

## **Manual**

### **LS50TH $\alpha$ Telescope with Pressure Tuner**

Congratulations and thank you on your purchase of a Lunt Solar Systems solar telescope! The Lunt Solar Systems are a new generation of solar viewing instruments utilizing the most current technologies to provide the highest quality contrast and resolution in their class.

#### **Warning**

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 system. 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!**

**The Lunt Solar filter/telescopes are not interchangeable with competitor products.**

#### **Handling**

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 case. 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.

#### **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.

## **The LS50TH $\alpha$ Telescope with Pressure Tuner**

Complete Solar Telescope with 50mm aperture. An internal etalon with new air-pressure tuning adjustment allows for a <0.75 Angstrom bandwidth. The "Pressure Tuner" system adapted the Etalon to varying altitudes and atmospheric pressures for always optimal performance. Blocking filter is the B400 or the B600. The star diagonal in which the blocking filter is installed, is equipped as standard for 1.25" eyepieces. Fine adjustment is achieved with a non-rotating Helical focuser.

### **What is delivered with the system?**

- H-alpha telescope with 50mm aperture
- Internal Etalon with Pressure Tuner
- Blocking filter B400 or B600
- non-rotating Helical focuser
- Tube ring with 1/4"-20 connection for photo tripods
- Instruction manual

### **What accessories are recommended?**

- **Eyepieces:** Simple eyepieces with narrow field of view are recommended. (25mm thru 8mm)
- **Sol Searcher:** This attaches to the clamshell assembly and makes finding the Sun much easier.
- **Dovetail plate:** For using the scope on astronomical mounts.

## **Setting up for the first time**

### **Note:**

- Please check before the telescope is removed from the transport box that the locking of the blocking filter is applied. Maybe it can happen elsewhere, that when removing the telescope the block filter slip out of the focuser and fall off.

### **Safety First!**

- **Always check any telescope before use. Do not use any telescope or filter that appears to be damaged.**
- **The Blocking Filter diagonal must always be used with the Lunt telescope.**

Attach the telescope and clamshell to your mount of choice. There is a 1/4-20 threaded hole on the underside of the clamshell. Attach the scope directly to a photographic tripod or attach a Vixen-style or Losmandy-style dovetail plate (whichever your mount requires) to the clamshell.

Slide the Blocking Filter into the focuser and lock it down with the thumb screw. Insert a low power eyepiece into the blocking filter. A 25 mm eyepiece is a good choice for a large field of view.

Point the telescope to the Sun. You can use the shadow of the front lens cell cast by the Sun onto the clamshell of your telescope. Center the shadow and you should be pretty close. Never attempt to use a conventional finder scope to locate the Sun! Look through the eyepiece. Do you see a fuzzy red ball? If not, make sure you have removed the dust cap from the front and check your alignment to the Sun. If the Sun is still not in the field of view of your eyepiece, move the telescope around a little while you are looking through it. Be patient, you will find it! Once you do, center the Sun and, if you have one, adjust the Sol-Searcher so that it is correctly aligned to your scope.

Now it's time to focus. Your goal is to get the edge of the Sun as sharp as possible. Focus is achieved using the helical style eyepiece focuser.

Tuning: Here is where the magic begins. On the side of the scope is a large black cylinder on a brass barrel. This cylinder is the Pressure Tuning system for the LS50TH $\alpha$ PT. The black handle of the cylinder has a short start-thread attaching it to the brass cylinder. Unscrew the black handle completely. There may be some resistance and a faint "popping" sound. That's normal when adjusting pressure for your altitude. Carefully install the handle onto the cylinder, engaging the threads about one turn. While looking through the eyepiece, gently turn the black handle clockwise onto the cylinder. There will be little resistance at first, but as the pressure in the

cylinder builds, the resistance increases slightly. As you turn the cylinder, centering the 656.28 nm wavelength on- band, you should see features come into view. Continued tuning will result in the wavelength shifting past 656.28 nm, and details will begin to disappear. Fine-tune for the best images.

When you feel you have tuned effectively, refocus the telescope. Try to relax your eye while observing and let the details come to you. Once you are comfortable observing with a lower power eyepiece, try a 12 mm or other higher power eyepiece. On days of good seeing, you can push the magnification higher than on days of poor seeing. Remember, if you cannot achieve sharp focus, use a lower power eyepiece.

A few details regarding the pressure tune system. The amount of pressure being supplied to the etalon cavity is minimal. It is the equivalent of going from -150m below sea level to about 3,000m. Or around 0.1 Bar, there is no risk of explosion. We are dealing with only a fraction of 1 atmosphere. When not in use we recommend that you release the pressure by simply backing off the black handle from the cylinder body. If the system unthreads completely, simply thread it back on 1 turn. It is not necessary to re-set the system every time it is used. Re-setting may only be required if the system has been sitting for a long period of time.

### **A few more definitions**

**Hydrogen-alpha:** The wavelength of light in the spectrum that these scopes allow you to look at. Centered at 656.28nm.

**Bandwidth:** The width of light at a given wavelength that is allowed to pass. The LS50THa with Pressure Tuner is <0.75 Angstrom. As bandwidth is reduced more surface detail of the Sun can be resolved. This can be accomplished thru double-stacking with an LS50C Filter (<0.5 Angstrom).

**Angstrom:** The unit of measurement for light. 1 Angstrom = 0.1nm.

**Etalon:** A resonating cavity produced thru the fabrication of highly precise optical surfaces.

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