

Instruction Manual

zoomion®



Gravity 150 EQ

English version 8.2014 Rev A

The Zoomion® Gravity 150 EQ

Congratulations on the purchase of the new Zoomion® Gravity 150EQ. This telescope will give you hours of fun, with its all optical glass mirror and light gathering capability, it is the ideal companion to start in the world of amateur astronomy. With this telescope you will be able to see the craters on the Moon, star clusters, some nebulae the Jupiter disc features and its Galilean moons and the rings of Saturn. We have included many accessories so it will be easy to use this telescope.

1. Included parts

we have included several accessories that will make the use of the telescope easier and fun, please take a look at the list of the parts so you can identify them in the future.

1. 1.5x Erecting Lens;
- 2, 3. Two eyepieces 1.25" (31.75mm); a PL25mm and a PL6.5mm eyepiece;
4. 6x Finderscope;
5. Moon filter;



2. Getting Started.

It is very simple to get started. Here is how the telescope works. The telescope aperture should point to the object being observed. The mirror on back of the tube will gather the light coming from the object and reflects it to the secondary mirror that brings it to the eyepiece. Close to the aperture there is the focuser. The focuser moves up and down to get a precise focused image. At the focuser one can use the supplied accessories. Different accessories combinations give different results, such as different image magnifications or correct image for example. But all this will be explained in detail in the next pages.

3. Assembly. Start by assembling tripod (figure 2), place the accessory tray (figure 3), the tray will be useful when observing as a platform for accessories. Next the equatorial mount should fit the top of the tripod (figure 4). Tighten it carefully, all telescope weight will be laying on it. Thread the counter-weight shaft (figure 5) and the fine adjustment knobs (figure 6), make also sure these are well tightened. The counterweight slides on the shaft and should also be place at half the shaft length (figure 7). Make sure the foot-saver is also in the right place at the end of the shaft it prevents the counterweight from accidentally drop. The two supplied optical tube rings should be placed as shown (figure 8). Insert the optical tube and make sure to tighten the ring knobs (figure 9). They prevent the tube from sliding off. Now it is time to place the finderscope (remove the finderscope thumbnuts and place the finderscope pointing to the telescope's aperture – figure 10 and 11). By unlocking the two knobs (figure 12) you can point the telescope to any direction. Before starting using the telescope one last thing is required, you need to balance the telescope. Loosen the tube rings so the tube slides and adjust it so when it is balanced. Do the same for the counterweight (figure 13).



Figure 2. Assemble the tripod.

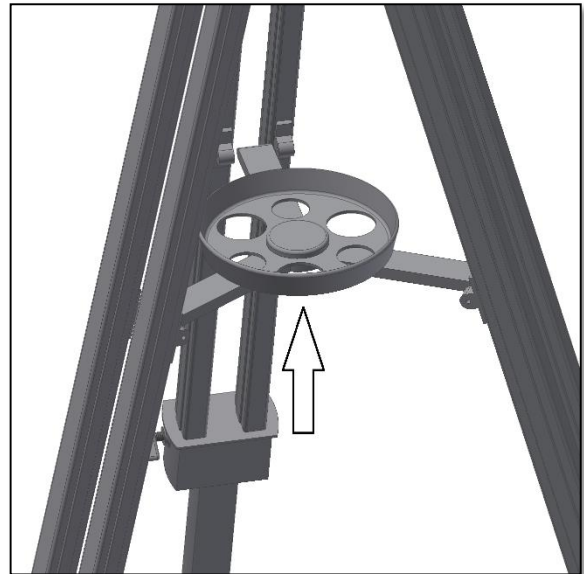


Figure 3. Place tray.



Figure 4. Place the Equatorial Head.

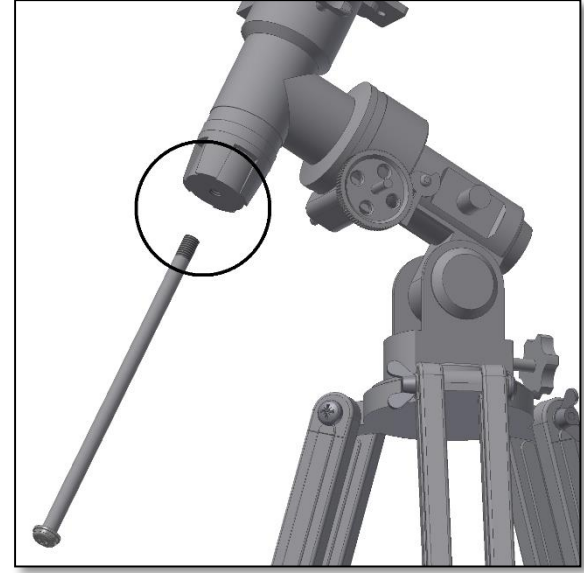


Figure 5. Thread the counterweight shaft.



