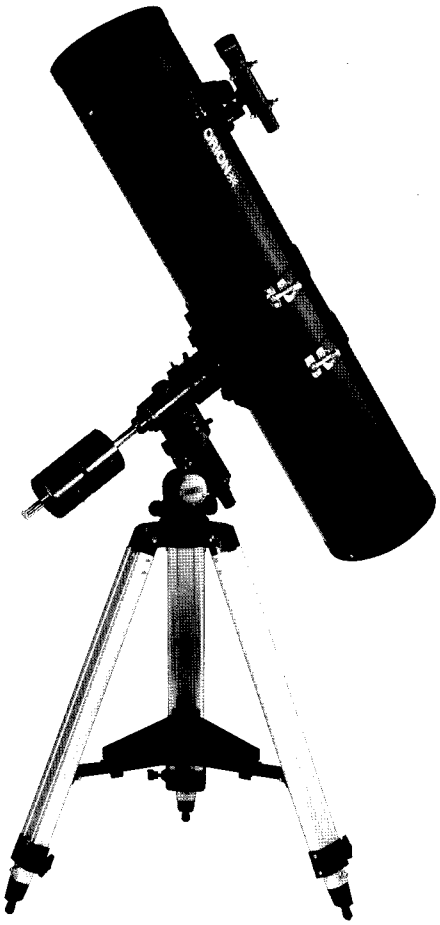
EUROPA INSTRUCTIONS

Instruction Manual
Europa 114
Europa 150
Europa 200
Europa 250
Europa 200 f4 SCH



Orion Optics

Parts Diagram

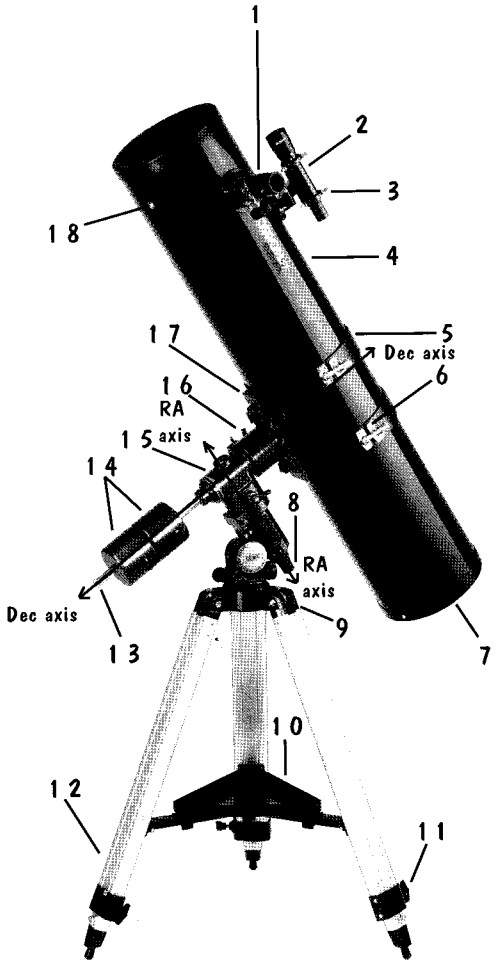


Fig.1

Captions from Fig.1

1. Focus Mount
2. Finder Scope
3. Finder Bracket
4. Telescope Tube
5. Tube Cradle
6. Cradle Latch
7. Mirror Cell
8. Polar Finder
9. Tripod Top
10. Accessory Tray
11. Leg Locking Knob
12. Tripod Leg
13. Safety Screw for Weights
14. Counter weight / s
15. Equatorial Mount
16. Mount locking Knob (dec.)
17. Saddle Plate Knob
18. Spider Collimation Screw

WARNING! Never use ANY telescope to look at the sun. Observing the sun even for a fraction of a second will result in fatal damage of your eye as well as possible damage to the telescope.

RA----Right Ascension

Dec---Declination

Contents

PLEASE READ THIS LEAFLET THOROUGHLY, PRIOR TO ASSEMBLY OR USAGE.

