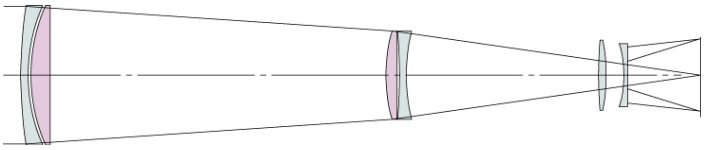
Borg EDF4 Focal Reducer [7704]

The Borg EDF4 focal reducer, part number 7704, is designed for use as a photographic field reducer for digital sensors up to 35mm film-frame size (24x36mm). It is suitable for refractors with focal lengths between 500 and 1000mm. It features a built-in camera rotator ring for easy adjustment of composition, wide non-vignetting light path, and filter port.

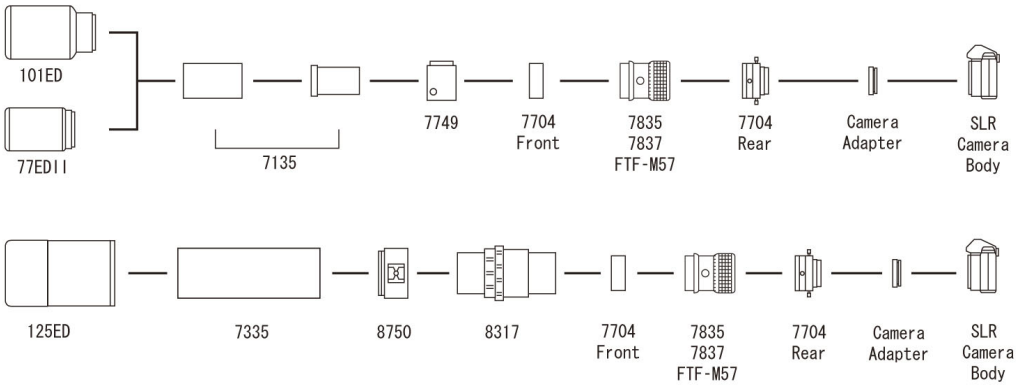


ED elements are shaded in pink.

In conjunction with the Borg 76/77, 100/101, 125 ED, and 150ED objectives, the reducer creates a highly corrected, 6-element (2 ED elements) astrographic system, specifically optimized for the demanding requirements of digital imagers.

Setup and Configuration

The EDF4 focal reducer is designed to be attached to a Borg focuser (models 7835, 7837, or FTF-M57). The focal reducer comes in two sections. The section designated as the “front” section threads into the objective side of the focuser, and the “rear” section threads into the camera side of the focuser.

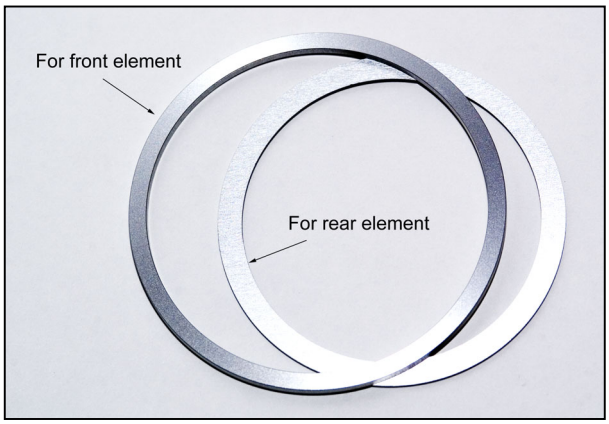


For this optical design, two distances are critical for achieving optimum performance:

- Distance between the two optical components of the reducer
- Distance between the rear component and the imaging plane

To achieve the optimal distance for the different objectives in the Borg line, two sets of spacers are supplied. The set with the larger diameter is used on the front element of the reducer, between the focuser and the front element. The smaller diameter set is used for the rear element, between the camera adapter* and the rear element. Each set consists of one thin spacer and one thick spacer.

