INSTRUCTION MANUAL

80mm f/7.5 ED Refractor

#9895 Optical Tube Assembly

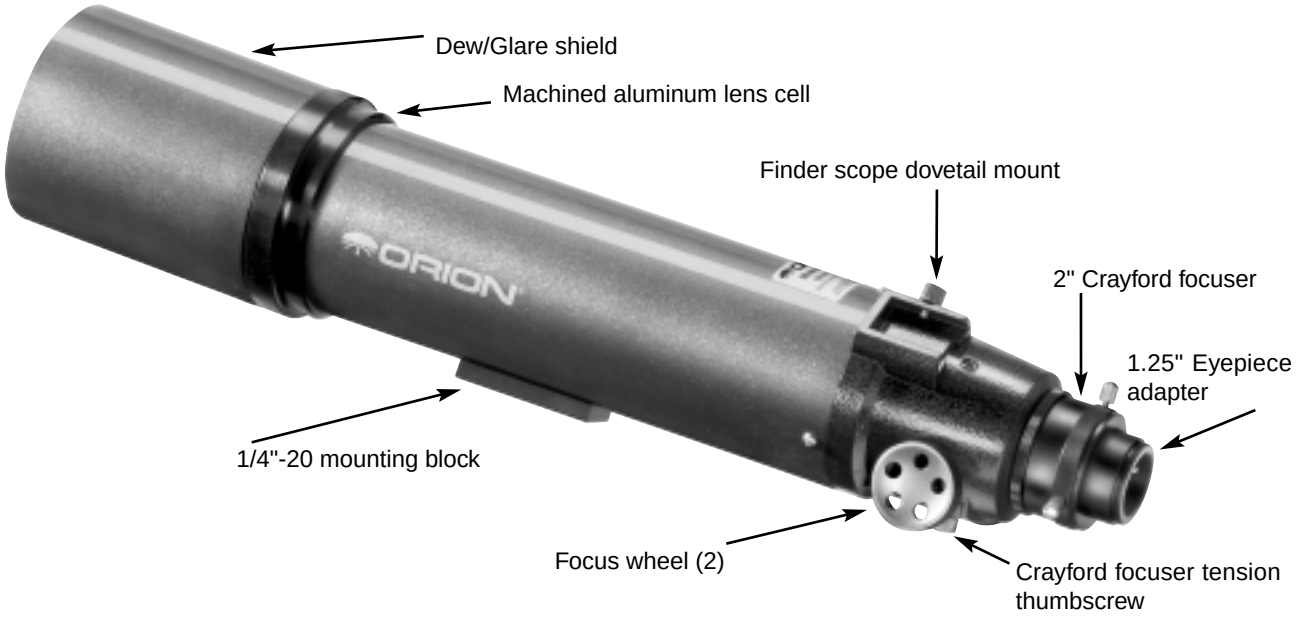

Figure. The 80mm f/7.5 ED Refractor optical tube assembly

Congratulations on your purchase of an Orion 80mm f/7.5 ED refractor optical tube. Your 80mm f/7.5 ED has been designed with high quality optics and excellent mechanical construction. The ED glass in the objective lens means you'll enjoy images with far less color distortion than those seen in a standard refractor, and the smooth Crayford focuser will make getting sharp images a breeze. These instructions will help you set up and use your telescope tube.

Getting Started

The 80mm f/7.5 ED comes fully assembled from the factory. The telescope's optics have been installed and collimated, so you should not have to make any adjustments to them.

Please keep the original shipping box! In the unlikely event you should need to ship the telescope back to Orion for warranty repair service, you should use the original packaging. The box also makes a very good container for storing the telescope when it is not in use.

Attaching the Refractor to a Tripod or Mount

The 80mm f/7.5 ED can be attached to a tripod or mount by the use of the 1/4"-20 mounting block. The 1/4"-20 shaft of a sturdy camera tripod will thread into the hole on the mounting block on the underside of the optical tube.