Pre Assembly Notes

Your telescope assembly will be easily accomplished providing the following instructions are carried out in the order they are given. If they are carried out incorrectly or the telescope is not assembled in the order prescribed, considerable damage could be caused to the instrument.

All the models in the Europa range are assembled in the same manner. The only modification is the slightly different Europa 200 f4 Schmidt Newtonian. This model has a slightly different method of collimation compared to the other telescopes. This will be dealt with in a separate section within **'Collimation'.**

All through the instructions manual pictures and illustrations of the **Europa 200** are shown, apart from obvious differences in size of the 250mm and 200mmf4sch, the attachment method of all the parts are in the same manner.

When checking all the constituent parts of the telescope prior to assembly, please ensure no damage has occurred in transit. No claim for damage or missing items can be accepted if made more than 48 hours after receipt or collection, unless agreed by Orion Optics.

The most important and accurate parts of the telescope are the two mirrors within the tube. These are coated with two microscopically thin layers of aluminium which are over-coated with quartz, to give the aluminium added protection. These optical surfaces are quite delicate and MUST NOT BE TOUCHED WITH FINGERS OR ANY UNSUITABLE CLEANING PRODUCT.

Unfortunately we cannot accept responsibility for any optical surface which has been cleaned incorrectly.

> WARNING! Never use ANY telescope to look at the sun. Observing the sun even for a fraction of a second will result in fatal damage of your eye as well as possible damage to the telescope.

Telescope Assembly

The following notes apply to all models, any small difference in assembly will be indicated where appropriate.

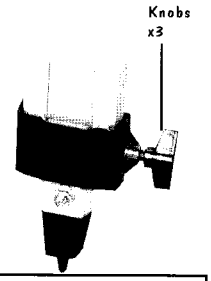


Fig.2 Tripod leg base, each has one adjusting knob.

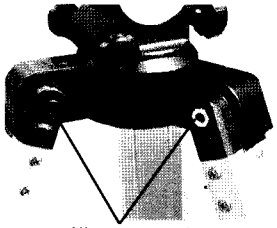


Fig.3 Each leg tightens up to the tripod top by an Allen screw and nut.

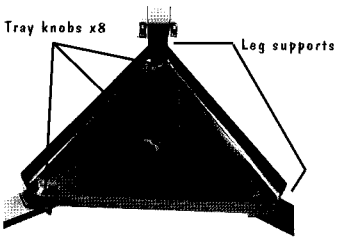


Fig.4 Accessory tray located mid way down on the tripod.

1. Locate the three legs of the tripod and adjust the three knobs **(Fig.2)** at the bottom of each leg and adjust to your required height. You should now be able to move the legs together and apart quite easily without any undue force. To adjust the tension of each leg tighten or slacken the Allen screws in **(Fig.3)**.

2. You should now attach the accessory tray to the leg supports. Place the tray on the supports, lining up the corresponding holes **(Fig.4)**. Then place the screws up through the holes and tighten using the knobs. The longest of the four screws is to be used in the centre hole. The tray acts as an accessory tray as well as strengthening the tripod itself.

You should now have a completely assembled tripod in front of you. Now make sure the tripod screws and knobs are tight again before you put the mount on top and then the tube. You may cause some damage to the telescope if you do not assemble this important item correctly.

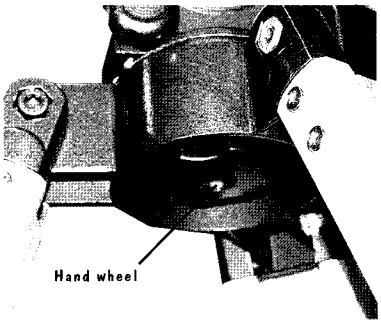


Fig.5 Large hand wheel to lock mount into place..

