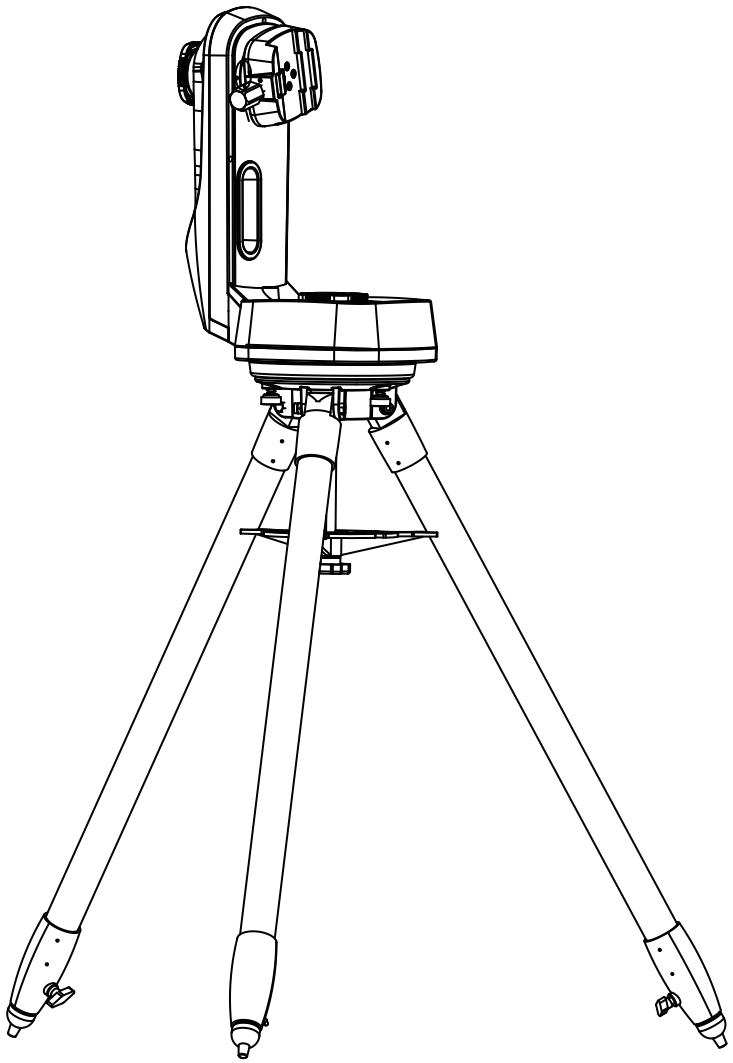
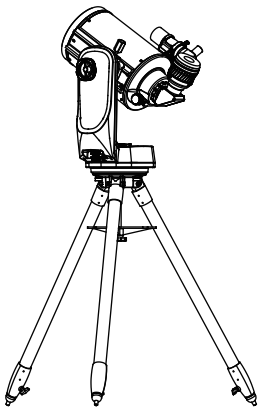
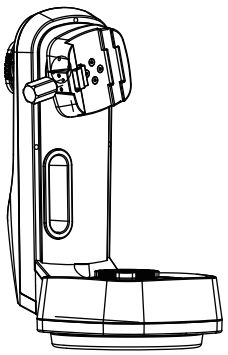
INSTRUCTION MANUAL