Optional tube rings can also be used to mount the scope to a telescope mount. Tube rings with an inner diameter of 100mm (3.9"), such as Orion item #7371, are needed. If you are using tube rings, you should first attach them to your telescope mount and then lay the optical tube in the tube rings.

Use of Optional Eyepieces, Diagonal, and Finder Scope

The 80mm ED does not come with a finder scope, diagonal or eyepieces in order to grant the user the greatest versatility in customizing the instrument to suit their tastes. However, certain rules for using accessories still apply.

Any Orion finder scope with a dovetail bracket can be used with the 80mm f/7.5 ED. Simply unthread the thumbscrew on the dovetail mount (Figure) and insert the assembled finder scope and dovetail bracket. Retighten the thumbscrew. Finder scopes that do not use a dovetail bracket will need to be attached by other means.

The 80mm ED can use almost any 1.25" diagonal and eyepiece. Please note that the telescope will not come to focus without the use of a diagonal or extension tube. To install a diagonal, unthread the thumbscrew on the 1.25" adapter (Figure) until it is flush with the interior of the adapter. Insert the diagonal or extension tube and secure it with the thumbscrew. Then insert the eyepiece into the diagonal or extension tube and secure it with the thumbscrew.

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Use of 2" Eyepieces and Diagonals

A feature of the 80mm ED is its ability to also use 2" barrel-diameter eyepieces and diagonals. At low magnifications, 2" eyepieces can give a wider field of view than standard 1.25" eyepieces. This is especially desirable for observing deep-sky objects, as many of them appear quite large, but faint. As with 1.25" eyepieces, the 80mm ED will not reach focus with the 2" eyepieces unless a 2" diagonal or extension tube is used.

To use 2" eyepieces, simply loosen the two large thumbscrews on the 2" adapter (Figure). Once these thumbscrews are loosened, the entire back end of the focuser, including any 1.25" diagonal and eyepiece that may be attached, comes off, exposing the 2" diameter focuser drawtube. Now, insert your 2" diagonal into the drawtube and secure with the two thumbscrews loosened previously. Insert a 2" eyepiece into the diagonal, secure it in place with the thumbscrew on the diagonal, and you're ready to observe.

Note About the 2" Crayford Focuser

The 80mm ED comes equipped with a Crayford focuser. The Crayford design allows for smooth, precise focusing without any image shift that typical rack-and-pinion designs experience. If you find that the focus wheels are too tight or too loose, you can make adjustments to the focuser tension by using the focuser tension thumbscrew located on the bottom of the optical tube, between the focus wheels. Make adjustments to this thumbscrew until the focuser motion feels comfortable. Please note that you must have at least some tension applied to the focuser drawtube or else it will not move when you turn the focus wheels.

Calculating Magnification (Power)

It is desirable to have a range of eyepieces of different focal lengths, to allow viewing over a range of magnifications. To calculate the magnification, or power, of a telescope, simply divide the focal length of the telescope by the focal length of the eyepiece:

Telescope F.L. ÷ Eyepiece F.L. = Magnification

For example, the 80mm ED, which has a focal length of 600mm, used in combination with a 25mm eyepiece, yields a power of

600 ÷ 25 = 24x.

Every telescope has a useful limit of power of about 45x-60x per inch of aperture. Claims of higher power by some telescope manufacturers are a misleading advertising gimmick and should be dismissed. Keep in mind that at higher powers, an image will always be dimmer and less sharp (this is a fundamental law of optics). The steadiness of the air (the "seeing") will limit how much magnification an image can tolerate.

Always start viewing with your lowest-power (longest focal length) eyepiece in the telescope. After you have located and looked at the object with it, you can try switching to a higher-power eyepiece to ferret out more detail, if atmospheric conditions permit. If the image you see is not crisp and steady, reduce the magnification by switching to a longer-focal-length eyepiece. As a general rule, a small but well-resolved image will show more detail and provide a more enjoyable view than a dim and fuzzy, overmagnified image.

