ADC-MK3
Atmospheric Dispersion Corrector
Smart and easy

User manual

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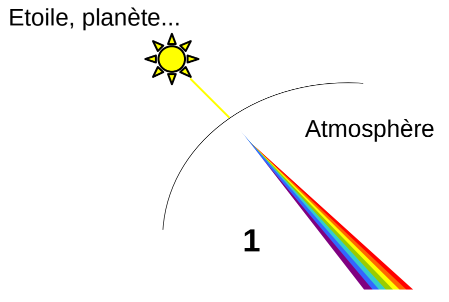
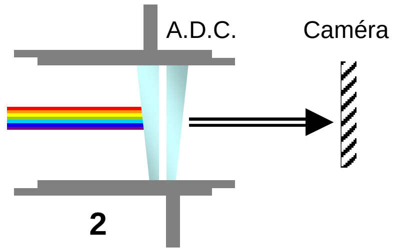
Theory :

The light from stars, planets and other objects of deep sky, travel in a vacuum and then passes through the Earth's atmosphere (1), it is then "refracted", or dispersed (diverted from a certain angle, depending on the different wavelengths composing). This effect, similar to a Prism, chromatic aberration on the images of these objects and is very penalizing for planetary pictures high resolution.

The ADC, or atmospheric dispersion corrector (2), is an optical and mechanical accessory designed to correct this chromatic dispersion by the superposition of two counter-rotating prisms. Simplified principle is described by the small diagram below:





Physical characteristics

- Male T2 thread at the top (camera side)
- M48 thread at the bottom (telescope side)
- M48 / T2 ring adapter included at the bottom with easy removing holes
- Height/back-focus (without threads) : 24mm height only
- Aluminum and black anodized body, machined with highest precision CNC machines
- Internal parts built in 3D laser printed material with 60um precision and hand crafted
- Free optical aperture : 24mm
- Adjustment knobs screwing built in PETP and CNC machines, threaded on stainless steel levers for adjustments and easy blockade including cold temperature operating.

-Over-positioning of the tracks by 60° to maximize the time of use without rotation of the body

Optical characteristics

- Number of prisms 2
- Deviation of Angle of edge (°) 2.5 °
- Surface precision (λ) 1/10
- Anti reflection coating FMC all surfaces UV and IR friendly (Venus…)
- Blackened edges
- Substrate fused silica (2 prisms).

made in France

How to use the A.D.C.

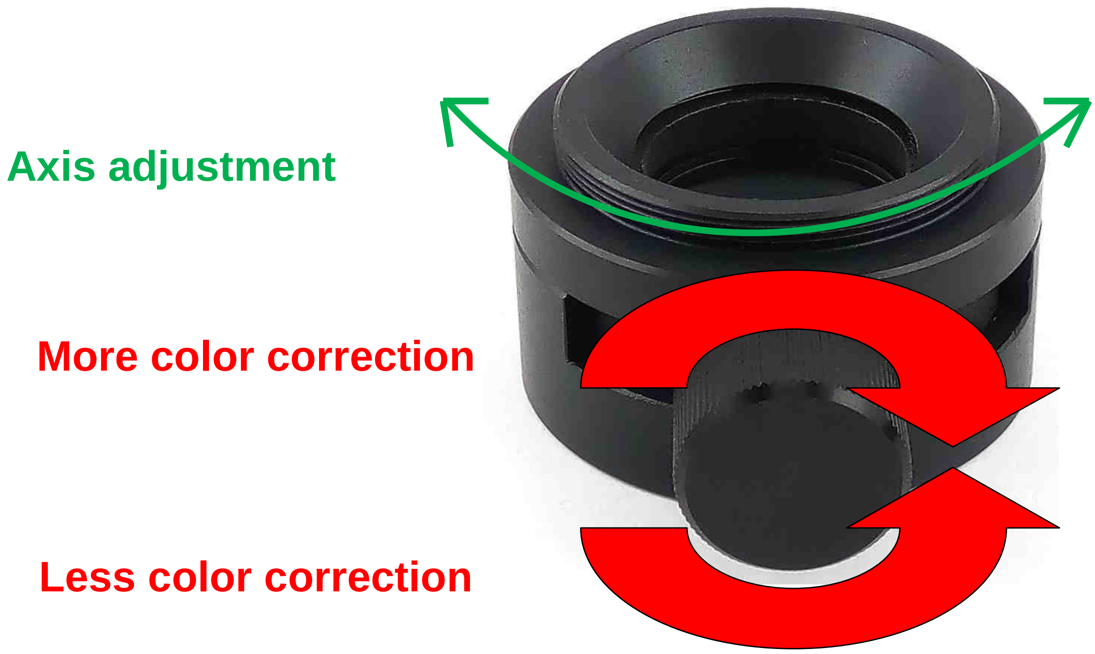
The new ADC MK3 is smarter than previous versions because it offers the user to separate the power adjustment and the angle adjustment. The user can then modify the angle of the correction (refering to the vertical and horizontal axis) and then adjust the power of the correction with only one watch-like button.