FUSION-120i

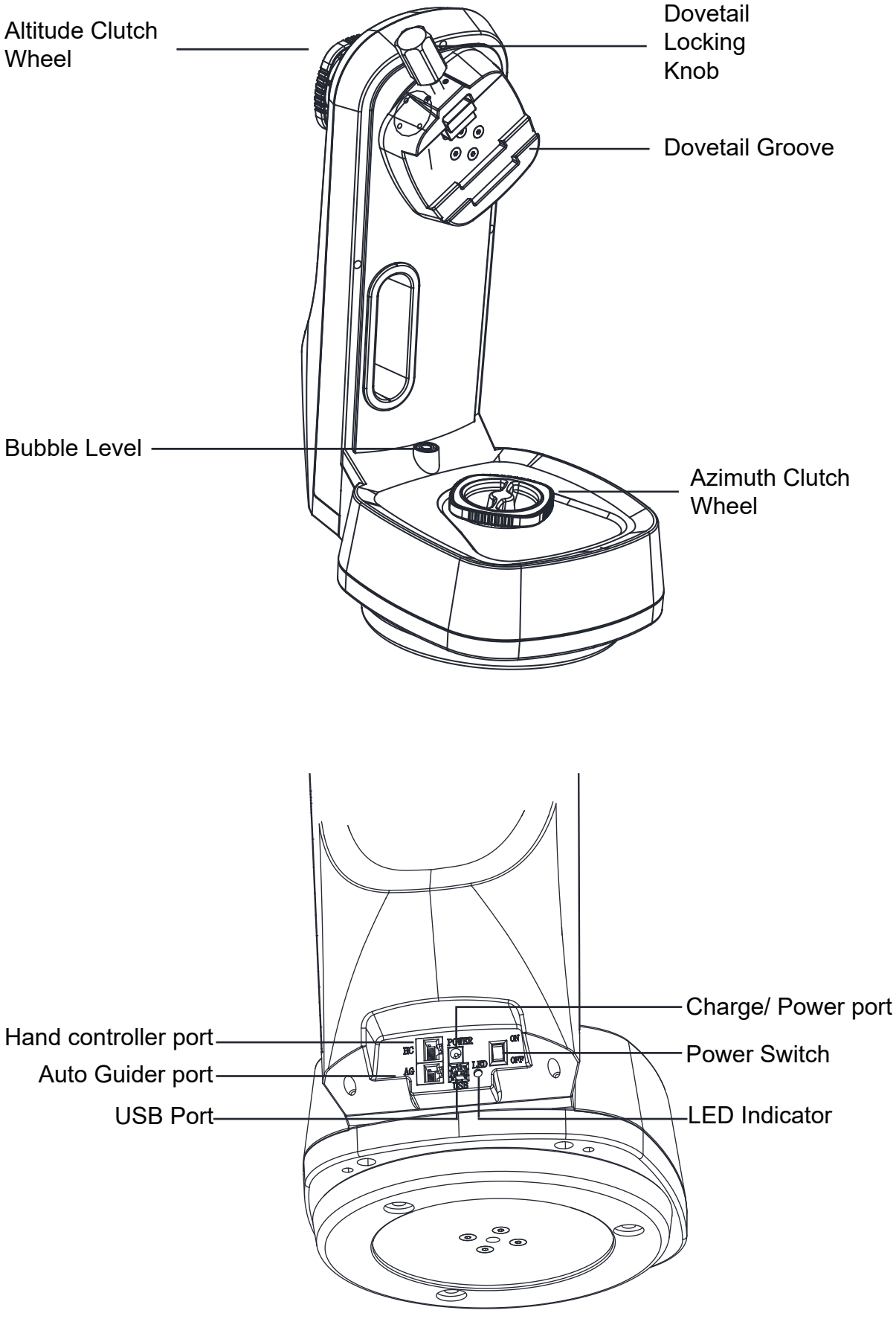






CONTENT

PARTS DIAGRAM



1.1 Setting Up on a Skywatcher Tripod

(1) Loosen the 3 locking screws and extend the 3 legs to the desired height,ensuring that the platform is approximately horizontal once the tripod is on the ground. Lock the 3 screws.

(2) Put the accessory tray in between the legs and lock it in place with the washer and handwheel to be screwed on the central rod. (Fig 1.1a)

(3) Install the FUSION-120i on the tripod and secure it with the three 3/8'' screws. (Fig 1.1b)