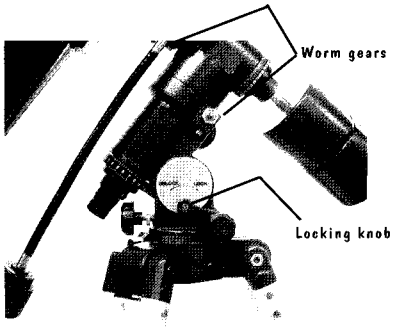


Fig.6 Locking knob on the equatorial mount.

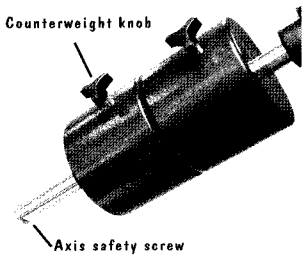


Fig.7 Two counterweights (200model) are movable on counterweight shaft to balance the scope.

3. You now need to place the equatorial mount on top of the tripod. There will be a large hand wheel on the bottom of the mount **(fig.5)**, unscrew this, then place the mount on the tripod making sure the peg on the tripod top goes between the two azimuth knobs **(fig.14)**. Now replace the hand wheel so it goes through the tripod top into the mount. Then tighten the azimuth screws against the peg.

4. Before any adjustments are made make sure the locking knob on the mount is tight **(Fig.6)**.

5. The counter weight shaft should now be screwed into the mount with no weight attached. This is done by turning the shaft in a clockwise movement whilst pushing it into the hole on the mount. **(fig.6)**. The safety screw on the axis should now be removed so you can slide the weight/s up the shaft. Make sure you tighten the counterweight knobs **(Fig 7)**. Replace the safety screw back on the shaft. The weights will be positioned accurately later.

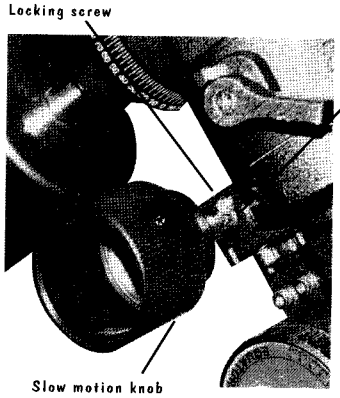


Fig.8 2x slow motion should be fitted.

6. The slow motion knobs now need to be fitted to the mount. You will find the two knobs have to be located on the worm shafts **(Fig.6/8)**. You do this by sliding the two knobs on either worm shaft. **(Fig.8)** shows how the R.A knob should appear once fitted.

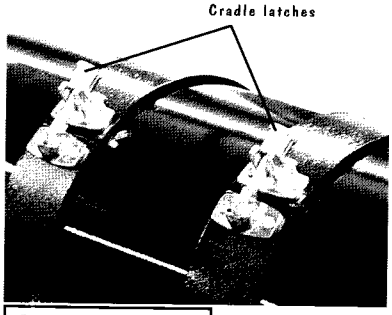


Fig.9 Cradle latches should be tight when in use.

7. The telescope tube is now ready to be put on the mount. First take the tube out of the cradles by unscrewing the two cradle latches **(Fig.9)**. Take the cradle with the attached saddle plate and unscrew the two saddle plate knobs. **(Fig.10)**. Now attach the saddle plate to the mount by tightening the screws through the top of the mount, ensuring these are tight. Place the tube back in the cradles so that the tube is positioned about 2/3rds up in the cradles. The mirror cell has to be pointing towards the ground **(fig.1)**. The correct procedure for balancing the telescope will be dealt with later.

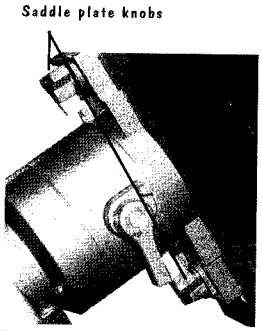


Fig.10 Cradles are located on top of the mount by the two knobs.

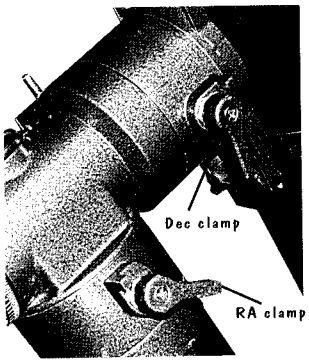


Fig.11 RA and Dec locking knobs.

