

# INSTRUCTION MANUAL

## ESPRIT 80 ED Super APO



  
**Sky-Watcher®**  
*Be amazed.*

SL140613

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## Introduction

### *The spirit of perfection, by Sky-Watcher*

Designed with the discerning astronomer in mind, Sky-Watcher top-of-the-line Esprit refractors deliver the kind of imaging performance one would expect from telescopes costing much more. With their three-element air spaced objective lens design, false color is completely eliminated, yielding exceptional contrast and sharpness.

The 2.7" CNC machined 1:11 rotatable dual speed linear power focuser provides a smooth, rock-solid focusing with zero image shifts. The Esprit ED 80mm refractor comes with a 9 x 50 right angle finder scope, 2-inch Star diagonal, EQ5 (Vixen-style) dovetail, eyepiece and padded case. Everything you need to get out under the stars.

The 2-element thread-on 48mm field flattener guarantees excellent field flatness across the entire 33 mm imaging plane. Its oversized lenses ensure a larger and clearer aperture and also extremely minimized halation.

#### *Quick overview:*



- 80 mm apochromatic, 3-element refractor
- 400 mm (f/5)
- Metallic high-transmission lens coatings
- 2.7" CNC machined 1:11 dual-speed focuser
- Zero color fringing even on bright objects
- 33 mm image circle
- Knife-edge Baffled Optical System
- 2" Diagonal with dielectric coatings
- 9x50 erect-image 90° finder scope
- EQ5 dovetail (Vixen style) bar
- Aluminum foam lined case
- Thread-on field flattener
- APS-C corrected focal plane



- NEVER USE YOUR TELESCOPE TO LOOK DIRECTLY AT THE SUN. PERMANENT EYE DAMAGE WILL RESULT.
- NEVER USE AN EYEPIECE-TYPE SOLAR FILTER.
- NEVER USE YOUR TELESCOPE TO PROJECT SUNLIGHT ONTO ANOTHER SURFACE; THE INTERNAL HEAT BUILD-UP WILL DAMAGE THE TELESCOPE OPTICAL ELEMENTS.
- USE A PROPER SOLAR FILTER FIRMLY MOUNTED ON THE FRONT OF THE TELESCOPE FOR VIEWING THE SUN.
- WHEN OBSERVING THE SUN, PLACE A DUST CAP OVER YOUR FINDERSCOPE OR REMOVE IT TO PROTECT YOU FROM ACCIDENTAL EXPOSURE.
- NEVER LET A TELESCOPE POINTING THE SUN UNATTENDED.

# Getting started

## Parts description



- 1. Dew cap
- 2. EQ5 (Vixen) dovetail bar
- 3. 9x50 erect-image 90° finder scope
- 4. 2.7" 1:11 dual-speed focuser
- 5. 2" dielectric diagonal
- 6. 2" eyepiece f= 28mm

## Unpacking the telescope

Your telescope is inside the sturdy aluminum padded case, designed to securely carry the telescope and the tube rings.



The case contains and protects the telescope and its accessories. Once open you will find:



- 1. The telescope with dew cap and EQ5 (Vixen style) dovetail bar.
- 2. The 9x50 erect-image finder scope with tube rings and mount.
- 3. The 2" (50.8mm) diagonal.
- 4. The 2-element thread-on field flattener (used for photography only), guarantees excellent field flatness across the entire 33mm imaging plane, allowing picturing the sky with large sensors.  
**Note:** A ring spacer of 11mm is attached to the field flattener body. Its usage will be discussed on page 7 and 8.
- 5. 2" eyepiece, f= 28mm.
- 6. Thread-on field flattener adaptor, used to install the field flattener on the focuser's drawtube.



**Some parts may be optional, depending on the dealer's country. Please check with him if any doubt.**

## *Preparing the telescope for an observation*



**A.** Upon delivery, and when not used, the telescope and its accessories are inside the aluminum padded case. Unpack the instrument...



**B.** The instrument is ready to be placed on the mount, via the EQ5 (Vixen style) dovetail bar. Please refer to your mount manual for proper and secure installation.



**C.** The 9x50 erect-image finder scope is a small fixed magnification scope mounted on the optical tube. When it is correctly aligned with the telescope, objects can be quickly located and brought into the field of telescope (see also "*Aligning the finder scope*" chapter, on next page)

To install the finder scope on the telescope insert the positive dovetail of the finder scope support inside the negative dovetail mounted on the focuser, as shown in picture.

