

New release ortho extender

An extender that magnifies the central image of an aberration-free objective lens such as TOA. The newly released Ortho Extender is an enlarging lens primarily used for astrophotography that magnifies the aberrations of Takahashi's completely aberration-free objective lenses such as the TOA.

We have two types of lineup: Ortho Extender 2X with 2x magnification and Ortho Extender 4X with 4x magnification. However, the optical system to which they are installed and the celestial objects to be photographed are different, so it may be difficult to use the telescope you currently have. Please purchase according to the desired celestial body.

Ortho Extender 2X

The perfect extender for full moon photography, corona photography, and extrasolar nebula photography.

The Ortho Extender 2X, which has a magnification of 2x, is intended for photographing the entire surface of the moon, the corona during a total solar eclipse, and small celestial bodies such as extrasolar nebulae and planetary nebulae.

The recommended optical system is an objective lens of F/5 or higher with as few aberrations as possible.

Optical systems brighter than F/5, principal focus of ε , etc. will exceed the aberration correction ability, so please use it in conjunction with the ε Extender 1.5X.

When used with the FS-60C, the focal length is 710mmF/12, making it the ideal angle of view for photographing the total solar eclipse corona with a full-frame camera. Although the flatness of the image is inferior to the Extender CQ1.7X, it is convenient because it allows you to store your luggage compactly.

When using the ε -160ED, if you attach the ε Extender 1.5X and also use the Ortho Extender 2X, it will become a coma-less Newtonian reflector telescope with a focal length of 1600mmF/10.

It is a multi-telescope that can be used for a variety of purposes, with a star image that is sufficient for observing the moon and planets at high magnification and for taking enlarged pictures of extrasolar nebulae. I can say that.

When used with TOA, the optical design is designed to directly extend the focal length of the TOA optical system, which has no chromatic aberration, making it an optimal combination. When combined with TOA-130, it becomes an aberration-free optical system with a focal length of 2000mmF/15. This focal length is suitable for capturing the entire surface of the moon and strongly magnifying images of extrasolar nebulae. Note that this does not have

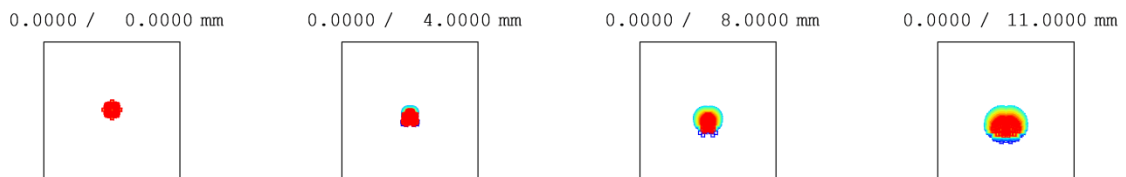
much of an effect when photographing the entire surface of the moon, but when used for star field photography, if a 35 flattener is also used, distortion of the star image due to coma aberration in the periphery will be reduced.

Mounting on the lens barrel side is an M43P0.75 screw-in type, and mounting on the camera side is a combination of an M42P0.75 screw-in type and a ϕ 31.7 sleeve insertion type, making it convenient for camera mounting and visual viewing.

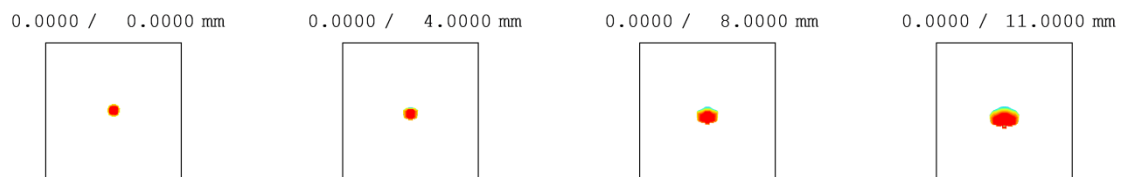
In addition, the set comes with a small burr tube with an optical path length of 20 mm and a burr tube with an optical path length of 40 mm, so if you replace them according to the system chart, you can use a single-lens reflex camera, use an atmospheric difference correction prism, or use a zenith prism. It can be used at an appropriate magnification of approximately 2x for combined visual observation.

