

Manual

LS40THa H-alpha Solar-Telescope

Telescope for solar observation in the H-Alpha wavelength. The H-alpha wavelength is the most impressive way to observe the sun, here prominences at the solar edge become visible, filaments and flares on the surface, and much more.

Included Contents:

- LS40THa telescope
- H-alpha unit with tilt-tuning
- Blocking-filter B500, B600, or B1200
- 1.25 inch Helical focuser
- Dovetail bar (GP level) for installing at astronomical mounts
- 1/4-20 tapped base (standard thread for photo-tripods) inside the dovetail for installing at photo-tripods
- Sol-searcher

Please note: Please keep the foam insert from the delivery box. The optionally available transport-case for the LS40THa (item number 0554010) is not supplied without such a foam insert, the original foam insert from the delivery box fits exactly into this transport-case.

Congratulations and thank you for purchasing the LS40THa telescope from Lunt Solar Systems! The easy handling makes this telescope ideal for starting H-Alpha solar observation. Due to its compact dimensions it is also a good travel telescope for the experienced solar observers.

Safety Information:

There are inherent dangers when looking at the Sun thru any instrument. Lunt Solar Systems has taken your safety very seriously in the design of our systems. With safety being the highest priority we ask that you read and understand the operation of your telescope or filter system prior to use. Never attempt to disassemble the telescope! Do not use your system if it is in some way compromised due to mishandling or damage. Please contact our customer service with any questions or concerns regarding the safe use of your instrument.

Never look at the Sun with your naked eye or with a telescope that is not specifically designed to do so. Permanent and irreversible eye damage may result!

Never leave the solar telescope unsupervised while pointed at the Sun. People who are not familiar with the correct operating procedures of the system may inadvertently remove the diagonal or remove the filter itself not being aware of the integrated safety features of each.

The Lunt Solar Systems telescopes are not interchangeable with competitor products.

A Lunt Solar Systems solar telescope houses many optical elements that are all pre-aligned and fixed at the factory. There are no user serviceable parts inside the scope. The telescope should never be taken apart. This will not only void your warranty leading to costly repairs, it can only serve to further damage the instrument and compromise its safety.

Most Lunt Solar Systems filters and telescopes house a delicate optical element referred to as an Etalon. These Etalons are suspended in the system housing in an effort to both protect it and isolate it from outside influences, which could de-tune the Etalon filter. Extensive research has been done to assure the best performance of what is essentially the "heart" of the system while protecting it from the day-to-day bumps, jarring, and vibrations of normal use. However, the instrument should never be subjected to shock due to being dropped. Mishandling of the filters system will cause the Etalon to de-contact (not covered under warranty) and will render the instrument useless until repaired.

The instrument should be stored in its original box, or in the optionally available transport case item number 0554010. As with any precision optical instrument it should be kept in as low a humidity area as possible. With proper handling and care the filter should last a lifetime.

Okay let's get started...

Safety First!

- Always check any telescope before use for solar observing. Do not use any telescope or filter that appears to be damaged. Verify that all glass and filters are in place.
- The Blocking Filter diagonal must always be used with the LUNT telescope or filter for solar observing.

Install the LS40THa telescope on a astronomical mount or on a photo tripod.

Pull the blocking-filter diagonal out of the focuser by about 15mm and then tighten the clamping screw on the side of the focuser.



First use an eyepiece with around 25mm focal length to have the largest possible field of view. Point the telescope at the sun by using the sol-searcher. There is a small hole in the front of the sol-searcher, which projects the sun onto the back of the white ground. When the sun is visible in the center of the white ground, look through the eyepiece. Do you see a fuzzy round red ball? If not, make sure you have removed the dust cap from the front of the telescope. After some trial and error the Sun should appear in the eyepiece.

Focus: It is amazing how many people walk up to a solar telescope and take a quick look thru without ever focusing. Course focus is achieved by moving the diagonal drawtube in and out. Fine focus is achieved by the Helical focuser. Focus so that the edge of the Sun is as sharp as possible.

Tuning: On the filter housing installed at the telescope front, there is a small wheel, half embedded in the tube. Move the wheel all the way to the left, do not move it too much against the stop! While looking through the telescope, slowly turn the wheel to the right. After a few turns, you should see prominences at the edge of the sun, and structures will also become visible on the surface. If the wheel is turned too far, the prominences and other structures disappear again. Turn the wheel back again in the other direction until the prominences are at their most contrasting. When the most detail is visible, you have tuned the system to the H-Alpha wavelength of 656.28nm. Once set (tuned), you do not need to change the setting during observation.

The Etalon of the LS40THa is tilted rather quickly as you turn the wheel. Therefore, turn this wheel very slowly to avoid missing the optimal tuning point.



Re-Focus: When you feel you have tuned effectively, re-focus the telescope. The finer details should come into view. Try to relax the eye while observing and let the details come to you.

