objective lens, its magnification power depends on the eyepiece used. In order to see objects clearly at the proper magnification power, we recommend having four or more eyepieces. Here is why:

1. Low-power, wide-field eyepiece: You need a low-power, wide-angle eyepiece to more easily locate objects in the sky and to observe extended objects like the Andromeda galaxy. Our best wide field eyepiece is the Stellarvue Optimus 20.

2. Medium-power eyepiece: Boosting the power darkens the sky background and shows more detail in deep sky objects such as nebulae, star clusters and galaxies. We recommed the Stellarvue Optimus 9 and 13.5 eyepieces as the best for use at medium power.

3. Two High-power eyepieces: Viewing planets, close double stars, and small craters on the moon requires a high- power eyepiece. We recommend having two high-power eyepieces because the atmospheric seeing conditions cannot always support the highest power. Having two high-power eyepieces of different focal lengths will allow you to adjust the magnification based on the seeing conditions. We recommend the Optimus 3.6 and 4.7 eyepieces.

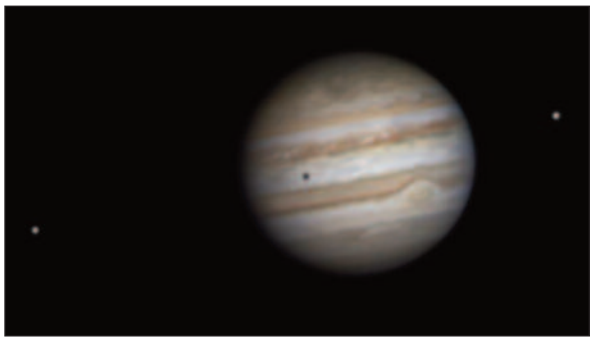
OPTIMUS EYEPIECES

The amount of magnification is determined by dividing the focal length of the telescope by the focal length of the eyepiece. Your telescope has a focal length of 480 mm. A 20 mm eyepiece, when used with this telescope, will provide a magnification of 24 power (480/20). 24 power means that objects will appear 24 times larger. Notice that the smaller the focal length of the eyepiece, the higher the power becomes. So our 4.7 mm eyepiece provides 102 power (480/4.7).

The ability of a telescope to magnify is limited by:

A. The accuracy of the optics
B. The steadiness of the atmosphere

Under perfect conditions this telescope is capable of magnifying bright objects 20 - 250 times. Unfortunately, the air is often unsteady due to air turbulence. This causes the stars to twinkle and limits the ability of any telescope to show fine details. Boosting the power darkens the view and only increases the size of the burry image. This is referred to as "empty magnification" since it is too high of a power for the conditions and actually shows you less. Under turbulent conditions, it is best to use an eyepiece that provides a lower power.



Jupiter appears sharp under steady skies and its moons appear as disks.

If you purchase the entire set of Optimus eyepieces you will notice on turbulent nights the view through the 3.6 mm eyepiece may be soft. This indicates that the seeing conditions are not optimal. Under these conditions, you should switch to the 4.7 mm eyepiece and view the planets, craters on the moon and double stars at a slightly lower but clearer magnification.

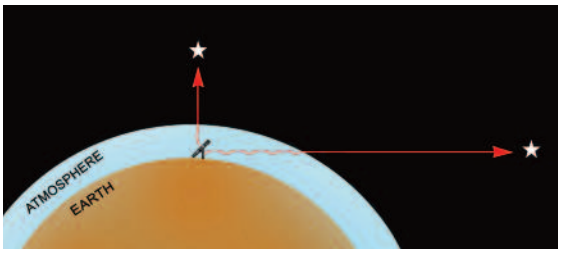
Stellarvue optics are extremely accurate. If details are soft when you observe through it, you are observing under less favorable conditions. Be patient. On a steady night you will see magnificent detail.

Unsteady air distorts the moons and Jupiter is soft with little detail

Magnification is not as important on larger extended objects so many amateur astronomers switch from planets to star clusters and nebulae when the air is unsteady.

OBSERVING TIPS

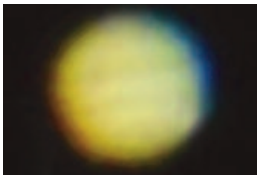
Cool down: Optics are affected by temperature changes, so it is not recommended to take a telescope from a warm room to the cold night and immediately observe with it. The objective lens must settle down to the ambient temperature before it performs as it should. It is best to leave the telescope outside for a couple of hours to let it cool down and acclimate.



Plan out your observing session: Use a good planetarium program to see what celestial objects are viewable in your location when you are observing. Observe dimmer deep sky objects after it gets completely dark and planets when they are as high in the sky as possible. Planets will be less affected by air turbulence and atmospheric refraction when they are higher in the sky. This is because you are looking through less atmosphere.

