



# ASTRO-TECH AT106

from Astronomy Technologies

Thank you for choosing this **Astro-Tech AT106** high-performance apochromatic ED triplet refractor.

A review in *Sky & Telescope* magazine said the AT106 "provided superb optical and mechanical quality" and called it "an amazing bargain in the world of premium refractors."

This instruction sheet will help you get the most out of your new refractor so you can enjoy a lifetime of high-performance observing and imaging.

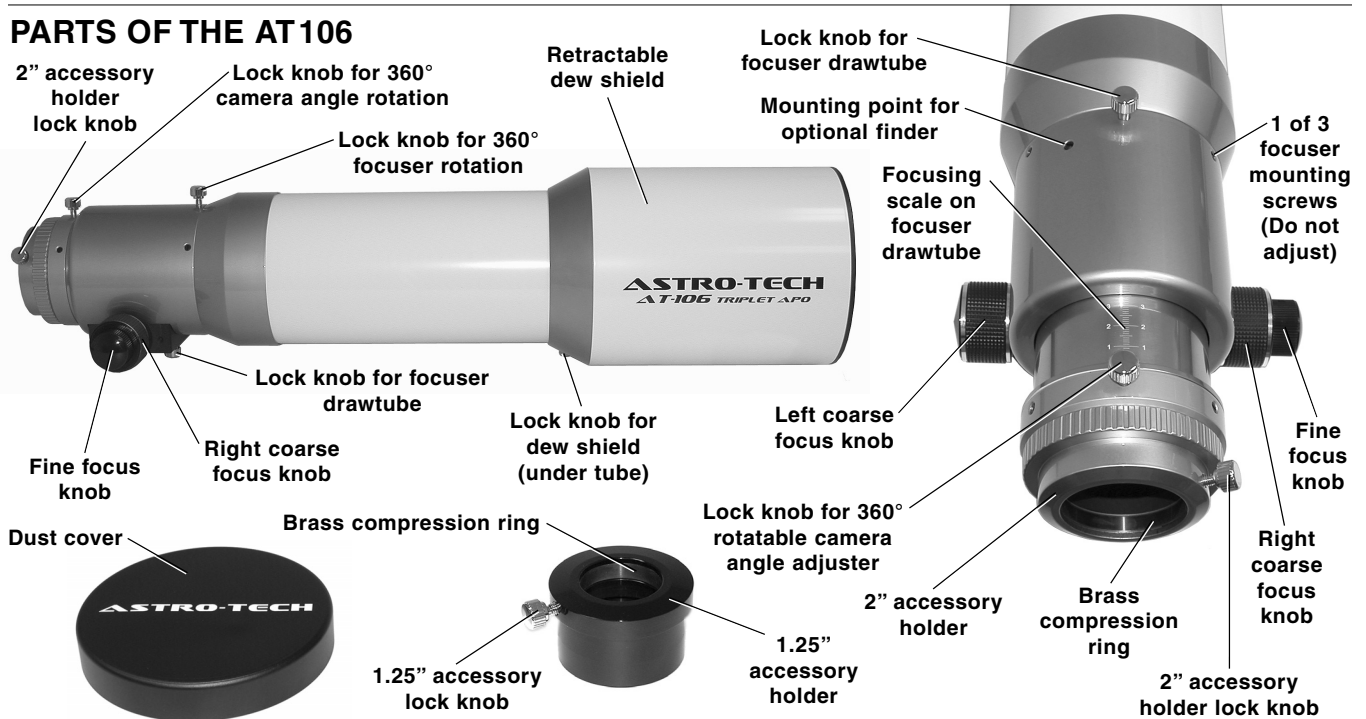
Please familiarize yourself with your telescope's parts and functions before using it for the first time.

## Astro-Tech AT106 Apochromatic ED Triplet Refractor Specifications

<b>Aperture</b> .....	106mm (4.17")
<b>Focal Length</b> .....	690mm
<b>Focal Ratio</b> .....	f/6.5
<b>Objective Type</b> .....	collimatable air-spaced triplet using all Ohara glass, including an FPL-53 ED element
<b>Optical Coatings</b> .....	fully multicoated
<b>Resolving Power (Dawes' Limit)</b> .....	1.09 arc seconds
<b>Visual Limiting Magnitude</b> .....	12.6 maximum
<b>Light Grasp (versus the eye)</b> .....	229x
<b>Field Stops</b> .....	three knife-edge baffles
<b>Focuser</b> .....	2.7" dual-speed Crayford with 10:1 reduction ratio fine focus; 2" and 1.25" compression ring accessory holders; 360° rotating focuser with separate 360° camera angle rotation
<b>Focuser Travel</b> .....	80mm (3.15") with mm scale
<b>Back Focus (drawtube fully extended)</b> .....	65mm (2.55")