## *Cooling the telescope*

Telescopes require time to cool down to outside air temperature. This may take longer if there is a big difference between the temperature of the telescope and the outside air. This minimizes heat wave distortion inside telescope tube (tube currents). Your telescope would require at least 15 minutes cooling off to outside conditions. Tip: use this time for planning your session and mount accessories.

## ***Aligning the finder scope***

The 9x50 erect-image finder scope is a small fixed magnification scope mounted on the optical tube. When it is correctly aligned with the telescope, objects can be quickly located and brought to the center of the field.

The alignment should be done at first use and over time if the alignment is no more accurate.



**Alignment is best done outdoors in day light when it's easier to locate objects**



If it is necessary to refocus your finder scope, sight on an object that is at least 500 meters (or yards) away. Loosen the locking ring by unscrewing it back towards the bracket. The front lens holder can now be turned in and out to focus. When focus is reached, lock it in position with the locking ring.



Choose a distant object that is at least 500 meters (or yards) away and point the main telescope at the object. Adjust the telescope so that the object is in the center of the view in your eyepiece.



If you are using the star diagonal the image will be left/right inverted, like images in a mirror.



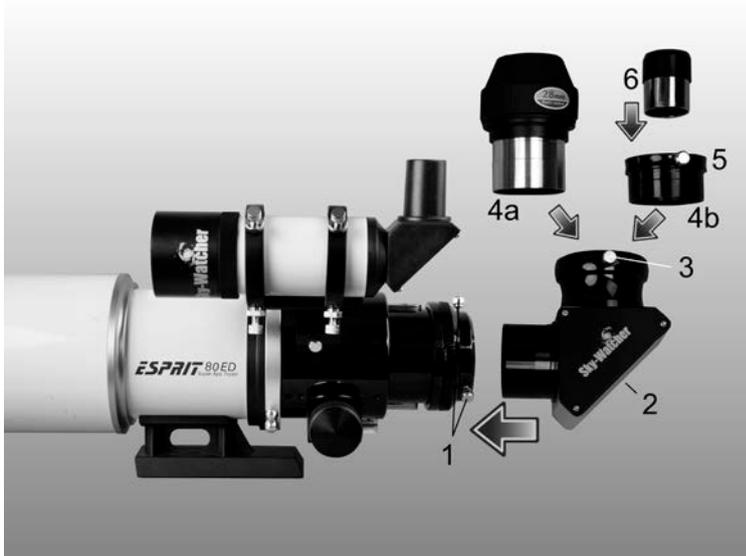
Having an erected image, the view you have in the finder scope has the same orientation as the landscape.

Check the finder scope to see if the object, centered in the main telescope view, is centered on the crosshairs. If not unscrew the three blocking rings on the rear ring, then adjust the three small screws to center the finder scope.

Do not over tighten the screws when aligning the finder scope. When the finder scope is correctly oriented, screw the three blocking rings in position.

## Using the telescope for visual observation

### Inserting the eyepiece



- Loosen the two thumbscrews (1) on the end of the focuser tube.
- Insert the 2" diagonal (2) into the focus tube and re-tighten the thumbscrews (1) to hold the diagonal in place.
- Loosen the diagonal's screw (3).
- For 2" eyepieces (4a), insert it into the diagonal and secure it by re-tightening the thumbscrew (3).
- For 1.25" eyepieces first insert the 2" to 1.25" adapter (4b) into the diagonal and secure by re-tightening the screw (3). Loosen the adapter's screw (5) and insert the 1.25" eyepiece (6) inside the adapter ring, then secure it by re-tightening the screw (5).

### Focusing



- Make sure the locking lever below the focuser (1) is unlocked (position as shown in picture).
- Slowly turn the focus knobs (2) one way or the other, until the image in the eyepiece is nearly sharp.
- To finely focus the image turn the 1:11 knob one way or the other until the image is perfectly sharp (3).
- Lock the screw below the focuser (1) if a heavy load is attached (pull the lever at 90°).

The image usually has to be finely refocused over time, due to small variations caused by temperature changes. This often happens when the telescope has not yet reached outside temperature.

Refocusing is almost always necessary when you change an eyepiece.



When looking through a diagonal, the image is inverted left to right, as an image in a mirror. This is normal and has no incidence for astronomical observations.