* Compatible camera adapters:
- 5002 - Pentax K
- 5003 - Nikon
- 5004 - Canon FD
- 5005 - Canon EOS
- 5007 - Minolta Alpha
- 5009 - Yashica & Contax



The selection of the proper spacer is determined using the following table:

Objective	Front spacer	Rear spacer
Borg 76ED/77ED/77EDII or equiv. 500mm FL scope	(None)	Thick spacer
Borg 100ED/101ED or equiv. 640mm FL scope	(None)	Thin spacer
Borg 125EDF6.4 or equiv. 800mm FL scope	Thin spacer	(None)
Borg 150ED or equiv. 1000mm FL scope	Thick spacer	(None)

Unlike SLR and DSLR cameras, astronomical CCD cameras are not designed to a standard distance between the camera interface and imaging sensor. Consequently, a custom adapter often has to be made to properly attach a CCD camera to the focal reducer. The critical spacing to maintain is 55mm between the sensor and the shoulder (or rear spacer, if required) of the focal reducer coupling.

In some cases, standard Borg accessory parts can be combined to reach the proper distance. Contact Hutech for guidance on connecting your specific camera to the focal reducer.

Filter Attachment

Provision for the attachment of filters is via a 55mm diameter filter thread on the front reducer lens assembly (for semi-permanent filter installation).

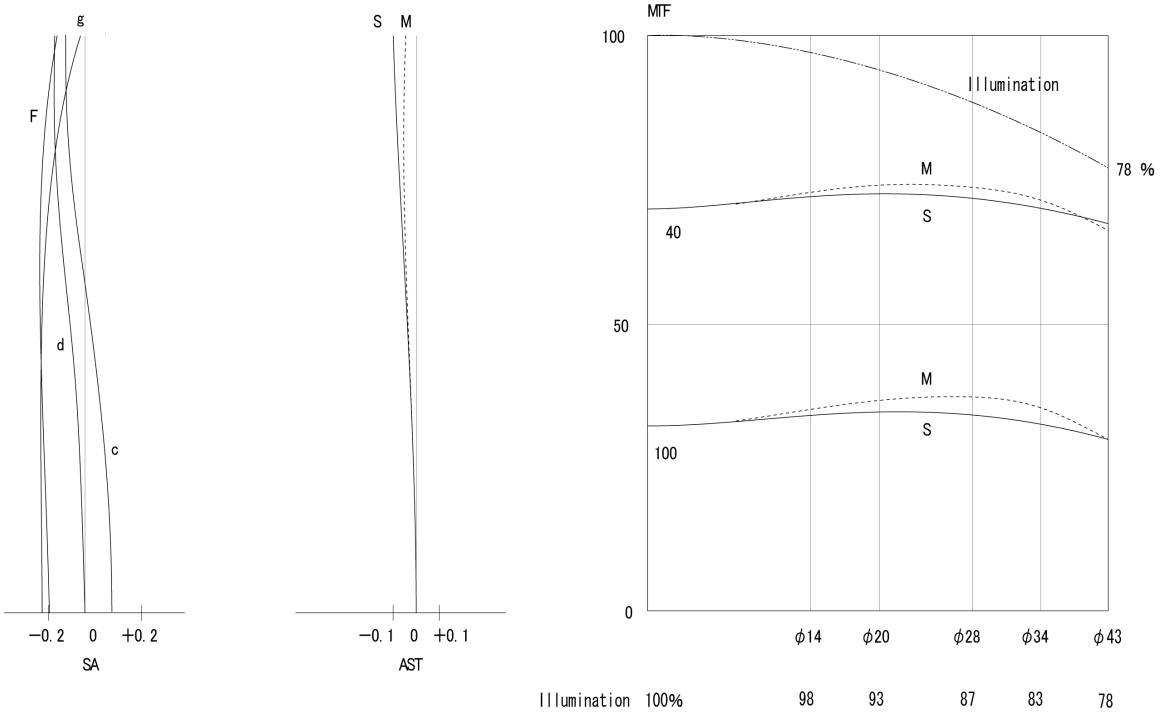
Filters that need to be often changed may be mounted in an easily removed filter carrier that can accommodate 52mm or 48mm filters. 48mm filters require the used of the supplied step-down adapter ring. When inserting or removing filters from the carrier, use caution to avoid cross-threading or bending the carrier. Additional filter holders [#7518] are available for quick changes between filters and are recommended to avoid unnecessary insertion and removal of filters from their holders.

