

# LUMICON

760 Easy Street, Simi Valley, California 93065 • (805) 520-0047 • Fax (805) 520-3030 • [www.lumicon.com](http://www.lumicon.com)

## LUMICON® NEWTONIAN EASY-GUIDER™ For Newtonian and Refractor Telescopes

### DESCRIPTION

Congratulations! You have purchased one of the most powerful astrophotographic accessories on the market today for Newtonian and Refractor Telescope astrophotography - the low-profile LUMICON® NEWTONIAN EASY-GUIDER™. The easy-to-use Lumicon Newtonian Easy-Guider incorporates a unique, patented, radial adjustment for finding bright, off-axis photographic field guide stars. The Lumicon Newtonian Easy-Guider has both **radial** and **360° rotational** adjustments, along with a large off-axis pickoff prism that helps make bright guide star selection a breeze.

The Lumicon Newtonian Easy-Guider uses your telescope's optics directly for pinpoint guiding accuracy. This method is superior to using a guide-scope, which is subject to differential flexure.

The low-profile design of the Easy-Guider allows installation in seconds into a standard focusing mount.

#### **Required Accessories:**

- 12mm Dual Cross-Hair, Illuminated Guiding Eyepiece.
- Camera-specific T-ring

#### **Recommended Accessories:**

- 2X Barlow Magnifier/Relay for increased off-axis guiding precision -- see below.
- Lumicon Deep Sky Filter (see [www.lumicon.com](http://www.lumicon.com) for complete filter application information)
- Lumicon Coma Corrector for pinpoint photographic star images.
- Cable release to minimize camera vibration.

### Lumicon Newtonian Easy-Guider



Shown with optional Lumicon Illuminated Reticle Eyepiece, a Barlow and prism-diagonal

### INSTALLATION

#### 2" Easy Guiders:

1. Thread a filter (if used) into the T-ring Adapter provided with your Easy-Guider.
2. Insert your Newtonian Easy-Guider into a standard Newtonian or Refractor telescope focuser, securing with the focuser's thumbscrew.
3. Attach your camera's body to the T-ring adapter.
4. Install your camera in the Easy-Guider, tighten the 3 brass thumbscrews, and check for sufficient focuser in-travel: focus on a star at night, or an object at least 900 yards away during the day. If you are

unable to bring your camera to focus at infinity, see *OBTAINING SUFFICIENT EXCESS FOCUSER IN-TRAVEL* on page 3.

### 1-1/4" Easy Guiders:

1. Thread your camera's T-ring loosely onto the Easy-Guider. Do not over tighten.
2. Attach the Easy-Guider/T-ring assembly to your camera.
3. Thread a filter, if used, into the guider's nose-piece.
4. Insert the entire unit into your telescope's focuser, and secure with the focuser thumbscrew(s). Check for sufficient focuser in-travel: focus on a star at night, or an object at least 900 yards away during the day. If you are unable to bring your camera to focus at infinity, see *OBTAINING SUFFICIENT EXCESS FOCUSER IN-TRAVEL* on page 3.

## OPERATION

**Basic operating steps:** Acquire target; find guide star; compose subject in camera; focus subject, focus guide star; open shutter; guide.

Before getting started, check for sufficient focuser in-travel (see Notes). At the same time, you should execute a daylight test run. Use an object at least 900 yards away to simulate infinity.

1. **Acquire** your target deep-sky object and achieve approximate centering and focus. It is recommended that you use a finely ground matte focusing screen for your particular camera. If your target is faint and cannot be seen through the camera, remove the camera and use an eyepiece and/or adapter to center it. Then reinstall the camera and focus on a field star.
2. **Find** a guide star by inserting a LOW power eyepiece such as a 25mm Plossl or 20mm Erfle in the off-axis tube. Focus on field stars, then rotate the whole off-axis guider, with the camera attached, while looking through the low-power eyepiece. When a star has been brought near the center of the field, tighten the retainer screws on the focusing mount. *Note: What you see through the off-axis guider is normally outside the field-of-view of your camera.* Install your reticle eyepiece.
- 2a. **Radial Adjustment:** If there is no bright guide star close to the center of the field after rotating your Lumicon Easy-Guider, or if no stars are near the cross-hairs, loosen the thumbscrews that secure the off-axis eyepiece holder, and slide the whole off-axis assembly back and forth to cover a wider swath.
3. **Compose** your photo by rotating the **camera body** alone, with respect to the Easy-Guider. For 2" Easy-Guiders, loosen the 3 thumbscrews that hold the camera adapter, rotate the camera, then re-tighten the thumbscrews. For the 1-1/4" Easy-Guider, rotate the camera, then tighten the locking ring (the narrow one with the o-ring) against the T-ring adapter.
4. **Fine focus** the camera.
5. Insert a 2X multiplier between the reticle eyepiece and the off-axis eyepiece holder. Re-focus the off-axis **guide star** by sliding the reticle eyepiece in or out, and secure it with the thumbscrews.
6. With your target framed and the guide star centered in the cross-hairs, open the camera shutter, and guide away!