If you plan to do terrestrial observation often, like bird watching, optional image-erecting devices such as the Amici prism or the erected 90° diagonal may be the right tool.

Your reseller will be glad to advise you about the best optional part that can be used with your telescope.

# Using the telescope for prime focus imaging



Before installing the field flattener onto the drawtube of the focuser, the 2" ring adaptor (2) needs to be unscrewed and removed.

In order to easily unscrew the ring, hold with one hand the ring (1) at the end of the drawtube and then unscrew the 2" ring adaptor (2) with the other hand.

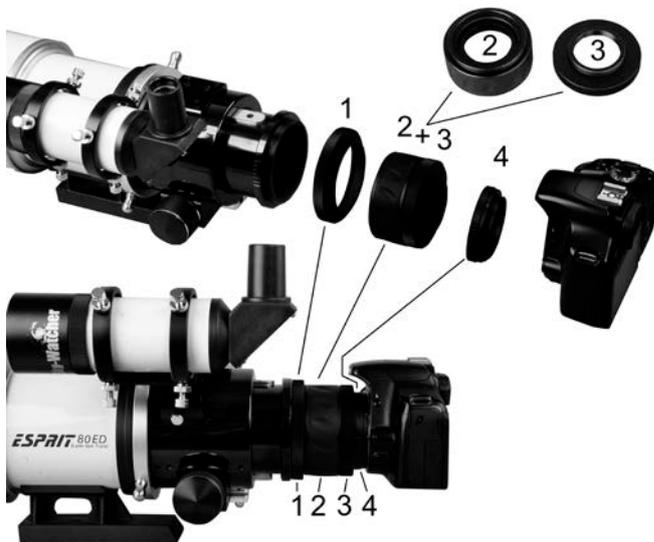


The Sky-Watcher ESPRIT 80 Field flattener has been specifically designed for your telescope. It guarantees excellent field flatness across the entire 33 mm imaging plane and ensures full illumination with extremely minimized halation and zero color fringing even on bright objects.

*No "universal" field flattener available on the market will deliver the premium results achieved with the Sky-Watcher ESPRIT 80 Field flattener which is designed exclusively for this telescope.*

## Installing the field flattener and a DSLR (Digital Single-Lens Reflex) camera

**Note:** Inside the box the 6mm ring spacer (3) is assembled with the field flattener body (2). When assembled, the two parts may look as if there were only one piece. When taking pictures with a DSLR camera it should stay assembled.



1. Screw the drawtube adaptor (1) at the end of the focus tube.
2. Screw the field flattener (2) onto the drawtube adaptor (1).
3. If not yet done, screw the extender tube (3) onto the field flattener (2).
4. Screw the enlarged 48mm T-Ring (4) onto the extender tube (3).



The enlarged 48mm T-Ring **may not be included with your telescope** and should match your DSLR camera's manufacturer and model. Please check with your reseller to get the correct 48mm Enlarged T-Ring for your DSLR camera.

5. Install your DSLR camera on the 48mm enlarged T-Ring (4).



In order to get the premium results the field flattener for ESPRIT 80 can deliver the distance between the last lenses to the sensor should be exactly 66mm. This distance is called the field flattener "back focus".

The rings are designed to provide 66mm of back focus with any DSLR camera. Modifications to this layout, i.e. by adding a radial guider, will lead to blurry stars images in the field edges.

### ***Installing the field flattener and a CCD (Charge-Coupled Device) camera***

Installing an astronomical CCD camera and its accessories (filter wheel, radial guider...) behind the field flattener is not as straightforward as installing a DSLR camera. All DSLR cameras have the exact same distance from the front side of the T-Ring adapter to the sensor, thus share the same extension rings to ensure the 66mm back focus distance.

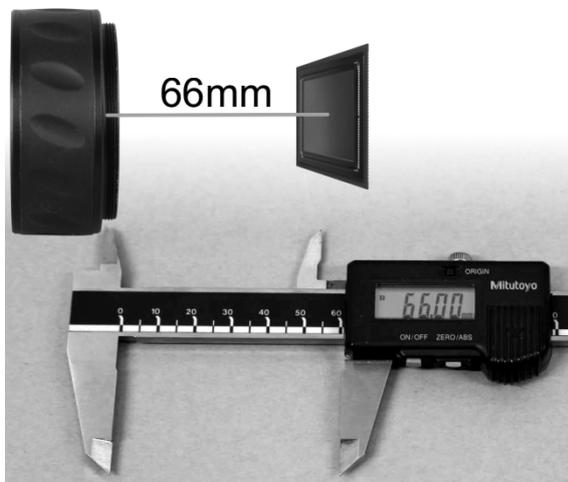
CCD cameras differ from one model to another, even in the same brand name, by the threads used and the body-to-sensor distance. Accessories also have different possible threads and depths, thus the combination of a CCD camera and its accessories can have any total length and any coupling thread.