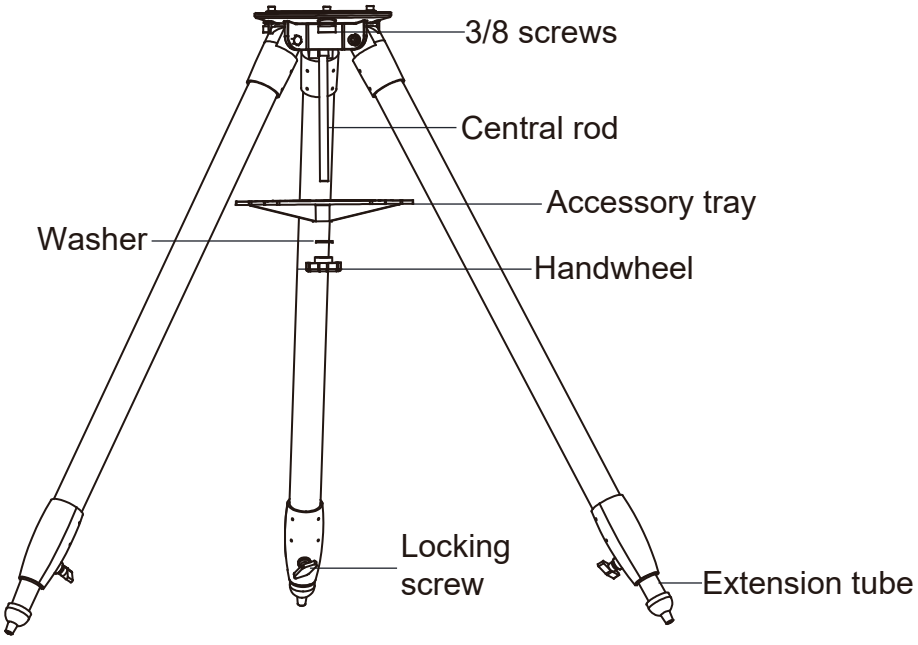


Fig 1.1a

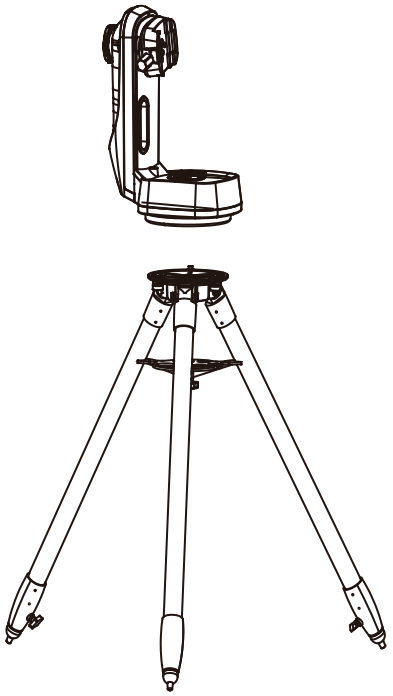


Fig 1.1b

1.2 Installing The Telescope

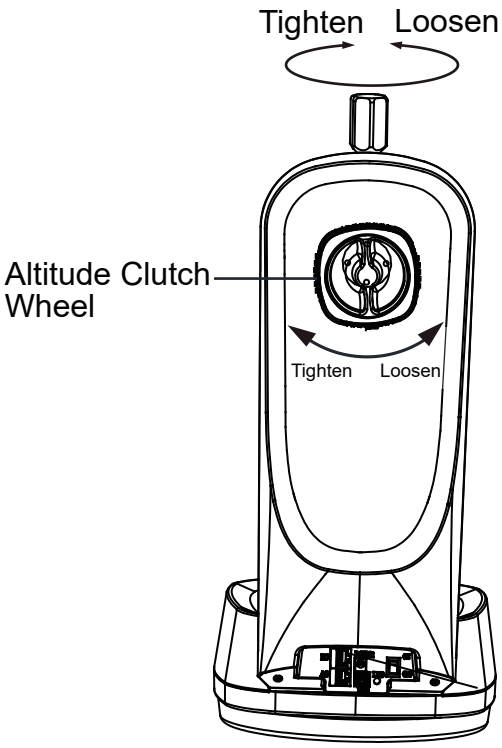


Fig 1.2a

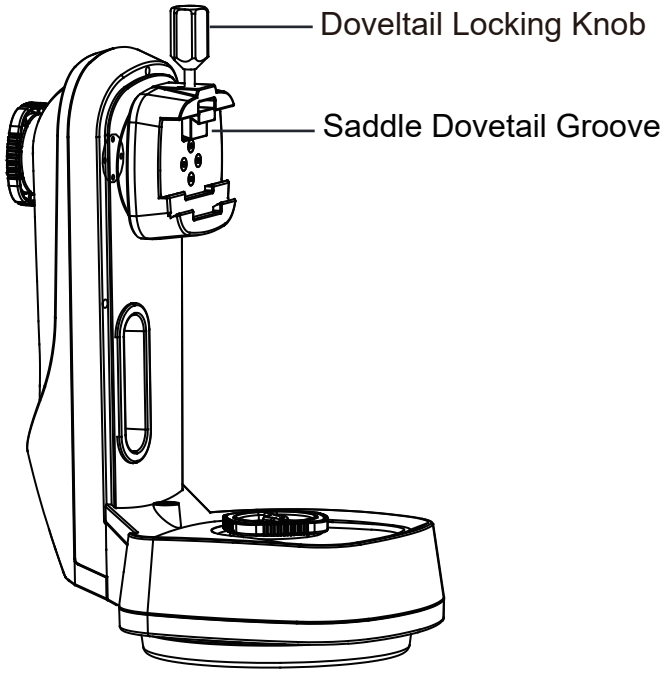


Fig 1.2b

(1) Loosen the altitude clutch wheel and rotate the saddle until the dovetail groove is horizontal, then tighten the altitude clutch wheel again (Fig 1.2a).

(2) Loosen the dovetail locking knob until nothing is obstructing the dovetail groove in the saddle (Fig 1.2b).

(3) Hold the telescope horizontally and slide the dovetail bar of the telescope into the dovetail groove of the saddle (Fig 1.2b).

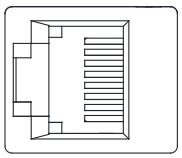
(4) Tighten the dovetail locking knob until the bar is securely locked in the groove.
DO NOT LET GO OF THE TELESCOPE UNTIL YOU ARE SURE IT IS FIRMLY ATTACHED TO THE SADDLE

(5) While holding the telescope tube, fully loosen the altitude clutch to check the balance.

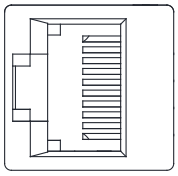
(6) If the balance is not good, reposition the telescope tube more forward or backward (see step 3 and 4), and tighten the altitude clutch again.

PART II : ELECTRONIC CONTROLS

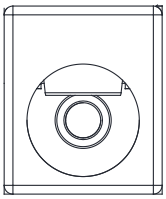
2.1 Panel Interface Components:



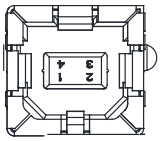
Autoguider port for use in equatorial mode during astrophotography.



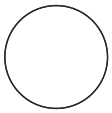
Hand controller port RJ-12 for optional SynScan hand controller.



12 V DC power input for charging the internal battery and direct supply of power for operation of the FUSION-120i mount.



USB port for firmware upgrade



LED
When the switch is turned off ,the green light is steady on. The charging is complete or the charging is not performed ,the green light is off.The switch is turned on the red light blinks when no external power is being charged.The switch is turned on,the red light blinks and the green light blinks fast when the power is low.