The RA and Dec locking clamp are used for locking the respective axes. Unlocked , they enable fast positioning of the telescope. After positioning, re-lock the clamps. To enable you to use the slow motion controls these clamps should always be tight, if slack the slow motion controls will not work. IMPORTANT! Always remember to leave the clamps tight when the telescope is not in use.

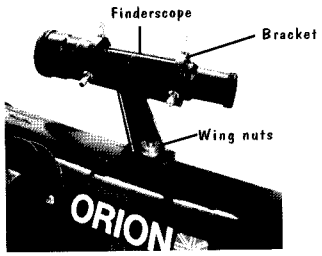


Fig.12 Finderscope located in its bracket on the tube.

8. The telescope tube should now be fully secure in the cradles on the mount. Now locate the finderscope and bracket and assemble them together. Make sure the finderscope is equally spaced in the bracket. Above the focus mount on the telescope you will find two wing nuts with washers **(fig.12)**. Unscrew them and place the bracket with the finderscope on the screws and tighten back up.

Balancing The Telescope

Before the telescope can be used safely and efficiently it has to be 'balanced'. This is quite easily carried out by adjusting the position of the counterweight(s) and the position of the telescope tube longitudinally in the cradles. Firstly ensure the complete telescope is positioned on a firm observing base, a lawn is not a good site for observing because the tripod legs tend to sink into the grass. Concrete , flag stones, tiles, are all good surfaces onto which you should place your telescope. Carefully slacken off both the Declination clamp and Right Ascension clamp, at the same time holding onto the tube to avoid it swinging around. Gradually release the tube and allow it to position itself in it's preferred position.

Whilst keeping both clamps slackened, hold the telescope tube and point it in another direction. If it stays there without slipping to another position, your telescope is already balanced. Probably you will have to adjust it to balance properly until it will 'stay put'. To do this look at (fig.13) showing the position into which you should put your telescope to enable it to be balanced properly. (If you remove/reposition your counterweight(s) or take the tube out of it's cradles, this operation needs to be carried out again) When the balance point is achieved, position the tube in it's 'parked' position (fig.1) and lock both axis with the axis clamps. Attach the slow motion knobs, if you haven't already done so, to the worm shafts and try out the telescope movement. It should be very smooth and even.

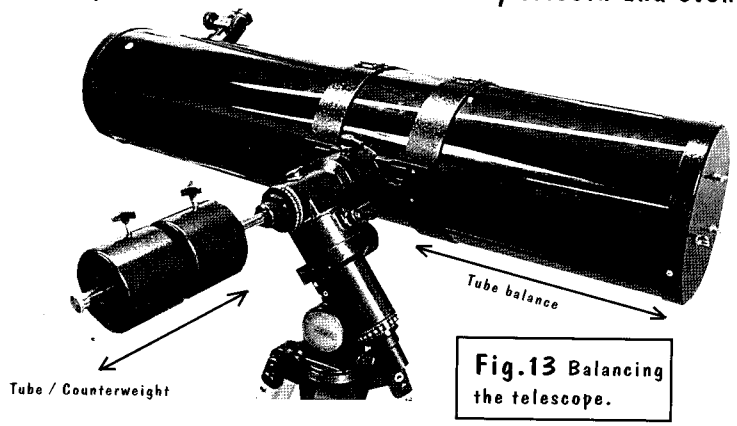


Fig.13 Balancing the telescope.

Alignment of the finderscope

In order for the finderscope to be useful, it must first be aligned with the main telescope, so that both the finderscope and the telescope are pointing at precisely the same place. To align the finderscope follow this procedure. The telescope is pointed in daylight at a distant object preferably several hundred metres away. Use a low power eyepiece, a 25mm is fine, and focus the telescope on a distant part of the object. This process is best carried out after the telescope has been properly balanced and you are also familiar with the basics of the equatorial mount. Next, with the finder bracket adjustment screws 'x6', align the finderscope to give the same view as the object in your telescope. The more accurate you do this the easier it will be to find astronomical objects which are much smaller. If the finder is not in focus, slacken off the front locking ring and crew the objective cell in and out. When a clear image is visible, lock the ring by tightening against the objective cell. Your finder should not need to be aligned again but a slight movement of the adjusting screws may give better astronomical alignment.