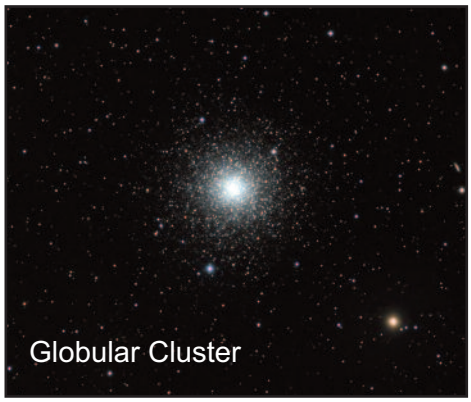
Dark adapting: It takes at least 15 minutes for your eyes to adapt to the darkness so you can see faint objects. If you use white light at night you will ruin your night vision. The human eye is less impacted by red light, so always use a red observers flashlight when observing. If a car approaches, avoid looking at the headlights. If your observing session includes the moon you may want to do it last as it will seriously impact your night vision. A good moon filter is recommended when observing the moon to filter out 80% of the moons glare. It is reflected sunlight after all.

Record your observations: It is fun to try your hand at sketching planets, clusters and other deep sky objects. Check out the Astronomical League https://www.astroleague.org/ for more information.



Heat sources: Avoid looking at planets, the moon, or close double stars when they are positioned above a house roof or other structure that gives off heat. It will distort the views at higher powers.

Atmospheric Diffraction: The atmosphere can cause your telescope to exhibit false color. That color is not in the telescope, but above you. Moisture in the atmosphere may act like prisms, and brighter objects will appear with a reddish color on one side and a green-blue color on the other. This is the atmosphere, not your telescope.

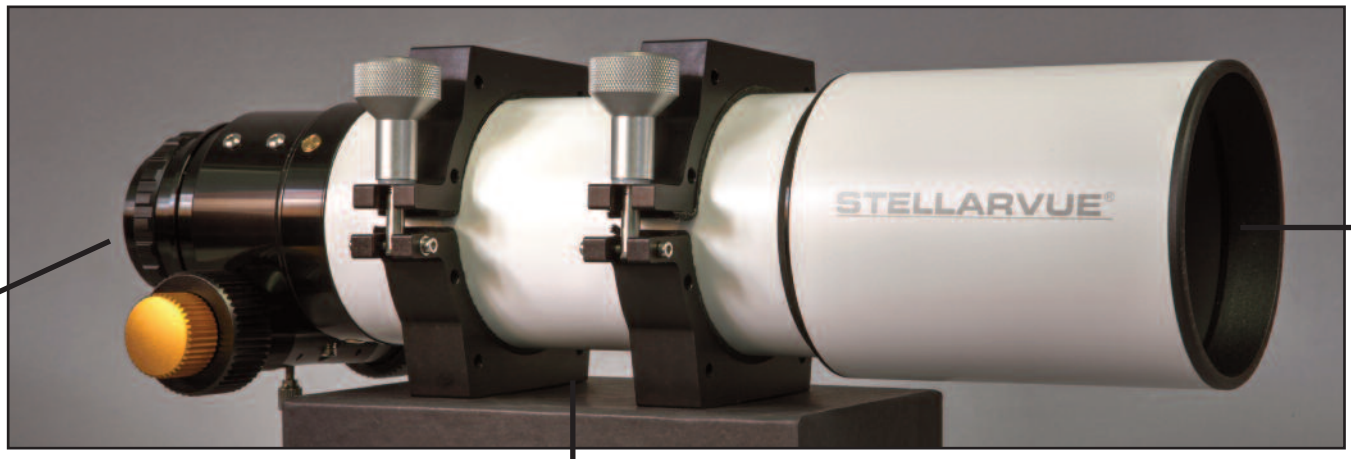


Observing deep sky objects: Deep sky objects like nebulae and galaxies can be very hard to discern for new hobbyists.The more experience you have, the more of them you'll be able to see. Avoid observing when you are tired or after comsuming alcohol or drugs. With time, you will become more able to see these very low contrast, diffuse objects. Try using averted vision, where you look to one side of the object where your eye is more sensitive. If you are looking at a diffuse object and you are not sure you are seeing it, lightly tap the side of the telescope and as the stars vibrate, so will the object. When observing deep sky objects, if you want to focus the telescope better, focus on the brigtest star in the eyepiece, not the diffuse object. Finally, when observing objects like gobular star clusters make sure you are not touching the telescope. Even a small vibration can render dimmer stars invisible.

Comfort: Dress warmly enough for the night air, if you are cold you will not see as much. This is particularly true for your ears. Cover your ears and you will retain more body heat. Use a comfortable chair and position yourself so you are not craning your neck or twisting your back. If you have a refractor that requires you to get down on your knees, use a padded kneeling mat.

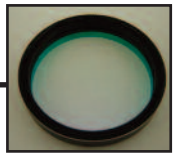
Putting it all away: Always keep the telescope capped and/or covered when not in use. After a night under the stars, bring your telescope inside and let it acclimate to the indoors. If dew has formed on your lens, uncap both ends and let it air dry before putting it away. Do this in a room that is dry and relatively dust free. Putting your telescope away wet can encourage mold growth and while that is rare, it is something you should always avoid.