The two levers are now replaced by only one aluminium knob. The axis can be adjusted over 100° and the top of the axis has now a knurled high precision knob, in the same way as a watch crown, that can rotate to adjust the power of the correction (the angle separation of the prisms).

When the ADC is in front of you, with the T2 male thread on the top, and the knob on your right, you must rotate the knob clockwise to maximize the power, and counter-clockwise to minimize the power.

Please notice that internal mechanics are very fragile and you may not use any force to adjust the knob position.
You can also adjust the angle of correction on about 100°. This helps you keep all your setup without tweaking for 6 hours following the horizontal axis on an equatorial mount for example.

The ADC can be efficiently used on optical systems with F/D ratio over 10 (F/D >= 10) and about 50mm distance between the camera sensor and the top of the ADC (flat surface).
We actualy recommand to use a F/D ration about 15 to 20 for easer work.

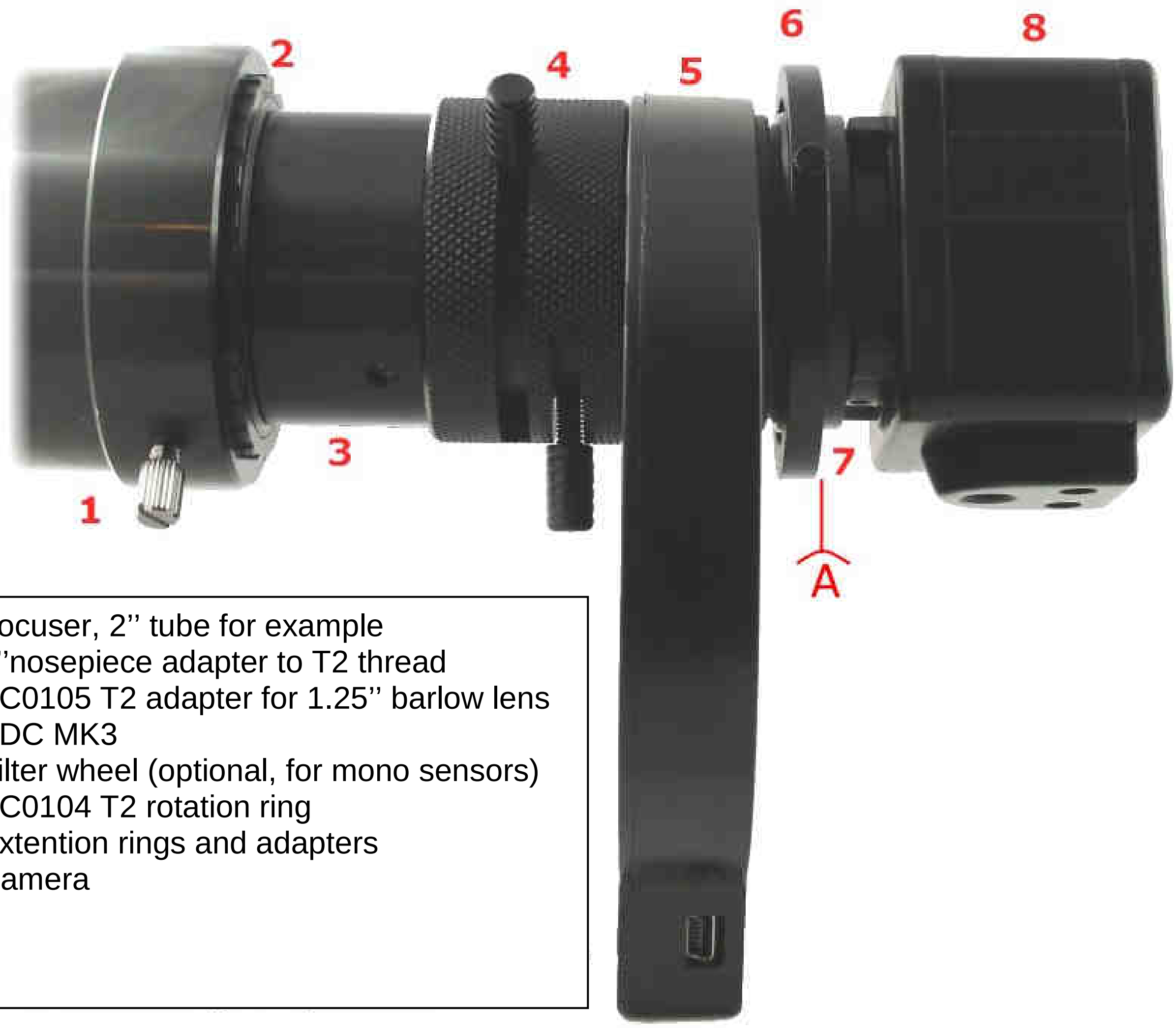


The T2 to M48 adapter makes you 2 possible ways of use of your ADC :
- when screwed at the bottom of the ADC : your ADC is T2 male / female
- when screwed at the top of the ADC : your ADC is M48 male/female

There are 2 holes on the adapter ring face to help you unscrew it.

How to build your planetary imaging solution ?

For optimal results we recommand to use the ADC in this kind of configuration :



1. Focuser, 2'' tube for example
2. 2''nosepiece adapter to T2 thread
3. AC0105 T2 adapter for 1.25'' barlow lens
4. ADC MK3
5. Filter wheel (optional, for mono sensors)
6. AC0104 T2 rotation ring
7. Extention rings and adapters
8. Camera

Note : we recommand to use color sensors with the FireCapture ADC assistant to achieve the best results with the maximum efficiency and very easy.

If your ADC has not enough power, you have to add more distance between the camera and the ADC or use a higher F/D ratio to something between 15 and 25 (depending on your camera and telescope characteristics.

If the atmospheric color error goes higher instead of going lowered, then you have to put the ADC knob at the other side (may be because of a diagonal mirror somewhere in the optical path).