A camera shutter cable can be attached to the focal reducer assembly filter ejection port to make removal of the filter holder a simple operation that does not disturb the optical train. If the ejection port is not being used, leave the supplied screw attached to prevent light and dust from entering the assembly.

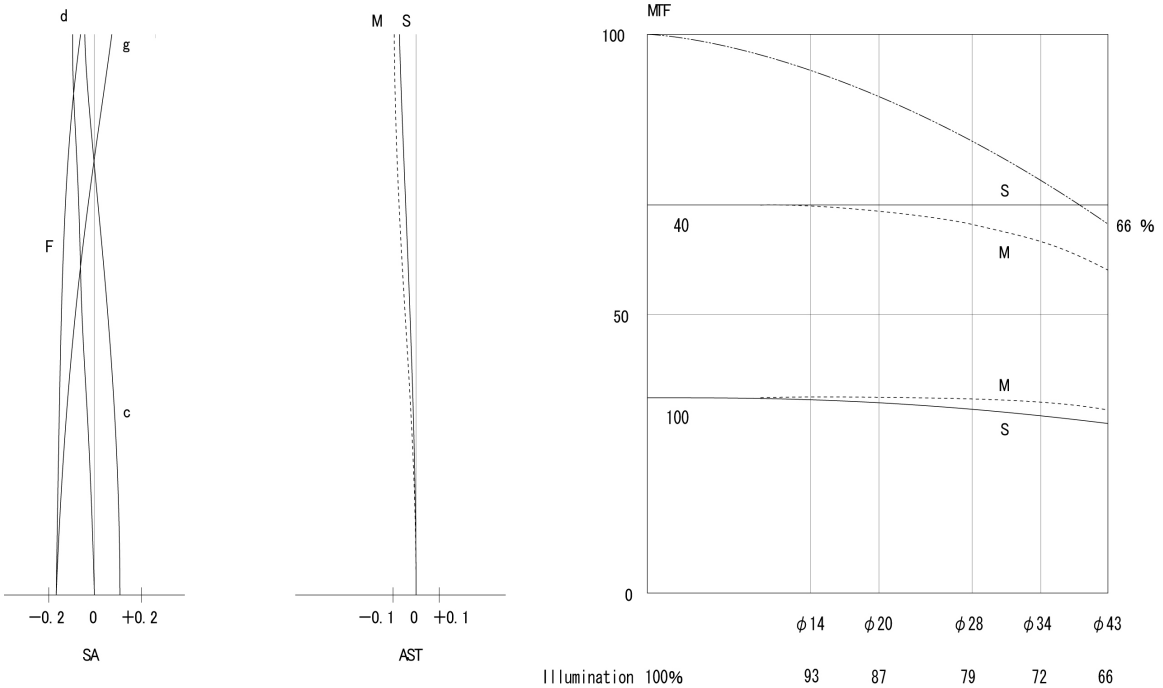
Camera Rotator

The camera rotator allows just the imager to be rotated so that the best composition can be achieved, or to allow an imaging system with a separate guide chip to be positioned on a guide star. Loosen the 3 thumbscrews slightly to rotate the imaging camera and then lock them when the camera has been repositioned. To allow for smooth operation, the rotator parts are lightly coated with a special grease. Do not allow the reducer to be subjected to high temperatures for extended periods (e.g. in a hot car). Doing so may allow the grease to flow onto the optics and degrade performance. Also, do not attempt to add or replace the lubricant. A special formulation is applied at the factory.

Optical Performance Plots



Borg 77ED + 7704 Focal Reducer



Borg 101ED + 7704 Focal Reducer