



ASTRO-TECH

AT10RC

from Astronomy Technologies

Thank you for choosing this **Astro-Tech AT10RC** 10" f/8 Ritchey-Chrétien astrographic reflector.

Your AT10RC is designed for exceptional coma-free imaging using DSLR cameras and large-format CCD cameras having up to a 35mm chip size. Because of its long back focus, it is particularly good with systems involving long imaging equipment chains (filter wheel, adaptive optics system, electric focuser, etc.)

Visual observing is also possible with your AT10RC, as the scope's 2" Crayford focuser will accept both 1.25" and 2" star diagonals. However, the visual contrast will

be lower than a conventional reflector, because of the relatively large secondary mirror obstruction, so visual observing should always be considered to be no more than a minor secondary application with the AT10RC.

This instruction sheet will provide you with information on how to get the most out of your new Ritchey-Chrétien reflector, and how to properly maintain your telescope so it can give you a lifetime of high quality imaging enjoyment.

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

PARTS OF THE AT10RC





Components of the Focusing System: Your AT10RC has an external non-vignetting 3.3" Crayford focuser with a thread-on adapter that steps down from the 3.3" drawtube to a 2" compression ring accessory holder. There is also a separate 1.25" compression ring accessory adapter that can be slipped into the 2" accessory holder. These allow you to use either 1.25" or 2" accessories with no other adapters needed.

To minimize drawtube flexure under heavy loads during imaging, the drawtube travel of the removable AT10RC external focuser is kept short, at 50mm. To make up for the longer all-purpose drawtube travel found in refractors used for both visual work and imaging (typically 80mm to 135mm or more), the AT10RC focusing system has several components, as shown in the illustration above. They consist of the removable 3.3" Crayford focuser that is threaded onto the scope's rear cell when you receive your AT10RC, plus three thread-on extension rings (two 1" and one 2") that can be installed singly or in combination between the focuser and the scope's rear cell.

The focuser is used by itself or (more typically) in combination with one or more extension rings threaded between it and the rear cell to place your camera's imaging chip at the telescope focal plane. Many long equipment train imaging setups will require no extensions.

Available back focus with the focuser alone and no extension rings installed is 140mm (5.5"). This is reduced in 25mm (1") steps by adding the extension rings singly or in combination. One 1" extension and the focuser provide 115mm (~4.5") of back focus. The 2" extension ring and focuser provide 90mm (~3.5") of back focus. The 2" extension ring and one 1" extension ring, plus focuser, provide 65mm (~2.5") of back focus. The 2" extension ring, both 1" extension rings, and the focuser provide 40mm (~1.5") of back focus.

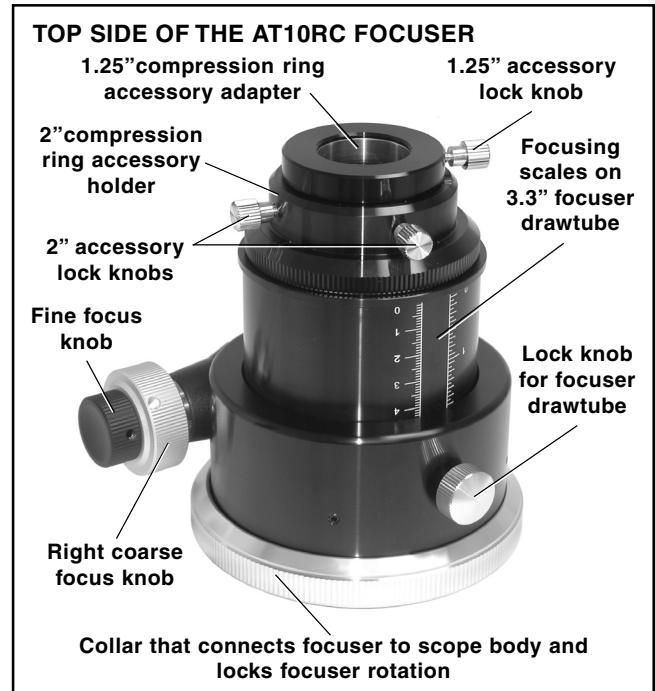
With careful choice of extension rings, it can be seen

that there will be no situation when the focuser drawtube will need to be extended more than half of its 50mm travel, providing an exceptionally rigid camera mount for whatever equipment load you might want to add. A little experimentation will be called for to determine what combination of focuser and extension ring(s) will be needed for your particular combination(s) of imaging components. Be careful not to cross-thread any of the focuser components when and if changing them in the dark.

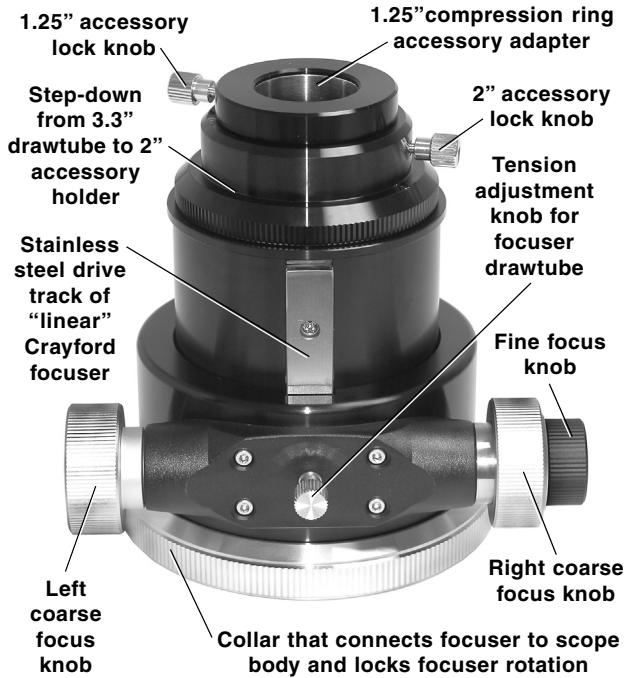
The "linear bearing" Crayford Focuser: The new linear bearing focuser has a polished stainless steel drive rail that runs the length of the underside of the drawtube. The focuser's enclosed stainless steel drive shaft presses on this drive rail to move the focuser, rather than having the hard steel drive shaft press directly on (and wear out) the softer aluminum drawtube as with conventional Crayford focusers. The steel drive rail rides in a self-lubricating track within the focuser body that extends almost the entire length of the body. The drive rail and its attached drawtube are thereby supported over most of their length at all times, rather than by a conventional Crayford focuser's two sets of small contact area roller bearings. This results in a broad and very rigid drawtube support, with essentially zero flexure or sag under heavy equipment loads.

This system also distributes the drive force evenly over the length of the drawtube, without concentrating it on a few small contact points. The result is no wear on the focuser's soft aluminum drawtube, with no possibility of flat spots or uneven wear.

Any dirt or grime accumulating on the exposed flat surface of the stainless steel drive rail can be wiped clean with a cloth periodically, but the drive rail and its internal bearing track should not be lubricated.



UNDERSIDE OF THE AT10RC FOCUSER



The backlash-free Crayford focuser has dual-speed focusing. There are two coarse focusing knobs. The right knob also has a smaller concentric knob with a 10:1 reduction gear for microfine focusing. Every ten turns of the small focusing knob rotates the coarse focus knobs one turn. This provides very precise image control during CCD/DSLR imaging. The focus knobs have ribbed gripping surfaces so they are easy to adjust, even while wearing gloves or mittens in cold weather.

There is a chrome tension adjustment knob on the underside of the focuser, between the focus knobs, as shown in the illustration above. This knob adjusts the drive shaft pressure on the focuser's linear bearing to accommodate different weight equipment loads without focuser slippage. This tension knob should always be tightened relatively firmly to avoid focuser slippage.

A second larger knob is located on the top of the focuser body, over the focusing scales on the drawtube, as shown in the illustration to the left. This knob locks the focuser drawtube firmly in place once the correct photographic focus has been reached.

Rotating the Focuser: Your AT10RC focuser can be rotated a full 360° for the best photographic composition prior to critical focusing. To rotate the focuser, loosen the ribbed aluminum focuser rotation lock ring (shown above and to the left) by turning the ring slightly counterclockwise. This ring also connects the focuser to the telescope rear cell or extension ring(s). Adjust the focuser to the desired angle, then turn the lock ring back in the opposite direction and tighten firmly to lock the focuser at the new rotation angle. It is best to adjust the focuser rotation angle before fine-tuning the focus and locking the drawtube.

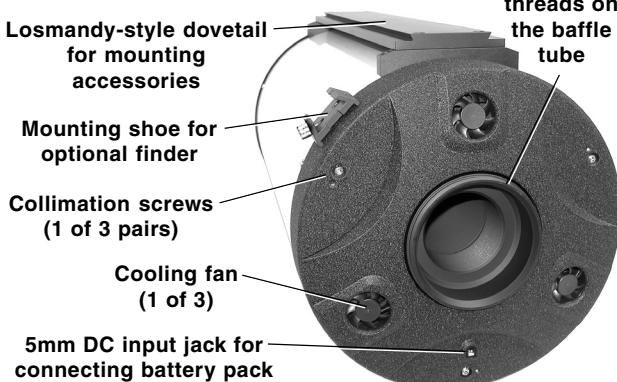
Mounting Your AT10RC: The underside of the AT10RC has a 21" long Losmandy-style "D-plate" dovetail running from front cell to rear cell. This will let you install your AT10RC on any high-payload equatorial mount (such as a Losmandy G11 or Celestron CGE Pro) that uses a Losmandy-style dovetail to hold a scope.

There is an identical 21" long Losmandy-style "D-plate" dovetail on top of your AT10RC. This will let you mount accessories using Losmandy-style adapters (such as Astro-Tech photoguide rings) on top of your AT10RC.

Finderscope: No finderscope is provided, due to the primarily photographic nature of the AT10RC. However, a mounting shoe is provided on the rear cell that will hold an optional Astro-Tech #ATF non-magnifying illuminated multireticle finder, or any similar finder.

The Rear Cell of Your AT10RC: The illustration below shows the rear cell of the AT10RC with the focuser and extension rings removed.

AT10RC REAR CELL WITHOUT FOCUSER



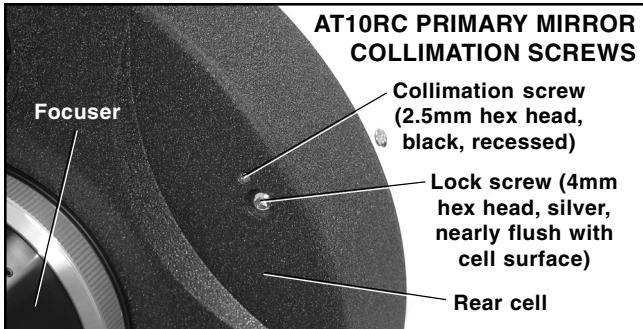
Visible are the three high speed/low vibration 12VDC cooling fans that help get your AT10RC down to ambient temperature more quickly. These pull ambient air in through the rear cell, blowing it across the back of the mirror, and carrying heat from the mirror up the optical tube where it exhausts out the open front of the scope. Your AT10RC will cool down more quickly if the front of the optical tube is tilted up at a 45° angle while the fans are running to more quickly exhaust the heat.

A standard equipment battery pack holding eight user-supplied AA batteries powers the cooling fans. It has a 5mm female pin jack on a 5' cord for connection to the scope. The input jack can be seen at the 6 o'clock position on the rear cell in the illustration above.

Alternatively, the fans can be powered by any 12VDC power supply using a 5mm female pin jack, such as those on the nearly ubiquitous 12VDC rechargeable battery packs from Celestron and others.

Also visible in the illustration above are the three pairs of collimating screws for collimating the primary mirror.