Figure 6. Place the Hand Knobs.

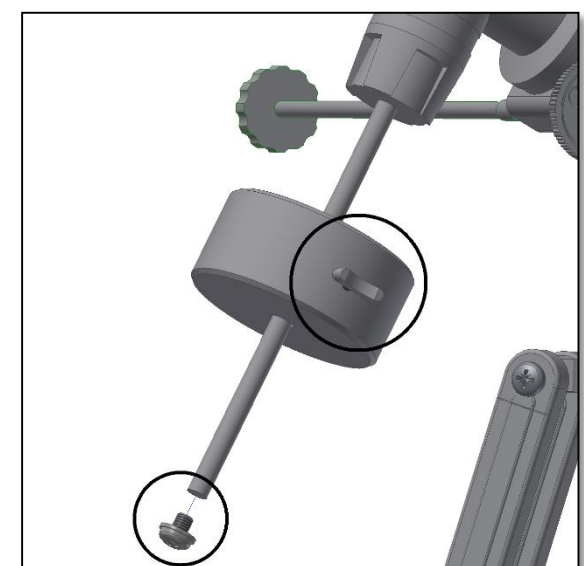


Figure 7. Slide counterweight and the Foot-Saver.

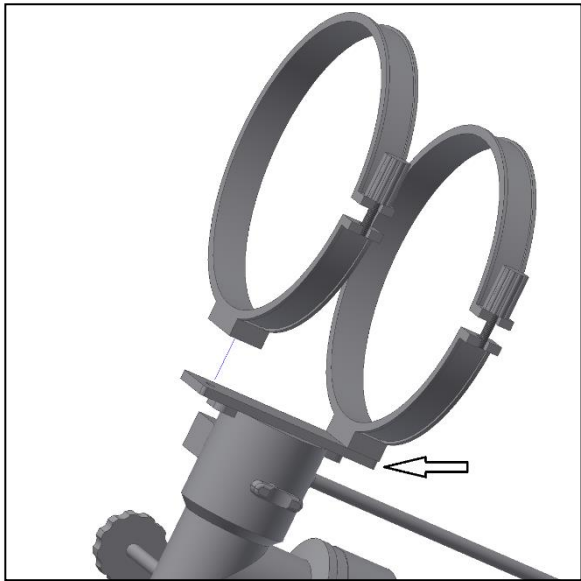


Figure 8. Place tube rings and tighten.

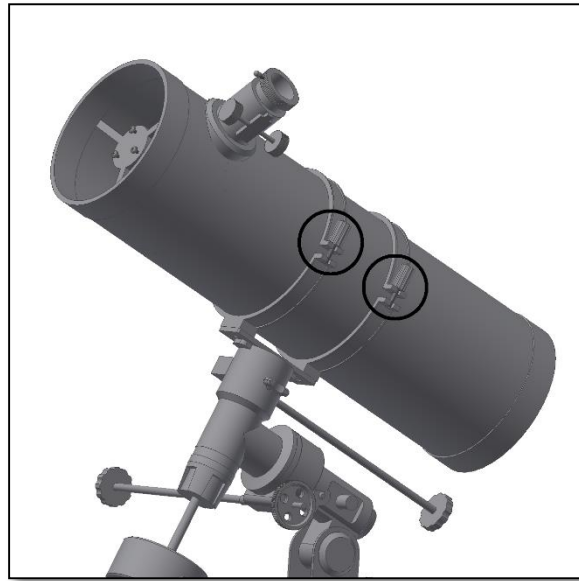


Figure 9. Use the two knobs to prevent tube from sliding.