ACCESSORIES CHART

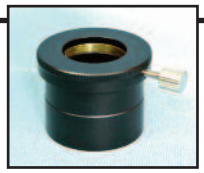


Stellarvue 2” Dielectric Diagonal #D1040Q

2” Eyepieces



Optional 2” Filter

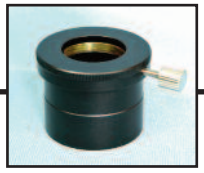


FA2 1.25” Adapter

1.25” Eyepieces

Optional 1.25” Filter

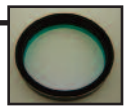
Optional Quark Solar Filter with UVIR Energy Reduction Filter



FA2 1.25” Adapter

Stellarvue 1.25” Diagonal #D1030ED

1.25” Eyepieces



Optional 1.25” Filter

IMAGING ACCESSORIES

Remove 2” adapter on focuser and thread into focuser drawtube

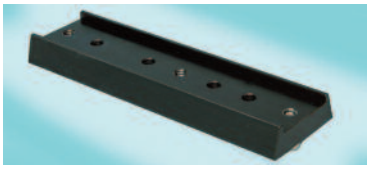
SFF3-80 Field Flattener

T-ring → DSLR Camera

Extension tubes required for your CCD camera (call Stellarvue for assistance) → CCD Camera

Optional Full Aperture Solar Filter

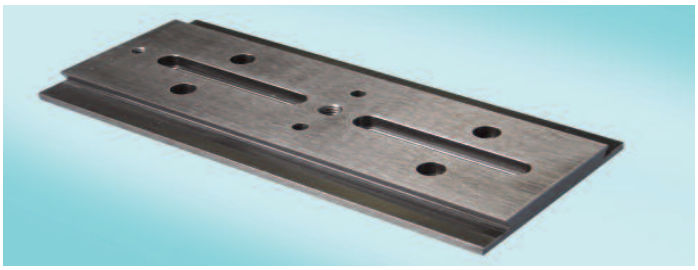
NEEDED MOUNTING HARDWARE



Vixen Style Rail (TP014) or RB002V Riser Block System

Telescope mounts using Vixen sized rails

Please note: The M002C mount head shown works with either the Vixen or Losmandy style rails.



Losmandy Style Rail (TP006) or RB002L Riser Block System

Telescope mounts using the Losmandy sized rail.

Standard Thickly Padded Travel Case (Included)

REFLEX SIGHTS AND FINDER SCOPES

Reflex sights and finder scopes are small viewing devices attached to the side of a telescope to help the user acquire objects in the eyepiece of the telescope. They serve the same purpose as a rifle scope, ensuring that your telescope is pointed directly at the object you wish to view. Since telescopes have a relatively narrow field of view, these sights and finder scopes make locating objects much easier.

REFLEX SIGHTS

Reflex sights do not magnify but have an optical window with a red dot or crosshair pattern displayed on it.

#F001 Red Dot Finder: The simplest reflex sight to use is the Stellarvue Red Dot Finder #F001. This is an inexpensive, plastic reflex finder that projects a red dot on a glass window. The red dot indicates where the telescope is pointed.

For more information on this finder visit:
http://www.stellarvue.com/red-dot-finder/

The F001 red dot finder uses the standard BB gun mount. We offer a number of bases that allow you to attach this finder to your telescope.

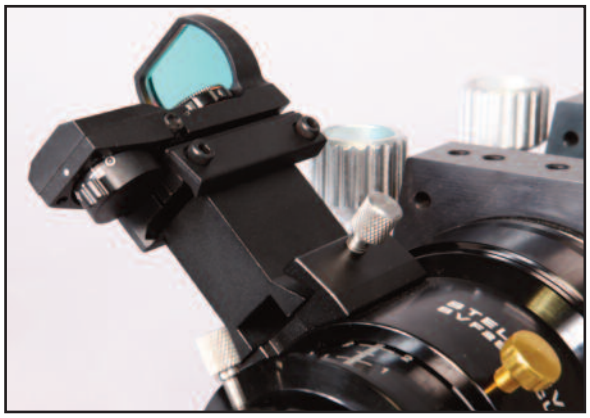
To mount this finder to the telescope mounting ring use the F001EF base with is available separately.

ADVANCED REFLEX SIGHTS

We also offer a more advanced reflex sight, the multi-reticle finder #F002. Find this on the web at:
http://www.stellarvue.com/deep-sky-mrf-deluxe-red-dot-finder-f002/

This finder permits the user to select the desired reticle pattern including a red dot (two sizes), a circle, or a crosshair pattern.The patterns shown below may vary slightly. Merely move the lever at the rear of the finder to select the pattern you prefer to use.

The F002 Multi-reticle finder uses the standard riflescope mount. To mount this finder to your telescope attach it to the F002DA base and insert this into the dovetail shoe on the focuser as shown below.



STELLARVUE®

OPTICAL FINDERSCOPES

An optical finderscope has the advantage of gathering more light than the naked eye. Deep sky observers prefer these when looking for faint objects. We designed our finder scopes with a 90-degree, fully multicoated, correct image erecting prism, 1.25” helical focuser (so other 1.25” eyepieces could be used) and a reticle that may be illuminated. They come in 50 mm, 60 mm and 80 mm.

