



# ASTRO-TECH AT60ED

from Astronomy Technologies

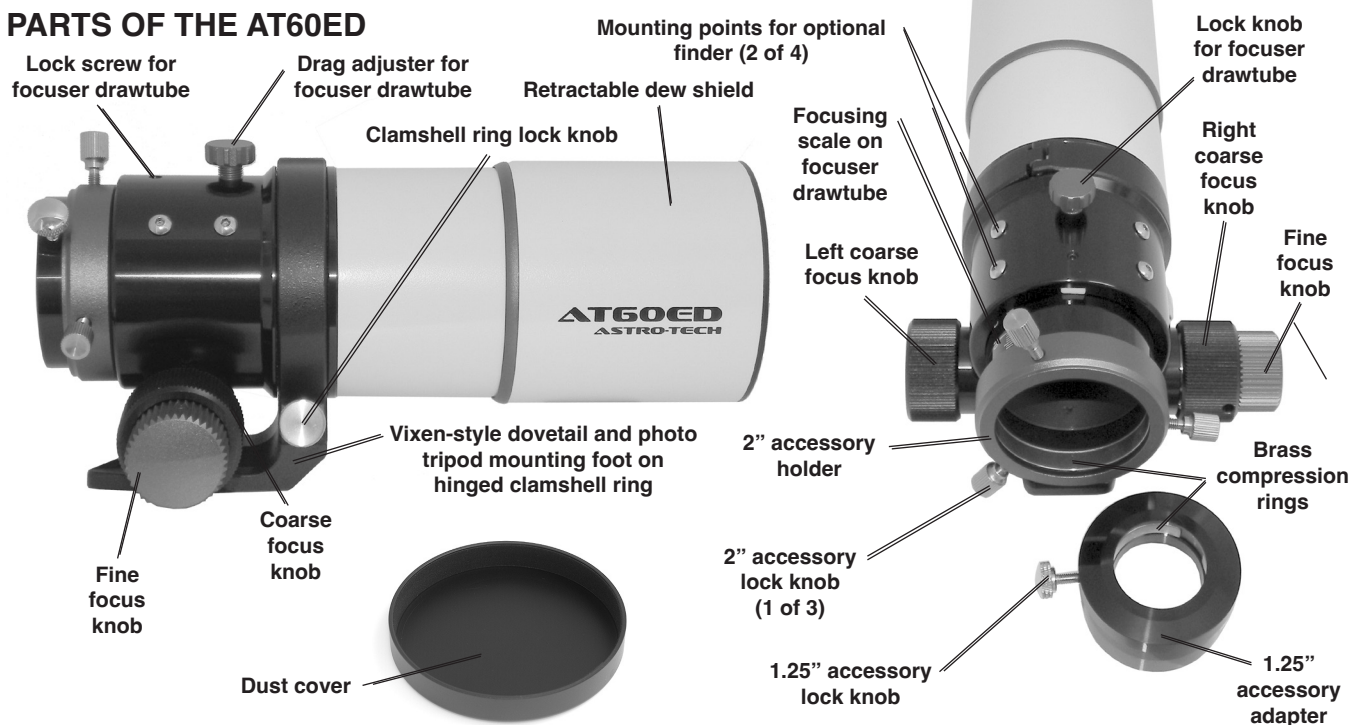
Thank you for choosing this **Astro-Tech AT60ED** high-quality compact ED doublet refractor.

The images from its f/6 ED (FPL-53 Extra-low Dispersion) air-spaced doublet optics are virtually color-free. We believe you'll find the optical performance of your AT60ED to be exceptional, particularly in view of its very reasonable price.

This instruction manual will provide you with information on how to get the most out of your new telescope, and how to properly maintain your telescope so it can give you a lifetime of observing enjoyment.

Please familiarize yourself with your telescope's parts and functions before operating it for the first time.

