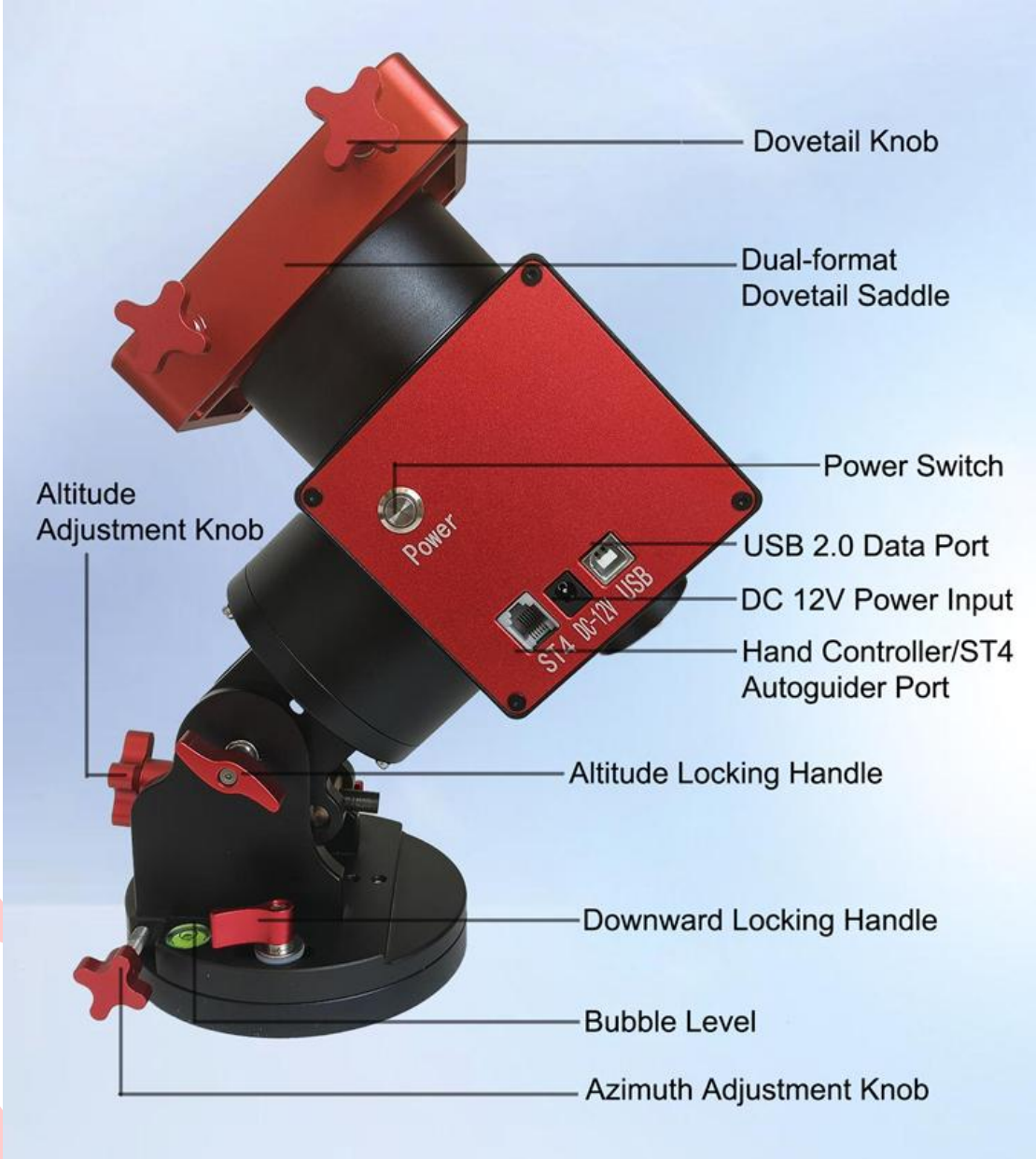
User Manual: TeSeek HM-17PE Equatorial Mount

I. Product Overview:

The TeSeek HM-17PE Equatorial Mount is a harmonic drive mount meticulously engineered for astronomical observation and astrophotography. Utilizing advanced harmonic drive technology, it delivers exceptional precision and stability. By flawlessly tracking celestial movements, the TeSeek provides users with an unparalleled stargazing and imaging experience. Furthermore, it supports multiple control methods to seamlessly accommodate the diverse needs of different users.



II. Features:

1. High Precision: Equipped with an astronomy-specific harmonic reducer, it delivers high-precision control with periodic error (PE) stably within ±10 arcseconds. The PE curve of each unit is individually measured to ensure stable performance and consistent high-torque output.
2. High Load Capacity: Weighing just 5.1kg (with a possible variance of ±300g due to ongoing product optimization), it supports a native payload of 13kg, and up to 18kg with an additional counterweight.
3. OnStep Control System: Utilizes the OnStep control system, supporting control via PC, smartphone, ASIAIR (ZWO box), N.I.N.A., Wi-Fi, Bluetooth, and hand controller.
4. Dual Modes: Equatorial & Altazimuth: Features both Equatorial (EQ) and Altazimuth (AZ) operating modes, making it versatile for both visual observation and

astrophotography.
5. No Latitude Restrictions: Designed with a 0-90° altitude angle range, it can be operated seamlessly from the equator to the poles.
6. Control Options: Supports control via PC, smartphone, ASIAIR (ZWO box), N.I.N.A., Wi-Fi, Bluetooth, and hand controller.
7. Power-Off Brake Device: Automatically engages to protect the equipment during sudden power outages, preventing the telescope from falling and sustaining damage.
8. Mechanical Zero Reset & Position Memory: Enables one-click mechanical zero reset from any position. It also features a power-off position memory: as long as the RA and DEC axes are not moved by external forces after a power outage, it prevents tripod/pier collisions caused by zero-position misalignment during unexpected power failure.

III. Specifications:

* Mount Type: German Equatorial Mount
* Operating Modes: Equatorial/Altazimuth
* Transmission Mode: Harmonic Drive + Synchronous Belt (400:1 Reduction Ratio)
* Periodic Error (PE): < ±10 arcseconds
* RA Drive: 42-Step Stepper Motor + 17-100 Reduction Ratio Harmonic Drive + Electronic Brake
* DEC Drive: 42-Step Stepper Motor + 17-100 Reduction Ratio Harmonic Drive
* Load Capacity: 13kg (without counterweight)/18kg (with counterweight)
* Weight of Mount Body: 5.1kg
* Latitude Adjustment Range: 0°-90°
* Azimuth Adjustment Range: ±9°
* Electronic Polar Scope: iPolar / QHY
* Counterweight Bar Thread: M12x1.75 Coarse Thread
* Counterweight Bar Dimensions: Φ20x230mm
* GOTO Speed: 2.5°/s
* Power Interface: DC 5.5-2.1 (12-15V/2-5A)
* Operating System: OnStep System
* OnStep System Features: Supports control via PC/smartphone/ASIAIR (ZWO box)/N.I.N.A./Wi-Fi/Bluetooth/hand controller
* Guiding Interface: ST4/Hand Controller
* Communication Interface: USB/Wi-Fi
* Zero Position Handling: Mechanical Zero Position Reset

IV. Accessories List:

* TeSeek Equatorial mount body x 1
* Counterweight bar x 1
* 1-meter USB 2.0 cable x 1
* M5 hexagon socket wrench x 1

* M6 screws x 3
* Hand controller (optional)
* Pier extension (optional)

V. Installation Steps:

(A) Mounting the TeSeek Equatorial Mount Body

1. Select a stable, level observation platform. Unfold the tripod and adjust it to a horizontal position, ensuring each leg is firmly supported.
2. Mount the equatorial mount body onto the connecting base at the top of the tripod. Secure it firmly using the provided screws or quick-release mechanism to prevent any wobbling or shifting during subsequent use.
3. Install the counterweight bar by inserting it into the corresponding interface on the mount, ensuring it is securely attached. Depending on your observation requirements, slide an appropriate amount of counterweights onto the bar to balance the weight of the telescope and other accessories, ensuring the stability of the mount during movement. Note that the position of the counterweights should be adjusted appropriately to keep the entire setup balanced.

(B) Installing the Hand Controller

1. Use an RJ12 6P6C double-ended cable (ST4 guiding cable) to connect the hand controller to the ST4 port of the equatorial mount. Ensure both ends of the cable are securely connected; insert the modular plug into the port until a "click" sound is heard, indicating a proper connection.

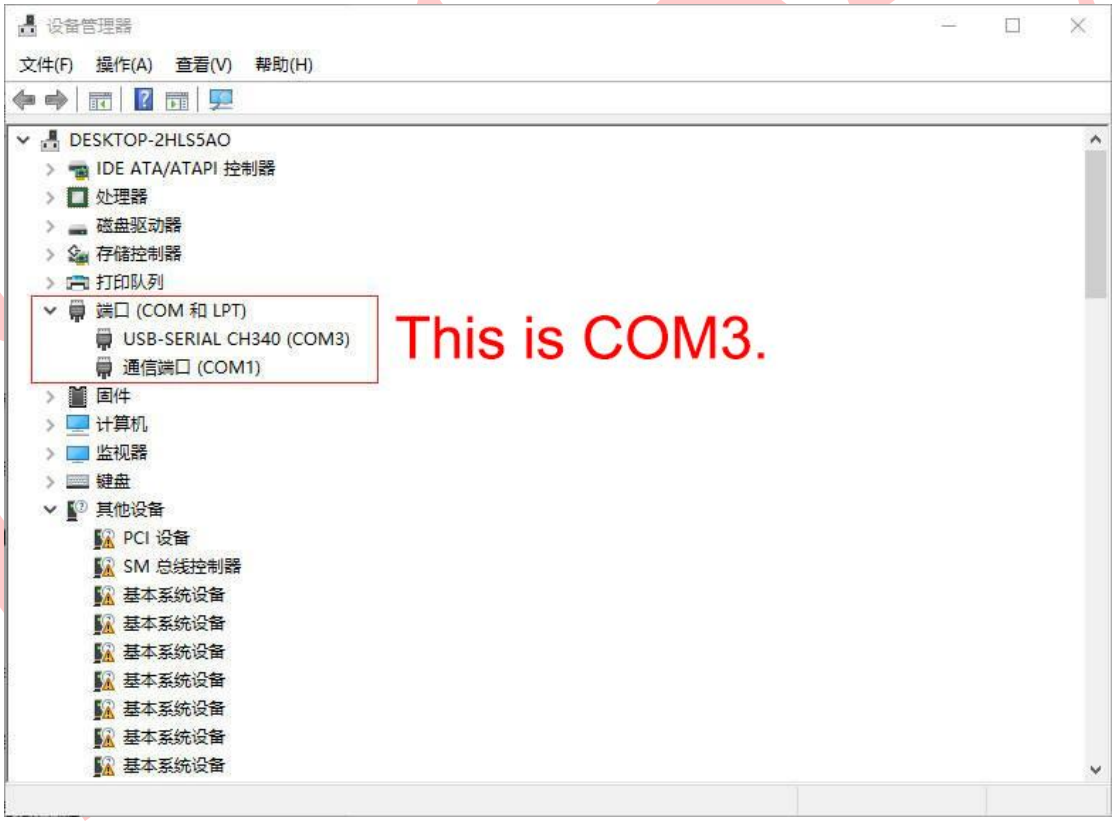
(C) Installing the Telescope and Accessories

1. Mount the telescope onto the telescope mounting base of the equatorial mount. Select the appropriate installation method according to the telescope's type and interface, and securely fasten it using screws or clamps.
2. Install other accessories such as finderscopes, cameras, and filters. Ensure all accessories are securely installed in proper positions to prevent wobbling or collision during observation. When installing the finderscope, adjust its angle and position to align it coaxially with the main telescope, facilitating quick location of target celestial bodies.

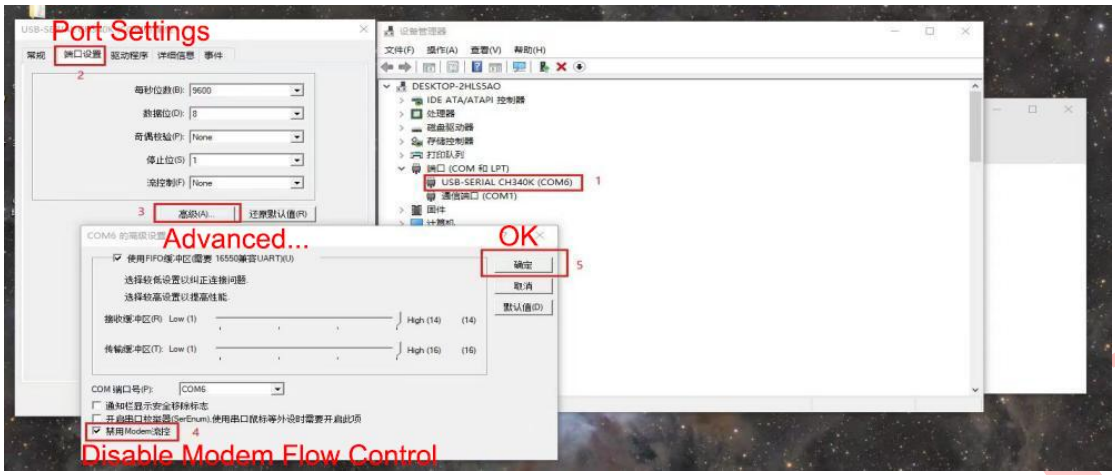
VI. Connection and Setup:

(1) Computer Connection

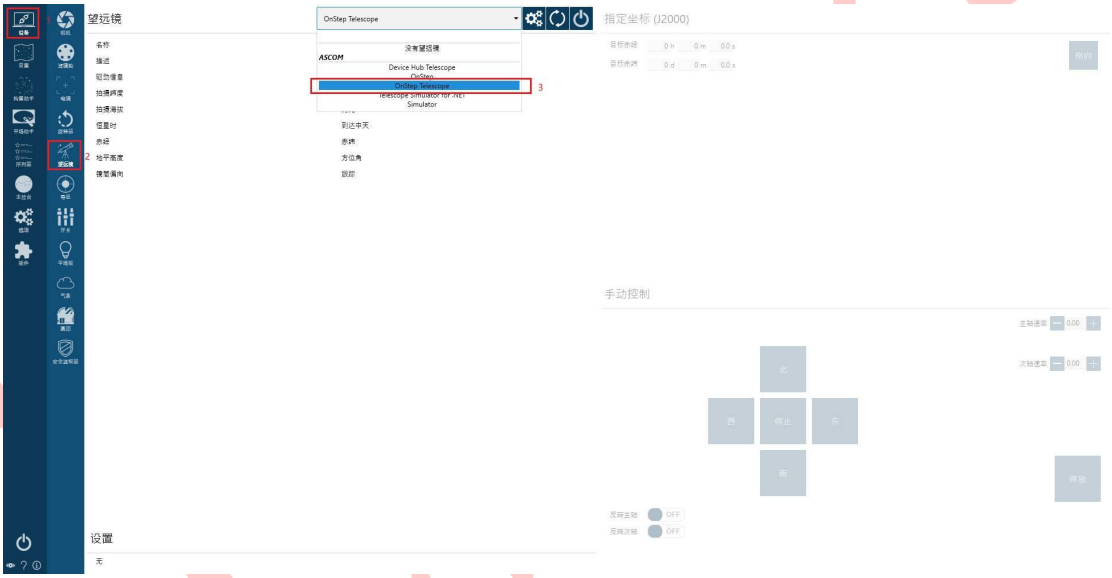
[Picture 1]



[Picture 2]

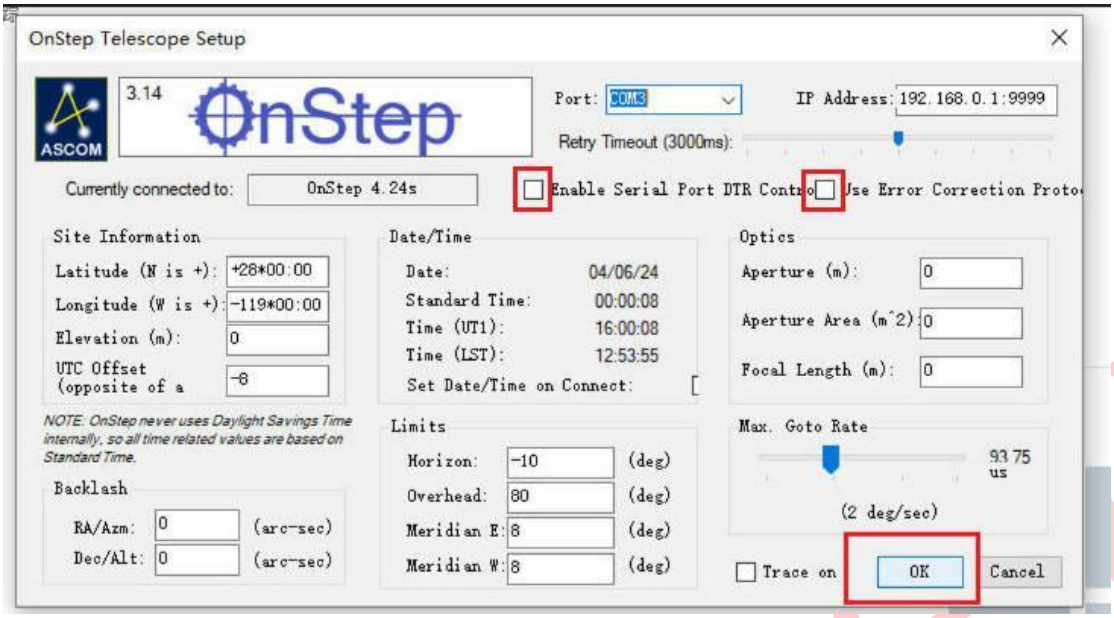


[Picture 3]



[Picture 4]

[Picture 5]



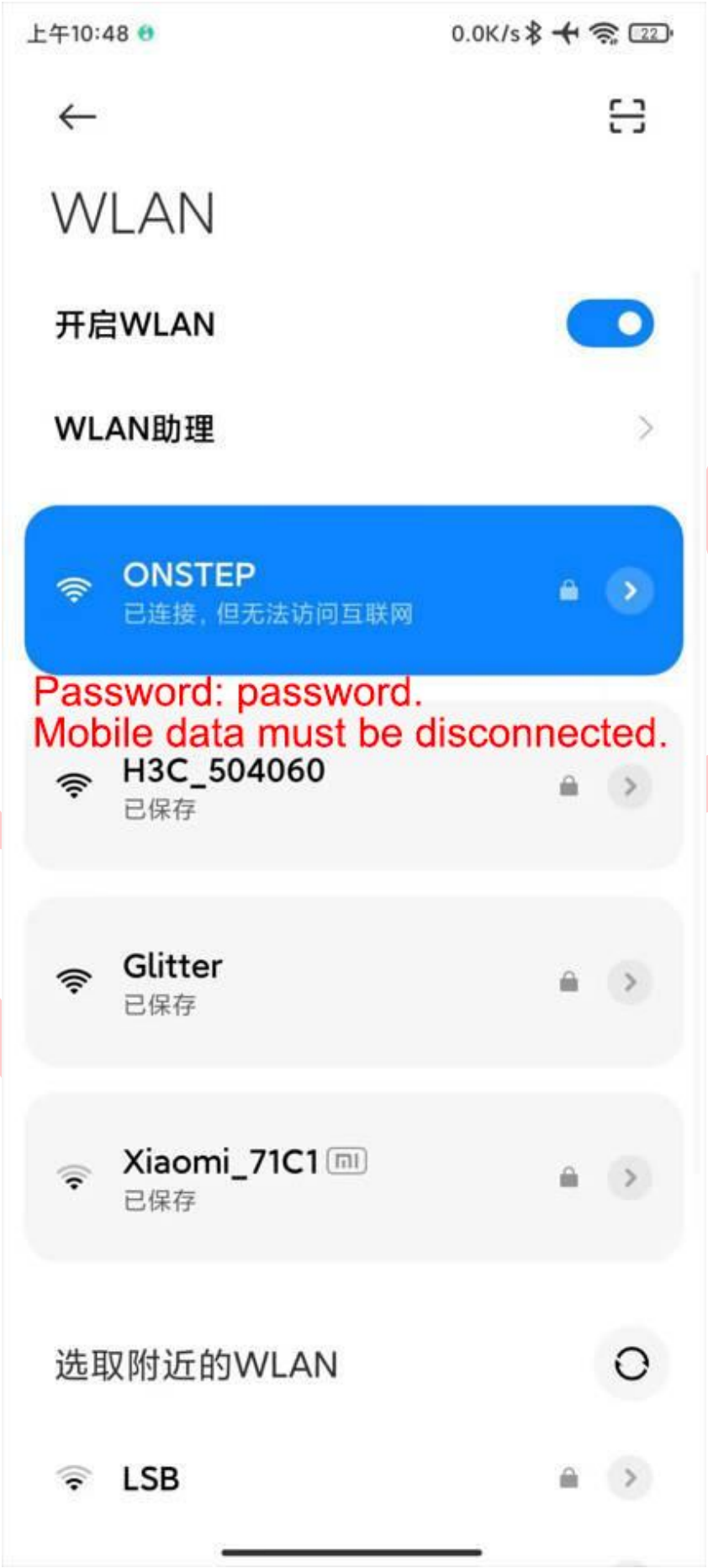
[Picture 6]

[Picture 7]

1. The provided OnStep driver (version 3.14) MUST be used.
2. Note that the check-marks in the two upper boxes in Figure 6 MUST be removed.
3. The serial port MUST be configured according to Figure 3.

(2) Mobile Phone Connection (STM32 Wi-Fi Version)

1. Open the Wi-Fi settings on your smartphone, search for the hotspot named "ONSTEP", and connect using the password "password".


上午10:48
0.0K/s
WLAN
开启WLAN
WLAN助理
ONSTEP
已连接，但无法访问互联网
Password: password.
Mobile data must be disconnected.
H3C_504060
已保存
Glitter
已保存
Xiaomi_71C1
已保存
选取附近的WLAN
LSB

2. Download and launch the corresponding Android app. Once inside the app, tap the menu button in the upper-right corner. (Note: The app may occasionally respond slowly; please be patient). From the drop-down menu, select "Connection Settings".

3. In the input field below, enter the IP address: 192.168.0.1. Keep the default port number (typically no adjustment is needed), then tap the connect button.

4. Wait a moment until "Connection Successful" is displayed at the top of the screen. The app will then read the saved data (such as the last configured time, longitude, and latitude) stored on the mount's mainboard, and details like the software version will scroll across the interface.

(3) Hand Controller Connection

1. Ensure that the OnStep main controller meets all compatibility requirements (correct ST4 port pin definition, +5V pin connected, and both ST4 port and hand controller support enabled in the firmware). Use the ST4 cable to connect the hand controller to the OnStep main controller, then power on the system.

2. The hand controller screen will display the startup logo, enter the connection state, and show "OnStep connecting". After a short wait, "OnStep connected successfully" will appear, confirming a successful connection with the main controller. It will then immediately enter the main interface, displaying data such as manual adjustment speed, autoguiding speed, status icons, and the current RA/DEC coordinates. If the connection between the hand controller and the main controller is interrupted during use, the hand controller will automatically attempt to reconnect or report an error.

(4) Setting Observation Site Information

1. Set the observation site via either the mobile app or the hand controller. In the mobile app, tap the upper-right menu and select "Observation Site Settings". On the hand controller, navigate to "Settings" and use the 5-way navigation key to select "Observation Location Settings".

2. In the settings interface, name the observation location (customizable based on your actual site), then accurately enter the local longitude, latitude, and time zone. Note the coordinate format: East longitude is expressed as "E + degrees", and North latitude as "N + degrees". Once completed, tap "Upload" (in the mobile app) or confirm (on the hand controller) to save the information to the mount.

(5) Synchronizing Time

1. Mobile App: After configuring the observation site information, return to the main menu, tap "Initial Settings", and select "Synchronize Time". Your smartphone's time will be uploaded to the mount's mainboard to ensure its internal clock matches the current actual time.

2. Hand Controller: Navigate to "Settings", use the 5-way navigation key to select "Date and Time", and accurately enter the current date and time based on your smartphone. Confirm the settings to synchronize the mount's internal clock.

VII. Maintenance and Care:

1. Cleaning: Regularly wipe the exterior surfaces of the mount with a clean, soft cloth to remove dust and stains. For optical components (such as telescope and finderscope lenses), use dedicated optical cleaning tools and solutions to avoid scratching the coatings. Apply moderate force and follow standard optical cleaning procedures.
2. Lubrication: Periodically inspect the transmission components (including worm gears, synchronous pulleys, and belts). Depending on usage, apply an appropriate amount of lubricating oil or grease in a timely manner to reduce wear and ensure smooth transmission. Ensure the lubricant selected is compatible with the mount's operating environment and apply it according to the product guidelines.
3. Storage: When not in use, store the mount in a dry, well-ventilated environment away from direct sunlight and moisture. A dedicated instrument case or dust cover should be used to protect the equipment from dust and debris. If storing the device long-term, it is recommended to power it on periodically to verify that all functions remain normal.

VIII. Precautions:

1. Before installing and operating the mount, please read this user manual carefully and familiarize yourself with all operating procedures and safety guidelines to ensure proper usage.
2. The mount is a precision instrument. It must be handled and installed with care; avoid severe vibrations and impacts to prevent damage to internal components.
3. When connecting the power supply, always verify the polarity to prevent damage from reverse polarity connection. When running on battery power, ensure the battery is fully charged to avoid unexpected interruptions during observation.
4. Before initiating a GOTO command or tracking celestial objects, ensure the surrounding area is clear to prevent the mount or telescope from colliding with obstacles. Choose an observation site minimizing light pollution and severe obstructions.
5. When connecting the hand controller to the main controller, verify that the ST4 port pin definition is correct and that firmware support is enabled. If connection issues or malfunctions occur, first check if the cables and configuration parameters are correct. If the issue persists, contact professional technicians for assistance.
6. Exercise extreme caution when modifying internal parameter settings (such as stepper motor pulse counts and backlash settings). If you are unfamiliar with the function and impact of these parameters, do not modify them arbitrarily, as this may

cause abnormal operation. Parameter adjustments should ideally be performed under professional guidance.

7. Always protect your eyes during astronomical observations. NEVER look directly at strong-light celestial bodies, especially the Sun, without proper protection, as this can cause permanent eye damage. To observe the Sun, you MUST use professional solar filters or dedicated solar observation equipment.