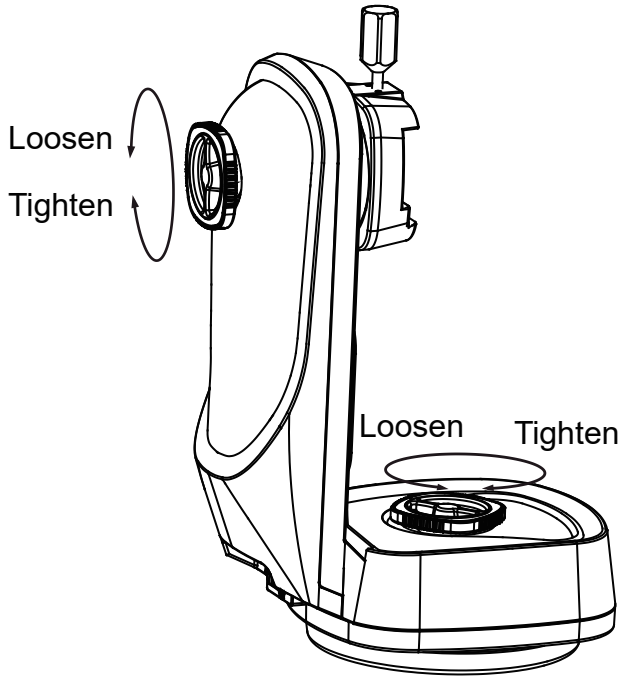
ON/OFF Switch: Turns the power to the mount and hand controller on and off.

2.2 External Power Supply Requirements

- Input Voltage: DC 11V (minimum) to DC 14V (maximum). Voltage not in this range might-cause permanent damage to the motor controller or the hand controller.
- Input Plug: Barrel type with 2.0mm I.D and 5.5mm O.D. Must be central positive.
- Input Current: At least 750mA.
- Do not use an unregulated AC-to-DC adapter. When choosing an AC adapter, a switching power supply with 12V output voltage and minimum 2.8A output current is recommended.
- If the power voltage is too high, the motor controller will stop the motors automatically.

PART III : USING THE FUSION-120i

3.1 Manually Rotating The Mount Refer to the following diagrams:



（1）Loosen the Altitude clutch wheel to manually rotate the telescope vertically.

（2）Loosen the Azimuth clutch wheel to manually rotate the telescope horizontally.

Tips:
Fully tighten the clutches for all motor driven applications. Fully loosen the clutches to move the telescope quickly by hand. Be aware that the calibration for precise automatic positioning ("goto" operation) is then lost, and renewed calibration is needed for automatic positioning.

3.2 Control with a SynScan Hand Control

Plug in the SynScan hand control into the hand control port in order to control the telescope and mount for astronomical observation. Please refer to the SynScan hand control manual for operation instructions.

3.3 Control with an Mobile Device

Users can download the free "SynScan" App from the App Store(for iOS devices) or Google Play (for Android Devices) for astronormical observation. Skywatcher will also provide apps for photography. Please check the stores for availability.

3.4 Wi-Fi Connection

- User must connect to the mount's Wi-Fi within 15 minutes after turning on power.
- The Wi-Fi will be turned off automatically if no connection is estabilished within 15 minutes, . By default, the SSID of the built-in Wi-Fi is "SynScan_xxxx" and there is no password. User can download Skywatcher's "SynScan" app from App Store or Google Play to confgure the mount's built-in Wi-Fi.
- Reset Wi-Fi confguration to factory default by turning on the power without the SynScan hand control connected and no App operations via the Wi-Fi connection for 4 hours.

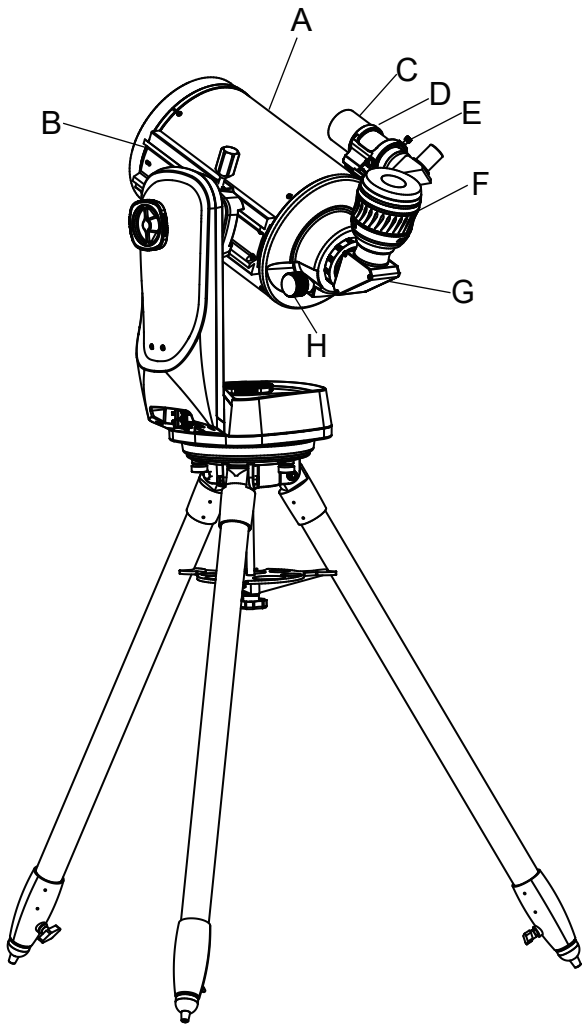
3.4 Wi-Fi Connection

When a new frmware for the control board inside the mount is available, Sky-watcher will release it on www.skywatcher.com. Users can visit this website to download the frmware and the necessary application to upate the frmware.