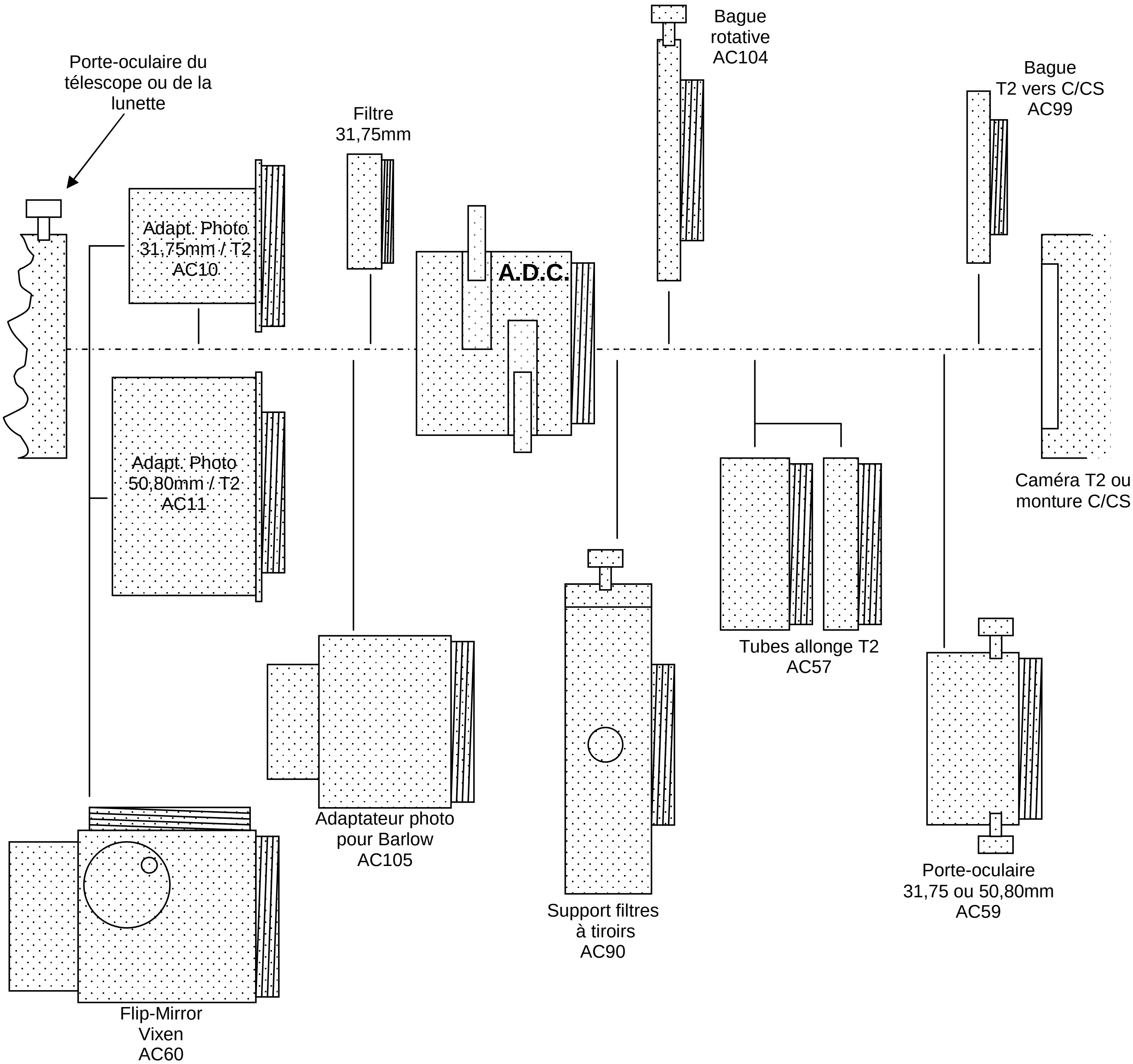
You can also use your ADC for visual purpose adding a T2 to 1.25'' female adapter.

Accessories delivered :

- Top and bottom high quality T2 threaded aluminium caps
- T2 to M48 adapter ring for T2 or M48 use of the ADC

Installation diagram

The diagram below shows a series of usable with the A.D.C. accessories according to the various uses of this device:



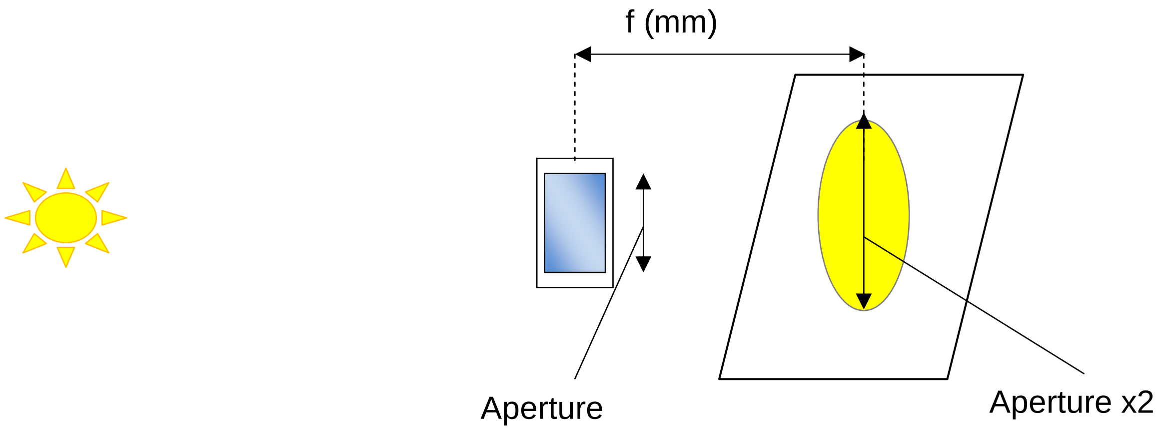
Positioning of the elements

We recommend using a photo for Barlow AC0105 adapter, in order to transform your Barlow threaded accessory and thus without mechanical games. As a reminder, the magnification of a Barlow factor formula is:

$$G = T/f + 1$$

with T = distance of the optical between the Barlow and the focal plane,
f = focal length of the Barlow

