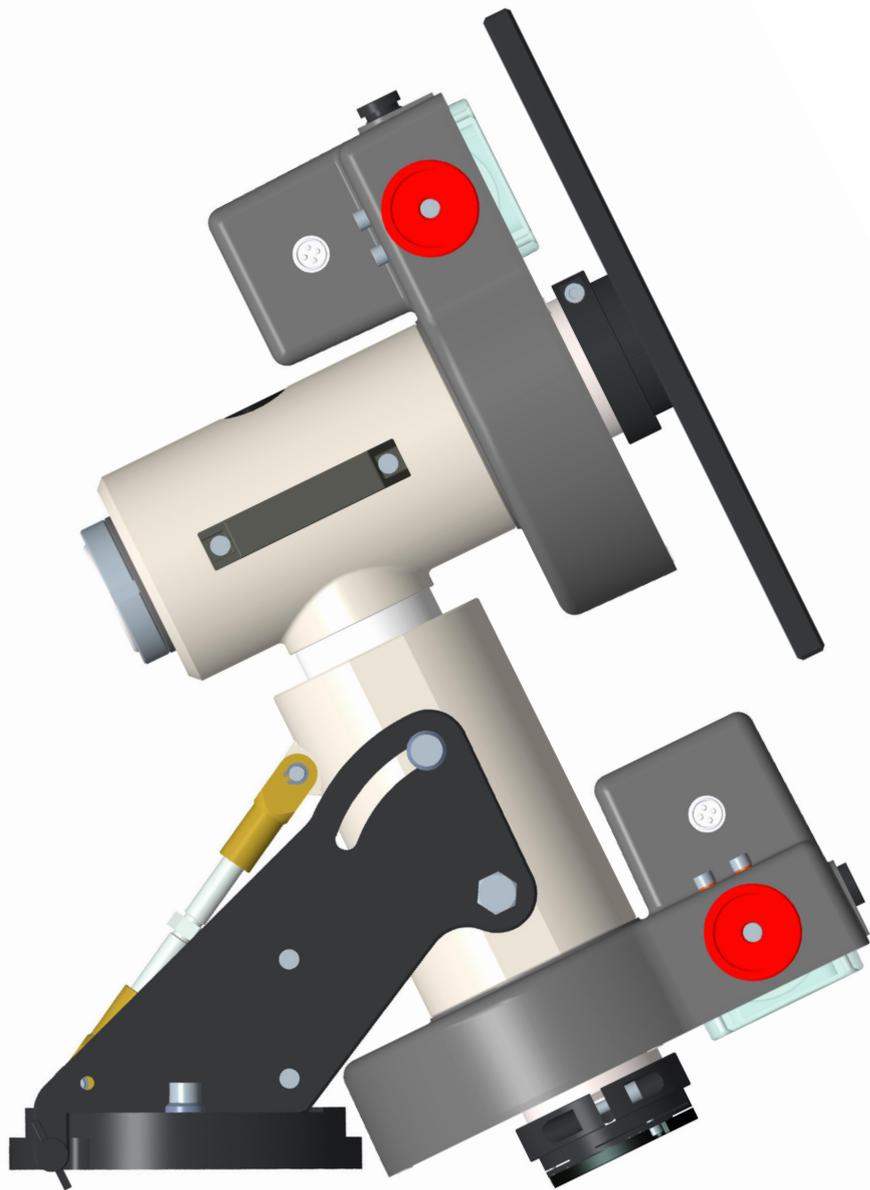




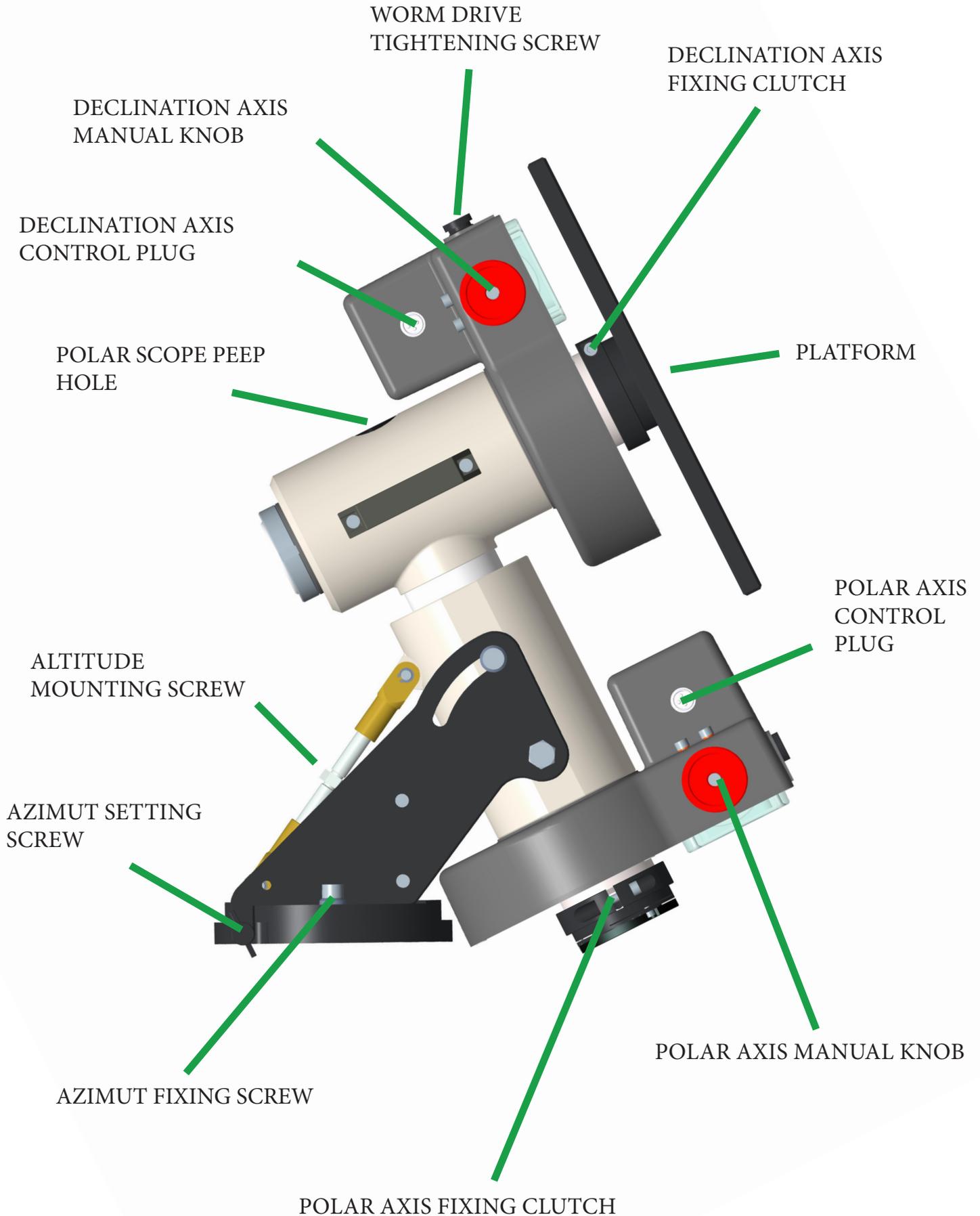
FORNAX MOUNTS

GERMAN TYPE EQUATORIAL MOUNT
(FM 51/52 - FM 100/102 - FM150)

USER MANUAL



NOMENCLATURE



HOW TO SET UP?

Installing telescopes and counterweights. Balancing the system.

After placing the mount on the column, the optics have to be put on the platform. Make sure that the weight of the telescope is constantly and gradually increased on the mount. A good idea here could be placing a counterweight on the counterweight axis, as near as possible to the root of the axis and then mounting the telescope. When mounting several telescopes the above described procedure applies with one counterweight followed by one telescope and so on. After that first try balancing the polar axis by moving the counterweight. Use additional counterweights if necessary. The next step is balancing the declination axis by adjusting the tubing (not included). The excentricity of the counterweight previously installed can enhance this procedure. As the boreholes on the counterweights are not symmetrical, by rotating the counterweight around the axis one can finetune the balance of the declination axis. Continue with this procedure until both axes of the system are balanced.

Alignment

1. ALIGNMENT USING A POLAR TELESCOPE

Alignment is most easily done with the help of a polar telescope. Insert the polar telescope in the polar telescope slot of the mount (a connecting adapter might be needed due to possible incompatibility with some polar telescopes). Remove the cap of the peep hole of the polar telescope (unscrew it). Manually approximate the system towards the polar star then looking through the polar telescope finetune the appropriate angle with the altitude adjusting screw and the azimuth adjusting screws.

MC3 Motor Controller

For MC3 user manual please visit <http://www.ursaminor.hu> website.

2. OTHER WAYS OF ALIGNMENT

ROUGH ALIGNMENT METHOD

This method can sometimes be adequate for general observing through the eyepiece or for very wide angle astro-imaging with a tripod-mounted camera. Newcomers to amateur astronomy with an equatorial mount telescope should initially adopt this method. The procedure for rough alignment in the Southern Hemisphere is as follows:

Step 1 - Set up the telescope and mount. Ensure that the mount/tripod is level.

Step 2 - Use a spirit level to ensure it is level.

Step 3 - Set the latitude adjustment pointer of the mount to the latitude of your observing position.

Step 4 - Using a magnetic compass, align the mount with Magnetic South. Make certain that the metallic mount does not influence the compass' ability to define south/north.

Step 5 - Realign the mount by the angular difference between the South Magnetic Pole and the Celestial Pole. This varies greatly world wide and is entirely dependent on the location of the observer.

The procedure for rough alignment in the Northern Hemisphere is to visually align the telescope mount with Polaris, which is less than one degree away from the North Celestial Pole. Rough alignment followed by drift alignment is required when astro-imaging through a lens or telescope of significant imaging power.

A slightly better alignment is attained when using a calibrated (e.g. with a spirit level) inclinometer with an accuracy of 0.1 degree and coordinates of a well-known bright object not higher than 30 degrees above the horizon, the current sidereal time - clock time offset and the polar axis is cylindrical (i.e. not tapered, unless you know the tapered angle) and (digital) setting circles:

Step 1 - Set up the telescope and mount. Making certain that the mount/tripod is level.

Step 2 - Set the polar axis of the mount roughly to the North (Polaris) or the South (depending on which hemisphere you are in).

Step 3 - Put the telescope in a rough vertical position.

Step 4 - Put the inclinometer on the polar axis and set the latitude adjustment pointer until the inclinometer reading matches with the latitude of your global observing position.

Step 5 - Set the telescope in an exact vertical position (i.e. pointing at the zenith) in both east-west and north-south direction with a spirit level.

Step 5 - Now adjust the RA (Right Ascension - i.e. the polar axis) setting circle to the current sidereal time and the Declination setting to your latitude. Now point the telescope to the object using the setting circles (or the Goto). Note that in the Southern hemisphere setting circles on some older mounts are for the northern hemisphere only so subtract the value from 24, e.g. 6:45 gets 17:15.

Step 6 - The object should now mismatch only in azimuth, so move the horizontal adjusting of the mount until the object is in the center of the field.

This should allow alignment within 0.5 degrees off-polar axis which allows tracked (i.e. motorized) telephoto images of the sky.

DRIFT ALIGNMENT METHOD

A rough alignment is performed, then refined by pointing at different stars and observing any drift that occurs. The mount is then adjusted according to the direction of the observed drift. The procedure is as follows (hemisphere independent):

Step 1 - Point the telescope at a star in the meridian opposite the pole location (e.g. in the North from the Southern hemisphere) that has a declination less than 30 degrees from the equator.

Step 2 - Rotate the guider CCD or reticule eyepiece in the telescope so that moving the mount in Right Ascension causes the star to follow a crosshair line very accurately. Consider this line to be the 'horizontal'. If the mount's tracking is switched off for a few minutes the star should follow this line.

Step 3 - Position the star exactly on the centre of the cross hairs.

Step 4 - Leave the mount tracking and note the drift direction of the star away from the crosshair centre.

Step 5 - While watching the position of the star, put a hand on the front of the scope and push gently either up or down - enough to move the star visibly. Figure out if you need to push UP to re-centre the star or DOWN.

Step 6 - If you need to push UP, use the azimuth adjustment to rotate the whole mount with the side facing the pole in the direction EASTward (imagine looking at the mount from above). If you had to push DOWN, rotate the side of the mount facing the pole WESTward. Start with a small rotation to get a sense of how much change the rotation will produce.

Step 7 - Go back to step 3. Keep repeating steps 3 to 7 until the star does not drift up or down for at least 5 minutes. (Remember, sideways drift is not important).

Step 8 - Now point the scope at a star low in the West.

Step 9 - Centre the star perfectly and let the mount track until a drift is observed.

Step 10 - Put a hand on the front of the scope and give a gentle push. If you have to push the scope UP to re-centre the star, then you must increase the angle that the polar axis makes with the horizontal. If you need to push DOWN then the angle must be reduced. (It is probably wise to figure out which way the adjustment knobs move your mount in daylight before you do the actual drift alignment. It is quite easy to get confused in the dark and go the wrong way.)

If the Western part of the sky is obscured, perhaps by trees or a building, then use a star in the East. Use the same procedure as for the West, but reverse the correction. If you have to push the scope UP to re-centre the star, then you must decrease the angle that the polar axis makes with the horizontal. If you need to push DOWN then the angle must be increased.

You should then repeat the whole procedure until no drift is seen for 10–20 minutes.