## PARTS OF THE AT60ED



## Astro-Tech AT60ED Apochromatic Refractor Specifications

<b>Aperture</b>	60mm (2.36")
<b>Focal Length</b>	360mm
<b>Focal Ratio</b>	f/6
<b>Objective Type</b>	air-spaced doublet, with one element of FPL-53 ED glass
<b>Optical Coatings</b>	fully multicoated
<b>Resolving Power (Dawes' Limit)</b>	1.93 arc seconds
<b>Visual Limiting Magnitude</b>	11.4 maximum
<b>Light Grasp (versus the eye)</b>	73x
<b>Lowest Usable Power</b>	9x (with 40mm eyepiece)
<b>Highest Terrestrial Power</b>	60x (with 6mm eyepiece)
<b>Highest Practical Power</b>	90x (with 4mm eyepiece)
<b>Theoretical Maximum</b>	120x (with 3mm eyepiece)

<b>Field Stops</b>	2 glare-reducing baffles in optical tube, plus 15 micro-baffles in the focuser drawtube
<b>Focuser</b>	dual-speed 2" rack-and-pinion, with 10:1 reduction ratio fine focus, and 1.25" and 2" compression ring accessory holders
<b>Focuser Travel</b>	2.95" (75mm)
<b>Lens Shade</b>	retractable, 80.4mm o.d.
<b>Objective Lens Cover</b>	slip-on metal
<b>Tripod Mount</b>	Vixen-style foot on hinged clamshell
<b>Tube Diameter</b>	76mm o. d.
<b>Tube Length (lens shade retracted)</b>	9" (229mm)
<b>Tube Length (lens shade extended)</b>	10.87" (276mm)
<b>Weight (with 1.25" adapter)</b>	3.25 lbs. (1.48 kg)

Your **Astro-Tech AT60ED** refractor is usable for day and night viewing, simply by adding an appropriate star diagonal or image erector and an eyepiece. You can use any 1.25" or 2" eyepiece, from a 40mm focal length for the lowest practical magnification, to a 3mm for high power use.

The AT60ED has a dual speed 2" rack-and-pinion focuser, a non-marring 2" compression ring accessory holder for use with 2" star diagonals, 2" eyepieces, or 2" photo accessories. Also supplied is a 1.25" compression ring accessory adapter for use

with 1.25" star diagonals, terrestrial image erectors, and 1.25" eyepieces and photo accessories.

The 360mm focal length of your AT60ED is ideal for low to medium power wide-angle views of nebulae, open star clusters, large galaxies, and comets. Crisp views of the Moon, planets, binary stars, and globular clusters are also routine at magnifications up to 120x when seeing conditions permit.

To calculate the magnification of your telescope and eyepiece combination, divide the telescope focal length in mm by the

eyepiece focal length in mm. For example, a 6mm eyepiece will give you a magnification of 60x ( $360\text{mm}/6\text{mm} = 60$ ).

**Astronomical Observing:** The theoretical maximum usable power available from this telescope is 120x, although this requires a 3mm eyepiece that provides a narrow and dim 0.5mm exit pupil. Still higher power is occasionally possible, given excellent seeing conditions. Keep in mind that seeing conditions play an important role in how high a magnification you can use on any given night. Only very good seeing conditions (clear skies and calm air) will support viewing at 120x or higher. Under less than ideal conditions, lower powers in the 72x to 90x range provide more consistently usable and pleasing images.

The widest field of view with a 1.25" eyepiece is about 4.8°, which can be achieved with a 9x (40mm) TeleVue Plössl. A 2" wide field eyepiece such as the 40mm Explore Scientific 68° will deliver an immense 7.5° field of view, making the AT60ED its own best finderscope when used with this eyepiece.

The AT60ED also does an outstanding job as a wide-field astrograph for DSLR and CCD/CMOS imaging, particularly when matched to an optional Astro-Tech field flattener. The image circle is 41mm. An optional camera angle adjuster is also available to aid in finding the best image orientation. A mm scale on the focuser drawtube lets you note and quickly return to the best photographic focus, while a chrome lock knob under the focuser lets you lock in that sharp focus.

**Terrestrial Observing:** The AT60ED works very well for daytime birding, nature studies, sweeping the landscape from the home with a view, etc. Generally speaking, the maximum usable daytime power with any terrestrial scope is about 1x per mm of aperture (60x with a 6mm eyepiece). Attempts to push the daytime power higher often magnify the heat waves, dust, and "mirage" in our atmosphere to the point where the images become blurred and unusable. A 30x (12mm) to 45x (8mm) eyepiece is usually more satisfying for terrestrial use than a 60x eyepiece. It is also a very good f/6 360mm telephoto lens for terrestrial photography (7.2x when used with a 35mm film camera; 1.3x to 2.0x higher when factoring in the crop factor of APS-C and 4/3 format digital cameras).

