

DayStar Filter Owner,

Congratulations on your new DayStar Filter Quantum Upgrade. Welcome to a new world in control and precision in solar observing. We want to be sure to explain a few features of the new Quantum so you can use it to its highest capacity.

- Your DayStar filter's optical configuration is the same.
- Your DayStar filter will mount the same as it did before.
- Your DayStar filter will require the same ERF and F/30 configurations that it did before.
- Your DayStar Filter no longer requires 110vac as its only power option. It operates on 12VDC, so you can plug it in with the included 100-240VAC converter, or directly to 12VDC cigarette lighter or alligator clip plug with a standard 2.1mm x 5.5mm connector. The heater can operate using 10-30VDC.
- You will see that the filter shows you a startup message with the bandpass and PE/SE quality of the optics.
- The filter displays a readout of the wavelength *currently* being transmitted by the filter. The central emission line of Hydrogen Alpha is 6562.8Å. When your filter is first plugged in, it should read a wavelength below Ha. As it heats up, it will reach the 6562.8 and stop. In order to see the target wavelength, press the red or blue buttons. Another number will appear, blinking. This is the TARGET wavelength. It will return to the current wavelength readout after you release the button.
- Once the target wavelength is reached, the unit will wait approximately 8 minutes before the yellow light turns green. This allows the heat to radiate completely through the optics to assure you are ON the target wavelength indicated.
- To change the desired target wavelength, press the RED (up) button or BLUE (down) button until the flashing number changes to your desired target wavelength. The Quantum can only travel 1.0Å above or below 6562.8Å. Each time the target wavelength is changed, the filter will restart the 8 minute delay and the light will turn yellow again.
- It is possible that on a hot day, your filter may never cool down enough to travel 1.0Å below Halpha. If this happens, your readout will not lower to the desired target wavelength and naturally the light will stay yellow. This doesn't alter the operation of your DayStar. Your ambient temperature is just too high to shift this far below Halpha.
- For SCT owners who apply their ERF off-axis, orientation of the Quantum will be: ERF Hole down/ LCD up.
- There are no user serviceable parts inside the Quantum electronics or DayStar optical assemblies. Please do not open a DayStar for any reason. If you have problems or require service, please contact us at: 660-747-2100
- The Quantum upgrade for your DayStar is warranted for 10 years from the date of shipment of the filter. Please keep your warranty, operating instructions and/or manual with the filter for future reference.

Yours,

Jen Dudley Winter - Owner  
DayStar Filters LLC



- Desired Wavelength for **Halpha**: **6562.8Å**
- Readout = **CURRENT** wavelength
- Red = Up in temperature, Up in wavelength
- Blue = Down in temperature, Down in wavelength
- Yellow light = ON, but **not on** target wavelength at this time.

#### OPERATING PROCEDURE:

- 1: Plug unit in.  
Light is yellow. Readout will be lower than 6562.8  
Startup message reports bandpass and SE or PE  
As Quantum heats up, readout will go up.  
Readout will reach 6562.8 target.
- 2: Once Target wavelength is reached, 8 minute delay starts.  
After approximately 8 minutes, light turns green.  
Temperature has now settled inside glass.
- 3: To wing shift, press red or blue button.  
Readout will blink new target wavelength.  
Light will turn yellow.  
Readout will move to new target wavelength  
Light turns green after 8 minutes at target wavelength.



#### NOTES:

- DayStar Filter will not operate onband at temperature above that listed on the manufacturers' serial number label. This temperature is designed to be above ambient room temperature. Using the filter in temperatures above 100° F can cause your filter to exceed it's desired operating temperature.
- Also, full 1Å wing shift in blue wing is only possible if ambient temperature is more than 17°F below the noted temperature of the filter. The filter must cool 17°F in order to drop 1Å in blue wing shift.
- **A button lockout** feature is included. Hold down both red and blue buttons while plugging in the cord to lock out red/blue wing controls. This feature is designed for public demonstration purposes. To unlock the buttons, unplug the filter and plug it back in while holding down both buttons.
- Filter may be warm to the touch. Exposure to the Sun can also make metal very hot to the touch. Use caution when handling hot metal, including your telescope and Daystar filter.
- Install mounted **GOLD** side towards Sun, **RED** side towards the eye on telescope operating at F/27-F/40 (preferably F/30) with an appropriate ERF (Energy Rejection Filter). Operating the filter at focal ratios less than F/30 will result in increased bandpass, *i.e.* 0.5Å will become 0.8Å bandpass if operated on "faster" configurations.
- SCT owners must use the 1.9° wedge plate mounted on the GOLD side of the filter. Refractor owners must use a flat plate mounted on the gold side of the filter. Use of the wrong plate will result in off-band transmission. Orientation of the Daystar Quantum will be: ERF off-axis hole positioned DOWN / Quantum LCD readout facing UP.
- Use caution with your solar telescope, taking precautions when pointing the telescope without the DayStar Filter in-place to avoid looking at the sun without the DayStar Filter installed properly.  
**Do not leave the solar telescope unattended** in a public place where users might remove the DayStar Filter.
- A risk of electrical shock exists for exposure of DayStar Filters electrical components to water or if opened.
- The Quantum housing has **NO USER SERVICABLE PARTS**. Please do not open the optical or electronic housings of the DayStar Filter Quantum. Doing so could result in damage to your filter, which would not be covered under the Daystar warranty.
- Keep the DayStar Filter in a cool, dry, climate controlled environment while not in use to extend the life of your optical elements. Users in hot, humid environments should store the filter in an air conditioned space and/or a sealed case. Desiccant is recommended.



## DayStar Filters Quantum Electronic Specifications:

- Status indicator with wavelength readout and bandpass control buttons with  $\pm 1.0 \text{ \AA}$  offset capability.
- Red/yellow/green LED status light, 3mm diameter.
  - Green = normal operation, filter on band.
  - Yellow = filter warming up, please wait.
  - Red = fault, low battery or high voltage.
- Rated supply voltage input: 10-30V DC with 5.5x2.1mm jack., typical 10W at 12V.
- Fully operational with reverse polarity. Maximum 2.5 amp heater power consumption.
- Overvoltage, overcurrent and overtemperature protection
- AC wall adapter/cord included: Worldwide 100-240V AC, 50-60Hz, 18W, 6 foot cord, with supplied ungrounded user-interchangeable US, Euro, UK, and Australian plugs.
- Power options: AC adapter, alligator clips (not included), cigarette lighter cord (not included)
- Operational with European 24VDC automotive cigarette lighter.
- Temperature regulation:  $\pm 0.5^\circ\text{C}$  ( $\pm 0.05\text{\AA}$ )
- Temperature control method: PID (Proportional / Integral / Derivative).
- Operating temperature range:  $0^\circ\text{C}$  to  $+40^\circ\text{C}$ , 20-80% humidity non-condensing (\*For on-band operation, temperature should not to exceed optimum temperature noted on manufacturer's label.)
- Standard Heater is NOT certified for use in vacuum, and is NOT radiation hardened.
- RoHS compliant, lead free electronics. EPA Energy Star.
- RS232 computer interface for future filter status and offset control programming.
- Faint whining noise changing in pitch/volume is normal

### Error Codes:

**DEADB** = Dead battery, voltage < 8VDC

**LOBAT** = Low battery, voltage < 10VDC

**HIGHV** = High Voltage; voltage > 30VDC

**OPENT** = Internal wiring fault – please return to DayStar laboratory for repair.

**SHORT** = Internal wiring fault – please return to DayStar laboratory for repair.

## DayStar Filters Optical Specifications

- Clear and usable aperture: 32 mm. (1.25").
- Bandwidth measurement: 19 mm. (0.75") central aperture.
- Fully blocked transmittance: 4%-8% of polarized light. Lower values correspond to narrower bandwidth filters.
- Off-band rejection: Average optical density greater than 6.0 from X-ray to beyond 2.0 microns.
- Optical components: BK-7 grade A, fine annealed 60-40 scratch-dig. Each optical element other than the etalon has a maximum wave front distortion of  $1/4\lambda$  @  $5461\text{\AA}$  Hg.
- Air-glass interfaces are anti-reflection coated in the filtering assemblies.

### Dimensions:

Diameter: 76 mm. (3.00") Length: 43 mm. (1.70") Length with filter mounting plates: 56 mm. (2.20")

Weight: Approx. 0.453 Kg. (1.00 lb.).

### Warranty:

DayStar Filters products are warranted to be free of optical, electrical or mechanical defect for a period of 10 years. A Warranty will be included in shipment of the DayStar filters. Please refer to warranty start and expiration dates.

### Service:

For service of your DayStar Filter, please contact us at:

**149 Northwest OO Highway • Warrensburg, MO 64093 • 660-747-2100 • [service@daystarfilters.com](mailto:service@daystarfilters.com)**