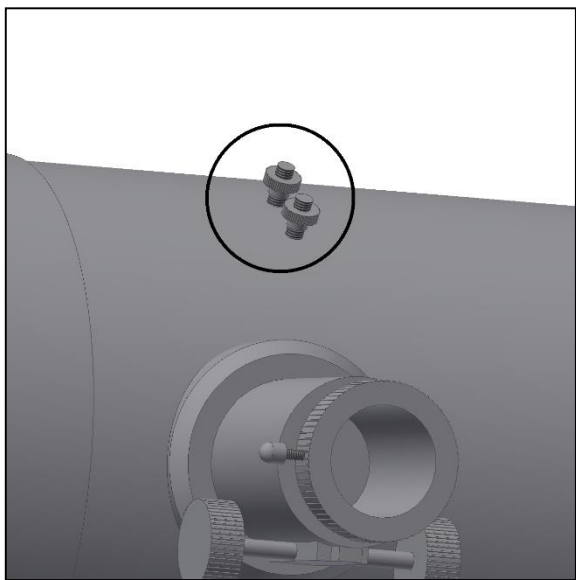


Figure 10. Remove the finder scope nuts.

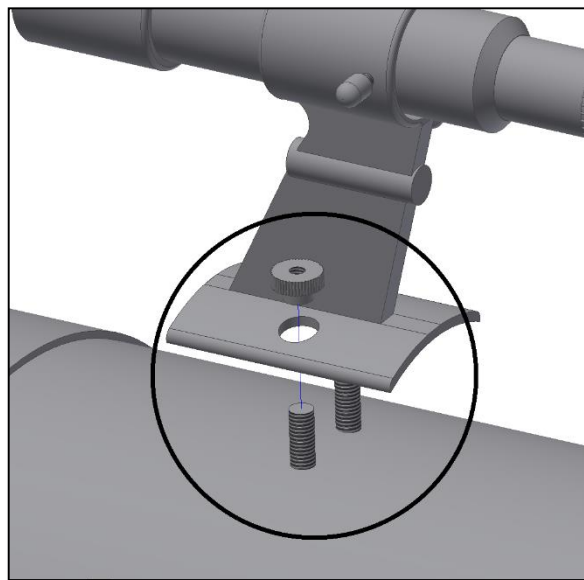


Figure 11. Place finder scope and thread the thumbnuts

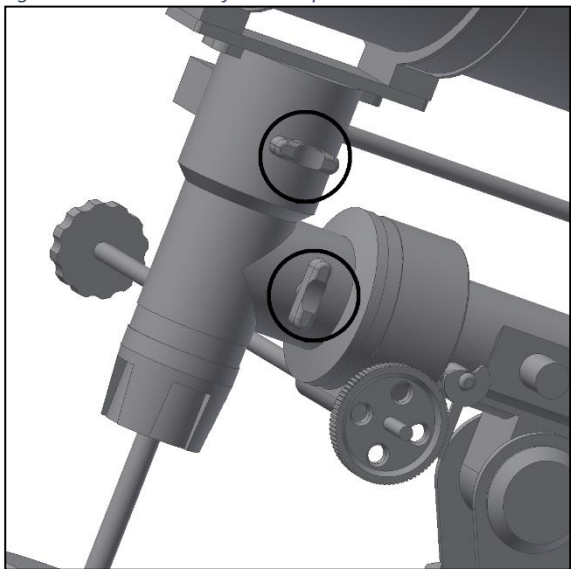


Figure 12. The two axis locking knobs.

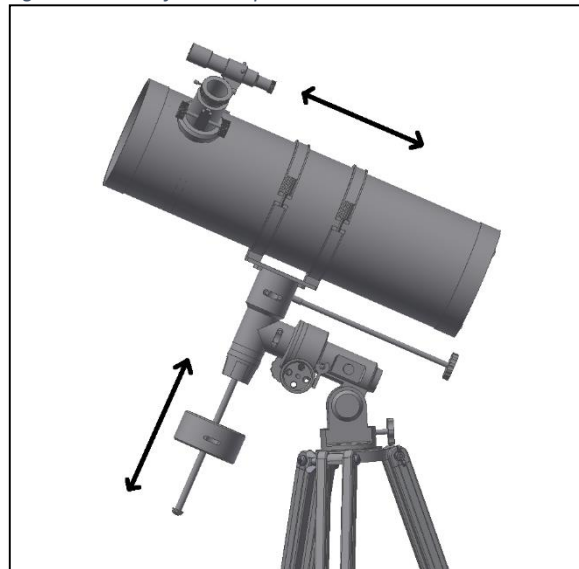
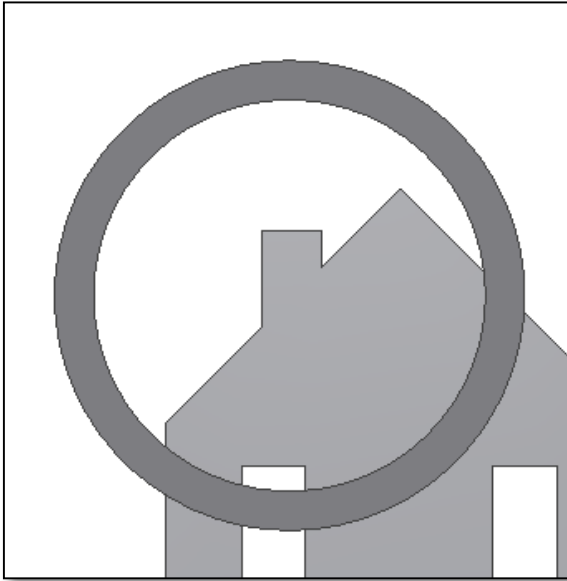