Primary Mirror Collimation Screws: The primary mirror is mounted in an open-back mirror cell for faster cooling. A collar machined into the front of the mirror



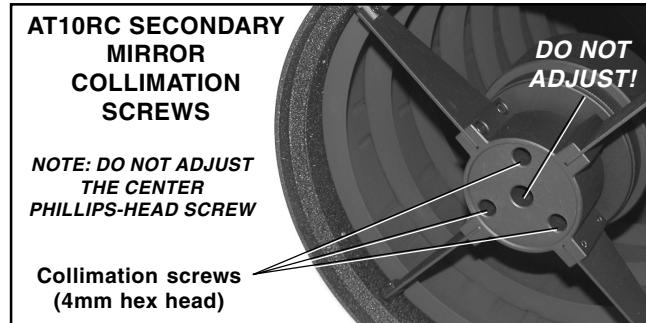
cell passes through a circular perforation in the center of the primary mirror from behind. This precisely centers the mirror in the cell and forms a base for attaching the central baffle tube. The back of the mirror rests firmly on pads in the cell. The mirror is held in place in the cell by a locking collar and O-ring that threads onto the front of the machined collar that passes through the mirror. The central baffle tube in turn threads onto this locking collar.

The back side of the mirror cell is threaded to provide a collar with focuser connection threads. This collar passes through an opening in the rear cell without touching the cell itself, as shown in the illustrations on the previous two pages. This allows the mirror assembly to move independently of the rear cell during collimation and forms a base for threading on the external focuser.

The primary mirror, mirror cell, and central baffle tube form a single rigid assembly that is held within your scope's rear cell by the three pairs of primary mirror collimating screws on the rear cell. The collimating screws move the entire mirror/cell/baffle tube assembly as a single unit within the rear cell of your scope.

The black recessed screws are the actual collimation

screws. They can be adjusted with a user-supplied 2.5mm hex-head wrench. The silver screws, nearly flush with the surface of the rear cell, are the locking screws that hold the mirror assembly firmly in place once the primary has been collimated. These screws are adjusted by means of a user-supplied 4mm hex-head wrench.



Secondary Mirror Collimation Screws: These are the three black recessed screws in the secondary mirror holder. They can be adjusted with a user-supplied 4mm hex-head wrench. ***Do not adjust the central recessed Phillips-head screw in the secondary holder, as this will change the secondary/primary mirror spacing and degrade image performance.***

For detailed collimation instructions, see the separate "AT10RC Collimation Sheet."

A Cautionary Note: Do not disassemble your scope for any reason, including to clean the mirrors. A small amount of dust and particulates on the mirror surfaces will not affect performance. This telescope does not contain user-serviceable parts and disassembly of the components will void the warranty. When not in use, please use the supplied dust caps to keep dust and particulates out of the tube and off the optics.

Astro-Tech AT10RC Ritchey-Chrétien Reflector Specifications

Aperture	254mm (10")
Focal Length	2000mm
Focal Ratio	f/8
Optical Type	true Ritchey-Chrétien dual hyperbolic mirror reflector
Mirrors	low thermal expansion quartz, 99% reflectivity dielectric multicoatings
Secondary Mirror Holder Obstruction	110mm (43% by diameter, 18.75% by area)
Optical Tube	rolled steel, with die-cast and machined aluminum front and rear cells
Field Stops	nine internal knife-edge baffles
Focuser	"linear bearing" 3.3" Crayford with dual-speed 10:1 reduction ratio fine focus; 2" and 1.25" compression ring accessory holders; 360° rotating camera angle adjuster
Focuser Travel	2" (50.4mm) with 1/16th inch and millimeter scales on drawtube for repeatable focus

Back Focus 9.25" (235mm) from rear cell,
5.5" (140mm) with focuser installed

Extension Rings (to adjust back focus) three total,
two measuring 1" in length and one 2" in length

Tube Diameter 11.75" (298mm) o. d.

Tube Length (without focuser) 24.75" (628mm)

Tube Length (with focuser) 28.25" (717mm)

Maximum Tube Length (with all three extension rings and
focuser drawtube fully extended) 34.25" (870mm)

Tube Weight (without focuser) 32.15 lbs. (14.6 kg)

Tube Weight (with focuser) 34.4 lbs. (15.6 kg),
add 6.4 oz. for each 1" extension and 14.4 oz. for 2"

Dovetail for Connection to Mount 21" long
Losmandy-style "D-plate" dovetail

Dovetail for Mounting Accessories 21" long
Losmandy-style "D-plate" dovetail

Finder none; mounting shoe provided for optional
Astro-Tech multiple reticle finder or similar finder