## NOTES:

**Focus Requirements:** The Newtonian Easy-Guider takes up 7/8" of back focus. The camera body takes up about 2.0" more, thus for photography you need about 3" of extra back focus. When designing or building a telescope, or when moving the primary mirror ahead in the main telescope tube for

photography, be sure to allow a minimum of 3" from the fully racked-in position of the focuser to the focal plane of the telescope.

If you are unable to focus the camera with the focuser racked all the way in, see *Obtaining Sufficient Focuser In-Travel*, below.

**Guiding Ratio:** a 35mm camera's film plane scale is comparable to the view with a 50mm eyepiece. If your guiding eyepiece is a 12.5mm, then you are using a 4X-guiding ratio. This is sufficient if you guide carefully. But for increased guiding precision, Lumicon recommends an additional 2X magnification. This can be attained with Lumicon's 2X Barlow.

**Using Filters:** The Lumicon Deep-Sky Filter is highly recommended, especially for fast f/4-f/6 Newtonian Telescopes. When using a filter, the focus will shift outward by about 1mm, thus it is essential to refocus when adding or removing a filter.

**Coma:** With f/7 or slower Newtonian telescopes, you should see nearly pinpoint guide star images in the off-axis viewer. Since your Lumicon Newtonian Easy-Guider picks off an off-axis guide star approximately 2.2cm from the actual center of the optical field, your Newtonian off-axis guide star image will have a somatic / astigmatic blur circle diameter that is adequately small and will not interfere with guiding if your Newtonian telescope mirror is

F/7 and larger than 5"

F/6 and larger than 7"

F/5 and larger than 10"

F/4 and larger than 18"

For Newtonian mirrors larger than these, guide star images are very minute and guiding is easy. For smaller mirrors of these focal ratios, your guide star will have a cusp or crescent shape, and guiding will be a bit harder but still attainable. For fast Newtonian telescopes, you are encouraged to use the Lumicon 48mm Coma Corrector. If nothing else, the Coma Corrector will increase your telescope's useful field, resulting in superior photographs generally. In fast Newtonians, high image quality of the guide star is restored with the Lumicon Coma Corrector lens.

Clear skies and great astrophotos to you from Lumicon!

### OBTAINING SUFFICIENT FOCUSER IN-TRAVEL

#### 1. Move the primary mirror cell forward.

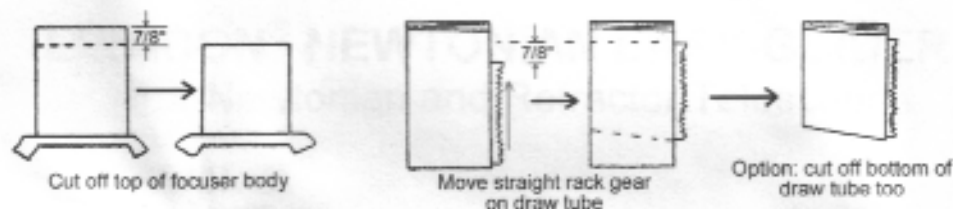
On many Newtonian telescopes, there are two sets of primary mirror cell mounting holes drilled in the telescope's main tube. The holes farthest away from the focuser are used to position the primary mirror for visual observing. The holes closer to the focuser are for photography.

If no such holes exist, remove the primary mirror cell assembly from the telescope and drill new primary mirror cell mounting holes in the main telescope tube 7/8" to 1" up from the existing ones. Install the primary mirror cell assembly in these and re-collimate the telescope.

#### 2. Another option is to remove the focuser from the telescope and take off 7/8" from the top of the focuser **body** (not the eyepiece drawtube).

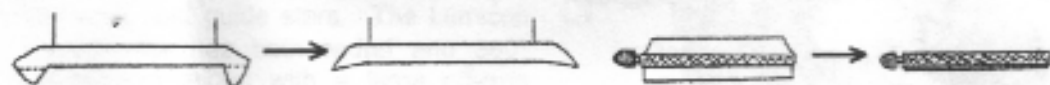
First, remove the rack & pinion mechanism from the focuser body by loosening the screws holding pinion/knob plate to the focuser body. Remove the chrome eyepiece drawtube from the focuser by sliding it from the focuser body. On the aluminum focuser body, cover the lubricated areas with masking tape to prevent aluminum filings and chips from sticking to the lubrication. Now saw ~7/8" off the top of the focuser body.

Shortening the eyepiece drawtube comes next. Remove the rack gear (long, straight focusing drive gear) from the drawtube by removing the two retaining screws. Carefully mark and re-drill two new holes  $7/8"$  higher on the drawtube toward the eyepiece mounting flange threads (or as high as the drawtube allows). Use a #45 drill bit (0.085" diam.) to drill the new holes. Thread the drilled holes with a 3-56 tapered tap and remount the rack gear. Insert the "new" drawtube into the focuser body and replace the pinion/knob assembly.



Your new "low-profile" focuser is now ready for photographic use.

3. If only a little distance is needed, then either or both of the following steps may be done: slice off the "feet" of the focuser body and/or remove excess material from the drawtube's eyepiece threaded thumbscrew ring.



4. Lumicon makes low-profile helical focusers that provide extra in-travel. See [www.lumicon.com/hf.htm](http://www.lumicon.com/hf.htm) for details.

## Lumicon 2" Newtonian Easy-Guider