**Mounting the AT60ED:** A stable photo tripod or astronomical mount is essential for best viewing. At only 3.5 pounds, the scope is light enough to use on any good quality camera tripod with a payload capacity of 7 to 8 pounds. The scope's supplied Vixen-style dovetail has a 1/4"-20 thread hole for direct connection to a standard photo tripod head.

**Finder Mounting Points:** There are four mounting holes available for installing an optional finder on either the left or right side of the focuser. Their positions are shown on the illustration on the front page. Four chrome screws seal the holes when no finder is installed.

**Optional Astro-Tech Accessories:** The adjustable-height Astro-Tech Voyager II altazimuth mount has worm gear manual slow motion controls in both altitude and azimuth to make tracking terrestrial and astronomical objects smooth and easy. Astro-Tech 1.25" and 2" star diagonals have state-of-the-art 99% reflectivity dielectric coatings to provide the maximum brightness and planetary detail and contrast possible from your AT60ED. 45° viewing angle image-erecting 1.25" diagonals are available to provide correctly-oriented terrestrial images.

**Caring for Your Scope Optics:** Never store your telescope in a damp or humid environment. Avoid leaving it in a hot

environment (exposed to direct sunlight on a windowsill, in a car trunk, etc.) If you must store it in high humidity conditions, put a few packets of desiccant (silica gel or the equivalent, available from most camera stores) in with the telescope to absorb excess moisture. If not properly stored in a humid environment, the telescope may develop mildew, which can damage the optics.

If dew has formed on the scope after a night's observing, allow the scope optics to air dry at room temperature before putting the lens cover on the scope and storing it away.

If the front lens surface becomes dusty, smeared, or shows fingerprints or any other surface build-up, clean the lens as follows. First, gently blow away any surface dust or particles with a clean air blower (a child's ear syringe or a photographer's camel's hair brush with attached blower bulb, for example).

Next, moisten a soft cloth with a few drops of an optical cleaning solution designed for multicoated camera and binocular lenses. A well-worn cotton handkerchief works well and Canon, Nikon, and Zeiss make suitable lens cleaning fluids. Do not drip cleaning fluid directly on the lens. Use the barely damp (not wet) cloth to gently wipe the lens clean, turning the cloth frequently to always keep a clean portion of the cloth in contact with the lens.

Blot the lens dry with a dry portion of the cleaning cloth or a separate cloth. Use a clean cloth each time cleaning is needed.

Avoid overcleaning your scope. The multicoatings on the lens are quite hard and durable. However, frequent overzealous cleaning can scratch the coatings if all the dust particles (often tiny flecks of windborne rock) are not removed before you start pushing a damp cloth around the lens surface. A few specks of debris on the lens will not be visible in your images, as they are not in the focal plane and don't block enough light to measure, let alone be seen.

Fingerprints should always be cleaned off promptly, however, as they can potentially etch the coatings on your lens if not removed before storing your scope.

As a rule, though, clean your optics only when absolutely necessary. If you take proper care of your scope, cleaning should rarely be needed.

**Caring for Your Scope Finish:** Your AT60ED is finished in baked-on automotive paint, with portions hard anodized. These very durable surfaces can become smudged with fingerprints during use, but these will not harm the finish. A clean soft cloth slightly dampened with plain water (or a little moisture from your breath and a quick wipe with a clean handkerchief) is generally enough to remove the fingerprints. Avoid harsh chemical cleaners or organic solvents like benzene, alcohol, etc., as these may ruin the finish. They can certainly affect the optical coatings if they accidentally drip or splash on the objective lens.

Never use your AT60ED terrestrially in the rain or in conditions where it may get wet. Your telescope is not waterproof. If your scope accidentally gets caught in the rain, immediately wipe off all water using a clean and dry soft cloth. If your telescope gets totally soaked in water, or submerged, immediately contact your dealer for service instructions. Do not disassemble or attempt to repair your telescope yourself, as this violates the warranty terms under the limited product warranty, and negates any guarantee.

 **ASTRO-TECH** [www.astronomytechnologies.com](http://www.astronomytechnologies.com)

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