<b>Finder</b> .....	none; mounting point provided for optional Astro-Tech multiple reticle finder or similar finder
<b>Dew Shield</b> .....	retractable, with lock knob
<b>Dew Shield Diameter</b> .....	148mm o. d.
<b>Objective Lens Cover</b> .....	slip-on metal
<b>Tube Diameter</b> .....	114mm o. d.
<b>Tube Length (lens shade retracted)</b> .....	24" (610mm)
<b>Tube Length (lens shade extended)</b> .....	27.5" (698mm)
<b>Optical Tube Weight</b> .....	11 lbs. (5 kg)
<b>Case</b> .....	9.5 lb. (4.3 kg) aluminum-frame foam-fitted lockable hard case, with carrying handle
<b>Case Dimensions</b> .....	28.25" x 9.25" x 10"
<b>Lowest Usable Power</b> .....	17x (40mm eyepiece)
<b>Highest Terrestrial Power</b> .....	98x (7mm eyepiece)
<b>Highest Practical Power</b> .....	172x (4mm eyepiece)
<b>Theoretical Maximum</b> .....	215x (3.2mm eyepiece)

## PARTS OF THE AT106



Your **Astro-Tech AT106** refractor is usable for day and night viewing, simply by adding a star diagonal, eyepiece, and mount. Any 1.25" or 2" eyepiece can be used, from a 40mm for the lowest practical magnification (17x) to a 3.2mm (215x) for high power use. A 2" compression ring accessory holder on the focuser and a separate 1.25" compression ring accessory holder let you use either 1.25" or 2" star diagonals and eyepieces with no other adapter needed.

**Mounting your AT106:** A stable altazimuth or astronomical mount is essential for best viewing with the 11 pound AT106. Your scope is not supplied with mounting rings, but 114mm i. d. split rings and a variety of dovetail plates are readily available from your Astro-Tech dealer for installing your AT106 on the mount of your choice.

**Astronomical observing:** The theoretical maximum usable power available from your AT106 is 215x, although this requires a 3.2mm eyepiece that provides a very narrow and dim 0.49mm diameter exit pupil. Still higher powers *are* within your scope's capabilities, but require truly excellent seeing conditions and the patience to wait for those conditions to make their brief and infrequent appearances.

A more practical maximum magnification for astronomical viewing with your AT106 would be 172x, using a 4mm eyepiece.

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 215x. Under less than ideal conditions, powers in the 115x to 140x

range provide more consistently usable and pleasing images.

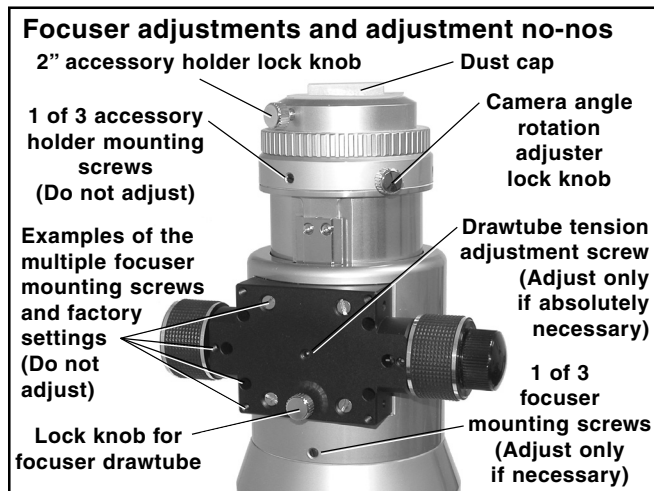
The widest possible field of view with a 1.25" eyepiece is about 2.4°, which can be achieved with a 40mm (17x) Plössl eyepiece having a 6.15mm exit pupil. A 2" wide field eyepiece, such as the Astro-Tech 40mm Titan Type 2, will give you a 3.95° field at the same power.

**Terrestrial observing:** Your AT106 can be used for daytime birding, nature studies, sweeping the landscape from the home with a view, etc. – provided it is installed on a suitably sturdy mount. A good choice would be the Astro-Tech Voyager altazimuth mount, which can also be used for grab-and-go astronomical observing. The Voyager has a 20 pound payload capacity and manual slow motion controls.