Figure 13. Balance both telescope's axis.

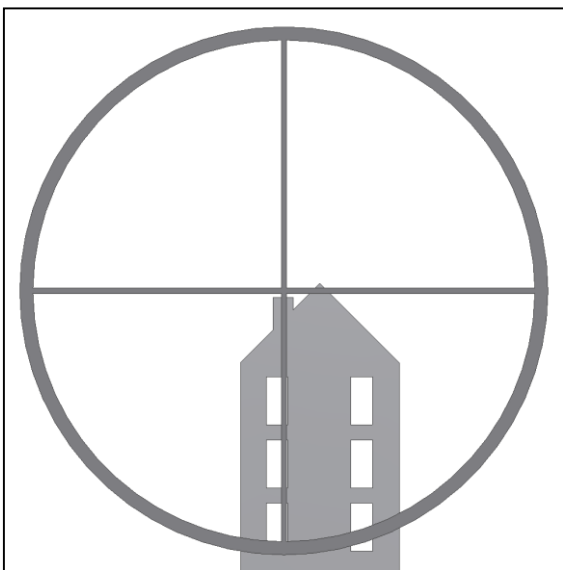
4. How to use and how to align the finderscope?



4.1. A distant object is centered at the telescope's field of view with an eyepiece. In this example we have a house with a chimney. The chimney is the reference point to place at the center of the field of view. We first look through the telescope with the lowest magnification possible (PL25mm should be preferable). So we have the widest field of view.



4.2. Looking through the finderscope we see the same building but in this case the chimney is not centered. We adjust the finderscope using the three thumbscrews so that the finderscope moves slightly. This is enough to correct the objects position in the finderscope. Trial and error is required to get a satisfactory result. Make sure to tighten the 3 screws after finishing so that the finderscope tube does not move.



4.3. After playing with the three finderscope thumbscrews and some trial and error we get the finderscope recticle close to the center (in this case the chimney). The Finderscope is now ready to use!

4. What can be seen with this telescope?

Below you will find some examples of what you can expect to see when using this telescope.



4.1. The Moon is one of the most spectacular objects to be seen through a telescope. Even a small telescope will reveal high detail of the Moon's surface. You will be able to see the craters on the Moon's surface and other features like the Mare. The moon is a very bright object. It is better observed when the Moon is not full. Try the crescent Moon and look for features along the terminator (between illuminated and dark surfaces).



4.2. Jupiter is the biggest planet of our solar system. It is also one of the favorite targets for beginners. Galileo was able to discover that the four tiny dots that turn around the planet were in fact part of Jupiter's system of moons. With this telescope you will be able not only to see Jupiter's planet disc with its two major discernible bands but also its biggest moons, Io, Europa, Ganymedes and Callisto.



4.3. The "lord of the rings" of the night skies, Saturn is by far the most popular target for small telescopes. Saturn's rings are discernible even at 60x magnification. In a very good night you will be able to see the Cassini's division (the darker band on the Saturn's rings).

5. Using the accessories, a bit of math to understand how all it works.

Using the accessories is easy and fun. To change magnification simple swap eyepieces. To get more magnification simply use the barlow lens. But how all of this work?

$$\frac{1400mm}{25mm} = 56 \text{ power}$$

This means that the PL25 eyepiece provides a 56x power (magnification). This seems low but try it, you will see a a bright image with some very good detail.

