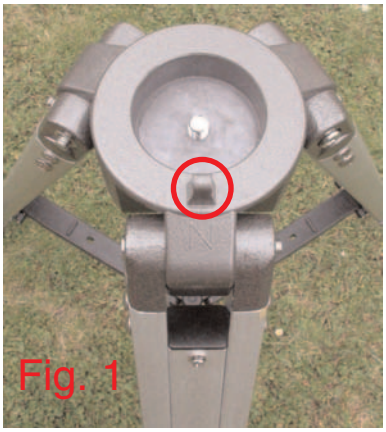
Astro-5 Setup Manual

A quickstart guide to using your Astro-5 German equatorial mount.

Everyone at Astronomica would like to thank you for purchasing our Astro-5 German equatorial mount. The design is a variant of the industry standard EQ5 that closely emulates the Vixen Super Polaris (SP) and Great Polaris (GP) mounts and has a payload capacity of around 9kg. This makes it suitable for a wide range of refracting, reflecting and catadioptric telescopes up to about 200mm (8 inch) aperture. The Astro-5 is supplied with manual slow motion controls about both axes, but dual-axis motors and a fully-featured computerised GoTo system — Gotostar — are available as optional extras. Please contact Astronomica on 01132 037240 for further details. The Gotostar is explained in our accompanying Install_Gotostar.pdf and Use_Gotostar.pdf manuals. Some of the illustrations used in this guide show the Astro-5 with pre-installed declination and polar axis motor enclosures, but the mount setup procedures are the same irrespective of the drive system used.

Attaching the Tripod and Head

The Astro-5 mount comes in two parts — the tripod and the head. Fig. 1 shows the socket on the top of a square cross-section extending aluminium tripod. (If you have the ST-2 tripod with cylindrical stainless steel legs, the following instructions still apply) ...



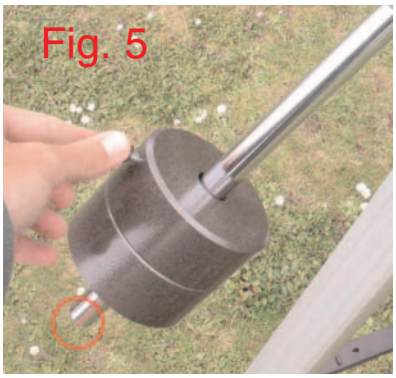
Note the locating pin circled in red that should face true north (if you look closely you will also see 'N' embossed on the casting next to the pin), so a small compass may be useful. Before attaching the head, pay attention to the tripod height: generally speaking, refractors will require you to extend the tripod as high as it will go, whereas reflectors, Schmidt-Cassegrains and Maksutov telescopes will be most comfortable to use with the legs somewhat shorter. Check that the top of the tripod is close to horizontal with a spirit level.

Fig. 2 shows the Astro-5 head attached to the tripod socket. You may need to slightly unscrew one or both of the black azimuth adjustment knobs in order clear the north-facing locating pin. Later, you will use these azimuth adjusters to point the polar axis of the mount precisely at the north celestial pole, so don't worry if those terms mean little at the present time. Finally, make sure that the locking knob under the top of the tripod is securely tightened, firmly attaching the head to the tripod.

The Counterweight Shaft

A key feature of a German equatorial is the counterweighted shaft that balances the telescope tube attached to the mount. The Astro-5's counterweight shaft needs to be firmly threaded into the head as shown in Fig. 4 overleaf. Please ensure that the declination axis clamp (arrowed black in Fig. 6 on page 2) is locked whilst you do this.

Before attaching the counterweight you will need to unscrew the chromed 'toe saver' from the end of the shaft, remembering to replace it (see red circle in Fig. 5) once the weight is in place and clamped in position. Just place the weight near the end of the shaft for now; you can refine the balance point later. Each time you assemble your mount, always remember to attach the counterweight before the telescope tube. If you put the 'scope on first it may swing around and get damaged, whereas a weight cannot come to any harm!



Attaching the Telescope Tube

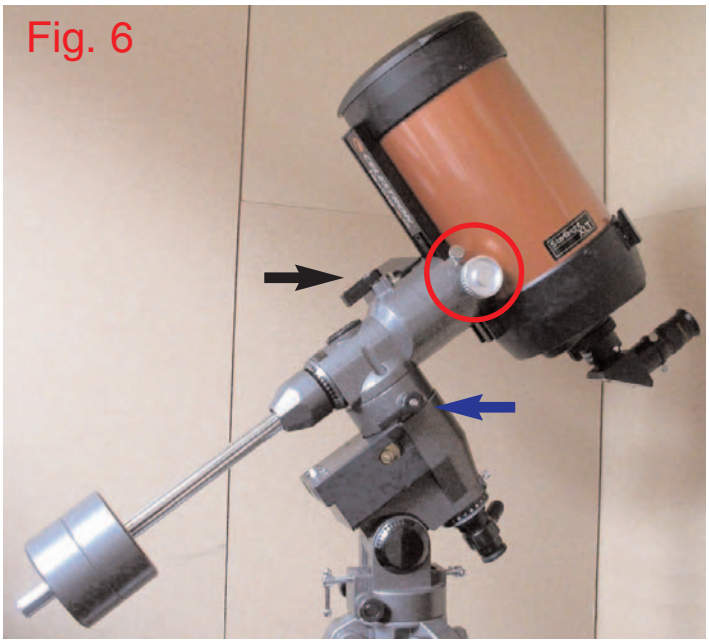
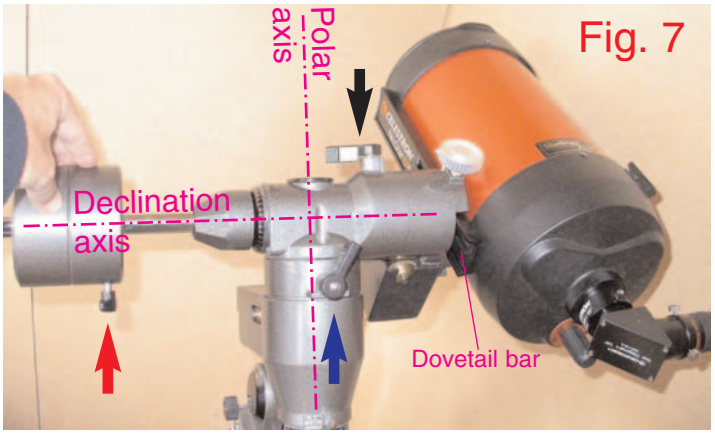


Fig. 6 shows a popular Schmidt-Cassegrain 'scope attached to a Astro-5 via the Vixen-style dovetail clamp and safely secured by the silver hand wheel lock and smaller chromed safety screw circled in red. Before attaching the tube, however, ensure that both the declination axis clamp (arrowed in black) and polar axis clamp (arrowed in blue) are tightened down to prevent any movement whilst in a potentially unbalanced state.

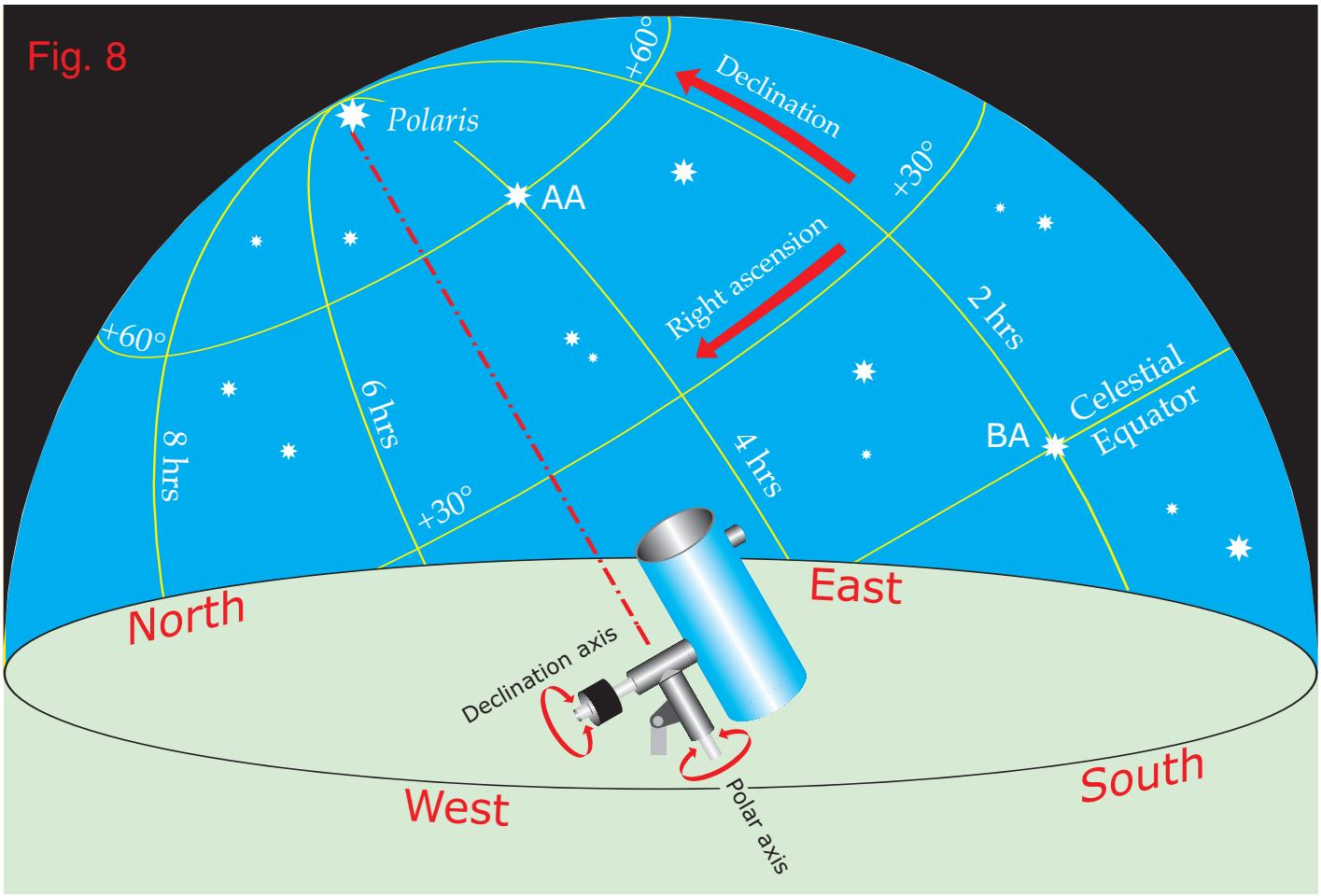
Balancing the Mount



This procedure may require the use of extra pair of hands! With one on the counterweight to hold it in place, loosen its clamp (arrowed red in Fig. 7) and the polar axis clamp (arrowed blue). Now slowly move the counterweight back and forth along the shaft until the telescope no longer shows a tendency to rotate about the polar axis. Lock the counterweight clamp (red arrow) firmly. With the declination axis close to horizontal, lock the polar axis clamp (arrowed blue) and, with a grip on the telescope tube, loosen the declination axis clamp (black arrow). If the telescope has a tendency to rotate about the declination axis, you may have to slide the dovetail bar back and forth in its clamp. Note that if you can rotate the telescope in a pair of tube cradles, or turn a star diagonal, try to arrange for the eyepiece to face in the opposite direction to the counterweight. This will ensure that the eyepiece will not get into awkward positions when swapping the tube from one side of the polar axis to the other to look at objects on opposing horizons.

Polar Aligning Your Mount

For any equatorial mount to be used effectively it has to be accurately polar aligned. This is achieved by making the polar axis of the mount parallel to that of the Earth's axis of rotation, as illustrated in Fig. 8 overleaf. Once this has been done it is possible to follow the movement of any celestial object across the sky merely by rotating the mount about the polar axis at a rate of one revolution per day in ...



a direction opposite to that of the Earth, thereby keeping the object centred in the field of view. This can be done via the manual polar axis slow motion control knob supplied with the basic Astro-5 mount or, as we ' ve discussed earlier, by using a dual-axis motor system or the Gotostar computerised mount upgrade. By good fortune, the direction of the north celestial pole is marked by a readily identifiable star nearby — Polaris, otherwise known as the Pole Star. Note, then, that it is not only necessary that the polar axis of the mount is turned toward true north, but the polar axis must also be inclined at an angle above the horizon equal in magnitude to your latitude. Fig. 9 shows how you use the chromed altitude adjusting


Fig. 9

screws (one is loosened while the other is tightened, much like the azimuth adjustment knobs) until the pointer (circled in red) reads the correct value against the graduated scale. Observers close to London should therefore use a figure close to 51°, whereas those in Edinburgh would set it nearer 56°.. The Astro-5 includes a polar alignment 'scope that helps you determine the 0.75° offset of Polaris from the north celestial pole.

While it is beyond the scope of this quickstart guide to go into celestial coordinate systems in precise detail, Fig. 8 also introduces the concepts of right ascension and declination — the sky's counterparts of latitude and longitude on the Earth. You will see that the declination axis of your mount is fitted with a graduated scale measured in degrees, while the polar axis scale is measured in hours and minutes of right ascension. Your library, local astronomical society or the Internet will provide you with detailed tutorials should you need them. However, it's worth noting that you don't need to polar align your mount this precisely for casual visual use — just ensure that its polar axis is inclined to the horizontal by an angle close to your latitude and it points close to north and you'll be up and viewing in the shortest possible time. Clear skies!