Generally speaking, the maximum daytime power with any terrestrial scope is about 1x per mm of aperture (98x with a 7mm eyepiece). Attempts to push the power beyond this point often magnify the heat waves, dust, and "mirage" in our atmosphere to the point where the images become blurry and unusable. Eyepieces in the 25mm (27x) to 10mm (69x) range are usually more satisfying for daytime use.

**Photography with your AT106:** The AT106 does an outstanding job as a wide-field astrograph for CCD and APS-format DSLR astronomical imaging, particularly when used with the Astro-Tech #AT2FF 2" field flattener. The AT106 also makes an excellent 690mm (13.8x) f/6.5 telephoto lens for terrestrial photography.

The scope's 2.7" Crayford focuser can be rotated 360° for the best photographic composition. To rotate the focuser, loosen the chrome lock knob at the top front of the focuser (its location is shown in the illustration on the front page). Turn the focuser to the desired angle and tighten the lock knob to hold it in position. There are three nylon focuser mounting screws that hold the focuser to the scope body. They also can be used to adjust the focuser rotation tension (one is shown in the illustration below). However, they should rarely, if ever, need adjustment. Excessive or uneven tightening or too-frequent adjustment of these screws can damage them, a problem not covered by warranty. They should be adjusted as little as possible.



In addition to rotating the focuser, it is also possible (and often more convenient) to simply rotate the 2" accessory holder on the focuser drawtube to adjust the camera angle for the best photographic composition, or to put your star diagonal in the most comfortable observing position.

To rotate the 2" accessory holder, loosen the chrome lock knob located on the accessory holder in front of the ribbed grip ring (as shown in the illustration above and on the front page) by turning it counterclockwise. Rotate the 2" accessory holder to the desired angle, then tighten the lock knob to temporarily lock the accessory holder in place at the new angle.

A chrome lock knob under the focuser body (shown above and on the front page) lets you lock the focuser drawtube at a sharp focus for photography.

There is a recessed Allen head screw in the underside of the focuser (as shown above) that lets you adjust the tension on the Crayford drawtube to accommodate differing accessory loads without slipping. The tension has been preset at the factory to accommodate most of the

accessory loads the scope will be called on to carry. However, if you consistently use very heavy equipment trains for CCD imaging, you might need to adjust the tension. Adjust only if and when needed. Avoid frequent unneeded adjustment or excessive tightening.

**Optional Astro-Tech accessories:** Astro-Tech makes 1.25" and 2" star diagonals with state-of-the-art 99% reflectivity dielectric coatings that nicely complement the performance of your AT106. These diagonals are available from your Astro-Tech dealer to provide the maximum possible image brightness and planetary detail.

An Astro-Tech 45° viewing angle image-erecting 1.25" diagonal is available for correctly-oriented terrestrial observing. An inexpensive Astro-Tech non-magnifying illuminated multiple reticle finder is also available for your AT106. The Astro-Tech Voyager mount mentioned above is a good choice for casual day and night observing.

**Collimating your AT106:** The black trim ring at the front of the dew shield can be unthreaded to give you access to the six push-pull collimation screws around the lens cell. Full collimation instructions are provided in the separate collimation sheet packed with your scope.

**Caring for your AT106 optics:** Never store your telescope in a damp or humid environment. Avoid leaving it in a hot environment (exposed to direct sunlight on a window sill, 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 that can damage the optics.

If dew has formed on the scope after a night of 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 using the following technique.

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 cloth with a few drops of a photographic-quality optical cleaning solution designed for use on multicoated camera and binocular lenses. A well-worn cotton handkerchief works well and Zeiss, Canon, Nikon, and Kodak all make suitable fluids. Do not drip the cleaning fluid directly on the lens.

Use the barely damp (not wet) cloth to gently wipe the lens surface clean with radial strokes, 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. Start with 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 (which are often tiny flecks of windborne rock) are not removed before you start pushing a damp cloth around the lens surface. A few specks of dust on the lens will not be visible in your images. They are not in the focal plane and do not block enough light to measure, let alone be seen.

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 AT106 body is finished in a durable white automotive-grade paint, with grey anodized trim and a black anodized focuser. The body 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 any 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 lens.

**Caution! Never directly view the Sun with your telescope!** Never aim your AT106 at the Sun without having a professionally-manufactured solar filter mounted over the objective lens. Viewing the Sun through the scope without the proper protection for even a moment may result in permanent severe damage to your eyes, and can even cause blindness. Contact your Astro-Tech dealer if you are interested in purchasing a compatible professional solar filter.

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