PART IV: ASSEMBLING YOUR TELESCOPE

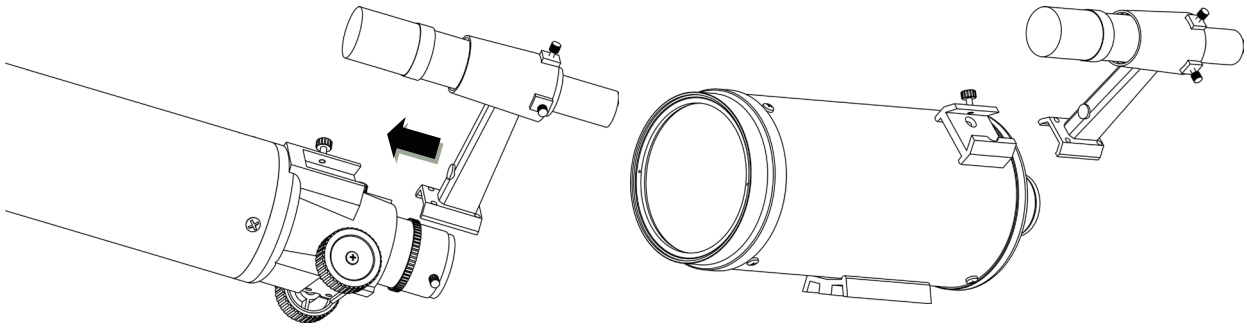
TELESCOPE

A. Telescope Main Tube
B. Dovetail
C. Finderscope
D. Finderscope Bracket
E. Finderscope Alignment Screws
F. Eyepiece
G. Diagonal
H. Focus knob



4.1 Finderscope / red dot finder assembly

1. Attaching the finderscope bracket(Fig.4.1.1a)
   - Locate the finderscope optical assembly.
   - Slide the finderscope bracket into the rectangular slot and tighten the screw to hold the mount in place.



refractor Maksutov

Fig.4.1.1a

2. Attaching the red dot finder(Fig.4.1.2a)
   - Slide the red dot finder bracket into the rectangular slot and tighten the screw to hold the red dot finder in place.

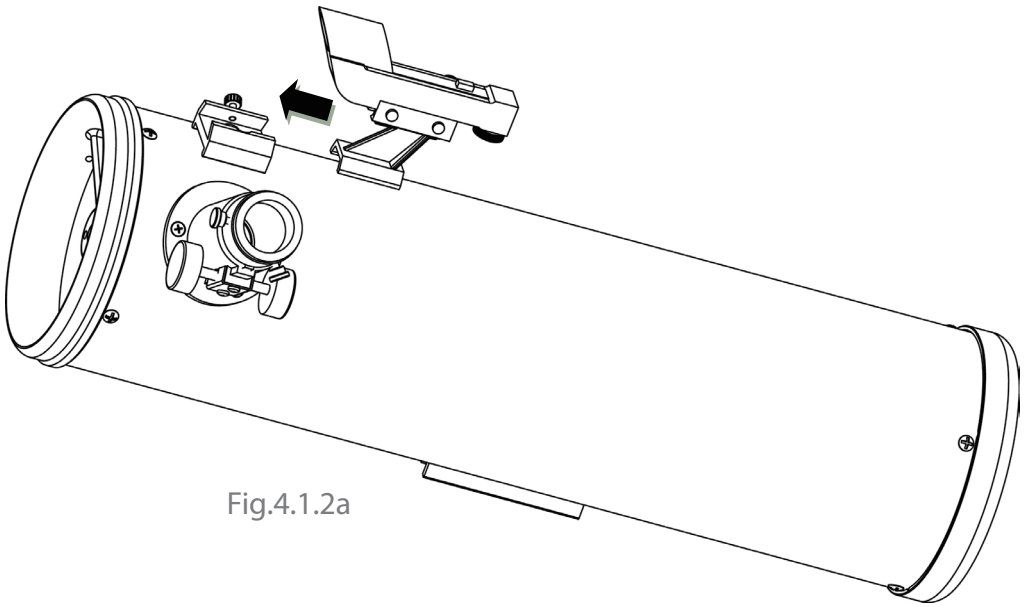


Fig.4.1.2a

4.2 Eyepiece assembly

1. Inserting eyepiece for refractor and Maksutov(Fig.4.2.1a)

- loosen the thumbscrew on the end of the focus tube.
- Insert the diagonal into the focus tube and re-tighten the thumbscrew to hold the diagonal in place.
- Loosen the thumbscrews on the diagonal.
- Insert the desired eyepiece into diagonal and Secure it by re-tightening the thumbscrews.