A custom coupling ring is needed in order to assemble the CCD camera and its accessories (called the "optical train") to the telescope's field flattener. The custom ring should be machined\* to have:

- 1) A female M62x1 thread, to screw and secure the ring to the field flattener exit.
- 2) A thread compatible with the first component of the optical train.
- 3) A length to ensure that the distance from the back of the field flattener to the CCD sensor is exactly 66mm.



**Note:** Inside the box the 11mm ring spacer is assembled with the field flattener body. When assembled, the two parts may look as if there were only one piece. When taking pictures with a CCD camera it can be useful to remove the 11mm spacer ring to gain 11mm additional back focus distance



The 66mm distance is measured from the edge marking the start of the male thread on the field flattener, to the CCD sensor (See picture on the left).

Most CCD cameras have also the distance from their body thread to CCD sensor noted in the manual, thus evaluating the length of the custom ring you need can be precisely evaluated.

\* Refer to your local dealer about custom ring supply.

## Installing the field flattener and a CCD camera - continued



1. Screw the drawtube adaptor (1) at the end of the focus tube.
2. Screw the field flattener (2) onto the drawtube adaptor (1).
3. Screw the custom ring (3) onto the field flattener (2).



The custom ring needs to be sturdy enough to secure the optical train to the field flattener.

4. Screw your optical train to the custom ring (3).

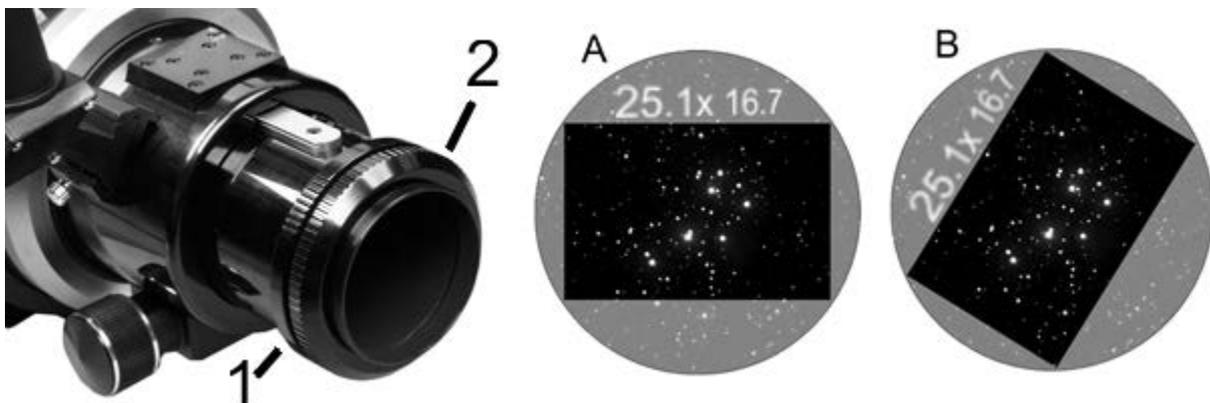
## Focusing



- Make sure the locking lever below the focuser (1) is unlocked (position as shown in picture).
- Slowly turn the focus knobs (2) one way or the other, until the image in the eyepiece is nearly sharp.
- To finely focus the image turn the 1:11 knob one way or the other until the image is perfectly sharp (3).
- Lock the screw below the focuser (1) if a heavy load is attached (pull the lever at 90°).

The image usually has to be finely refocused over time, due to small variations caused by temperature changes. This often happens when the telescope has not yet reached outside temperature.

## Framing the picture



When the object you want to picture is in the middle of the circular 33mm field, most often its orientation on the rectangular camera APS-C sensor is not what you expected (figure A). You can easily reframe the picture on the camera sensor by unscrewing the blocking ring (1) at the end of the focuser drawtube, then turning the adapter ring (2) with all the optical train until the framing suits your needs (figure B). When done screw the ring (1) to lock position, and you are ready to picture the sky.

