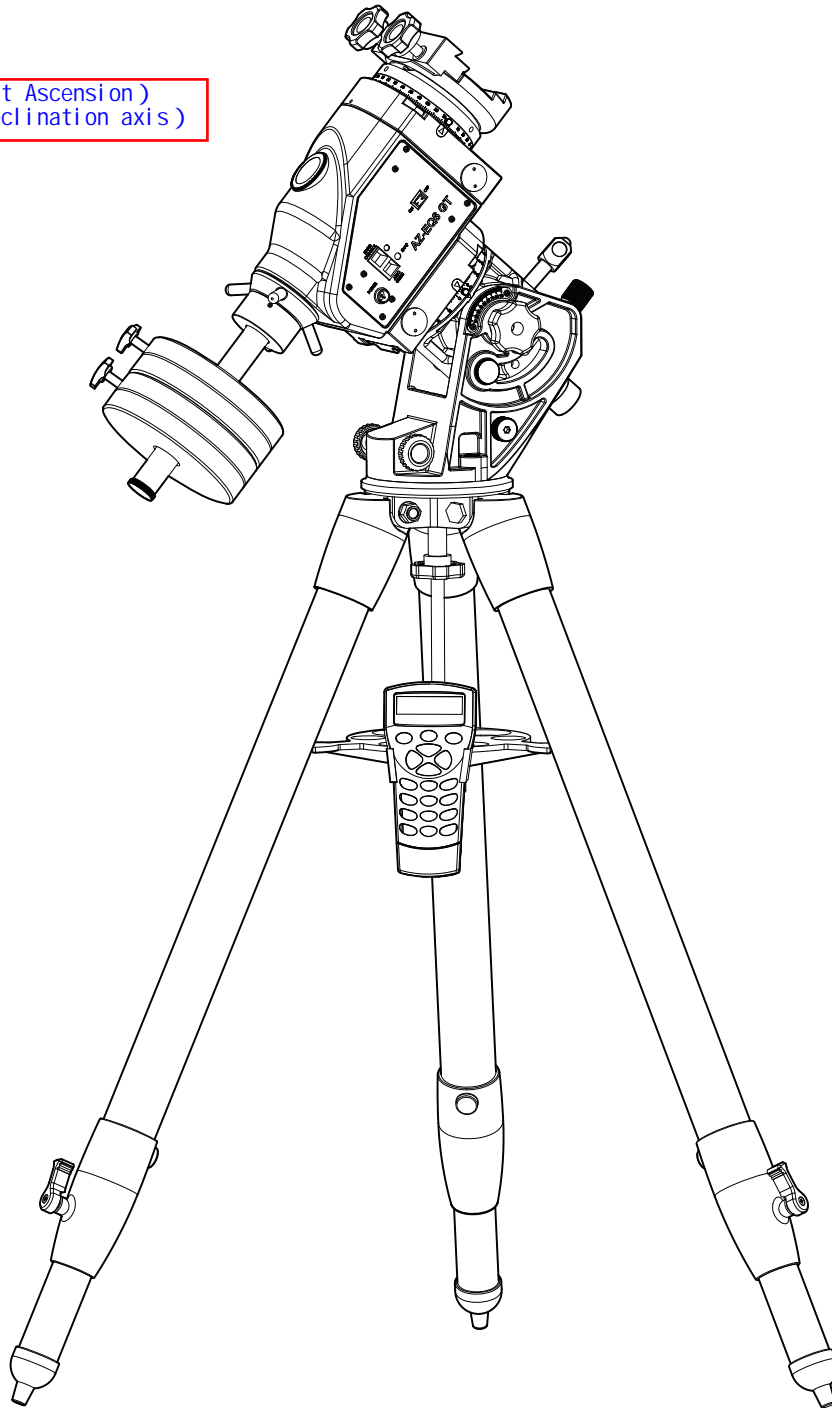


INSTRUCTION MANUAL

AZ-EQ6 GT Mount

R. A. 赤经 (Right Ascension)
Dec 赤纬轴 (Declination axis)



021112V1

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Note: The ① ② ③ signs on the diagrams are *not* related to the Chapter Steps 1. 2. 3.

PART I : SETTING UP THE AZ-EQ6 GT MOUNT

第一部分：赤道仪的安装

1.1 Setting Up the Tripod 1.1 支起三脚架

1. Fully expand the tripod legs on level ground. 1. 在水平地面上充分展开支架腿部
2. Locate the locking clamps on the legs and turn counter-clockwise to unlock them to extend the tripod legs. 2. 找到支架腿部的锁紧旋钮并按逆时针方向拧动以解锁展开脚架支脚。
3. Extend the legs to desired height, make sure the tripod top is level and then lock the clamps. 3. 展开到所需高度后，确保脚架上端基座部分水平然后锁紧旋钮。

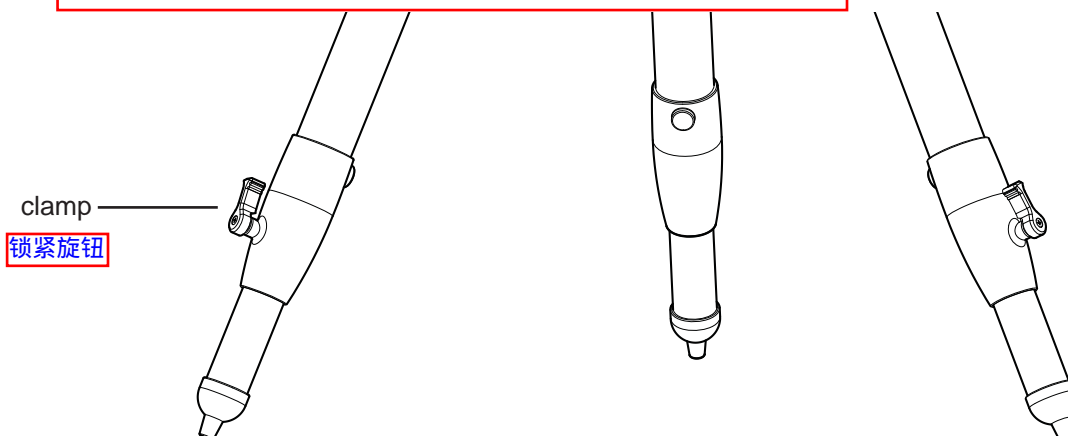
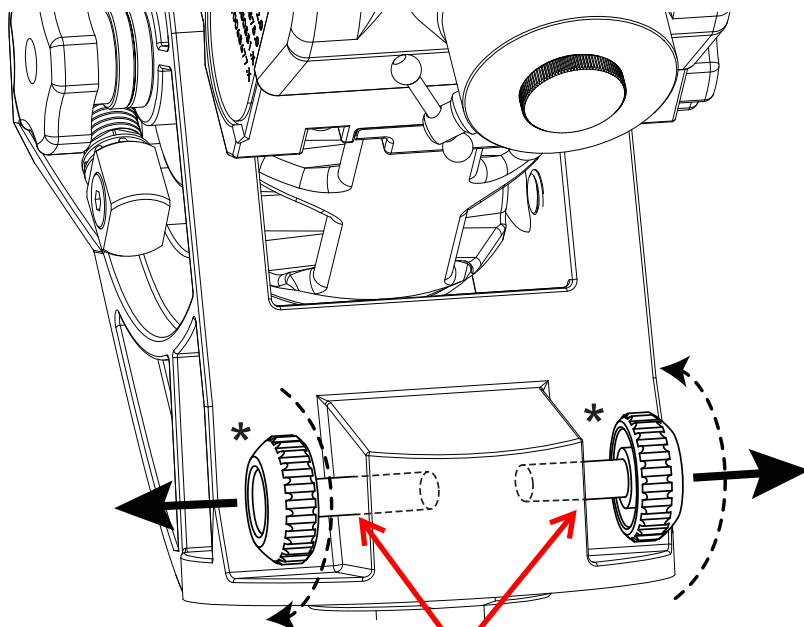


Fig. 1.1

1.2 Putting On the AZ-EQ6 GT Mount 1.2 放置AZ-EQ6 GT 赤道仪本体

1. Loosen the two azimuth adjustment knobs on the AZ-EQ6 GT mount until there is sufficient space between the two knob screws. (Fig. 1.2a)

1. 松开AZ-EQ6 GT 赤道仪上的方位调整旋钮以便在两个旋钮螺丝间留出足够的空间。（详见图示 1.2a）



* Azimuth Adjustment Knobs 两个方位调节旋钮

Fig. 1.2a

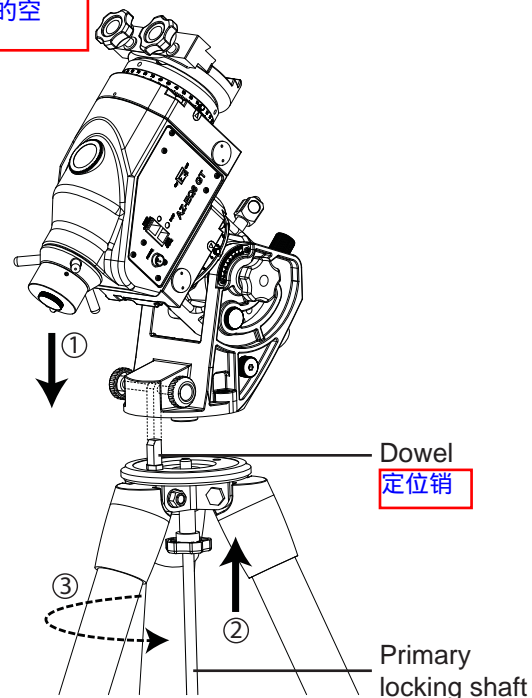


Fig. 1.2b

2. Align the metal dowel on the tripod top with the gap between the two azimuth adjustment knobs; then put the mount on the tripod top. (Fig. 1.2b) 2. 对准脚架基座上两个方位调节旋钮间的金属定位销后把赤道仪本体放置在脚架基座上。（详见图示 1.2b）
3. Once the mount is seated, slightly tighten the two azimuth adjustment knobs. 3. 赤道仪本体放稳后，尽快轻轻地锁紧两个方位调节旋钮
4. While supporting the mount with one hand, gently push the primary locking shaft up against the underside of the mount and turn the shaft counter-clockwise to secure the mount to the tripod top. Tighten the shaft with the knurled knob on the primary locking shaft. (Fig. 1.2b) 4. 在一只手扶好赤道仪本体的同时，朝上方的赤道仪底部轻推主锁紧轴然后朝逆时针方向旋紧以便将赤道仪本体固定在支架顶部的基座上。通过主锁紧轴上的螺纹紧固好该轴。（详见图示 1.2b）

1.3 Attaching the Accessory Tray and the Hand Controller Holder 1.3 安装附件托盘与控制器手柄支架

1. 沿主锁紧轴滑动附件托盘直到托盘的三个顶端顶紧支架的三条腿部，然后通过垫片和锁紧旋钮固定好托
1. Slide the accessory tray along the primary locking shaft until its three tips push against the tripod legs, and then secure the tray with the washer and the locking knob. (Fig. 1.3a)
2. By referring to the bubble leveler on the mount, level the mount by adjusting the length of the tripod legs. (Fig. 1.3b) 2. 参照赤道仪上的水平泡，通过调整三条支架腿的长度将赤道仪本体调节至水平。（详见图示 1.3b）
3. Insert the hand controller holder into the U-shaped opening on the accessory tray. (Fig. 1.3b) 3. 把控制器手柄支架插入附件托盘的U型缺口处。（详见图示 1.3b）

Warning: The accessory tray will ensure the tripod legs remain firmly expanded, which will prevent the tripod from accidentally toppling over. When using the AZ-EQ6 GT mount, an accessory tray should always be used to ensure stability.