Note About Chromatic Aberration

Chromatic aberration literally means color distortion. Whenever light passes through one material to another, light of different wavelengths (color) is bent by different amounts. This is a problem that plagues refractor-type telescopes, since light passes through both air and glass to form an image. Most astronomical objects emit a spectrum comprised of many different wavelengths of light, so each wavelength will be bent by a slightly different amount when passing through a lens. This results in each color of light reaching precise focus at a slightly different point, which reduces image sharpness.

The 80mm ED is designed to minimize chromatic aberration. The objective lens comprises two individual lens elements, one of which is made of "ED" (Extra-low Dispersion) glass, a special type of glass that has superior refractive properties compared to normal types of glass. The use of this ED glass minimizes the amount of chromatic aberration, resulting in a cleaner, sharper image compared to that in standard achromatic telescopes.

Photography with the 80mm ED Refractor

With an optional camera adapter, the 80mm f/7.5 ED becomes a 600mm f/7.5 telephoto lens for a single-lens reflex camera. For long-distance terrestrial or astronomical photography, you need only a T-ring for your particular camera model. The T-ring attaches to your camera and threads onto the 80mm ED's focuser drawtube, coupling the camera body to the telescope.

Use the camera's viewfinder to frame the picture. Use the telescope's focuser to focus the image. Tighten the focuser tension thumbscrew to make sure the camera does not slip out of focus.

You may want to consider using a remote shutter release instead of the shutter release on the camera. Touching the camera can vibrate the system and blur the resulting photographic image. Also, be sure to use a solid tripod.

Care & Maintenance

Give your telescope reasonable care and it will last a lifetime. When not in use, keep its dust cover on as well as the dust cap on the eyepiece opening. Store it indoors or in a dry garage. Do not leave the telescope outside except when using it. The optical tube is aluminum and has a smooth painted surface that should resist scratches and smudges. If a scratch does appear on the tube, it will not harm the telescope. Smudges on the tube can be wiped off with standard household cleaners such as Windex or Formula 409.

Any quality optical lens tissue and cleaning fluid specifically designed for multi-coated optics can be used to clean the telescope's objective lens as well as the lenses of eyepieces and finder scopes. Never use regular glass cleaner or cleaning fluid designed for eyeglasses. Before cleaning with fluid and tissue, however, blow any loose particles off the lens with a blower bulb or compressed air, or lightly brush the lens with a soft camel hair brush. Apply some cleaning fluid to a tissue, never directly on the optics. Wipe the lens gently in a circular motion, then remove any excess fluid with a fresh lens tissue. Oily fingerprints and smudges may be removed using this method. Use caution; rubbing too hard may scratch the lens! Clean only a small area at a time, using a fresh lens tissue on each area. Never reuse tissues.

Specifications

Optical tube: Seamless aluminum

Objective lens diameter: 80mm (3.1")

Objective lens: Achromatic, rear element made of ED glass, air-spaced

Objective lens coating: Fully multi-coated

Lens cell: Machined aluminum

Focal length: 600mm

Focal ratio: f/7.5

Focuser: Crayford, accepts 1.25" or 2" accessories and camera T-Ring

Mounting: 1/4"-20 mounting block, optional tube rings

Weight: 5 lbs. 11 oz.

Length: 23.5"

One-Year Limited Warranty

This 80mm f/7.5 ED Refractor is warranted against defects in materials or workmanship for a period of one year from the date of purchase. This warranty is for the benefit of the original retail purchaser only. During this warranty period Orion Telescopes & Binoculars will repair or replace, at Orion's option, any warranted instrument that proves to be defective, provided it is returned postage paid to: Orion Warranty Repair, 89 Hangar Way, Watsonville, CA 95076. If the product is not registered, proof of purchase (such as a copy of the original invoice) is required.

This warranty does not apply if, in Orion's judgment, the instrument has been abused, mishandled, or modified, nor does it apply to normal wear and tear. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. For further warranty service information, contact: Customer Service Department, Orion Telescopes & Binoculars, P. O. Box 1815, Santa Cruz, CA 95061; (800) 676-1343.

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