Example of spot diagram with 2x magnification

ϵ -160ED+ ϵ Extender 1.5X+Ortho Extender 2X Focal length 1600mmF/10



TOA-130+35 Flattener + Ortho Extender 2X Focal length 2000mmF/15



*Frame is 200 microns, synthesizes 11 wavelengths from 436nm to 656nm

Ortho Extender 2X Optical specs

Lens configuration: 2 elements in 1 group

Magnification rate 2x

Image circle ϕ 30mm (good image range)

Lens barrel side installation M43P0.75 screw

Camera side installation M42P0.75 screw/ ϕ 31.7 sleeve insertion

Ortho Extender 4X

Extender perfect for zooming in on planets and moon craters

The Ortho Extender 4X, which has a magnification of 4x, is intended to be attached to a telescope with an aperture ratio of F/8 to F/10 and used to take enlarged images of planets and craters on the moon.

There are two ways to take enlarged images of planets and the moon: by enlarging the eyepiece, and by extending the focal length with a barrow lens or extender lens. Eyepiece lenses are optically designed for visual viewing purposes, so when used for photography, they are inferior to extenders optically designed for photography in both central and peripheral aberrations.

The newly released Ortho Extender 4X is optically designed to magnify the TOA aberration-free image by 4 times, so if you attach the Ortho Extender 4X to the TOA-130 and set the focal length to 4000mmF/30, you can use a ϕ 20mm The angle of view of the Four Thirds is converged within the Airy disk, making it an almost aberration-free magnification photography method.

The mounting method and accessories are the same as the Ortho Extender 2X, with the lens barrel side mounting using an M43P0.75 screw, and the camera side mounting using a combination of M42P0.75 camera screw and ϕ 31.7 sleeve, and an optical path length of 20mm. By replacing the small burr tube and the 40mm optical path length burr tube according to the system chart, it is possible to maintain approximately the appropriate magnification of 4x even when using a single-lens reflex camera or an atmospheric difference correction prism.

Ortho Extender 4X Optical specs

Lens configuration 4 elements in 2 groups

Magnification rate 4x

Image circle ϕ 30mm (good image range)

Lens barrel side installation M43P0.75 screw

Camera side installation M42P0.75 screw/ ϕ 31.7 sleeve insertion

Example of spot diagram with 4x magnification

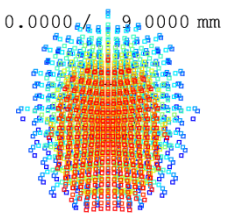
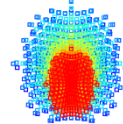
TOA-130+ Ortho Extender 4X Focal length 4000mmF/30

0.0000 / 0.0000 mm 0.0000 / 3.0000 mm 0.0000 / 6.0000 mm 0.0000 / 9.0000 mm



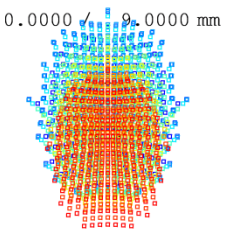
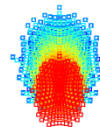
TOA-130+Abbe-12.5 enlarged photography Focal length 4000mmF/30

0.0000 / 0.0000 mm 0.0000 / 3.0000 mm 0.0000 / 6.0000 mm 0.0000 / 9.0000 mm



TOA-130+TPL-12.5 Enlarged Shooting Focal Length 4000mmF/30

0.0000 / 0.0000 mm 0.0000 / 3.0000 mm 0.0000 / 6.0000 mm 0.0000 / 9.0000 mm



*Circle is an Airy Disc. Combines 11 wavelengths from 436nm to 656nm.