警告：附件托盘能够确保支架腿部保持稳定张开，从而能够防止支架意外倾倒翻转。因此在使用本赤道仪时，要始终使用该附件托盘以保持仪器稳定。

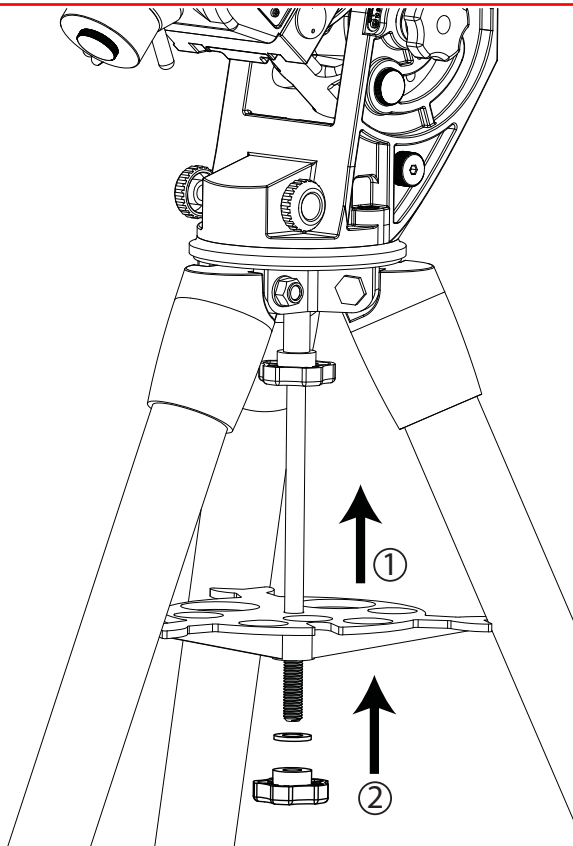


Fig. 1.3a

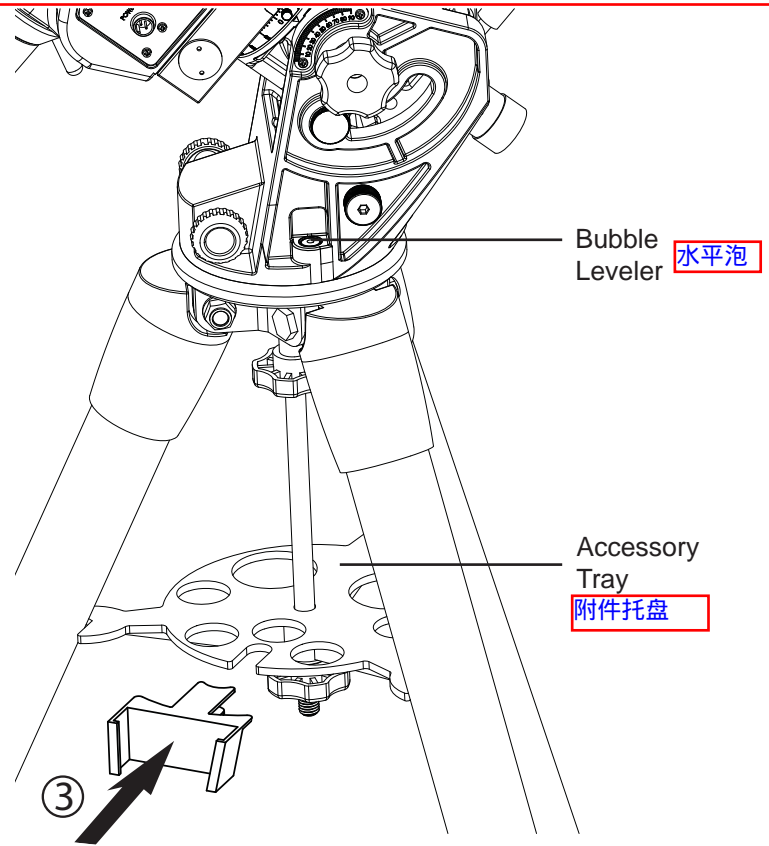


Fig. 1.3b

1.4 Installing the Counterweights 1.4 安装配重组件

1. 拧松用来锁紧配重杆的T型螺杆后轻轻拉出配重杆。再次拧紧T型螺杆确保配重杆固定到位。
1. Loosen the T-bolt for locking the counterweight rod and gently pull out the counterweight rod. Re-tighten the T-bolt to secure the counterweight rod in place. (Fig. 1.4a)
2. Loosen the R.A. Clutch with the handle, and rotate the R.A. Axis until the counterweight rod is pointing towards the ground. (Fig. 1.4b) 2. 通过把手松开赤经轴紧固装置，转动赤经轴（R.A. Axis）至配重杆指向地面。（详见图示 1.4b）
3. Remove the threaded cap from the end of the counterweight rod. 3. 去掉配重杆末端的螺帽。
4. The AZ-EQ6 GT mount comes with a 150mm counterweight rod extension, which can be installed at this point if necessary. Ensure the extension is tightly secured before installing counterweights. (Fig. 1.4c) 4. AZ-EQ6 GT赤道仪带有一根150毫米长的配重杆延长杆，如有必要可在此时装在配重杆上。在安装配重前需严格确保延伸足够合适。
5. Loosen the counterweight's thumb screw and slide the counterweight onto the counterweight rod. Re-tighten the thumb screw to secure the counterweight on the rod.
6. Replace the cap to the end of the counterweight rod. 5. 松开配重块上的翼形螺丝然后把配重块滑动安装至配重杆上。重新锁紧配重块上的螺丝把配重块固定在配重杆上。
6. 把配重杆末端的螺帽重新安装到配重杆上。

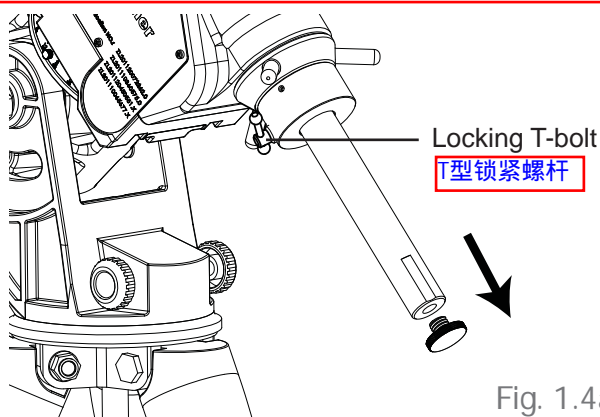


Fig. 1.4a

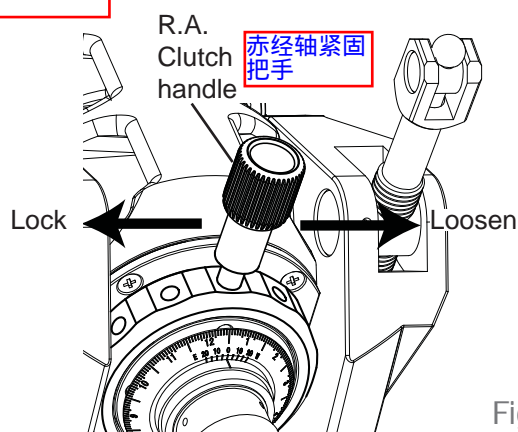


Fig. 1.4b

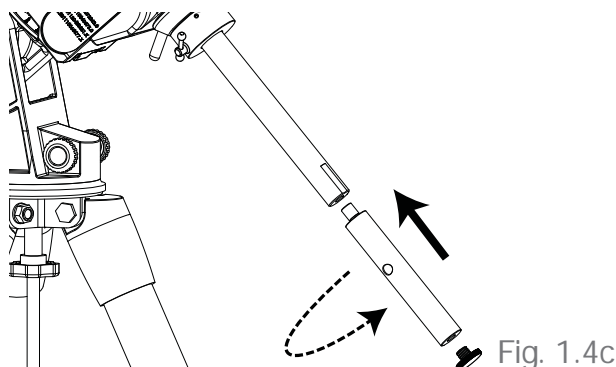


Fig. 1.4c

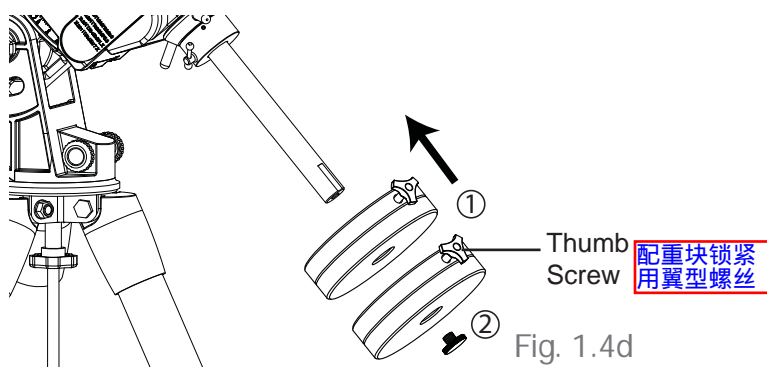


Fig. 1.4d

1.5 Installing the Telescope 1.5 安装望远镜

1. Before installing a telescope, ensure: 1. 开始安装望远镜前，必须确
 - The counterweight rod is pointing towards the ground. 配重杆已指向地面。
 - All counterweights have been moved to the end of the counterweight rod. 所有配重块都已移动到配重杆的末端
 - The R.A. Axis is secured by tightening the R.A. Clutch. 赤经轴已通过赤经轴紧固装置锁紧

2. 松开赤纬轴紧固旋钮后转动赤纬轴直到两用型活动调节座上的两个旋钮朝向上方同时鸠尾槽也调至水平状态。再次锁紧赤纬轴。
2. Release the Dec. clutch wheel and rotate the Dec. axis until the two knobs on the dual-fit saddle are facing upward and the dovetail groove is leveled. Tighten the Dec. clutch again.

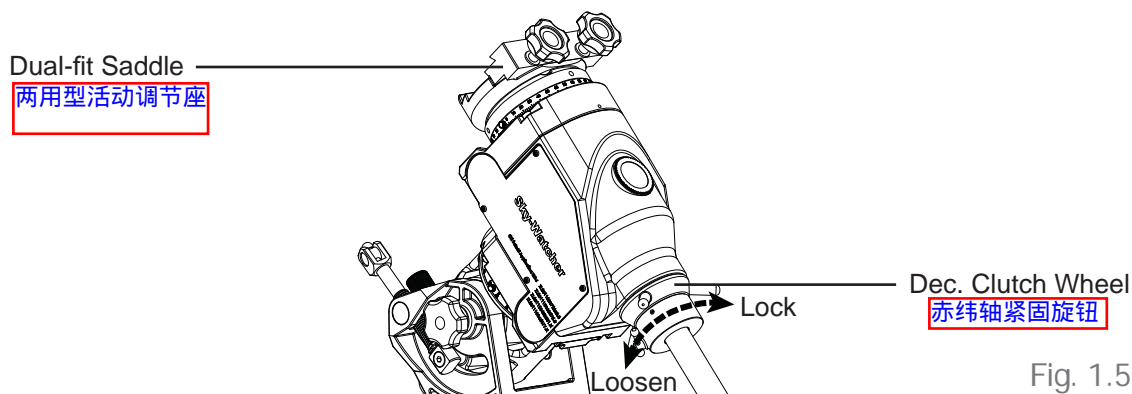


Fig. 1.5

3. Loosen the two knobs on the saddle until the width of one of the dovetail grooves is slightly wider than the width of the dovetail bar on the telescope. 3. 松开赤道仪鸠尾槽调节座上的两个旋钮直到要用到的那个鸠尾槽的间距略大于望远镜上鸠尾板的宽度。
4. While holding the telescope horizontally, seat or slide the dovetail bar of the telescope to the proper groove of the saddle. The lower groove is for a 45mm width dovetail bar and the upper groove is for a 75mm one. 4. 平托起望远镜，把望远镜上的鸠尾板放到对应的鸠尾槽处。注意赤道仪上鸠尾槽调节座处较低的卡槽对应的是45mm规格的鸠尾板而上方的卡槽对应的是75mm规格的鸠尾板。
5. Tighten the two knobs to secure the dovetail bar in the groove. 5. 拧紧两个旋钮把鸠尾板固定在卡槽处。

Warning: Keep supporting the telescope until you are sure that it has been firmly attached to the saddle. 警告：务必拿好望远镜直到把望远镜镜身牢固的固定到卡槽上为止。

1.6 Balancing the Mount 1.6 平衡赤道仪

Once the counterweight, telescope, and accessories tray have been installed, the mount should be balanced to reduce stress on the motor drive system, as well as to ensure smooth and accurate operation. 当配重块、望远镜和附件托盘安装好后，需要通过配平来减轻马达驱动系统的负荷，同时，通过配平也可以保持赤道仪运行的平顺性和精确性。

1. Loosen the R.A. Clutch and rotate the R.A. Axis until the counterweight rod is parallel to the ground. Tighten the R.A. Clutch. 1. 松开赤经轴紧固装置并转动赤经轴直到配重杆与地面保持平行，然后锁紧赤经轴。
2. Loosen the Dec. clutch and rotate the Dec. axis until the telescope is parallel to the ground. Tighten the Dec. clutch. 2. 松开赤纬轴紧固装置并转动赤纬轴直到望远镜与地面保持平行，然后锁紧赤纬轴。
3. Loosen the thumb screws on the counterweights. 3. 松开配重块上的翼型紧固螺
4. Hold the counterweight rod with one hand, release the R.A. Clutch and adjust the counterweights along the rod until the mount is able to remain stationary without support. Tighten the thumb screws on the counterweights again. 4. 一只手扶住配重杆，松开赤经轴紧固装置后沿着配重杆滑动调整配重块直到松手后赤道仪依然能够保持固定不动。
5. Rotate the R.A. Axis; the mount should remain relatively balanced along different angles. Once this is confirmed, return the mount to its original position described in Step 1 and tighten the R.A. Clutch again. 5. 转动赤经轴；此时赤道仪应当在不同角度都能保持相对平衡。确认能做到这一点后，把赤道仪还原到步骤一中的初始位置然后再次锁紧赤经轴。
6. Hold the telescope with one hand and release the Dec. clutch. 6. 一只手扶好望远镜后松开赤纬轴。
7. Slowly let go of the telescope and check for any rotational movements. If there is a movement, adjust telescope position with relation to the tube rings and saddle. The final position of the telescope should remain stationary without support. 7. 慢慢放开望远镜并检查下朝任意方向转动时的移动是否正常。在尝试调整望远镜与管环和鞍座的各种相对位置的过程中，要保证在没有支撑的情况下望远镜的最终位置应始终能保持稳定。

PART II : USING THE AZ-EQ6 GT MOUNT

第二部分：AZ-EQ6 GT赤道仪的使用

2.1 Manually Rotating the Mount 2.1 手动转动赤道仪

Refer to the following diagrams: 参照下列示意图

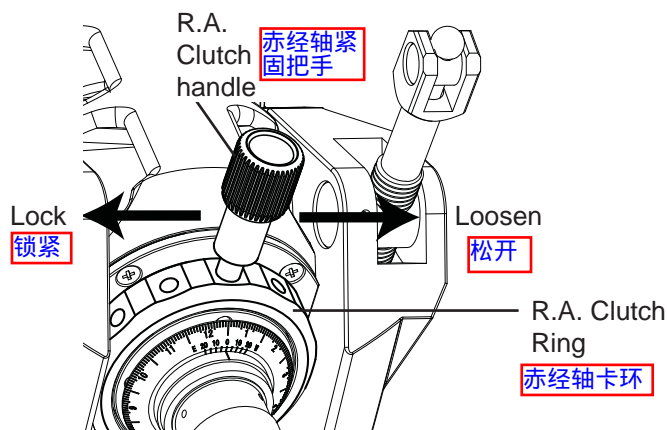


Fig. 2.1a

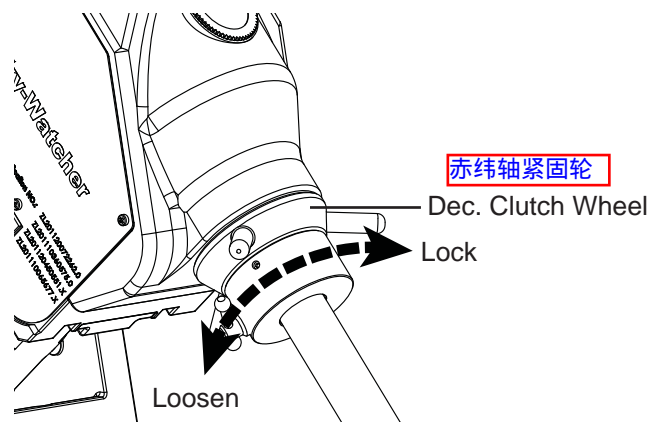


Fig. 2.1b

1. 松开赤经轴紧固装置以便能够手动转动赤经轴（详见图示 2.1a）

1. Release the R.A. Clutch to manually rotate the R.A. Axis. (Fig. 2.1a)

2. The R.A. Clutch handle can be removed and re-positioned on the clutch ring for adjustment of the tightening strength. (Fig. 2.1a) 2. 可以通过拆卸和复位赤经轴卡环上的赤经轴紧固把手来调节拧紧的力度（见图2.1a）

3. Release the Dec. clutch wheel to manually rotate the Dec. axis. (Fig. 2.1b) 3. 松开赤纬轴紧固轮以便能够手动转动赤纬轴（见图2.1b）

4. Both the R.A. Clutch and the Dec. clutch should be tightened when driving the mount with the internal motors. 4. 当由内部马达电机驱动赤道仪时赤经轴和赤纬轴必须全部锁紧。

2.2 Using the Dials 2.2 拨盘的使用

As displayed below, the AZ-EQ6 GT mount features a R.A dial and a Dec. dial.

如下图所示，即为AZ-EQ6 GT赤道仪赤经轴拨盘和赤纬轴拨盘的样子

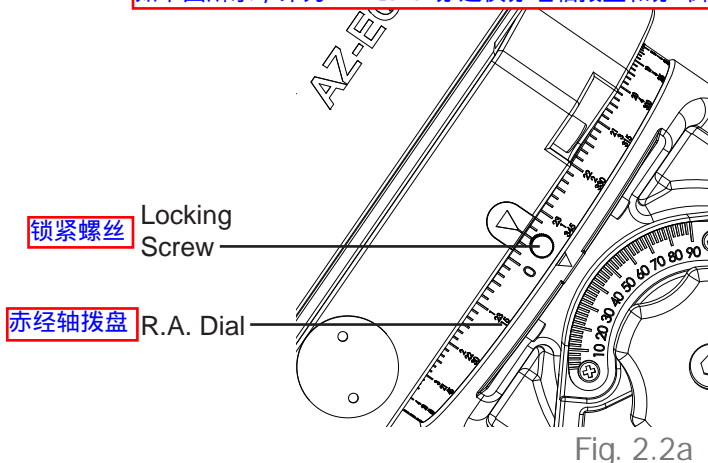


Fig. 2.2a

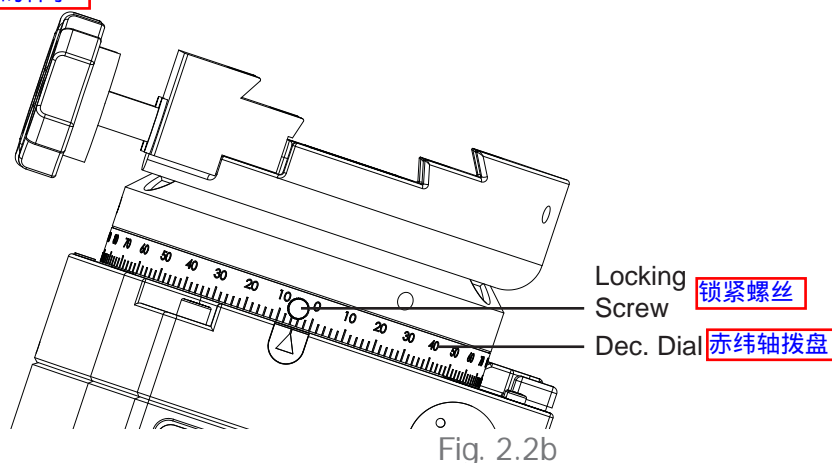


Fig. 2.2b

1. Before using the dials, they need to be calibrated: Point the telescope towards a known coordinate (R.A.-Dec. coordinates or azimuth-altitude coordinates). Loosen the two locking screws on the dials to turn and let the dials read the known coordinates, then tighten the locking screws again.

1. 在使用拨盘前，拨盘必须进行校准：具体方法是，使望远镜指向一个已知坐标（经纬度坐标或方位高度坐标）。松开两个拨盘上的锁紧螺丝并让拨盘指读出这个已知坐标，然后再次拧紧两个锁紧螺丝。

2. 当拨盘校准好后，通过对照拨盘读书赤道仪就可以用马达电机驱动或手动调节到特定的坐标了

2. Once the dials are calibrated, the mount can either be motor-driven or moved manually to specified coordinates by referring to the dial readings.

3. The R.A. dial features three different scales: the upper scale is used to indicate the right ascension in Equatorial mode when mount is operating in the Southern Hemisphere; the middle scale is used to indicate the right ascension in Equatorial mode when operating in the Northern Hemisphere; the lower scale is used to indicate the azimuth angle when operating in Alt-azimuth mode.

4. 赤纬轴拨盘被分为各90度的四个四分之一圆，用于表示赤纬（当赤道仪运行于赤道仪模式时）或者用于表示方位角（当赤道仪运行于地平模式时）。用户校准赤纬轴拨盘时要选用合适的种类

4. The Dec. dial is divided into four quadrants of 90-degree scales, used to indicate the declination (when mount is operating in Equatorial mode) or altitude angle (when operating in Alt-azimuth mode). Users should use the proper segment when calibrating the Dec. dial.

3. 赤经轴拨盘看上去有三种不同的尺度：上面的刻度是用来表示在南半球运行时，赤道模式下的赤经。中间的刻度用来表示在北半球运行时，赤道仪模式下的赤经。下层的刻度用来表示运行在地平模式时的方位角。

2.3 Adjusting the R.A. Axis's Elevation 2.3 调节赤经轴的仰角

1. Loosen the two fork tightening knobs located on the sidewalls of the mount. (Fig. 2.3a)

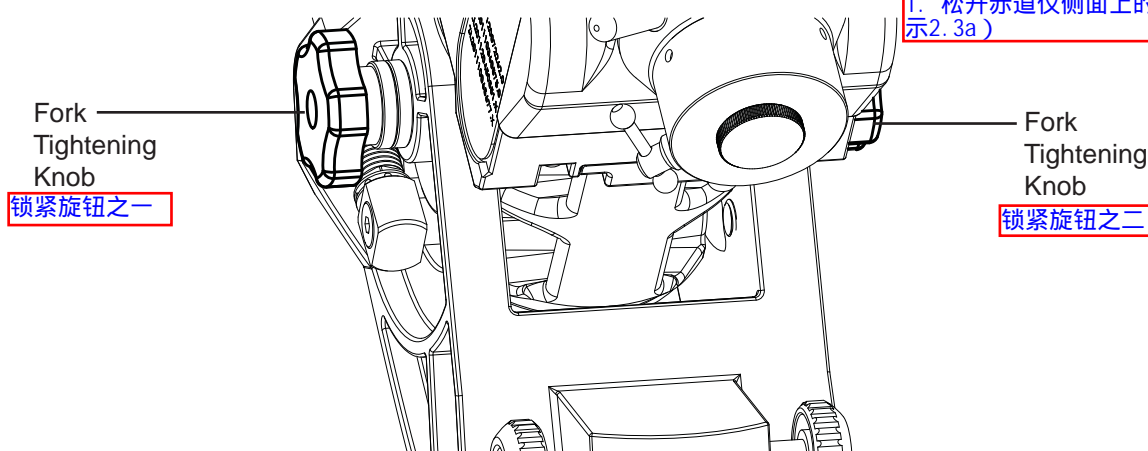


Fig. 2.3a

2. Pull out the handle stowed in the latitude jack screw (Fig. 2.3b), and use it to turn the jack screw to set the R.A. axis's elevation to a specified angle by referring to the latitude scale on the left side of the mount. (Fig. 2.3c)

2. 拉出连接在纬度顶紧螺丝上的把手（见图2.3b），随后通过该把手转动顶紧螺丝并根据赤道仪左侧的纬度刻度值调节赤经轴的仰角到一个特定的角度。（图2.3c）

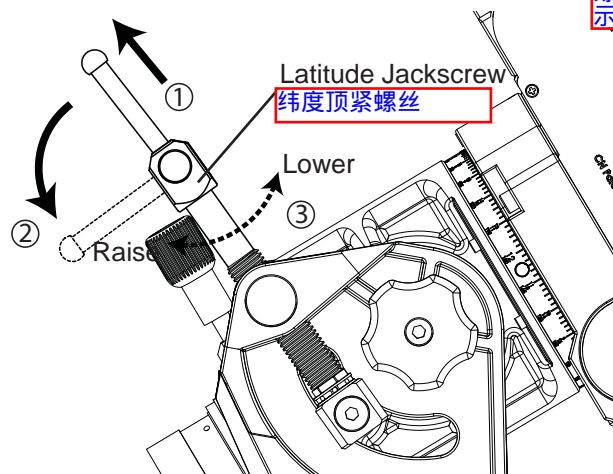


Fig. 2.3b

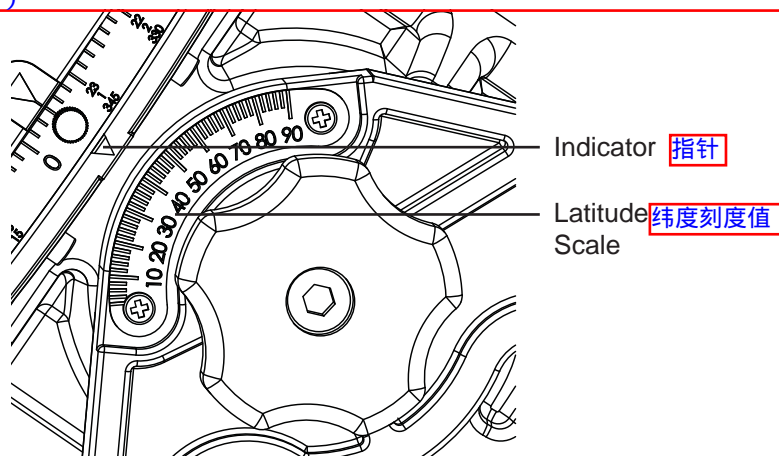


Fig. 2.3c

3. Stow the handle into the jack screw after the adjustment. (Fig. 2.3b) 3. 调节完成后把顶紧螺丝的把手归位
4. Engage the two fork tightening knobs. 4. 拧紧两个两侧的锁紧旋钮。

Note: It is normal to have slight elevation play on the AZ-EQ6 GT mount. The mount depends on the gravity of its payload and its own weight to stay firm. Because of this, it is recommended to end the elevation adjustment with an upwards movement. Whenever there is an upwards over-adjustment, lower the elevation first, and then jack the mount upwards again.

请注意：在AZ-EQ6 GT赤道仪上会存在正常的轻微仰角变动。赤道仪会基于其负载物的重力和赤道仪本身的重量作用而保持稳定。因此，建议通过一个向上的提升来收尾完成最终的仰角调节。无论何时要进行抬升调整，都要先调低方位角再将赤道仪朝上抬升。

2.4 Setting the AZ-EQ6 GT Mount to Alt-azimuth Mode 2.4 将AZ-EQ6 GT赤道仪调节成地平模式

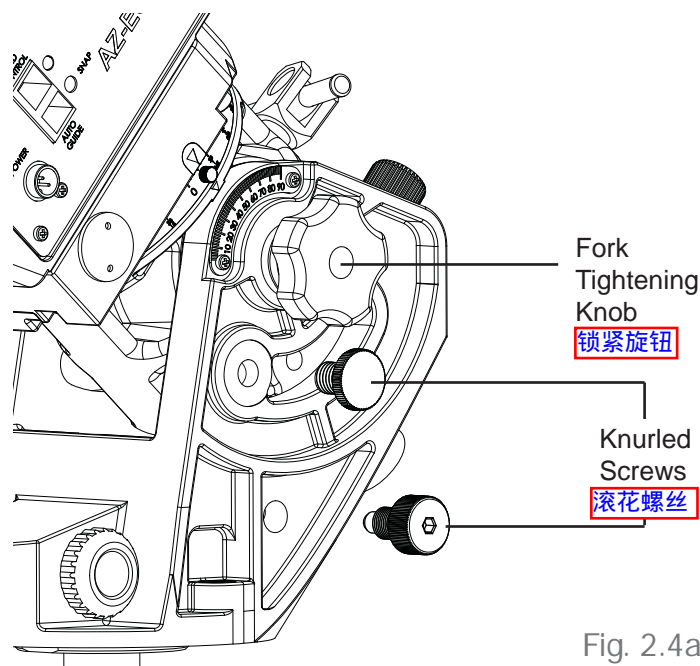


Fig. 2.4a

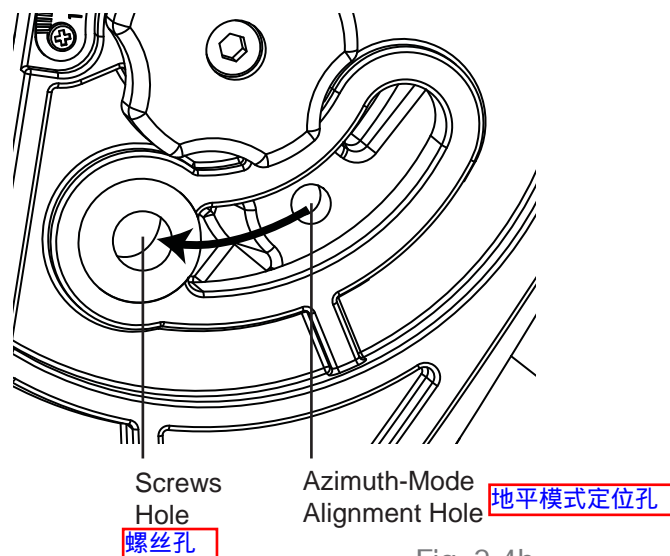


Fig. 2.4b

1. Loosen the two fork tightening knobs. 1. 松开两个锁紧旋钮
2. Remove the two knurled screws from the left sidewall of the mount; Put the shorter one into the lower screw hole, keep the longer one for later usage 2. 从赤道仪左侧壁移除两个滚花螺丝；将其中较短的那个滚花螺丝放入下方的螺丝孔，长的留下后面用
3. Jack up the R.A. axis's elevation until it reaches approximately 88 degrees and the jack-screw will disengage entirely. Lift the counterweight rod to align the azimuth-mode alignment hole with the upper screw hole on the left sidewall (Fig. 2.4b). Use the longer knurled screw to connect these two holes and tighten it with a 5mm Allen wrench. 3. 抬高赤经轴仰角至其接近约88度且顶紧螺丝完全脱离。通过左侧壁高处的螺丝孔将配重杆抬高至其与地平模式定位孔成一直线（图示2.4b）。用第二部中剩下的那个较长的滚花螺丝连接这两个螺丝孔并用5mm通用扳手拧紧。
4. Engage the two fork tightening knobs. 4. 拧紧两个锁紧旋钮
5. To restore the mount to Equatorial mode, loosen the two fork tightening knobs first, then remove and exchange the two knurled screws on the left sidewall of the mount. While holding the counterweight rod, slowly lower the R.A. axis's elevation until the latitude jack-screw starts to engage. Spin the jackscrew counterclockwise with the handle to lower the elevation to the desired angle.

5. 将赤道仪恢复成赤道仪模式，先松开两个锁紧旋钮，然后去掉并替换赤道仪左侧的两个滚花螺丝。扶好配重杆，慢慢降低赤经轴的仰角直到纬度顶紧螺丝就位。通过把手逆时针转动该螺丝以降低仰角到所需的位置。

注意： **Note:** 当设定赤道仪为赤道仪模式时，本体左侧壁上较长的滚花螺丝必须被移动到走侧壁下方低处的螺纹孔，绝对不要把它置于较高处的螺纹孔；否则，会在抬升赤经轴时损伤到赤道仪。

- When setting the mount to Equatorial mode, the longer knurled screw on the left sidewall of the mount must be moved to the lower threaded hole on the left sidewall. Do not put it in the upper threaded hole; otherwise, the mount may be damaged when jacking up the R.A. axis. 当赤道仪朝前时，望远镜应当被架设在它的右手边（没操作过，这里不明白什么意思）
- The telescope should be mounted in a way so that it is on the right-hand side of the mount when it points forward.
- When switching between Alt-azimuth/Equatorial modes, be sure to remove all counterweights and telescope from the mount first to avoid damage to the Mount's latitude adjustment mechanisms. 当在经纬仪和赤道仪模式间切换时，需要确保已经从赤道仪上移除所有配重并去掉望远镜以避免损伤赤道仪的纬度调节机构。
- It may be more difficult to balance the R.A. (or Azimuth) axis in Alt-azimuth mode. Here are the balancing steps recommended for Alt-azimuth mode: 在经纬仪模式下调节赤经轴（或赤纬轴）的平衡可能会更加困难，下面是推荐的平衡步骤：
 - » **Balance** the payload and counterweights in equatorial mode and mark the position of the counterweights. 在赤道仪模式下平衡载荷和配重并标记处配重锤的位置
 - » **Unload** the payload and counterweights to set the mount in Alt-Azimuth mode.
 - » **Re-load** the mount again by installing the counterweight at the marked position. 去掉负载和配重锤后把赤道仪设置为经纬仪模式
通过把配重锤安装在标记好的刻度位置来重新装好负重

2.5 Installing a Secondary Telescope 副镜的安装

A secondary telescope saddle can be installed at the end of the AZ-EQ6 GT mount's counterweight rod for the mounting of a secondary telescope. 副镜座可以安装在AZ-EQ6 GT赤道仪配重杆末端的副镜接口上。

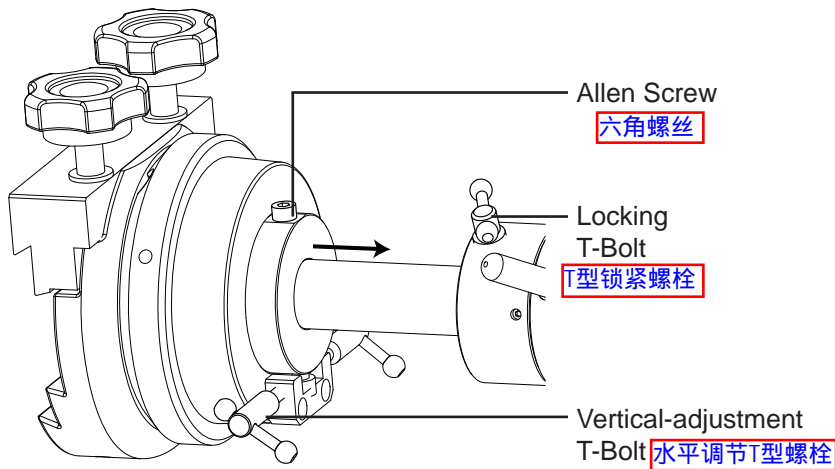


Fig. 2.5a

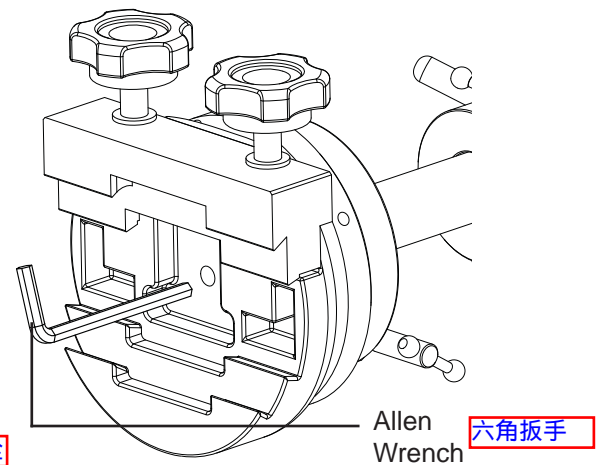


Fig. 2.5b

- Slide the counterweight rod out and rotate it so the flat cutting surface at the end of the rod is facing up, then lock the rod with the T-bolt. 1. 拉出并转动配重杆直到配重杆末端的平整切割面朝上，然后用T型螺栓锁紧配重杆
- Loosen the Allen screw on the saddle's silver ring and push the saddle onto the counterweight rod, as shown in Fig. 2.5a. Align the Allen screw to the flat surface on the counterweight rod. 2. 松开底座上银色圆环上的六角螺丝并把底座推到配重杆上，如图2.5a所示。把六角螺丝与配重杆上的平整面对齐。

3. 使用5mm六角扳手通过底座中间孔处六角螺丝将底座安装到配重杆上（图. 2. 5b）. 再用扳手固定好银色圆环上的六角螺丝。

3. Use a 5mm Allen wrench to secure the saddle to the counterweight rod with the Allen screw in the central hole of the saddle (Fig. 2.5b). Also tighten the Allen screw on the silver ring with the same wrench. 4. 固定赤纬轴，将副镜装在副镜底座上。望远镜朝前时副镜及底座应在赤道仪的左侧。？

4. Tighten the Dec. clutch, and then install the secondary telescope on the secondary saddle. The secondary telescope and its saddle should be situated to the left of the mount when the telescope points forward. 5. 松开配重杆上的T型锁螺栓以测试副镜的平衡性。通过调节镜身及燕尾板的位置调节好望远镜的平衡。然后再次固定好T型螺栓

5. Loosen the counterweight rod's locking T-bolt to test the balance of the secondary telescope. Adjust the positioning of the telescope in its tube rings or the dovetail bar's position in the groove of the saddle until the telescope is balanced. Tighten the T-bolt again.

6. Loosen the Dec. clutch to test and balance the telescope mounted on the primary saddle. Then tighten the Dec. clutch again. 6. 松开赤纬轴锁紧以测试和配平在主镜座上架好的望远镜。然后再次固定好赤纬轴锁紧装置

7. Loosen the counterweight rod's locking T-bolt and rotate the secondary telescope vertically until it points in the same direction as the main telescope. Lock the T-bolt again.

8. Aim the main telescope at a distant object, and then adjust the two T-bolts on the secondary saddle to point the secondary telescope to the same horizontal level of the distant object. 7. 松开配重杆上的T型螺栓并垂直转动副镜直到它的朝向与主镜一致。锁紧T型螺栓。
8. 将主镜指向一个远方的目标，然后调节副镜上的两个T型螺栓以将副镜指向相同水平面上的远方目标。

Note: 注意：

- It is recommended to use the secondary saddle only when the EQ6 GT mount is configured in Alt-azimuth mode. 仅在EQ6 GT使用赤道仪被设置为经纬仪模式时才建议使用副镜底座
- There is no mechanism on both the primary saddle and the secondary saddle for aligning the two telescopes in azimuth direction. User has to find a proper way to eliminate the azimuth deviation. 主镜底座与副镜底座上都没有什么机械装置用来对齐主副镜的方位朝向。用户必须寻求适当的方式以消除方位偏差
- The 150mm counterweight rod's extension cannot be used with the secondary saddle. 配备的150mm配重杆延长杆不能用于副镜底座。

PART III : POLAR ALIGNMENT

Prior to operating the AZ-EQ6 GT in Equatorial mode, it must be polar-aligned.

在赤道仪模式下运行AZ-EQ6 GT赤道仪前，必须把极轴对齐

3.1 准备

3.1 Preparation

1. 安装EQ6 GT赤道仪（参考第一部分：赤道仪的安装）。同时建议在对极轴之前就装载好望远镜及配重锤

1. Setup the EQ6 GT mount (Refer to **PART I : SETTING UP THE AZ-EQ6 GT MOUNT**). It is recommended to load the mount with the telescope and counterweights prior to polar alignment. 2. 把极轴镜指向北极轴的方向（在北半球进行观测时）或者南极轴的方向（在南半球进行观测时）。将赤经轴仰角值设置为当地的纬度值（参考2.3部分调节赤经轴仰角）
2. Point the polar scope to the direction of the North Pole (For Northern Hemisphere observing) or South Pole (For Southern Hemisphere observing). Set the R.A. axis's elevation to the local latitude (Refer to **2.3 Adjusting the R.A. Axis's Elevation**)
3. Remove the polar scope cap on the mount, loosen the Dec. clutch, and rotate the Dec. axis to allow the hole on the Dec. shaft to fully open for the polar scope and then lock the Dec. clutch again. (Fig. 3.1a & Fig. 3.1b) 3. 去掉赤道仪上的极轴镜盖，松开赤纬轴锁定装置，转动赤纬轴直到上面的极轴镜观察口充分打开然后再次锁紧赤纬轴锁定装置。

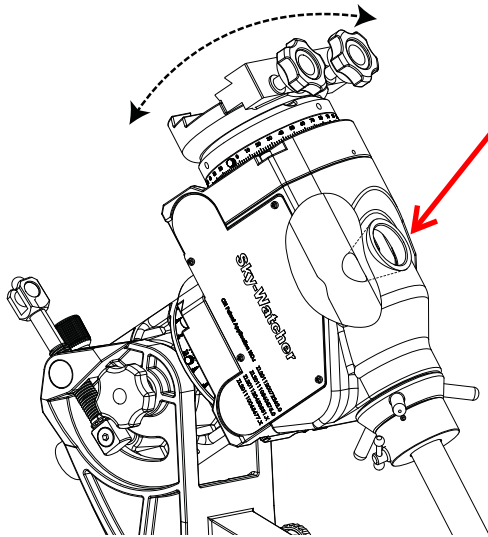


Fig. 3.1a

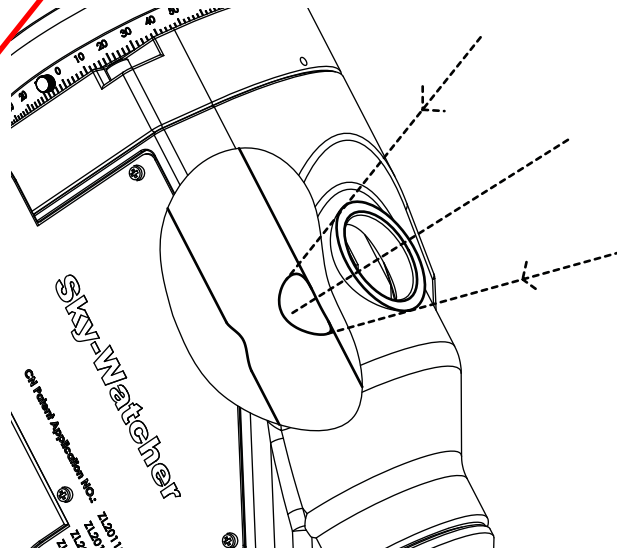


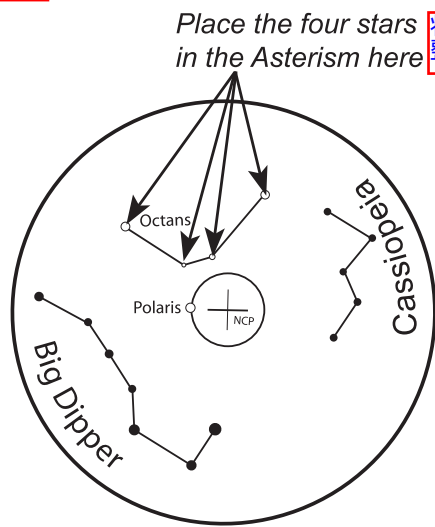
Fig. 3.1b

4. 核对极轴镜是否与赤经轴对齐。（参考3.4 校准对齐极轴镜 应该是指核对转动赤经轴时极轴镜的中心是否会跑偏）

4. Verify whether the polar scope is aligned with the R.A. Axis. (Refer to **3.4 Align the Polar Scope**).
5. Turn on the power on the mount to illuminate the polar scope. 5. 打开赤道仪电源照亮极轴镜
6. Find the orientation of Polaris in the Polar Scope. (Refer to **3.3 The Orientation of the Polaris**). 6. 找到极轴镜中北极星的方位（参考3.3 北极星的方位）

3.2 Alignment

3.2 对齐极轴



Southern Hemisphere

南半球

Fig. 3.2a

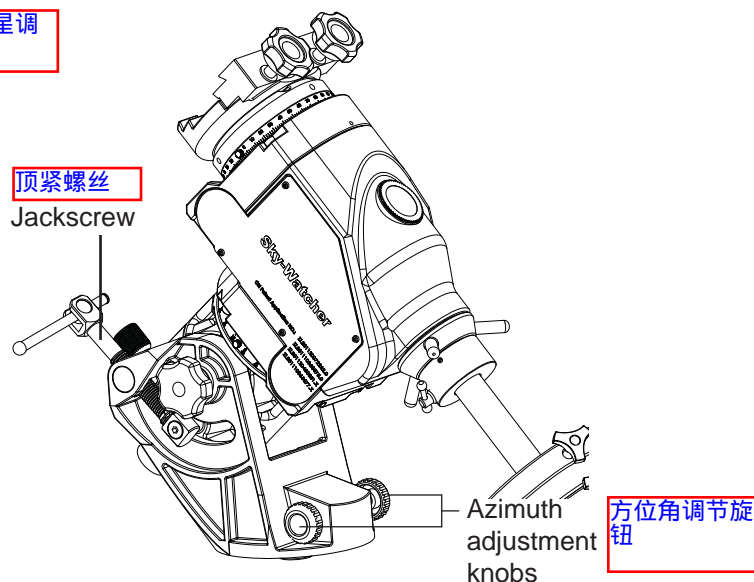


Fig. 3.2b

一旦赤道仪通电极轴镜被照亮后，上述画面将出现在极轴范围里的视野中。如果成像模糊，可转动极轴镜目镜上的调焦环

Once the mount is powered up and the polar scope is illuminated, the pattern in the above figure (Fig. 3.2a) should be visible in the field of view (FOV) of the polar scope. If the image appears blurred, rotate the knurled ring of the polar scope's eyepiece to focus.

1. 对于在北半球进行观测的情况：在极轴范围里找到北极星（在北天极附近最亮的那颗星）；然后用顶紧螺丝和两个方位角调节旋钮将北极星调整移动到极轴镜视场中的适当位置（参照接下来“极轴镜中北极星的方位”章节部分）

1. For observing in Northern Hemisphere: Find the Polaris (The brightest star near the North Celestial Pole) in the polar scope; then use the jackscrew and the two azimuth adjustment knobs to move the Polaris to the proper position in the FOV of the polar scope. (Refer to the upcoming section “The Orientation of Polaris in Polar Scope”).

2. For observing in Southern Hemisphere: In the FOV of the polar scope, locate the 4 dim stars (Around Magnitude 5 to 6) which form the pattern like the “Octans” drawing in the polar scope (refer to Fig. 3.2a). Loosen the R.A. clutch and rotate the R.A. axis to align the orientation of the “Octans” drawing to the 4 stars. Then use the jack screw and the azimuth adjustment knobs to move the 4 stars to the 4 small circles of the “Octans” drawing.

2. 对于在南半球进行观测的情况：在极轴范围里的视场中，找到像极轴镜中画出的南冕座里那4颗星一样的4颗暗星（星等5~6）（参考图3.2a）。松开赤经轴并转动赤经轴对准画面中南冕座的四颗星。然后用顶紧螺丝和方位角调节旋钮将这4颗星调节移动到画面上南冕座中的4个小圈圈中。

3.3 北极星方位

3.3 The Orientation of the Polaris:

当北极星没有被精确的对准北天极的情况下，我们将会看到它在极轴范围内绕着北天极转动，即在图3.2a中心的圆圈中看到北极星围绕着北天极转动。在进行对准极轴的操作中，必须确定北极星在这个圆圈中的方位。我们可以通过下述三种方法获得该方位：

As the Polaris is not located exactly at the North Celestial Pole, we can see it orbits the North Celestial Pole in a polar scope. The large circle seen in the center of the pattern in Fig. 3.2a is a representation of the Polaris' orbit around the North Celestial Pole. When performing the polar alignment process, it is necessary to determine the orientation of the Polaris on the circle.

We can use the following 3 methods to get the orientation:

1. 在天空中找到大熊星座，或者仙后座。松开赤经轴并在赤经轴上转动赤道仪直到大熊座或者仙后座与极轴镜视场中它们各自的图形对齐。再次锁紧赤经轴，此时，画面中中间大圈中的小圆圈代表了极轴范围中北极星的方位。把北极星套在小圈中完成极轴对齐。

1. Locate Ursa Major (Big Dipper) in the sky, or alternatively Cassiopeia. Loosen the R.A. clutch and rotate the mount in the R.A. axis until either the Big Dipper or Cassiopeia is aligned with their pattern in the FOV of the polar scope. Tighten the R.A. clutch again. At this point, the location of the small circle on the large central circle of the pattern represents the orientation of the Polaris in the polar scope. Put the Polaris to the center of the small circle to finish the polar alignment.

2. 同时找到天空中北天极附近的北极星和小熊座β星，北极星到小熊座β星的距离可以被作为极轴范围中北极星方位的近似值。把北极星放在极轴范围中中间大圈圈相同的方向以完成极轴对齐。

2. Locate both the Polaris and the Kochab in the sky near the North Celestial Pole. The direction from the Polaris to the Kochab can be used as proximity of the orientation of the Polaris in the polar scope. Put the Polaris to the same direction on the large central circle in the polar scope to finish the polar alignment.

3. At the end of the initialization of the SynScan hand control, after entering the proper local longitude, latitude, date, time, and daylight-saving time, the SynScan hand controller will display the message: "Polaris Position in P.Scope=HH:MM". Imagine the larger circle in Fig. 3.2a as a clock's face with 12:00 at the top, with the current time pointing to the "HH:MM". The orientation of the hour hand of the clock represents the orientation of the Polaris in the polar scope. Put the Polaris to the same orientation on the large circle to finish the polar alignment.

3. 在SYNSCAN控制手柄初始化结束时，即在输入正确的当地经纬度，日期，时间和夏令时后，手柄会现实出“极轴范围中北极星的位置=HH:MM”的信息。把图片3.2a里中间的大圈圈想象成时钟上12:00数字在上方的样子。把北极星放在大圈中（极轴范围中北极星位置=HH:MM）相同的方位完成对极轴

Out of the three methods above, the first two methods are somewhat less accurate, while the orientation given by the SynScan hand controller is the most accurate.

以上三种方法中，前面两种方法不够精确，而SYNSCAN控制手柄给出的方位则是最精确的

3.4 校对极轴镜

3.4 Align the Polar Scope

Before using the polar scope for polar alignment, the polar scope itself must be calibrated to ensure the pattern in the polar scope is aligned to the mount's R.A. axis. The following steps will outline how to calibrate the polar scope:

在使用极轴镜对极轴前，极轴镜本身必须进行校对以保证极轴镜中的画面与赤道仪的赤经轴对齐。下述步骤将简单概述如何校对极轴镜：

1. Choose a fixed object (the Polaris at night, or a faraway object in daytime); put the reticle in the FOV of the polar scope on the object by adjusting the two azimuth adjustment knobs and the latitude jack screw.

1. 选取一个固定目标（夜晚的北极星，或者白天时一个远方的目标）；通过调节两个方位角调节旋钮和纬度顶紧螺丝把极轴镜视场中的十字分划线对准目标物。

2. Rotate the mount in R.A. axis for half a turn. The R.A. dial can be used for an accurate rotation. Tighten the R.A. clutch after the rotation.

2. 在赤经轴上把赤道仪转动半圈。赤经轴拨盘可以用来作为精确转动的参照。转完后锁紧赤经轴。

3. 如果旋转后目标仍保持在极轴镜十字分划线的中心，那就意味着极轴镜已经与赤经轴一致不必再进行校对了。
3. If the object remains at the center of the reticle in the polar scope after the rotation, then it means the polar scope has been aligned to the R.A. axis and no calibration is needed.
4. If the target deviated from the reticle, then use a 1.5mm Allen wrench to adjust the three small Allen screws on the polar scope (Fig. 3.4a) to eliminate the deviation to half. (Fig. 3.4b)
4. 如果目标在十字分划线上存在偏差，那么就用1.5mm六角扳手调节极轴镜上的3个小六角螺丝（图3.4a）以将偏差消除一半（图3.4b）。
5. Repeat steps 1 to 4 a few times until the object keeps at the center of the reticle when rotating the mount in R.A. axis.
5. 多重复几次步骤1到4的步骤直到转动赤道仪赤经轴时目标能保持在十字分划线的中心

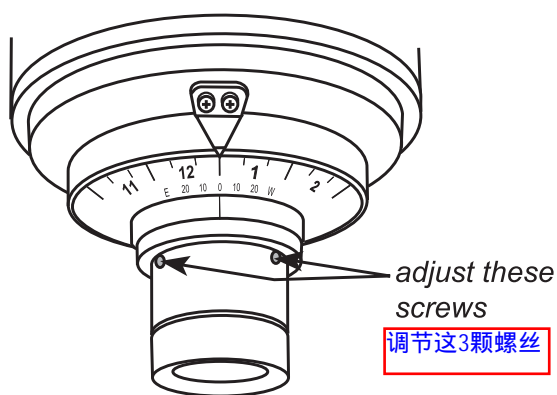


Fig. 3.4a

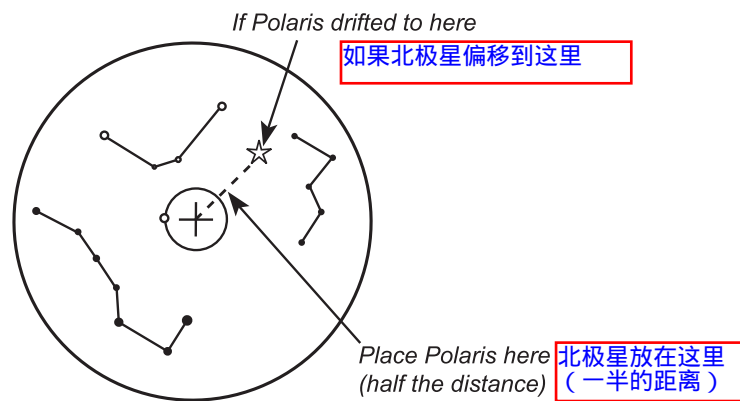


Fig. 3.4b

注意：

Note:

调节六角螺丝时，只松动螺丝的四分之一圈，然后拧紧其他两个

- When adjusting the Allen screws, loosen one screw only $\frac{1}{4}$ of a turn, and then tighten the other two.
- Do not over tighten the Allen screws; it might damage the pattern plate in the polar scope.
- Do not loosen one screw completely or loosen more than one screw at a time; otherwise, the pattern plate in the polar scope will be disengaged and further adjustment is impossible.
- If the pattern plate does disengage, remove the polar scope's eyepiece by turning the knurled ring counterclockwise and then engage the pattern plate again.

如果图形面板松动了，通过逆时针转动螺纹环去掉极轴镜的目镜然后再次固定好图形面板。

3.5 Polar Alignment Using SynScan Hand Controller

3.5通过synscan控制手柄对极轴

- Polar-align with the polar scope is good for normal observation, but astrophotography needs very high accuracy of polar alignment. The SynScan hand control provides a 2-Star alignment (or 3-Star alignment) based polar alignment routine which can achieve extremely precise polar alignment. Please refer to the SynScan hand controller instruction manual for more information on this high-precision polar alignment method.

通过极轴镜对极轴适合常规观测，但是天文摄影需要非常高精度的对极轴。synscan控制手柄提供了一种能够实现极高精度对极轴的2星校准（或者三星校对）功能。请参照synscan控制手柄设备手册中高精度对极轴方法里的更多信息。

PART IV : ELECTRONIC CONTROL INTERFACE

第四部分：电子控制接口

4.1 Control Panel 4.1 控制面板

The control panel of the AZ-EQ6 GT is shown below: AE-EQ6 赤道仪的控制面板外观如下：

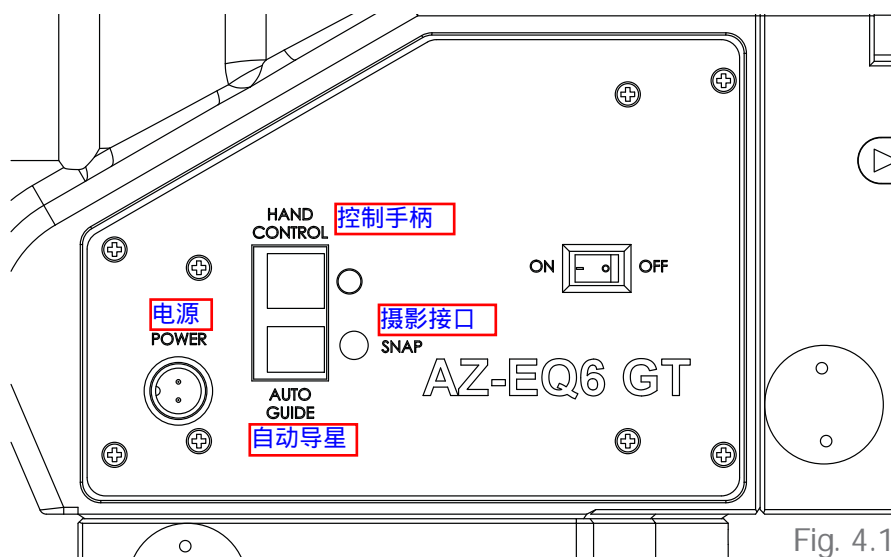


Fig. 4.1

4.2 面板界面详解：

4.2 Panel Interface Components:

POWER



POWER: This is an outlet from which the mount and the hand control get power supply. To connect to a power supply, align the index on both the plug of the cord and the outlet on the panel, and then insert the plug to the outlet. Tighten the knurled cap on the plug to secure the plug on the panel.

手柄控制器（端口）：这是一个用来连接synscan手柄控制器的RJ-45 8针接口。

HAND CONTROL



HAND CONTROL: This RJ-45 8-pins outlet is for connecting the SynScan hand controller.

自动导星：这是一个用于连接自动导星设备的RJ-12 6针接口。它适用于任何采用ST-4端口的自动导星设备。

AUTO GUIDE

AUTO GUIDE: This RJ-12 6-pins outlet is for connecting an autoguider. It is compatible with any autoguider with a ST-4 type interface.

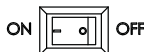
SNAP:这是用于连接相机快门的控制端口。synscan控制手柄能够通过该端口控制相机自动拍照。

SNAP



SNAP: This is a stereo outlet for connecting to a camera's shutter control port. The SynScan hand control can control a camera to take pictures automatically via this interface.

ON/OFF开关：打开或关闭赤道仪与控制手柄的电源



ON/OFF Switch: Turns on and off the power to the mount and hand controller.

Power LED：电源指示灯用于指示供电和其他一些设备状态。

Power LED: The power LED serves as a power-on indicator and provides other statuses.

- Steady on:** Power voltage is normal. 1.常亮：电源电压正常
- Slow flashing:** Power voltage is low; continuing to operate the mount may damage the battery (if a 12V lead-acid battery is in use). 2.慢闪：电压低；此时继续操作赤道仪会损坏电池（如果此时用的12伏铅酸蓄电池）
- Fast flashing:** Power voltage is extremely low; continuing to operate the mount may damage the battery and the motor controller in the mount. 3.快闪：电压非常低；继续操作赤道仪会损坏电池和赤道仪电机控制器。

4. Intermittent one flash: The PPEC training routine has been triggered, but the controller in the mount has not received the worm index signal and the correction-recoding has not started yet. 4. 间或闪一次：已经触发了周期性误差校正，但是赤道仪控制器还没收到误差指示信号并且未开始误差记录。
5. Intermittent two flashes: The PPEC training routine has been started and the controller in the mount has received the worm index signal and started to record the PE correction. When the intermittent two flashes stops, it means the PPEC training has finished. 5. 间或闪两次：周期性误差修正已经开始且赤道仪控制器收到了故障指示信号并开始记录PE修正。双闪停止时意味着周期性误差修正已经完成。
6. Intermittent, three flashes: Sidereal tracking with PEC is now enabled. 6. 间或闪三次：当前通过周期性误差校正进行恒星追踪的功能已经可用。

4.3 Pinout of the Interfaces:

4.3 单口引脚说明

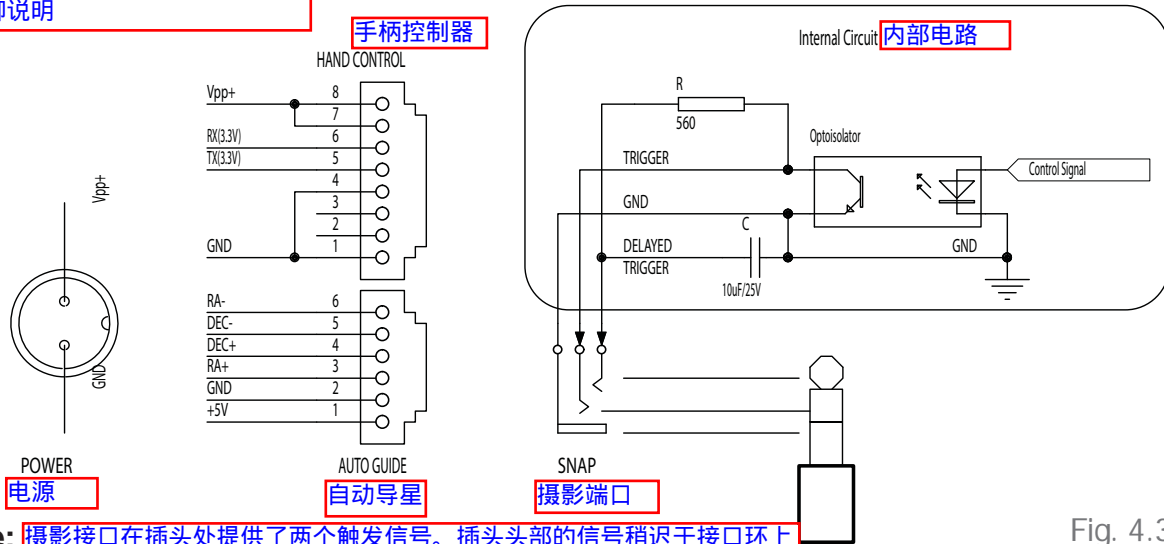


Fig. 4.3

Note: 摄影接口在插头处提供了两个触发信号。插头头部的信号稍迟于接口环上的信号。

- The SNAP port provides two trigger signals to the stereo plug. The signal to the head of the plug is issued slightly later than the signal to the ring of the plug.
- For a camera which only needs a shutter-release signal, either trigger signals will work. For a camera which requires a "Focus" signal ahead of the shutter-release signal, both signals should be connected properly. 对于只需要快门释放信号的相机，二者中任意的一个信号即可产生效果。对于需要在释放快门前先获取对焦信号的相机来说，这两个信号需要被妥善连接。
- The camera control cable shipped with the AZ-EQ6 GT mount is for a Canon EOS series DSLR camera. Cable for other cameras is optional and can be ordered separately.

AE-EQ6 GT赤道仪上的控制线适用于佳能的EOS系列单反相机。其他相机的线缆需要单独订购。

4.4 电源要求

4.4 Power Supply Requirements

输出电压：直流11伏（最小）到16伏（最大）。电压不在该范围会对电机或控制器造成永久损坏

- Output Voltage: DC 11V (minimum) to DC 16V (maximum). Voltage not in this range might cause permanent damage to the motor controller or the hand controller.
- Output Current: 4A for power supply with 11V output voltage, 2.5A for power supply with 16V output voltage. 输出电流：11伏输出电压下为4A供电，16伏下为2.4A供电。（好奇怪，不是电压越高相同电阻下电流输出越大吗？）
- Do not use an un-regulated AC-to-DC adapter. When choosing an AC adapter, it is recommended to use a switching power supply with 15V output voltage and at least 3A output current. 绝对不要使用非稳压的交流直流适配器。当选择交流适配器时，建议使用15伏电压输出至少3A电流输出的开关电源。
- If the power voltage is too low, the motor controller will stop the motors automatically. 如果电压过低，电机控制器会自动停止电机工作。

PART V : OTHER AZ-EQ6 GT MOUNT FEATURES

5.1 辅助编码器功能

5.1 Auxiliary Encoder Function

The AZ-EQ6 GT mount is equipped with auxiliary encoders on both the R.A. axis and Dec. axis. Therefore, the mount can keep tracking its current position even when a user unlocks the clutches and rotates the mount in R.A. axis and Dec. axis manually.

AE-EQ6 GT赤道仪配备有赤经轴和赤纬轴的辅助编码器。因此，即使在用户手动松开了锁紧装置并转动赤道仪的赤经轴和赤纬轴之后，赤道仪仍可以持续追踪当前目标。

With this feature, a user can manually operate the mount anytime without worrying about losing the mount's alignment status. When the user wants to operate the mount with the SynScan hand control again, no alignment is required and all that is needed to be done is to re-lock the clutches.

具有了该功能后，任何时候用户都可以手动操作赤道仪而无需担心丢失当前赤道仪的校准状态。当用户想要再次通过synscan控制手柄操作赤道仪时，无需校准而只需要再次锁死锁紧装置。

This feature can be enabled or disabled on the SynScan hand controller.

该特点和通过synscan手柄控制器激活或关闭。

5.2 Permanent Periodic Error Correction 5.2 永久性周期误差校正

The AZ-EQ6 GT mount is equipped with an index on its R.A. worm thus the motor controller can keep tracking the current position of the worm. After a proper PEC training routine, in which the training data is stored in the motor controller permanently, a user can start the periodic error correction (PEC) at any time to improve the tracking performance for short focal length astrophotography. A training process is not required in the next observing session (assuming that the polar alignment is always accurate), thus this is a Permanent Period Error Correction (PPEC). A user can train the mount with manual guiding or auto-guiding. For detailed instructions, please refer to the relevant section in the SynScan hand controller instruction manual.

AZ-EQ6 GT赤道仪在赤经轴误差上配有标示，所以电机控制器能够持续跟踪当前的误差位置（好吧，worm这个词我不知道在这里代表什么）。在适当的周期性误差校正测试后，测试数据会永久存储在电机控制器，用户可以随时开启周期性误差校正（PEC）来改善短焦距天文摄影的跟踪表现。下次观测时不需要重复误差测试步骤（假设是在极轴对的一直都很精确的情况下），这也是一种永久性的周期性误差校正（简称PPEC）。用户可以通过手动或自动导星的方式测试赤道仪。具体教程请参照SYNSCAN控制器设备手册的相关部分。

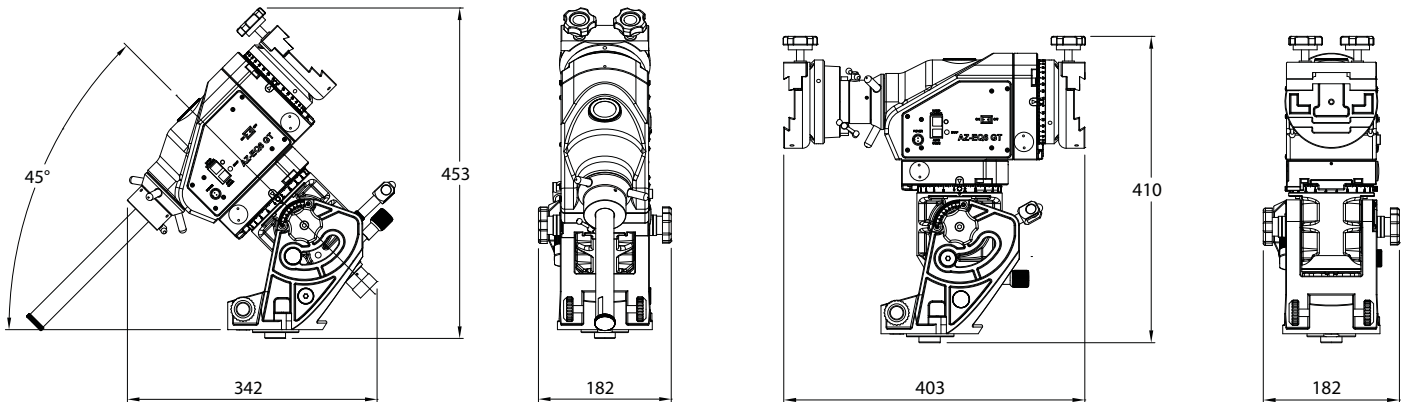
5.3 Batch Exposures Function 5.3 批量曝光功能

The AZ-EQ6 GT mount is equipped with a SNAP port which can control the shutter releasing of a camera. Working with the SynScan hand control's "Camera Control" function, a user can take batch exposures when doing astrophotography. Up to 8 groups of "Exposure-time & Frames" combinations can be set on the SynScan hand controller. For detailed information, refer to the SynScan hand control's instruction manual.

AE-EQ6 GT赤道仪配备有一个摄影接口，该接口能控制相机的快门释放。通过SYNSCAN控制手柄的“相机控制”功能，在天文摄影时用户可以进行批量曝光。通过手柄可实现多达8组不同的“曝光时间和帧”的组合。详情请参照SYNSCAN控制器设备手册。

APPENDIX I : SPECIFICATIONS

Dimensions:



Equatorial Mode

赤道仪模式

Alt-azimuth Mode

经纬仪模式

Specifications: 具体规格：

Product Name	产品名称	AZ-EQ6 GT Mount
Mount Type	赤道仪类型	German Equatorial / Alt-azimuth Dual Mode
Payload	载荷（不含配重）	20kg
(Counterweights excluded)		
Latitude Adjustment Range	纬度调节范围	10° to 75°, 90°
Azimuth Adjustment Range	仰角调节范围	About ±9 °
Weight(Tripod excluded)	重量（不含脚架）	15.4 kg
Counterweight	配重锤	2 x 5kg/ea
Tripod	三脚架	2-inch stainless steel, 7.5kg
Counterweight Rod	配重杆	25mm Diameter, Length 202mm + 150mm
Power Requirement	电源要求	DC11~16V 4A
Motor	电机	1.8 ° Hybrid Stepper Motor
Transmission	传输	180:1 Worm Drive + 48:12 Timing Belt Drive + 64 Micro-step/1.8° Stepper Motor Drive
Gear Ratio	齿轮比	720
Resolution	分辨率	9216000 Counts/Rev., approx. 0.14 arc-second
Maximum Slewing Speed	最大回转速度	4.2 degrees/second
Tracking Rate	跟踪速度	Sidereal rate, solar rate, lunar rate
Tracking Mode	跟踪模式	Alt-azimuth mode or Equatorial mode
Auto-guiding Speed	自动跟踪速度	0.125X, 0.25X, 0.5X, 0.75X, 1X
PEC	周期性误差校正	100 Segments Permanent PEC
Hand Controller	手柄控制器	SynScan
Database	数据库	42000+ Objects
Celestial Object Catalog	天体目录	Messier, NGC, IC, SAO, Caldwell, Double Star, Variable Star, Named Star, Planets
Pointing Accuracy	指向精度	Up to 5 arc-minutes (RMS)
Resolution of Aux. R.A./Dec. Axis Encoders	赤经赤纬辅助编码精度？	6356 Counts/Rev., approx. 3.4 arc-minutes

Note: The above specifications may be changed without advance notice.

注意：上述规格可能在没有预先通知的情况下发生变动。

AZ-EQ6 GT Mount

AE-EQ6 GT赤道仪

绝对不要用望远镜直视太阳，这回导致眼睛遭受永久性损伤。观察太阳时必须在望远镜前端使用合适可靠的太阳滤镜，注意在寻星镜上放一个防尘盖或去掉寻星镜以免意外曝光时损伤自己，不要使用目镜式的太阳滤镜，不要用望远镜朝向其他反射表面上反射的太阳光，其内部形成的聚焦加热会损伤望远镜的光学部件。



NEVER USE YOUR TELESCOPE TO LOOK DIRECTLY AT THE SUN. PERMANENT EYE DAMAGE WILL RESULT. 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 USE AN EYEPIECE-TYPE SOLAR FILTER AND NEVER USE YOUR TELESCOPE TO PROJECT SUNLIGHT ONTO ANOTHER SURFACE, THE INTERNAL HEAT BUILD-UP WILL DAMAGE THE TELESCOPE OPTICAL ELEMENTS.