Your First Observation

Place your telescope in the viewing position you have chosen (outdoors). Try and roughly point your polar finder to North. Setting of the polar finder more accurately will be covered later. Take off the dust caps. Insert a low power eyepiece (25mm) into the focus mount. Find the moon or something else large in the sky, with the finderscope. You should now be able to see an image through the eyepiece, this now needs to be focused to your eye. (If you change the eyepiece you will have to focus the image again). To focus the image so it looks sharp you have to turn the hand wheels on either side of the focus mount. If you leave the telescope alone you will see the moon travelling across the field of view. Once it has almost disappeared from view, slow motion knobs need to be turned to get the image back in the field of view. If you want the image to look closer replace the 25mm with a lower number (higher power) eyepiece 9mm. You will find the lower the number of eyepiece the faster the image moves across the view. Practice using your finderscope and focusing on different subjects.
To calculate the magnification use the following formula:-

$$\text{Magnification} = \frac{\text{Telescope Focal Length (mm)}}{\text{Eyepiece Focal Length (mm)}}$$

Using Your Polar Finder

To remove the polar finder from the mount you will first have to slacken off the small Allen screw in the locking ring, you will find this on the side of the ring. Once slackened, unscrew the locking ring. The ring, polar finder and the setting circle will all come off the mount together **(fig.1)**. The first operation in using the polar finder is to focus the eyepiece on the reticle which is on the display viewed through the finder. Indoors, point the finder towards a light coloured wall and view through the eyepiece. If the reticle is not in sharp focus, screw in / out the eyepiece holder until you produce a sharp image. This position will not need to be adjusted again. Next, point the finder towards a star or any other object at infinity. If this is not clear and sharply seen, slacken off the locking ring on the finder and screw the lens holder in or out to produce a sharp image. When achieved, tighten the locking ring. Check that both the reticle and the 'star' are both in focus. To put the polar finder into the mount. Now replace your polar finder in your mount. Put the setting circle on first, whilst holding this crew the locking ring back into position. The polar finder needs now to be pointed at the pole star. To position your telescope exactly on the pole you will need to adjust both the latitude adjust screw **(fig.15)**,

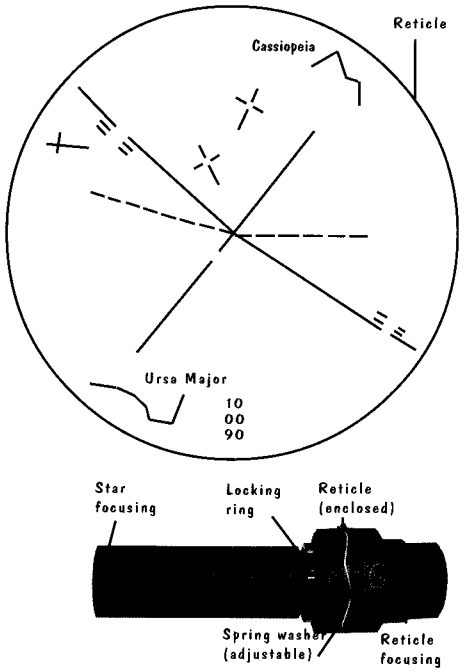
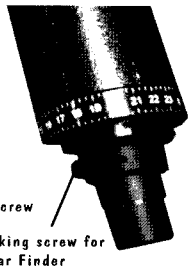


Fig.14 Azimuth Adjust Screws x2



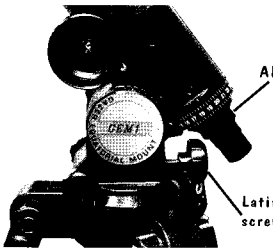


Fig.15 Latitude adjust knob.

this will move your mounting in an upward or downward direction to give it the correct setting for your locality. It is preferable to set your latitude on the scale before attempting to align the telescope.

Having done this, the alignment procedure will be easier if you ensure the tripod is vertical, which may mean adjusting the legs if it is on slightly uneven ground. Keep checking the view through the polar finder until you see Polaris come into view. Do not bother if it is to the left or the right at the moment. To adjust it's position to the left or right adjust the Azimuth adjustment screws **(fig.14)** until Polaris is quite near the centre of the field in your polar finder. If these two black knobs are difficult to rotate, slacken off slightly the large black hand wheel **(fig.5)** which secures the equatorial head to the tripod.

You now have to position Polaris in the centre of the reticle. When positioned correctly, rotate the telescope about 180 degrees around the RA axis by slackening off the RA clamp. Ensure Polaris stays within the centre. Find in the sky the constellations of Ursa Major and Cassiopeia. The line between the two constellations is the 'Time Angle'. The North pole and Polaris lie almost exactly on this line. Polaris always lies towards the Cassiopeia side of the central north pole.

To appreciate the reversal of images through the polar finder is difficult at first. It will, at first attempt, probably take quite a time for you to be able to visualise what you are seeing through the finder and what is actually in the sky. Don't forget, if you are not going to carry out any photography or other precision tracking procedure, you only need to position Polaris anywhere in the field of view through the polar finder scope, preferably near the centre. This is more than accurate enough to keep the object being viewed through the telescope in view with either drives fitted, or by slowly adjusting the slow motion controls to follow the object. We suggest that rather than attempt from the outset to set up the polar finder to it's most accurate position, get to know your telescope by using it on the night sky, by simple method of placing Polaris near the centre of the polar finder and enjoy the views. When you know your telescope completely, then, if you wish to try photography, carry out the procedures for accurate setting of the polar finder.

How to use the setting circles

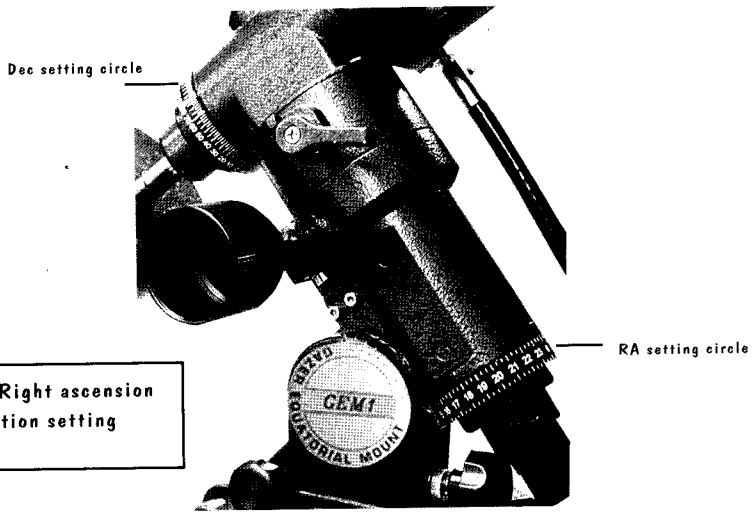


Fig.16 Right ascension and Declination setting circles

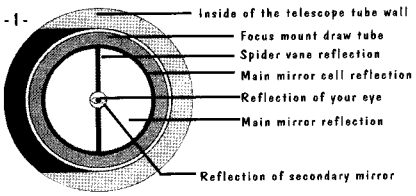
The R.A. and Dec setting circles are helpful to search for faint nebulae and clusters which are difficult to find with the naked eye. To make a search with the setting circles, you have to locate a bright star near the object you want to observe.
From a star atlas, you will find that the Ring nebula, (M57), is close to the star Vega. Vega is a bright star magnitude 1 and can easily be seen with the naked eye through Spring to Autumn in most places. Before you try using the setting circles you must make sure the telescope is polar aligned accurately.

Find the coordinates (RA and Dec) of Vega and M57 in a book or star atlas. You will find Vega RA 18h36m Dec 39degrees and M57 RA 18h52m Dec 33degrees.
Centre Vega in the field of view of the telescope using a low power eyepiece.
Turn the RA setting circle and set it to 18h36m (18 hours and 36minutes)
Set the Dec setting circle to 39 degrees.
To move the telescope to M57, turn the RA slow motion knob so the RA setting circle moves with the mount to 18h52m.
Turn the Dec slow motion control knob until the Dec setting circle is set to 33 degrees.
You should now be able to see the Ring nebula in the field of view. But, it may be quite small, to enlarge the image use a higher power eyepiece.

Collimation

Optical collimation should be carried out at any time if it is found that image quality, particularly star images, are deteriorating. This will be apparent in none circular star images or images which have a flare to one side and tend to look a little like a 'comet' with a short tail. Collimation is the aligning of the two mirrors in your tube with the tube itself. After you have carried out this operation a few times it should take only a matter of a minute or two to adjust the collimation to perfection. Diagram 1 shows how perfect collimation, should appear when you look into the focus mount without any eyepiece in position.

-1-



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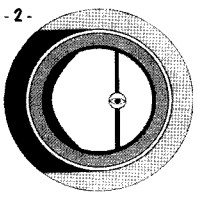

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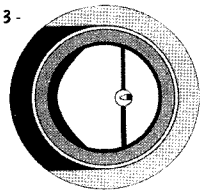

The first drawing shows a telescope in perfect collimation. The second drawing shows one with the main mirror out of collimation. The third drawing shows the main mirror and secondary mirror out of collimation. There are many different positions that an uncollimated telescope can

have and similarly, as many drawings would be needed to portray them all. There is absolutely no substitute for experience in collimating telescopes. If a telescope is giving irregular images the resultant collimated view through the focus mount draw tube will be as shown in the first drawing. If the view is asymmetrical as in drawing two or three or any combination of them, you will need to adjust the secondary mirror holder and the main mirror cell. You will probably find that the secondary mirror is the one which will need most of the correction. First look at the photographs (4 to 6) which depict your model.

EUROPA200 F4 SCH

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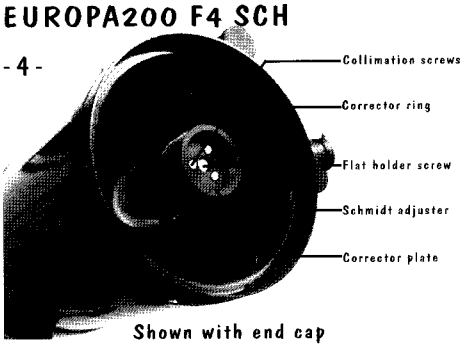
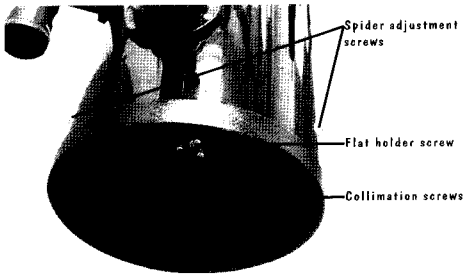


Shown with end cap removed

The collimation of the main mirror on the Europa200f4sch is the same as any other Europa telescope. The difference being the collimation of the secondary. The Schmidt adjuster can be rotated around 360 degrees on the corrector plate also, but can be collimated by using the three collimating screws around the flat holder screw.