5.1. Power (magnification)

Your telescope as a focal length of 1400mm. This is approximately the distance between the telescope lens to its focal point (very similar to the distance between the focus point of a loupe and the loupe lens). This is a very important feature that allows to determine several interesting facts such as magnification.

The magnification is determined by the telescopes focal length and the used eyepiece. You probably noticed that the two supplied eyepieces are PL25mm and PL6.5mm. This means that the PL25mm is a 25mm focal length eyepiece while the PL6.5mm is a 6.5mm focal length eyepiece.

To determine the magnification just devide the telescope focal length by the eyepiece focal length. Lets give an example for our telescope and the supplied eyepieces:

Telescope focal length is 1400mm
 PL25 eyepiece focal length is 25mm

5.2. Barlow Lens (not included)

The barlow lens is a very interesting device (not included). It is a negative lens that multiplies the telescopes focal length. So a 2x Barlow multiplies the original focal length by 2x, in this case $1400mm \times 2 = 2400mm$.

A 3x Barlow lens multiplies by 3x.

Your telescope is supplied with a 2x Barlow lens. When used with the PL25 eyepiece you get 2x the power obtained before
 $54 \text{ power} \times 2x \text{ Barlow} = 108 \text{ power}$

5.3. Erecting lens

The erecting lens gets you a upright image view with the telescope. It also adds some power like the barlow lens. The supplied Erecting Lens provides and extra 1.5x power.

Here are some examples on how to use the accessories.

Some possible accessory combinations

	Terrestrial View	Moon	Deep Sky	Jupiter and Saturn
Erecting Eyepiece 1.5x	Yes			
PL25mm	Yes	Yes	Yes	
PL6.5mm				Yes
Moon Filter		Yes		
Power	84x	56x	56x	215x

ATTENTION! Never look at the Sun through a telescope. Concentrated Sun light may cause serious eye injury. Children should use only with adult supervision

6. Troubleshooting and frequently asked questions

Q: I can't get to focus my telescope, only get a bright circle.

R: Make sure you have inserted the Diagonal and an eyepiece (start by the lowest power eyepiece – H20). Point to a distant object during the day and proceed as described in 4.

Q: I get a mirrored view of the objects. Like if they were reversed, and R show up like Я

R: This is caused by the Diagonal Mirror. It has a mirror inside. To get a corrected image it is necessary to use the Erecting Lens and the Eyepiece as shown below.

Q: When I use the barlow lens and the H6 eyepiece the image is so dark I can't hardly see anything.

A: Power should be used with moderation. It depends on how stable the atmosphere is, too much turbulence causes image distortion. Usually the limit is 2x for each millimeter of the telescope aperture. In this case this telescope, the telescope has an aperture of 150mm so in a very good night you should be able to reach 300x. The more magnified the image is the darker it gets.

Q: Is my telescope compatible with other eyepieces ?

A: Zoomion telescopes are compatible with all telescope eyepieces from different manufacturers as long as the eyepiece is a 1.25" (or 31.75mm) size eyepiece. If you would like to test an eyepiece from a fellow astronomer go ahead. Different eyepieces provide different visual experiences.

Q: I want to use my telescope to take pictures

A: This telescope is designed for visual use. It doesn't mean it can't be used for photography, however it will be hard to get high quality pictures with this telescope. If you have a smartphone you can shoot the Moon or some terrestrial objects. Search online for digiscoping and afocal photography.

Q: The stars only appear as points in the telescope

A: Stars will always appear only as points, even in the largest telescopes in the world. It is more interesting for beginners to observe two-dimensional objects, such the moon or planets. Once you find these, you will be able to start learning about the astronomical calendar.

Q: I would like to observe the Sun

A: An appropriate solar filter, placed over the objective, is essential for observing the sun. These are available as plastic foil or glass filters. They allow only a tiny and harmless fraction of sunlight into the telescope when securely positioned over the objective, so allowing you to observe the sun in complete safety. Eyepiece solar filters (not available from us) should be avoided at all costs as they are considered unsafe. **Note: Never look directly at the sun through a telescope without an objective solar filter!**

Q: I can't see anything when I look through my telescope

A: The telescope is only suitable for astronomical observing and when used outside at night. Observing from inside the house or during the day is not usually possible.

The dust caps must first be removed and an eyepiece inserted before you can start observing. Are you sure you have removed all the dust caps, not just the small ones? If you have not, then no light will enter the telescope and everything will appear black.

For any other questions please feel free to drop a line or visit our website at: <http://www.astroshop.de>

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