Change the eyepiece: When you have a good feel for observing at lower magnifications try to increase the magnifications in small steps. Place an interesting artifact in the center of the field, for example a prominence. Replace the 25mm with a 8 - 12mm eyepiece. Look thru the eyepiece and re-focus carefully. The image has dimmed slightly due to higher magnification but the details should be easier to see. You can push the magnification as seeing conditions allow.

Seeing conditions: Please note that seeing conditions can affect the performance of your telescope in H-alpha wavelength. Cloud cover, wind, humidity, and air turbulence caused by heat play a major role and can complicate the observation of details.

Photography:

The LS40THa telescopes are primarily designed for visual observation of the Sun. However, photography is also possible. Because the back focus is very small, we recommend special astro cameras for this, which have a very short distance to the sensor, such as the BRESSER Full HD camera item number 4959050. For DSLR cameras, the black sleeve with the eyepiece connection must be unscrewed from the zenith mirror / blocking filter. Below this is a T2 thread, to which cameras can be attached with a matching T2 ring. But even then, we cannot guarantee that you can get into focus with every DSLR camera.



Recommended accessories:

- LUNT Zoom-Eyepiece 7,2mm to 21,5mm - item number 0554501
- LUNT Transport case for LS40THa - item number 0554010
- LUNT Solar hat with neck flap - item number 0554900



If the telescope also should be used at very cold temperatures in winter, we recommend the LUNT heating module for blocking filters - item number 0554630



Cleaning

As with most telescopes and equipment there will be a build up of dust and debris on the lens and mechanical components after sitting out all day. For those who are familiar with cleaning telescopes we recommend you use the same techniques. For those who are new to the care of these instruments we can offer the following guidelines:

Blow off loose dust and dirt using a clean dry air source at low volume. Do not use shop compressed air, which contains oil and will further contaminate the instrument. Stubborn particulates can be brushed from the surface with a static free lens brush. Use gentle sweeping motions. Fingerprints and smudges can be removed using lens tissue or a Kleenex type tissue product. Fold the tissue or cloth to make a "pad", apply a cleaning product to the end of the pad dampening it evenly (do not apply solution to the lens), wipe in circular motion starting at the center and working around the edge and off in one complete motion. Be firm, but do not rub. Blow lightly to help remove residual solution before it "spots" the surface. Residual dust from the cloth can be blown off.

Consult your local dealer or call Lunt Solar Systems with any questions or concerns.

Do not use Acetone or strong degreaser type products, household cleaning agents, paper towels, tissues with added scent or color (plain tissues only), or bleach or acidic products which will damage the anodized surfaces.

What can be observed on the sun in H-alpha?

The Sun is active on a daily basis. During solar maximum the Sun will put on awe inspiring displays that include x-class flares, prominences, surface filaments, etc...

Prominences: These look like eruptions from the disk (edge) of the Sun. Prominences can be small spiky looking details, or large cloud like detail with fine feather like internal features. They are, in fact, ionized hydrogen emissions being projected from the limb. Prominences are anchored to the Sun's surface in the mesosphere, and extend outwards into the Sun's troposphere.

Filaments: These are string like features on the surface of the Sun. At high resolution they take on a 3D effect due to the cooler aspect of the filament contrasted against the bright, hotter, Sun. They are actually prominences being viewed against the surface.

Spicules: A spicule is a dynamic jet of about 500km diameter on the Sun. It moves upwards at about 20 km/s from the photosphere. Father Angelo Secchi of the Vatican Observatory in Rome discovered them in 1877. The chromosphere is entirely composed of spicules. These features can be seen as "fur" around the edge of the disk.

Plage: This is a bright region in the chromosphere of the Sun, typically found in regions of the chromosphere near sunspots. The plage regions map closely to the faculae in the photosphere below, but the latter have much smaller spatial scales. Faculae have a strong influence on the solar constant, and the more readily detectable because chromospheric plage areas traditionally are used to monitor this influence.

Solar Flares: A solar flare is a violent explosion in the Sun's atmosphere. Solar flares take place in the solar corona and chromospheres, heating plasma to tens of millions of Kelvin and accelerating electron, protons, and heavier ions to near the speed of light. They produce electromagnetic radiation across the electromagnetic spectrum at all wavelengths from long-wave radio to the shortest wavelength gamma rays. Most flares occur in active regions around sunspots, where intense magnetic fields emerge from the Sun's surface into the corona. Flares are powered by the sudden (timescales of minutes to tens of minutes) release of magnetic energy stored in the corona.

Chromosphere: The chromosphere is a thin layer of the Sun's atmosphere just above the photosphere, roughly 10,000 kilometers deep (approximating to, if a little less than, the diameter of the Earth). The chromosphere is more visually transparent than the photosphere. The name comes from the fact that it has a reddish color, as the visual spectrum of the chromosphere is dominated by the deep red H-alpha spectral line of hydrogen.

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