If you do not know the focal length of your Barlow lens, it is interesting to try experimentally determined. To roughly determine the focal length of a Barlow, measure the diameter of the opening of the Barlow and then draw a circle with a double diameter of this measure. The focal length is the distance between the middle of the optical element (and not the edge) and the sheet when the image produced on a subject to infinity (Sun for example) has a diameter equal to the circle drawn on the worksheet.



(These considerations are not valid in the case of use of certain "complexes Barlow", tele-extendeurs or certain Powermate lens. Refer to the documentation for your Barlow lens !)

Once determined the focal length of the Barlow, it is easier to determine the distance needed to obtain the desired magnification factor. For a Newtonian telescope for example, you may wish to get 3 to 5 x magnifications in general, for a refractor 2 to 4x and for a SCT/MCT, 1.5 to 3x.

We recommend to place the accessories in the following order (from telescope):

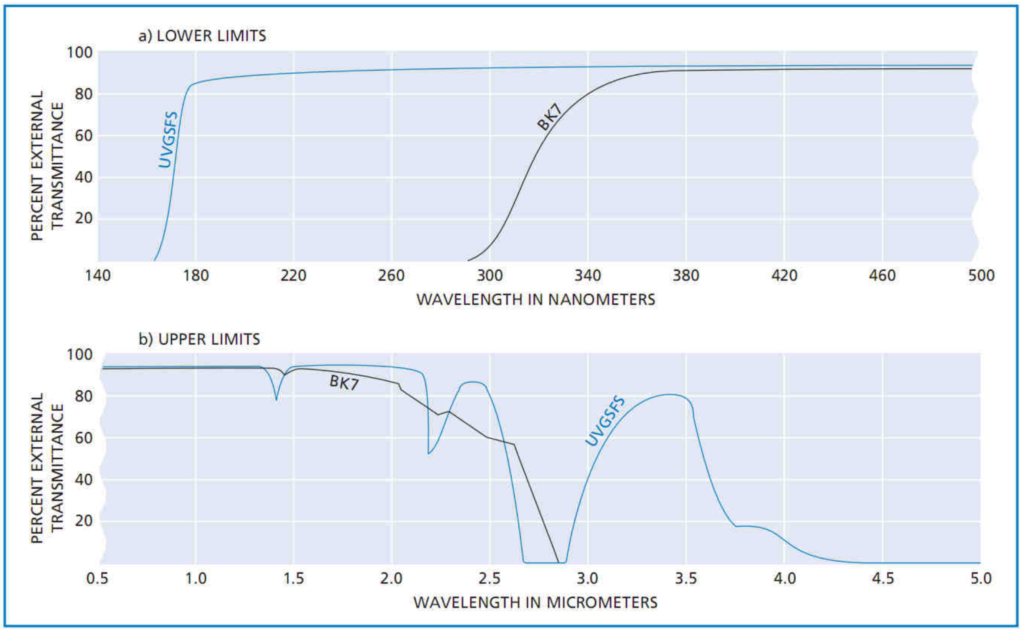
- photo-adaptater (nosepiece) to 1.25” or 2” to T2
- Barlow lens + T2 adapter (to get all things screwed together)
- ADC body
- Filter wheel
- Tubes adapters, extension tubes and back-focus adjusters
- Rotation system to help camera rotation without touching ADC orientation
- Planetary CCD or CMOS (monochrome) camera