50 mm Finder Scope

60 mm Finder Scope

80 mm Finder Scope

FINDER MOUNTING RINGS

Your finderscope will need adjustable mounting rings that fit your model of telescope. Our 50 mm and 60 mm finders use R50 rings. Our 80 mm finder will require the larger R80 rings. Below are various ring systems made for our optical finders. To mount these finders to the focuser of your telescope use the #R50DA/R80DA ring system. If you prefer to mount the finder to your mounting rings use the R50ET/R80ET ring system.

#R50AT/R80AT mounts to flat/curved surfaces

#R50ET/R80ET mounts to SV hinged mounting rings

#R50FA/R80FA for 2.5” to 3.5” Feather Touch focusers

#R50T/R80T mounts to most Takahashi’s

#R50DA/R80DA for SV dovetail shoes

#R50ST/R80ST mounts to most SCT’s

For more information on our finder scopes and rings visit http://www.stellarvue.com/finder.

Still not sure? call us at (530) 823-7796 or Email us at mail@stellarvue.com.

SOLAR VIEWING

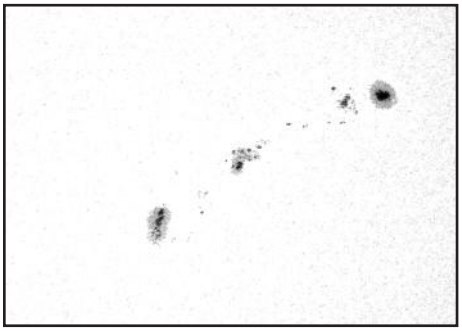
There are three basic, safe ways to look at the sun through this telescope.

1. Approved full aperture solar filter.
This filter is secured around the front of the dewshield and blocks 99.999 percent of light from entering the telescope.

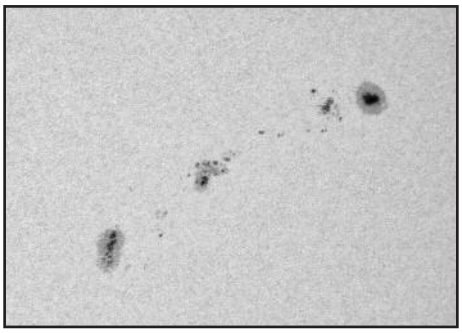
DO NOT use the old eyepiece solar filters that screw onto the eyepiece. These will be subjected to extreme heat and crack! For more information on solar filters visit:
http://www.stellarvue.com/solar-filters/

2. Hershel Wedge:
A good Hershel Wedge is used like a star diagonal. Insert it in the focuser and the eyepiece into it. These provide the most detailed white light view of the sun. They are significantly more expensive than simple glass or mylar full aperture filters but hard core solar observers swear by them as they show extremely fine detail in sunspots and faculae on our nearest star.

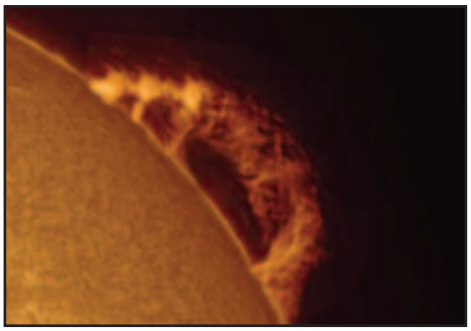
3. Daystar Chromosphere and Ha filters:
Observe prominences and surface (Chromosphere) details using a simple plug in device that fits between the 2" star diagonal and the eyepiece. Check with the manufacturer to ensure this is all you will need with the particular telescope you are using.



Sunspots seen through a full aperture solar filter



Sunspots and faculae seen through a Hershel Wedge



Solar prominence through a Chromosphere Filter

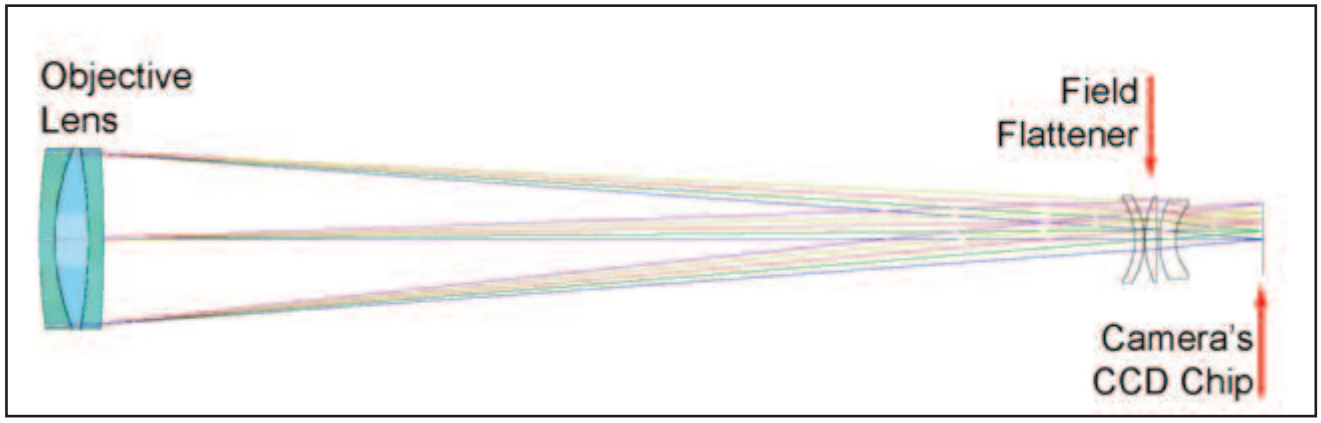
WARNING:

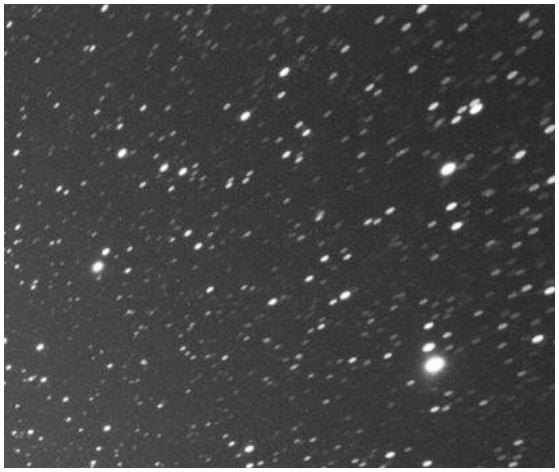
LOOKING AT THE SUN CAN CAUSE SERIOUS EYE INJURY AND BLINDNESS. NEVER POINT A TELESCOPE OR BINOCULARS AT OR NEAR THE SUN. VIEWING THE SUN WITHOUT A PROPER SOLAR FILTER MAY RESULT IN BLINDNESS, AS WELL AS DAMAGE TO THE INSTRUMENT.

NEVER ALLOW CHILDREN TO USE BINOCULARS OR TELESCOPES DURING THE DAYLIGHT HOURS, UNLESS THEY ARE SUPERVISED BY AN ADULT WHO UNDERSTANDS THE DANGER OF POINTING ANY OPTICAL INSTRUMENT IN THE GENERAL DIRECTION OF THE SUN.

ASTROPHOTOGRAPHY

While telescopes are designed to be used visually, they may be easily converted into a super photographic lens using one of our dedicated photographic correctors. You remove the eyepiece, star diagonal and 2” adapter from the focuser and you replace it with our field flattener and camera.





Without a corrector, stars will become elongated away from the center

With a properly spaced corrector stars will appear as they should

Left: The SFF3 field flattener will convert your telescope into a super 480 mm telephoto lens. The optical system shown to the left includes:

1. Your DSLR camera with the lens removed.

2. A 48 mm t-ring attached to the camera body.

3. The Field Flattener

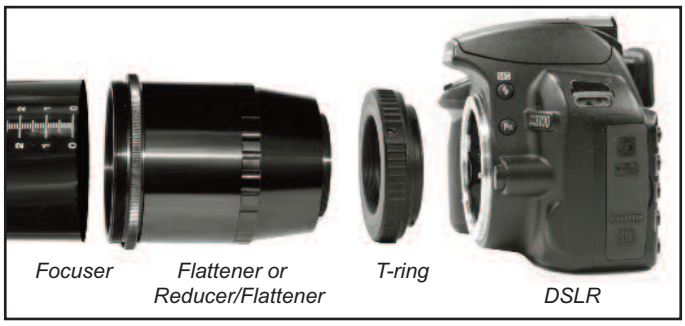
4. The focuser drawtube with the 2” adapter removed.

IMPORTANT: It is essential that corrector optics (field flattener or reducer/flattener) be placed at a precise distance from the ccd sensor in your camera. The CCD sensor in your camera is where the image is made. If the sensor is not the correct distance from the flattener, the stars around the edge of the field will be distorted. The first thing you need to know is the "backfocus" of the camera you will be using. The backfocus of the camera is the distance from the attachment thread on the camera to its ccd chip. In most DSLR cameras with the necessary t-ring added, this distance is 55mm.

Your field flattener or reducer/flattener also has a backfocus specification. Its backfocus is the distance from its rear of the flattener or reducer/flattener to where the field is precisely flat. It is important that the backfocus of your camera matches the backfocuser of the flattener or reducer/flattener.

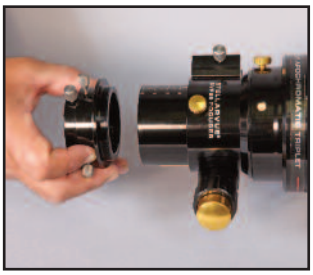
On ccd cameras this distance varies widely so you may need to add spacer rings and/or extension tubes. Also, it may be necessary to adjust-pacing by a millimeter or two to obtain optimal results.

