DAYSTAR FILTERS L.L.C

149 Northwest OO Highway • Warrensburg, MO 64093 • 866.680.6563 • service@daystarfilters.com

New DayStar Filter Owner,

Congratulations on your new DayStar Filter Quantum Purchase. 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 will require F/30 configurations by either aperture reduction or Barlow lens. Please use only telecentric Barlows, as single element Barlow lenses will cause vingetting on the perimeter of the image.

• An Energy Rejection Filter is recommended for anything other than short duration applications. The ERF may be Red glass, Yellow Glass or Dielectric reflection coatings which eliminate IR, UV or both from entering the telescope. This prevents overheating of your telescope, poor performance and premature failure of your filter.

• Your DayStar filter's should be mounted with optical elements: Yellow toward the-> SUN and Red toward the-> Eye Improper mounting causes internal reflections and poor performance.

• Used ON-AXIS on refractors or full aperture on SCT's, the filter will use a FLAT front plate.
• Used OFF-AXIS on SCT's with off-axis aperture reduction ERF plates, the filter must have a small 1.9° wedge plate mounted on the front of the DayStar. Also, be sure to orient the off-axis HOLE to the orientation of the filter. The clockwise position of the DayStar Quantum LCD readout is opposite that of the ERF Hole. If the orientation is not correct, your image will be OFF-BAND and you won't see prominences.
Your DayStar will come complete from the factory with your required configuration. If you change telescopes, pay attention to the wedge or flat plate.

• Your DayStar Quantum Series Filter operates on 12VDC, so you can plug it in with the included 100-240VAC converter, or directly to (optional) 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.
Ex: 4A quAntum SE

• 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 that. As it heats up, it will reach the 6562.8 and stop. This is your target wavelength.

• 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.

• 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. 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.

• 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

• We store additional information on the board of your quantum, including serial number, date manufactured, hours in use and to whom it was first sold. This will help protect your filter in the event of theft or confusion. Only at the DayStar lab can we access and see this information and it cannot be tampered with.

• Your DayStar Quantum optics and electronics are 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.

• Please store your filter in the included airtight case at all times when it is not in use to protect it from damage and humidity. When at all possible, store the filter in cool, dry environment. This is more important for its storage location than its use location. Filters

Clear Skies,

Jen Dudley Winter - Owner
DayStar Filters LLC

• Desired Wavelength for **Halpha: 6562.8Å,** Ca II K line: 3933.7Å, Ca II H line: 3968.5Å
• Not Blinking Readout = **CURRENT** wavelength
• Blinking Readout = **TARGET** 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 until it blinks.
The blinking number is your target wavelength.
Readout can move to a new target wavelength.
Press the red or blue button **again** to change the target.
Light will turn yellow.
In a few seconds, the readout will return to the non-blinking current wavelength.
As the filter heats or cools, the current wavelength will change until it matches the target.
Light turns green after 8 minutes at target wavelength.

NOTES:

• ***A button lockout feature is included***. Hold down both red and blue buttons for 5 seconds 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.

• DayStar Filter will only operate onband only at ambient temperatures below that listed on the label. The operative temperature is designed to be above ambient room temperature. Using the filter in climates above 100° F can cause your filter to exceed its 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.

• 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).

• SCT owners must use the 1.9° wedge plate. Refractor owners must use a flat plate as before.
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 ±1.0 Å 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: ±0.5°C (±0.05Å)
- Temperature control method: PID (Proportional / Integral / Derivative).
- Operating temperature range: 0°C to +40°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 1/4l @ 5461Å 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:
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