Technical notes

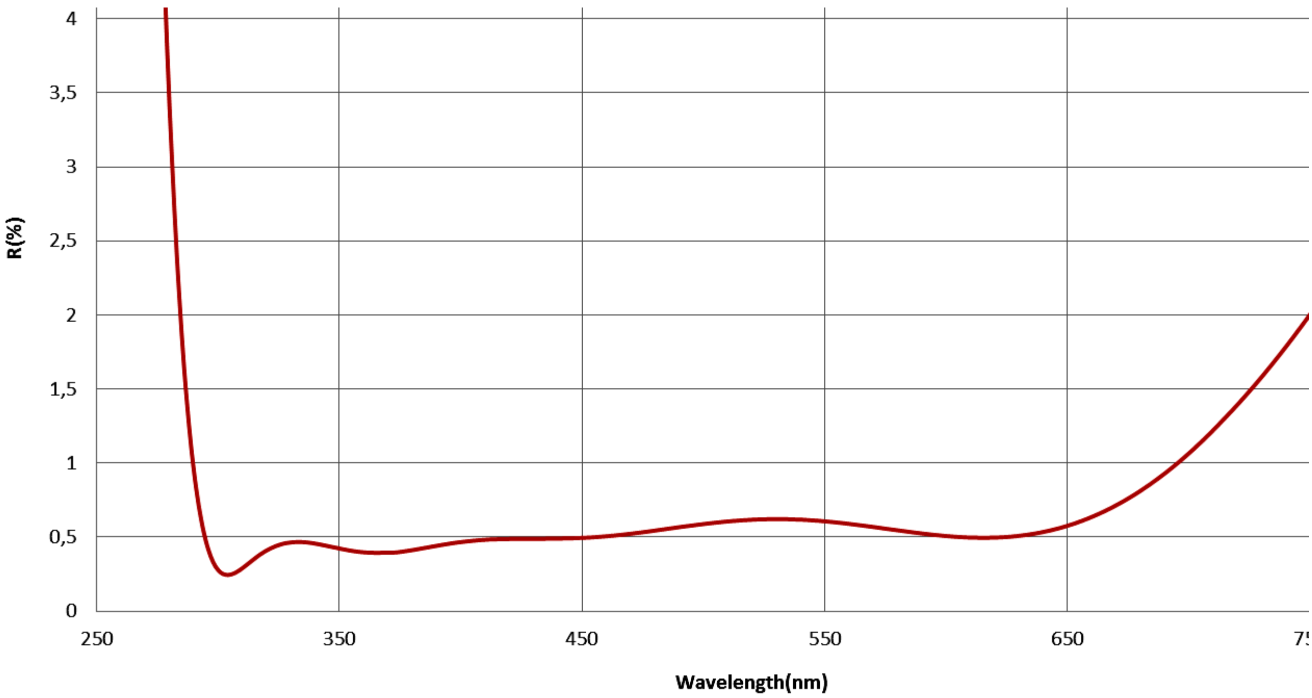
- The rings supporting the prisms are quite 'free' to be able to turn at any temperature heat as cold. However, they are more 'free' by cold weather because of a natural withdrawal of materials. Tightenable knurled knobs are done to have this freedom while ensuring a good maintenance of the prisms in position.
- The buttons are made of plastic to prevent large cold burns and to avoid damaging the body of the appliance when they are tight. They can be supplied as spare parts upon request (price: consult us).
- The use of the A.D.C. implies a slight natural wear of the knurled knobs in time. We recommend that you do not tighten too strongly, very light pressure is enough.
- The buttons are mounted on stainless steel screws to ensure a good life outdoors even in very wet weather.
- We use no fat or glue, to avoid streaks on optics problems in heat, the optical constraints or increased cold rigidity.
- Anti-glare prisms, on all optical surfaces treatments, are of a very high quality but they can be damaged by the use of chemicals. We recommend touching the least possible with optics in order to preserve their excellent properties as long as possible.
- The small size of the body of CDA avoids adding too many extension between the camera and other optical accessories (filters, Barlow lens wheels, etc...). You can add the extension between the ADC and the camera to increase his power of correction.
- The optics are inspected before delivery to ensure the optical surfaces perfect, Unscratched. Degradation of the lens after cleaning and scratches are not covered by the warranty.
- We offer a cleaning service and refurbishing of your ADC, please consult us for any request.