With Single Lens Reflex Cameras (DSLR's) remove the lens and replace it with a t-ring that has the same size thread as the flattener. The backfocus must include the thickness of the t-ring that is attached to the camera in place of the camera's lens. When you add a t-ring to your Canon or Nikon DSLR, this distance from the thread on the t-ring to the ccd chip in the camera is about 55mm. Our flatteners may be ordered with a "55 mm backfocus." Use one of these if you are shooting with a DSLR. Attaching your DSLR camera to the telescope is easy.



STEP 1: Remove the camera lens

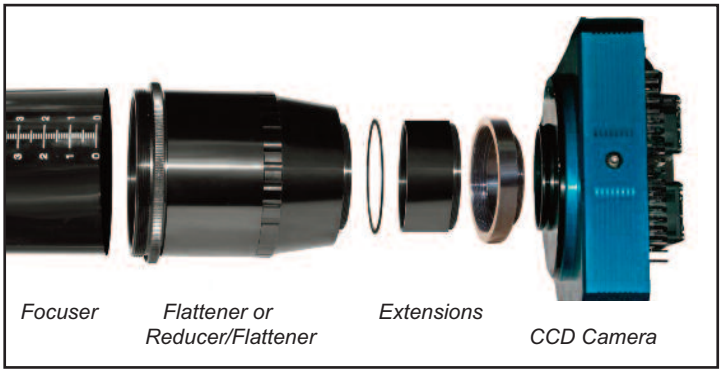
STEP 2: Install an oversized (48 mm) t-ring



STEP 3: Unthread the 2" adapter from the focuser drawtube

STEP 4: Thread the flattener to the drawtube & camera to flattener.

With other ccd cameras, the backfocus distances vary. Check with the maker of the camera to determine the backfocus of your camera. If the distance is less than 55 mm you will need to add extension tubes and/or spacer rings to make up the difference. For example, if your camera has a 35 mm backfocus you will need 20 mm of extension tubes to get the flattener 55 mm from the ccd chip in the camera.



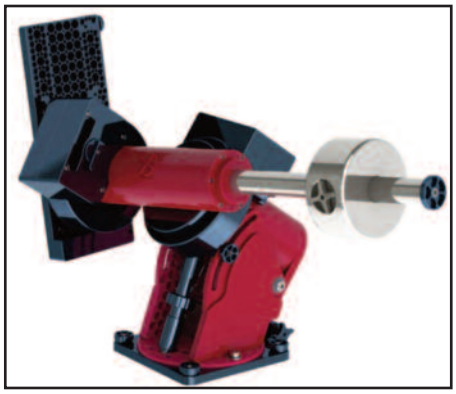
Stellarvue produces a variety of spacer rings and extension tubes. Visit our astro-photography accessory page on the web at:
http://www.stellarvue.com/astro-photography/

OTHER ITEMS YOU WILL NEED TO IMAGE

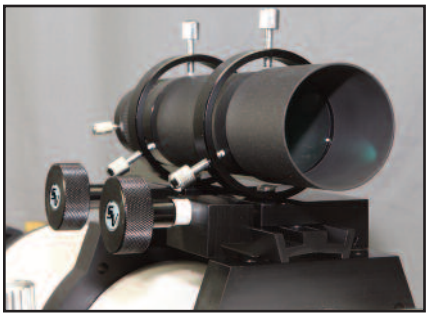
Now that you have your telescope, field flattener and camera connected you are ready to use it as a long range telephoto. For daytime shots all you need is a very steady tripod. For imaging the night sky you will need a few more things:

1. A sufficiently heavy equatorial mount with accurate dual axis drives.
2. A guide scope or off-axis guider.
3. A portable laptop computer to run the software.
4. Auto-guiding software.
5. Polar alignment.
6. Patience.

This is not as easy as the experts make it look. Astrophotographers have spent many many long hours perfecting their craft. For this reason we like to suggest that new telescope owners take a year to really enjoy using their instrument visually and learning the night sky.



Mount: We recommend the highest quality mount you can afford including mounts from Astro-Physics, Software Bisque (Paramounts) and Ten Micron. These mounts are expensive so if you need to spend a little less we highly recommend Losmandy mounts as a well constructed American-made alternative. Most customers want to spend less than $1000 on their mount and tripod. In this case, imported mounts are all they can afford. For these customers we recommend the Celestron VX for this telescope. The mounts we have listed above are not a complete list but we recommend them based on our experience in offering a variety of mounts over the past 20 years.



Guide Scope or Guider: It is necessary to guide the mount and correct for atmosphic effects and mount inaccuracies. A guide scope or off axis guider is connected to a laptop computer to accomplsih this. The guide scope will need a small guide camera hooked to it. Stellarvue offers our F050G guide scope that works well with this telescope: http://www.stellarvue.com/stellarvue-50-mm-photographic-f50-guide-scope-f050g/

Mount this guide scope securely to your telesscope using our guide rings as shown: http://www.stellarvue.com/r76lv-guidescope-rings/.