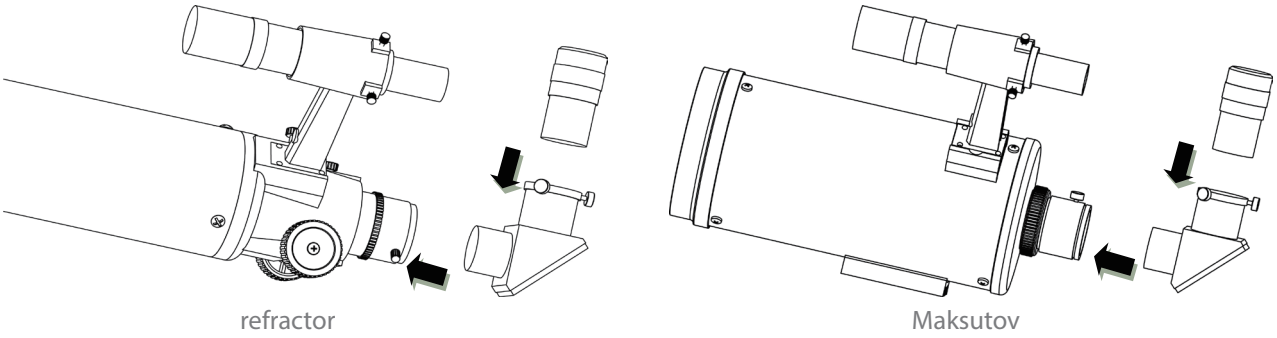


Fig.4.2.1a

PART V: OPERATING YOUR TELESCOPE

5.1 Aligning and using the finderscope / red dot finder

1. Aligning and using the finderscope

These fixed magnification scopes mounted on the optical tube are very useful accessories. When they are correctly aligned with the telescope, objects can be quickly located and brought to the center of the field. Alignment is best done outdoors in day light when it's easier to locate objects. If it is necessary to refocus your finderscope, sight on an object that is at least 500 meters (or yards) away. for the 6x30 finderscope: loosen the locking ring by unscrewing it back towards the bracket. The front lens holder can now be turned in and out to focus. When focus is reached, lock it in position with the locking ring (Fig.5.1.1a).

- Choose a distant object that is at least 500 meters (yards)away and point the main telescope at the object. Point the telescope exactly to have the object well centered in the . eyepiece of the telescope
- Check in the finderscope if the same object is also well centered on the crosshairs.

- For the 6x30 finderscope with spring loading, adjust only the two small screws (Fig.5.1.1b).

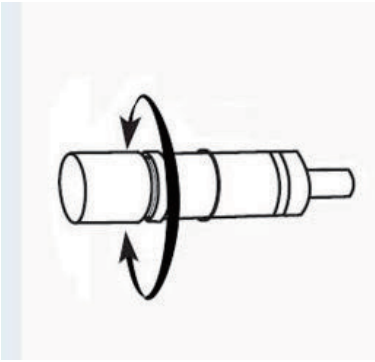


Fig.5.1.1a

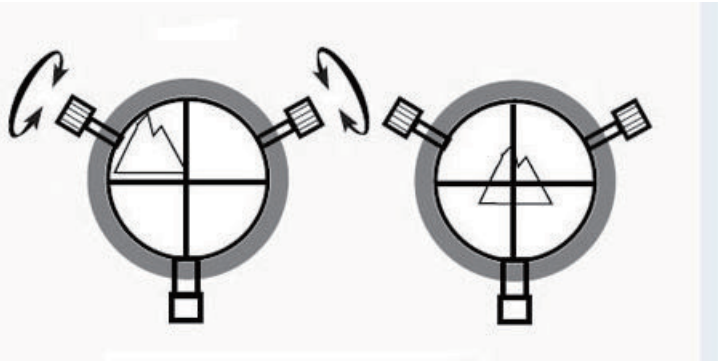


Fig.5.1.1b

2. Aligning and using the red dot finder

- The red dot finder is powered by a 3V lithium battery located under a removable cover. When new, this battery may be protected by plastic strip which should be removed before use.Like all finderscopes, the red dot finder must be properly aligned with the main telescope before first time use. This is a simple process using the azimuth and altitude control knobs (fig. 5.1.2a).

- Check if the plastic strip protecting the new battery has been removed. The battery is located under a cover. This location can differ in different red dot finderscope models (fig.5.1.2b).
- Turn on the Red Dot Finder by rotating the variable brightness control clockwise until you hear a “click”. Continue rotating the control knob to increase the brightness level.
- Insert a low power eyepiece into the telescope’s focuser. Locate a bright object and position the telescope so that the object is in the center of the field of view.
- With both eyes open, look through the sight tube at the object. If the red dot overlaps the object, your Red Dot Finder is perfectly aligned. If not, turn its azimuth and altitude adjustment controls until the red dot is merged with the object.

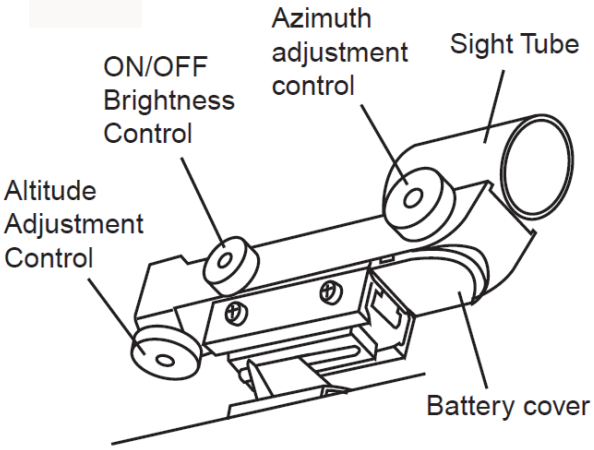


Fig.5.1.2a

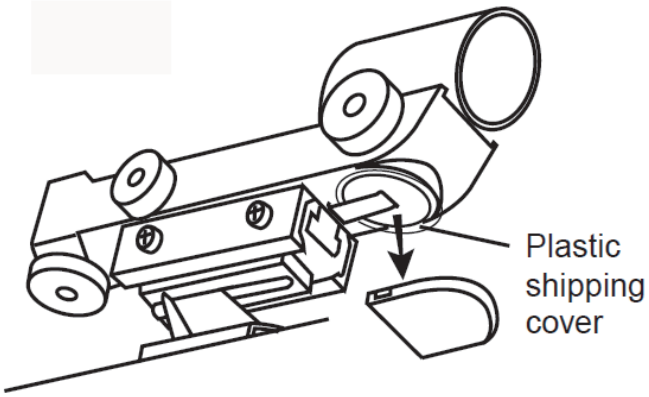


Fig.5.1.2b

5.2 Focusing the telescope

- Slowly turn the focus knob one way or the other, until the image in the eyepiece is sharp (fig.5.2a). Check if the accessories and adapters you use are corresponding to the instructions of the manual if a sharp image cannot be reached. Another cause may be that the object you are aiming at with yourtelescope is too close. Refocusing is almost always necessary when you switch eyepieces.

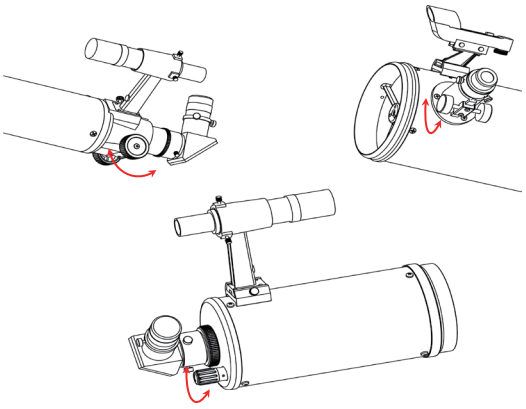


Fig.5.2a

5.3 Choosing the appropriate eyepiece

- The magnification produced by a telescope is determined by the focal length of the eyepiece that is used with it. To determine a magnification for your telescope, divide its focal length by the focal length of the eyepieces you are going to use. For example, a 10mm focal length eyepiece will give 80X magnification with an 800mm focal length telescope.
- When you are looking at astronomical objects, you are looking through a column of air that reaches to the edge of space and that column seldom stays still. Similarly, when viewing over land you are often looking through heat waves radiating from the ground, house, buildings, etc. Your telescope may be able to give very high magnification but what you end up magnifying is all the turbulence between the telescope and the subject.

A good way to choose the right eyepiece for observation of bright objects (moon, planets etc.) is to startwith a low power eyepiece, and increase the magnification step by step until you get the impression that increasing magnification does not provide more details in the image. A rule of thumb is that the maximummagnification is (with exceptionally good weather conditions) 2x the diameter in mm of the telescope.To look for faint objects (nebula etc.), a very low power eyepiece is recommended because magnifying
more also means a darker image, and inversely, a lower magnification produces a brighter image. A lower magnification also shows a wider view of the sky, which also helps finding objects. The minimal useful mag-
nification (= maximum brightness) of a telescope is 0.14x the diameter in mm of the telescope. Conclusion: every search in the sky starts by looking in the finderscope, then look in your telescope equipped with a low power eyepiece having a bright and wide view on the sky. After having found and centered the object in the low power eyepiece, magnification can be increased step by step by switching to more powerful eyepieces if weather conditions (air turbulence) and the brightness of the object allows it.

PART VI: OBSERVING THE SKY

6.1 Sky Conditions

- Sky conditions are usually defined by two atmospheric characteristics, seeing, or the steadiness of the air, and transparency, light scattering due to the amount of water-vapour and particulate material in the air. When you observe the Moon and the planets, and they appear as though water is running over them, you probably have bad “seeing” because you are observing through turbulent air. In conditions of good “seeing”, the stars appear steady, without twinkling, when you look at them with unassisted eyes (without a telescope). Ideal “transparency” is when the sky is inky black and the air is unpolluted.

6.2 Selecting an Observing Site

- Travel to the best site that is reasonably accessible. It should be away from city lights, and upwind from any source of air pollution. Always choose as high an elevation as possible; this will get you above some of the lights and pollution and will ensure that you aren’t in any ground fog. Sometimes low fog banks help to block light pollution if you get above them. Try to have a dark, unobstructed view of the horizon, especially the southern horizon if you are in the Northern Hemisphere and vice versa. However, remember that the darkest sky is usually at the “Zenith”, directly above your head. It is the shortest path through the atmosphere. Do not try to observe any object when the light path passes near any protrusion on the ground. Even extremely light winds can cause major air turbulence as they flow over the top of a building or wall. Observing through a window is not recommended because the window glass will distort images considerably. And an open window can be even worse, because warmer indoor air will escape out the window, causing turbulence which also affects images. Astronomy is an outdoor activity. The best conditions will have still air, and obviously, a clear view of the sky. It is not necessary that the sky be cloud-free. Often broken cloud conditions provide excellent seeing.

6.3 Choosing the Best Time to Observe

- Do not view immediately after sunset. After the sun goes down, the Earth is still cooling, causing air turbulence. As the night goes on, not only will seeing improve, but air pollution and ground lights will often diminish. Some of the best observing time is often in the early morning hours. Objects are best observed as they cross the meridian, which is an imaginary line that runs through the Zenith, due North-South. This is the point at which objects reach their highest points in the sky. Observing at this time reduces bad atmospheric effects. When observing near the horizon, you look through lots of atmosphere, complete with turbulence, dust particles and increased light pollution.