References

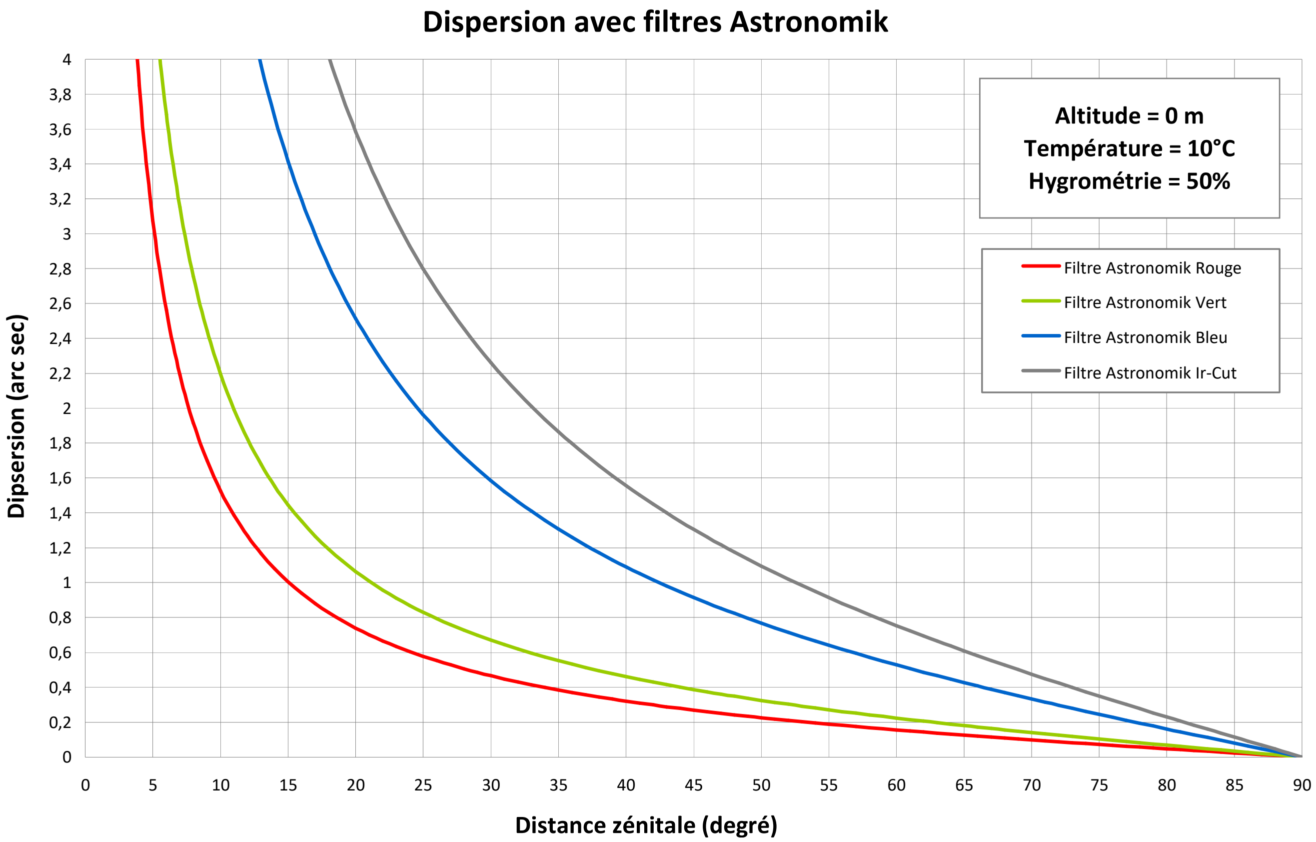
Light transmissions compared BK7 / fused silica (UVGSFS) with a thickness of 10mm. Note: Prisms of the A.D.C. measure about 3mm in height at the highest point.