## Useful tips for all observations



### ***Removing the finder scope***

During an observation, when the desired target is acquired, it is possible to remove the finder scope from its support. When needed the finder scope can be inserted again.

This can be useful when the observer's head is in a position where the finder scope becomes an obstacle to observation.



### ***Using the indexed scale***

The indexed scale on the focuser drawtube gives an accurate indication on the focus position for various accessories.

Once the position for one accessory is known it is very easy to approximate the focus position.

Due to the precision needed to reach perfect focus a fine tuning is advised.



### ***Rotating the focuser***

The whole focuser body can be rotated. It is useful when the focuser knobs aren't in a convenient position.

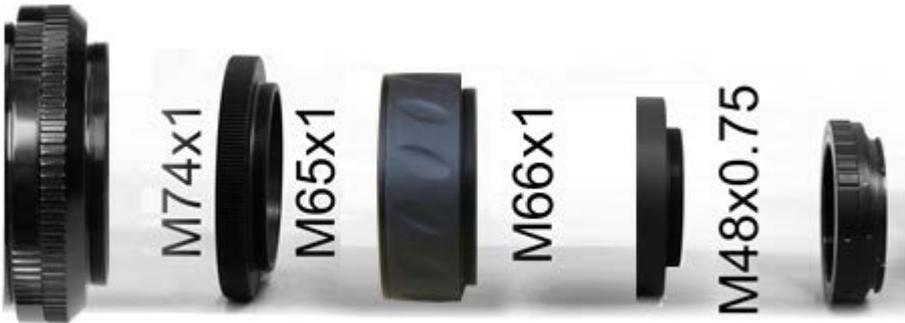
1. Remove all accessories from the focuser.
2. Fully retract the drawtube inside the focuser body.
3. Unscrew the "boat wheel" like large aluminum ring.
4. Rotate the focuser body.
5. Tight back the "boat wheel" like large aluminum ring.

# Specifications

## *Telescope specifications*

<i>Optical Design</i>	Refractor (air-spaced triplet APO)
<i>Field Flatteners</i>	Thread-on (2 lenses)
<i>Aperture (mm)</i>	80 mm (3.15 in)
<i>Focal Length</i>	400 mm (15.75 in)
<i>Focal Ratio</i>	5
<i>Finderscope</i>	9x50, erect-image, right-angle
<i>Diagonal</i>	2" dielectric coatings
<i>Dovetail</i>	EQ5(Vixen style) dovetail plate
<i>Highest Useful Magnification</i>	180 x
<i>Lowest Useful Magnification</i>	11 x
<i>Limiting Stellar Magnitude</i>	11.6
<i>Resolution (Rayleigh)</i>	1.74 arc seconds
<i>Resolution (Dawes)</i>	1.45 arc seconds
<i>Light Gathering Power (Compared to Human Eye)</i>	131 x
<i>Optical Coatings</i>	Fully multi-coated
<i>Fully Illuminated Field With Field Flatteners</i>	33 mm (1.3 in)
<i>Optical Tube Length</i>	44.6 cm (17.6 in)
<i>Optical Tube Weight</i>	4.05 kg (9 lbs)
<i>Telescope Visual Backfocus*</i>	> 160mm (6.3 in)
<i>Field Flatteners Backfocus**</i>	66mm (2.4 in)

## *Threads specifications*



<b>Rings/ Threads</b>	<b>Focuser Tube</b>	<b>Drawtube Adaptor</b>	<b>Field Flattener</b>	<b>DSLR Ext. Tube</b>	<b>Enlarged T-Ring</b>
<b>In Ø</b>	n/a	M74x1 F.	M65x1 F.	M66x1 F.	M48x0.75 F.
<b>In screw depth</b>	n/a	7 mm	8 mm	6 mm	variable
<b>Out Ø</b>	M74 x1 M	M65x1 M.	M66x1 M.	M48x0.75 M	Camera
<b>Out screw depth</b>	6 mm	6 mm	5 mm	5.9 mm	n/a

\* The visual back focus of the telescope is the distance from the end of the focuser tube (with 2" adapter installed) to the focal plane. This means, all accessories needing 160mm back focus or less can be installed.

\*\* The back focus of the field flattener is the distance from the back of the field flattener to the focal plane.



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<http://www.skywatcher.com>

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