6.4 Cooling the Telescope

- Telescopes require at least 10 to 30 minutes to cool down to outside air temperature. This may take longer if there is a big difference between the temperature of the telescope and the outside air. This minimizes heatwave distortion inside telescope tube (tube currents). Allow a longer cooling time for larger optics.

6.5 Adapting Your Eyes

- Do not expose your eyes to anything except red light for 30 minutes prior to observing. This allows your pupils to expand to their maximum diameter and build up the levels of optical pigments, which are rapidly lost if exposed to bright light. It is important to observe with both eyes open. This avoids fatigue at the eyepiece. If you find this too distracting, cover the non-used eye with your hand or an eye patch. Use averted vision on faint objects: The center of your eye is the least sensitive to low light levels. When viewing a faint object, don’t look directly at it. Instead, look slightly to the side, and the object will appear brighter.

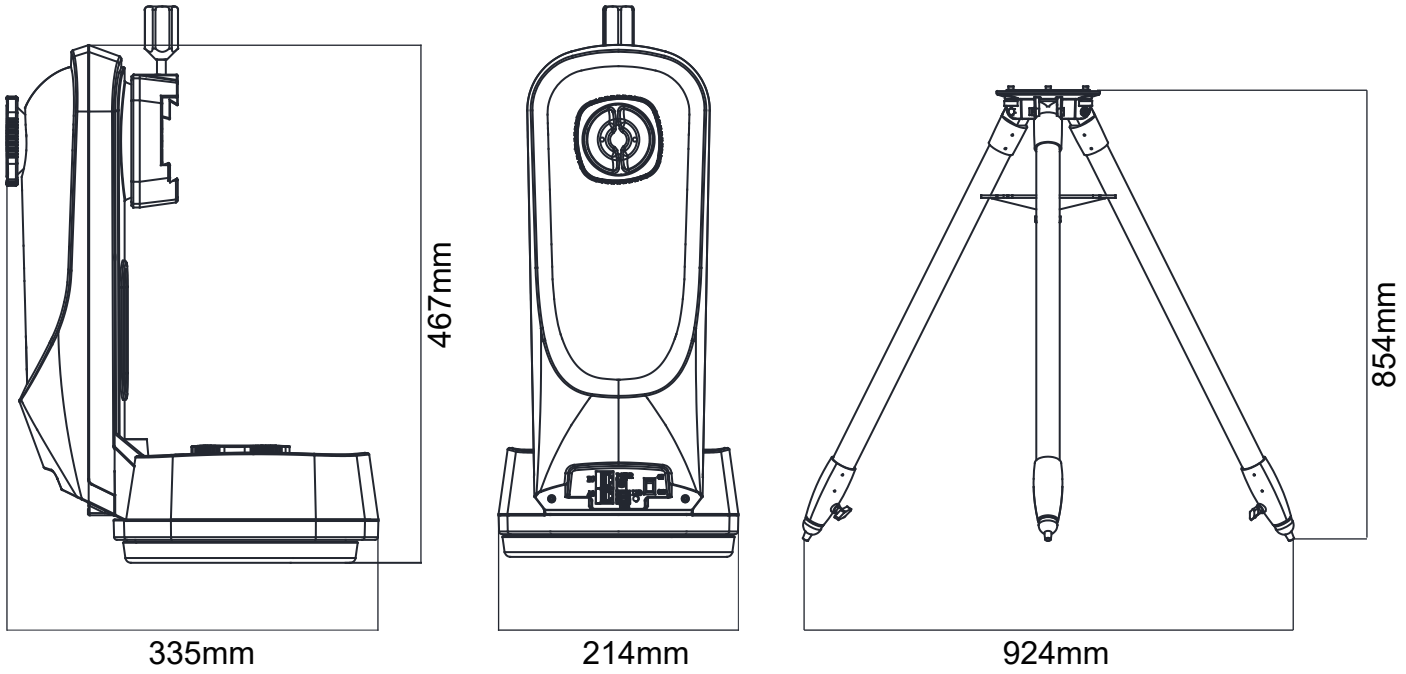
PART VII: PROPER CARE FOR YOUR TELESCOPE

7.1 Cleaning Your Telescope

- Replace the dust cap over end of telescope whenever not in use. This prevents dust from settling on mirror or lens surface. Do not clean the telescope mirror or lens surface unless you are familiar with lens surfaces. A little dust on these surfaces will not noticeably affect the image quality. Contact your dealer for advice if these surfaces are more dirty than just some dust. Eyepieces will get dirty more quickly due to contact with eyelash etc. Their optical surface is less sensitive, and can be cleaned regularly with soft cloth and cleaning fluid suited for optical surfaces.

APPENDI X I : SPECIFICATIONS

Dimensions:



Mount Tripod

Specifications:

	A	B
1		
2	Product Name	FUSION-120i
3	Mount Type	Altitude-azimuth Mount
4	Payload	12Kg
5	Mount Weight	8Kg
6	Tripod Weight	5.8kg
7	Power Requirement	12V-15V 2.8A DC IN
8	Motor	DC motor drive
9	Transmission Mode	Worm wheel and gear
10	Resolution	0.085 arc-seconds
11	Default Wi-Fi Access Point SSID	SynScan_xxxx

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

FUSION-120i

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.

FUSION-120i-V1.0-EN