The graph below shows the rate of reflection of the anti-reflective coating, which has been applied on the prisms on each surface depending on the wavelength. The A.R. U.V. treatment is optimized for a wide range of the spectrum, approximately 300-700nm:

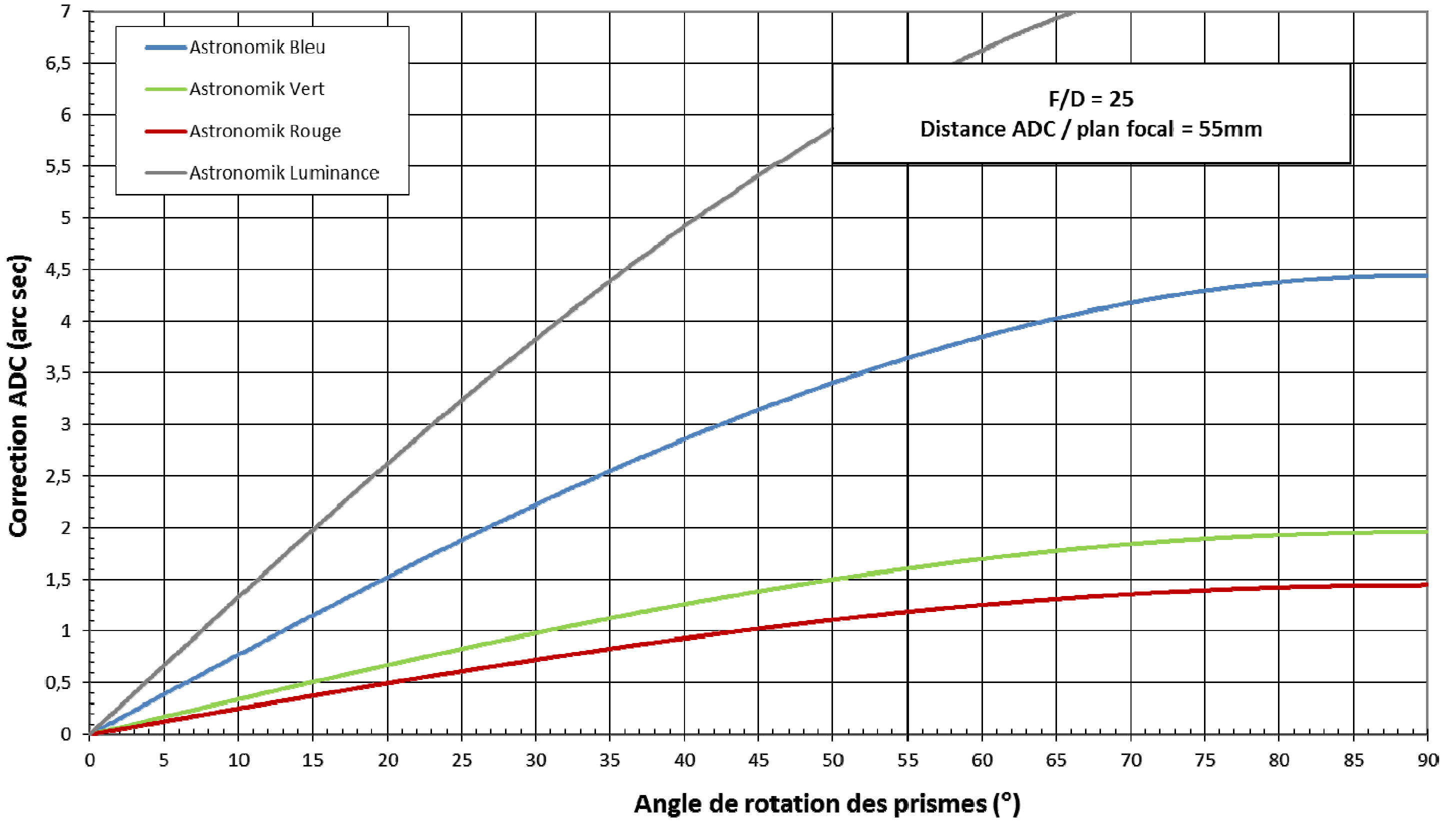


The graph below shows the natural atmospheric dispersion of the atmosphere without ADC, at the level of the sea, depending on the elevation of the stars in the sky. Traces made from Astronomik L-RGB filters.



(Données J.P. Prost).

The chart below shows the correction caused by an ADC MKII, at F/D = 25 and back-focus at 55mm from the sensor plane, depending on the wavelength (filter):



The graph below shows the residual dispersion after adjustment of the ADC: