V3 Instruction Manual:

WARNING: NEVER POINT A TELESCOPE AT THE SUN WITHOUT A PROFESSIONAL SOLAR FILTER OR HERSHEL WEDGE IN PLACE. PERMANENT INSTANT EYE DAMAGE WILL RESULT!

READ THESE INSTRUCTIONS BEFORE USING THIS PRODUCT! This is not a toy. These instructions must be read and understood completely before using the product. NEVER allow children or inexperienced adults to observe the sun with a telescope and wedge or filter without the supervision of a knowledgeable adult. NEVER remove a solar filter or wedge without first placing the front lens cap on the telescope. ALWAYS securely fasten Solar Wedge securely to the telescope. ALWAYS remove any optical finder containing lenses from the telescope before pointing it at the sun because you, or someone else may look through it by mistake. Use the safe Altair Solar Finder Code: SOLARFINDER. DO NOT use this product with a Schmidt Cassegrain (SCT), Newtonian, Maksutov or any other telescope containing mirrors. NEVER add any kind of filter (like solar continuum filter or ND moon filter) BEFORE the Solar Wedge, as it may crack. NEVER add any kind of Barlow lens BEFORE the Solar Wedge, as it may crack. MAKE CERTAIN there are no filters, Barlow lenses, field flatteners or focal reducers in the space between Solar Wedge and telescope lens.

Introduction: The Altair Solar Wedge (Herschel Wedge) replaces the 2" star diagonal at the rear of your refractor telescope. The Solar Wedge transmits a greatly reduced, safe amount of light to the eyepiece or camera. This makes it safe for visual use with an eyepiece, or astrophotography with a high speed CMOS camera like Altair GPCAM or Hypercam. Solar wedges give higher-contrast images than front-mounted metallized solar film filters or glass solar filters, because there are no reflections between the filter and front telescope lens. The Altair Imaging-Ready Solar Wedge directs energy into a special extra thick Polycrystalline Ceramic diffuser disc at the back of the Wedge. The diffuser disc has the added benefit of acting like a "solar finder". The sun appears as a "ball of light" on the disc. Move your telescope until the ball of light is in the centre to align the telescope with the sun. It is important to familiarise yourself with the parts before use.

Fig. 1 PARTS DIAGRAM:

Fig. 2 CONTROLS FOR OPERATION:

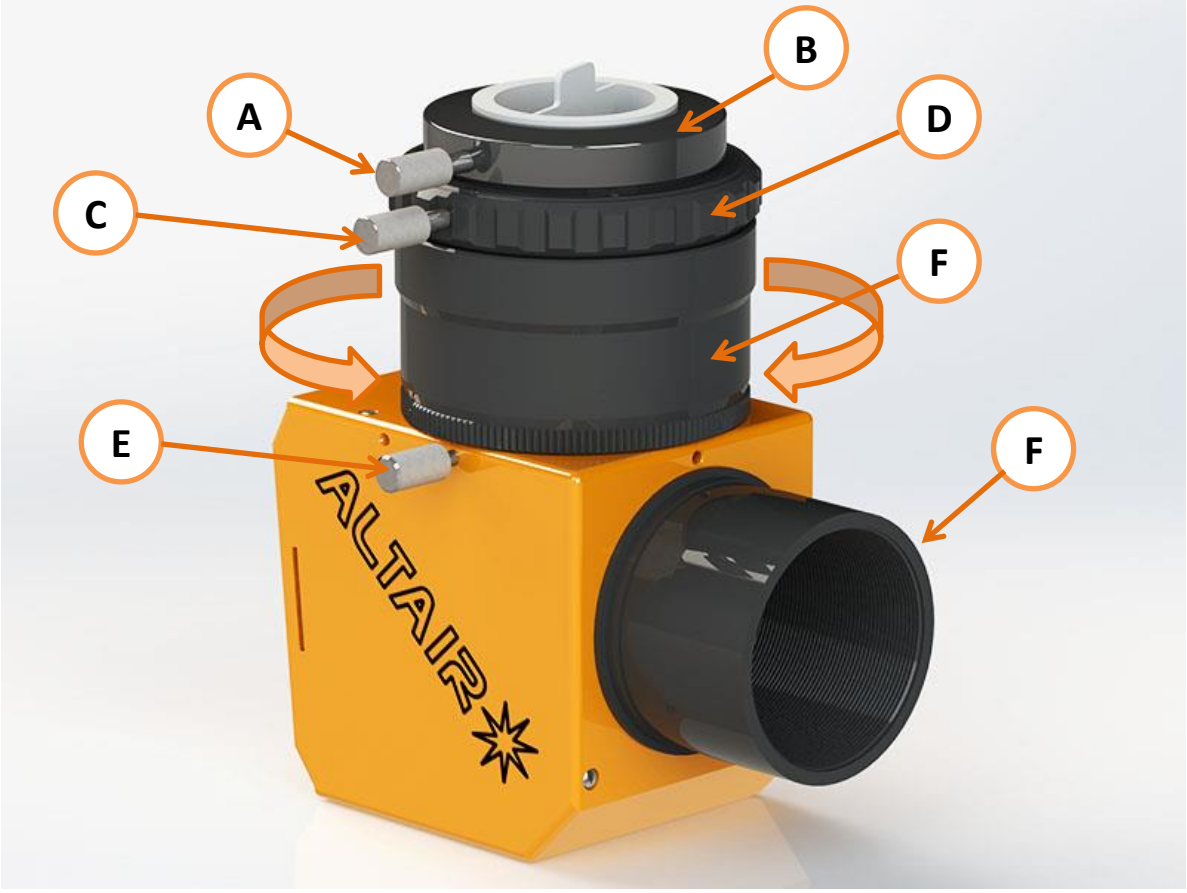
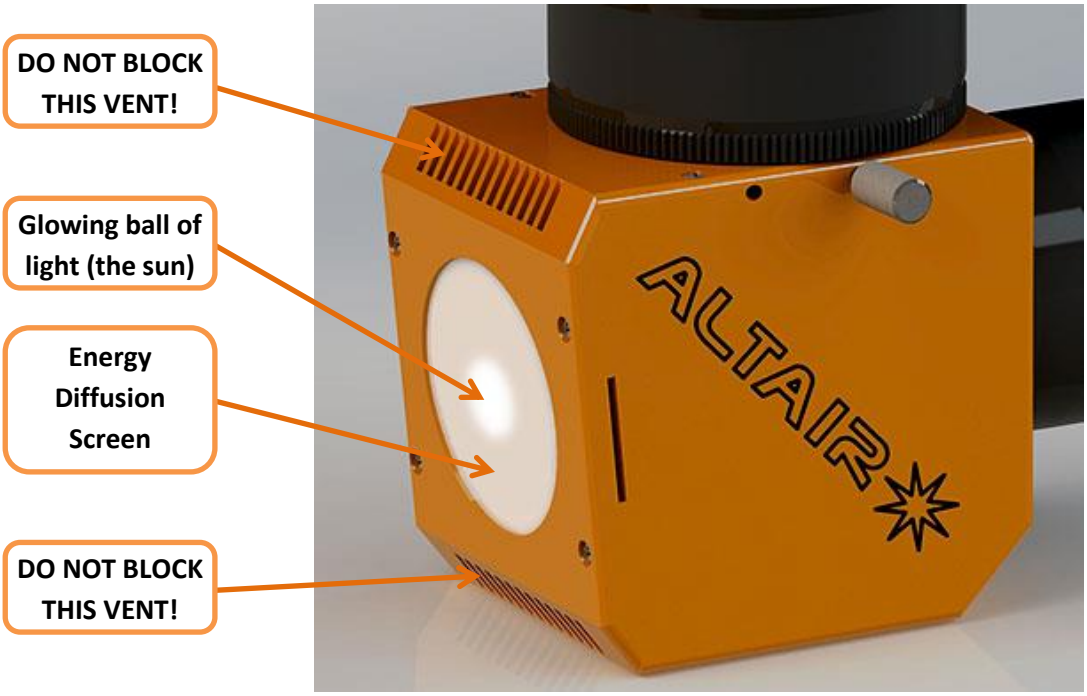


Fig. 3 THE REAR ENERGY DIFFUSER:



SAFE SETUP PROCEDURE:

1. With the front objective lens caps still in place. Remove the finder scope from the telescope and replace it with a safe **non-optical solar finder**, such as the Altair Solar Finder. (Code: SOLARFINDER)
2. The thumbscrews are kept in a separate bag for shipping. Screw the **smallest thumbscrew (E)** into the hole in the side of the casing. Leave it a little loose. Insert the other **two larger thumbscrews (A & C)** as shown in **Fig. 2.**