Once mounted you will need to attach a guide camera to the guidescope. The guide camera will plug into your laptop computer. Using information from the guide camera, it will make fine adjustments to the mounts tracking to keep objects centered. The guide camera shown to the right is only one of many available. CCD cameras are continually being updated by manufacturers. For our latest recommendation on a guide camera visit our website.

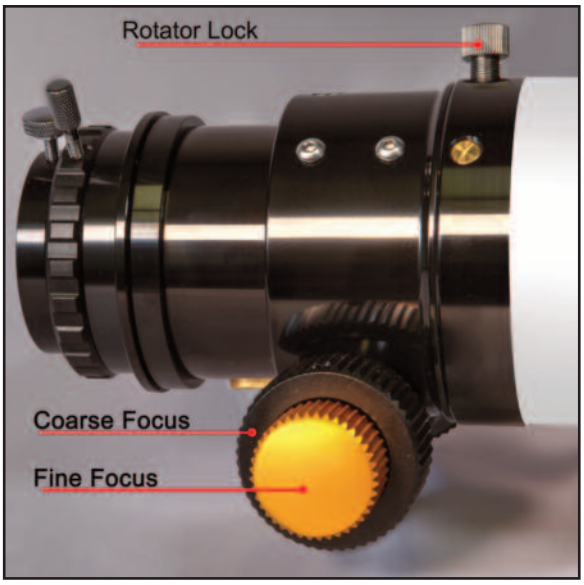
ZWO ASI-120

If you are using a ccd camera instead of a DSLR, you may prefer to use an off axis guider designed specifically for your camera. Generally, those who shoot with a ccd use a monochrome camera with filter wheel and the off axis guider is attached to this. This eliminates the need for a guide scope.

There is much more to learn when it comes to astrophotography. Fortunately, the internet has a vast amount of information that will help you as you embark on this new adventure. For more information visit http://www.stellarvue.com/new-to-astrophotography/.

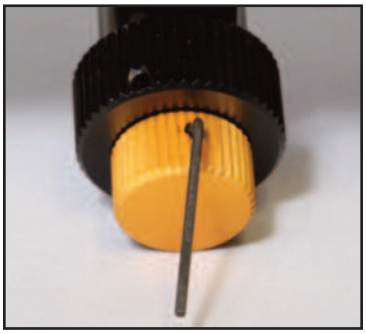
THE FOCUSER

Stellarvue focusers are oversized and designed to be accurate, very smooth and stable. They can lift more weight than is necessary, so heavier accessories may be used.



The focuser may be rotated 360 degrees so the user can put the focuser knobs in the most convenient position. To rotate the focuser loosen the rotator lock thumb screw slightly and rotate the focuser. Once it is positioned where you want it, lock the thumb screw.

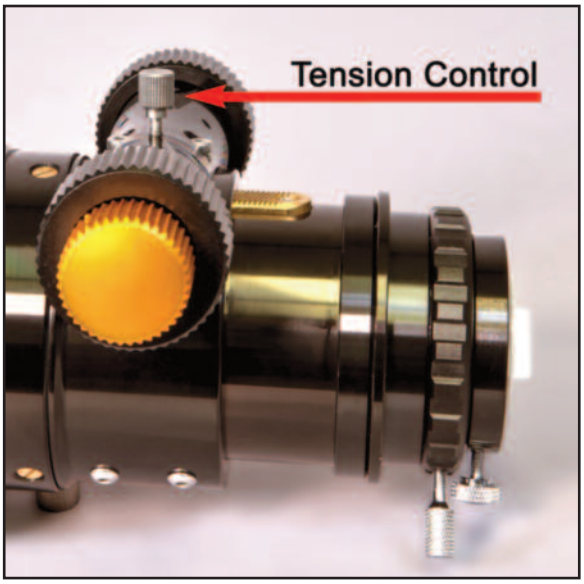
The coarse focus knobs on either side of the focuser move the drawtube in and out smoothly to attain focus. On one side there is a separate fine focus knob. This knob rotates 7 - 10 times with every single rotation of the coarse focus knobs. This permits extremely minute adjustments necessary to focus precisely at higher powers.



Focus Knobs**:** If there is a little play in the focusing knobs, use the supplied Allen wrench and tighten the set screw in the knob with play. This will fix the problem.

If the focus knobs make a noise when they are turned, they may be rubbing on one another or against the side housing. To eliminate this, loosen the knobs with the Allen wrench and pull them slightly apart from each other and the side housing. This will eliminate any rubbing.

Adjusting the Focuser: There is a tension control thumb screw under the focuser. Use this to adjust tension for your various accessories. Place your heaviest diagonal and eyepiece (or camera) in the focuser. If there is sideways movement when you focus or if the focuser drawtube slips, increase the tension by slightly tightening the Tension Control. Do not over-tighten, or the focuser will be harder to adjust.



Upper Tension Control: There is an upper tension control that applies additional pressure to the drawtube and makes it more stable especially when imaging with a heavy camera. Use a screwdriver to adjust this tension control if needed to stabilize the drawtube. Again, do not over-tighten and use this adjustment only when necessary.

CARE AND MAINTENANCE

Your telescope is a precision optical device that should be handled with care. Store it in a cool, dry place that is as dust free as possible. Do not drop the telescope, accidently strike a door frame or subject it to excessive vibration. When sitting on its mount on a hot day, cover it with a Telegizmos cover to keep it cool.

Bringing a telescope inside after observing in the cold night air can cause condensation to form on the lens and tube. Never put a telescope away wet. Let it air dry in a warm room before putting it away. Never store a telescope in a sealed case as this could lead to mold formation. The soft case we provide with our telescopes allows them to breathe while keeping dust at bay. Use the case your telescope came in for storage.

LENS CLEANING

- Lens cleaning should be done very infrequently. A small amount of dust or small spots on a lens will not affect performance. If dust accumulates on the lens, blow it off with a large bulb syringe like a “Rocket Blower.”
- If the lens needs cleaning, make sure you blow all the dust off the lens with the bulb syringe. **Never use canned air as it can damage the surface.**
- Use a 1” wide, fine camel hair brush to gently brush off dust when blowing with the syringe.
- Dust particles can be hard and scratch glass. So every bit of dust should be removed before you use a lens cloth.
- Once the lens is clear of any particles, use Stellarvue lens cleaner on a Kimwipe or optical cleaning cloth to clean the lens, followed by a dry wipe. **Never spray directly onto the lens as the liquid could migrate around the lens to the inside.** Apply a small amount to the cloth and gently wipe. Follow with a dry cloth to remove streaks.

The tube exterior can be cleaned with a lint free cloth and a commercial cleaner like “Fantastic.” As with any cleaner, follow the instructions on the container. The tube and dewshield may be waxed with a automotive wax designed for gel coat finishes. Do this very infrequently to avoid scatching the tube and clean off all wax debris when finished. You do not want to get any of it on the lens.

ADJUSTING THE RETRACTING DEW SHIELD

Your telescope comes with a retracting dew shield. Velvet is used to provide a smooth motion. After a while, the velvet may compress slightly and the dew shield may slip down when the telescope is pointed upward. In this case, you need to simply tighten the set screws located on the tapered ring behind the dew shield. Do not over-tighten these set screws. Turn them only 1/4 turn at a time and tighten it only enough to keep the dew shield from dropping down when the telescope is pointed upward.

STELLARVUE ®

LIMITED WARRANTY FOR U.S.A. END PURCHASERS ONLY

Stellarvue (SV) warrants that each SV brand telescope and accessory shall be free from defects in materials and workmanship for two years from the date of purchase. SV will repair or replace such product or part thereof, which upon inspection by SV is found defective in materials or workmanship. As a condition to the obligation of SV to repair or replace such product, the product must be returned to SV as specified in this warranty.

Register your new telescope online now. It's fast and easy:

http://www.stellarvue.com/warranty-registration/

THIS LIMITED WARRANTY, AND ANY IMPLIED WARRANTIES THAT MAY EXIST UNDER STATE LAW APPLY ONLY TO THE ORIGINAL PURCHASER AND LASTS ONLY AS LONG AS THE PURCHASER OWNS THE PRODUCT.

Return Requirements

· Proof of purchase acceptable to SV must accompany any return.
· A return authorization must be obtained from SV in advance of return.
E-mail Stellarvue at mail@stellarvue.com or call (530) 823-7796 to receive the authorization & packing instructions.
· The authorization code must be written on the outside of the container.
· All returns must be accompanied by a written note stating the model number of the product, authorization code, name, address, e-mail address and daytime telephone number of the owner, and an explanation of the problem. Replaced parts shall become the property of SV.
· The customer shall be responsible for all costs of transportation and insurance, both to and from SV.

SV Requirements

· SV shall use reasonable efforts to repair or replace any product covered by this limited warranty within thirty days of acceptance. If repair will take longer, SV shall notify the customer.
· SV may replace any product that has been discontinued with a new product of comparable value and function.

Products that have been damaged, dropped, disassembled, abused, misused, mishandled, subjected to temperature or weather extremes, subjected to wear or modified in any way will not be covered by this warranty. This includes but is not limited to such activities as replacing the focuser, disassembling the objective lens, etc. In these instances, this warranty shall be null and void.

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WARNING: LOOKING AT THE SUN CAN CAUSE SERIOUS EYE INJURY AND BLINDNESS. NEVER POINT A TELESCOPE AT OR NEAR THE SUN. VIEWING THE SUN WITHOUT A PROPER SOLAR FILTER MAY RESULT IN BLINDNESS, AS WELL AS DAMAGE TO THE INSTRUMENT. NEVER ALLOW CHILDREN TO USE BINOCULARS OR TELESCOPES DURING THE DAYLIGHT HOURS, UNLESS THEY ARE SUPERVISED BY AN ADULT WHO UNDERSTANDS THE DANGER OF POINTING ANY OPTICAL INSTRUMENT IN THE GENERAL DIRECTION OF THE SUN.