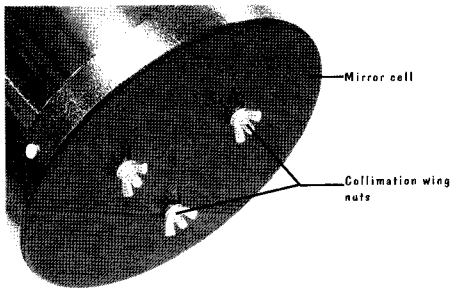
If the collimation looks similar to (1), you need to adjust nothing.
If the collimation looks similar to (2), you need to adjust the wing nuts on the main mirror cell. **Never take the wing nuts off the screw thread, your main mirror is held in by these.**

-5-

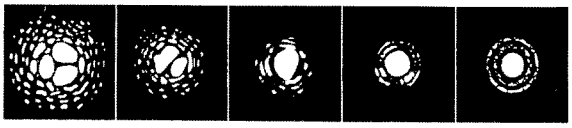


If the collimation looks similar to (3), you need to adjust the screws on the spider to align the secondary mirror. You will also have to adjust the wing nuts on the cell. To get the mirror aligned. **Never slacken off completely the central screw on the spider as this could allow your secondary mirror to drop off and damage itself and the main mirror.**

-6-



Adjust the screws by small amounts only, perhaps ¼ turn and then check to see if you are moving closer to correct collimation. If you are producing a worse view, tighten the 2 opposite screws to the original screw and watch the result. Never over tighten screws when collimating and always slacken off screws opposite first or serious damage may occur. If you still are getting problems, please contact our help line on 01270 251559 and describe your problem and we will try our best to solve it to allow you to correct it much easier when the next occasion arises.



Seeing conditions affect the quality of the image. The drawings above show a false star image. Most of the time this is caused by heat disturbance either in the tube or in the sky. The image on the left is showing lots of heat disturbance. The right hand drawing is showing a perfect image.

Trouble shooting

If you are having difficulty using your telescope make sure you have checked these points before contacting Orion Optics.

1. Make sure your telescope is correctly collimated.
2. Confirm all your dust caps have been removed.
3. Is your equatorial mount set up properly.
4. If you store your telescope in doors make sure you leave the telescope to 'cool down' sufficiently to view through. The larger the telescope the longer it will take. 6" approx. 30 minutes cooling time.
5. If you locate a subject in your finderscope, but cannot see it in your telescope, either your finderscope is incorrectly lined up or you have too high a powered eyepiece in the focus mount.
6. For accurate focusing, focus as slow as possible. This has to be very precise.

Specification / Europa	114	150f5/f8	200	200f4sch	250
Aperture mm (")	114 (4.5)	153 (6)	203 (8)	203 (8)	250 (10)
f Ratio	8	5 & 8	6	4	4.8
Focal length mm (")	910 (36)	750 (30)	1200 (47)	800 (32)	1200 (47)
		1200 (47)			
Resolution arc secs	1.01	0.76	0.57	0.57	0.46
Faintest Star	12.8	13.4	14.0	14.0	14.5
Total weight kgm (lbs)	10 (22)	12 (26)/13 (28)	25 (55)	25 (55)	28 (62)
Tube only weight kgm (lbs)	3 (7)	3 (7)/4 (9)	5 (11)	6 (13)	8 (18)
Gem Mounting	Equat.	Equat.	Equat.	Equat.	Equat.
Finder 'scope	6x30	6x30	6x30	6x30	6x30
Focuser	31.7	31.7	31.7	31.7	31.7
Max usable Magnification	225x	300x	400x	320x	480x
Eyepiece supplied	9 & 25mm	9 & 25mm	9 & 25mm	9 & 25mm	9 & 25mm
Options					
Single Axis Drive	Yes	Yes	Yes	Yes	Yes
60mm Guidescopes	n/a	Yes	Yes	Yes	Yes
70mm Guidescopes	n/a	Yes	Yes	Yes	Yes
GA4 Illuminated Guider	n/a	Yes	Yes	Yes	Yes
Photos 1=Good, 5=Excels	1	2	3	4	3
Sodium Light Pollution	Yes	Yes	Yes	Yes	Yes
EHC Photo Visual filter	Yes	Yes	Yes	Yes	Yes
2" Focuser Upgrade	n/a	Yes	Yes	Yes	Yes
10x50 Right Angled finder	n/a	Yes	Yes	Yes	Yes

Many more options also available

Equat. ----Equatorial Mount (GEM1)