3. Fully insert the Solar Wedge in place of your existing 2" diagonal mirror on your refractor telescope and fasten it securely.
4. If you have a 1.25" barrel eyepiece you insert this into the **1.25"-2" eyepiece adapter (B)** on the back of the Solar Wedge and tighten the little **thumbscrew (A)** to secure the eyepiece. If you have a 2" eyepiece, untighten the Positive Lock adapter by turning the knurled ring and remove the 1.25" eyepiece. You can now insert a 2" eyepiece into the socket and re-tighten the Positive Lock adapter. The Positive Lock Adapter has a **thumbscrew (C)** to lock it in position. This is useful for public viewing, making it more difficult to remove the eyepiece. It is not necessary to tighten this thumbscrew to retain the accessory and experienced observers often remove the thumbscrew and keep it aside.
5. Point the telescope at the sun until it's centred in the external solar-finder. **DO NOT REMOVE THE TELESCOPE FRONT LENS CAP, UNTIL THE SUN IS CENTRED IN THE SOLAR FINDER, ELSE DAMAGE TO YOUR TELESCOPE MAY OCCUR.**
6. Now the telescope is roughly aligned to the sun. Remove the front lens cap from the telescope. A glowing ball of light **(See Fig. 3 above)** should appear on the translucent **Energy Diffusion Screen** on the rear of the Altair Solar Wedge. Move the telescope slightly so the glowing ball of light is in the centre of the disc.
7. Approach the telescope, and look into the eyepiece. Some prefer to hold a paper in front of the eyepiece to check, because it can be uncomfortably bright like a light bulb. (You can also use a Neutral Density filter held in front of the eyepiece by hand or sunglasses). If the image appears too bright, loosen the side locking thumbscrew and rotate the **Brightness Adjustment Turret Top (F)** until it's dimmer. **Fasten the turret top locking screw (E)** in this position. Low power eyepieces require more light, and high power eyepieces require more light.
8. Barlow lenses and additional filters such as the Altair Solar Contrast Booster, G-Band and Cak filters make the image dimmer, so require additional brightness. **Note: Always place a Barlow lens or filters behind the Herschel Wedge, NOT in front of it because they can overheat and melt or crack.**

Q: What telescopes can I use with a Solar Herschel Wedge? A: Only refracting telescopes up to 6" (152mm) aperture can be used with the Altair Herschel Solar Wedge. Refracting telescopes have a front objective lens, and rear eyepiece. They do not have any mirrors. **It is dangerous to use ANY telescope with mirrors with a Herschel Solar Wedge due to the risk of fire and excessive heat from reflections within the tube.** This includes Maksutov Cassegrains, Schmidt Cassegrains, Newtonians and Ritchey Chretiens, amongst others. If in doubt, contact Altair Astro or your authorized dealer.

Q: Will the Altair Solar Wedge come to focus with my refractor telescope? The Altair Solar Wedge has an optical path length (also known as "backfocus" of 115mm from the front telescope facing side (excluding the 2" barrel) to the top of the 2" turret where the eyepiece or camera is inserted. This is similar to most 2" mirror diagonals and shorter than most other solar wedges to maximise compatibility.

Q: Can I use coloured filters with the Altair Solar Wedge? A: Yes you can but **only if added AFTER the wedge. NEVER add ANY filter in front of a Solar Wedge**, because it will crack or melt due to the concentrated heat from the sun, damaging the inside of your telescope.

Q: How do I "tune" the image brightness for imaging? A: When imaging the sun using "lucky" imaging techniques with a high frame rate cameras such as the Altair CMOS cameras, it's best to keep the exposure duration of the camera as short as possible - ideally less them 10 milliseconds, and less than 5ms is even better. This "freezes" air motion to capture granulation and other small details. Being designed for visual or imaging use, the internal polariser module (controlled by rotating the turret top) has a wider brightness range than normal Hershel wedges allowing fast frame rates and short exposure duration. When set for fast frame rates, the image can appear very bright visually through an eyepiece - like looking at a light bulb. This is uncomfortable, but not dangerous due to the protective ND filter inside the unit allowing a fraction of the sun's light through. It is best to start viewing and imaging by rotating the turret-top until the image is quite dim, gradually increasing brightness. Once you are satisfied with the balance of contrast, lock the polariser locking thumbscrew, and you are ready to observe. When using the Solar Wedge for imaging, you can just insert the camera and turn the turret-top until you achieve the shorted exposure time.

Q: For how long can you keep the wedge aimed at the sun? The Altair Solar Wedge has been fully tested with the sun remaining in the centre of the field of view for 4 hours of continual use centred on the sun with a 175mm aperture refractor telescope in mid-summer from 11:00 – 14:00, cloudless sky. At no point did the outer prism housing become too hot to touch, a problem common with solar wedges. Whilst we cannot recommend use with telescopes of larger than 175mm aperture for longer or shorter duration, if your telescope is larger, then we suggest trying the wedge for a short time initially, to assess the heat build-up and make your own informed decision.

Q: Can I place accessories like the Altair Solar Contrast Booster / Continuum filter, Altair G-Band Filter, or others, reducer, flattener, or Barlow lens in front of the Solar Wedge? NO you cannot because the concentrated light close to the wedge may cause the glass in these accessories to crack, paint to burn, or metal to melt. **ALWAYS** put accessories like filters, reducing lenses, flatteners, binoviewers, or Barlow lenses BEHIND the solar wedge, which is safest, and gives better performance.

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