

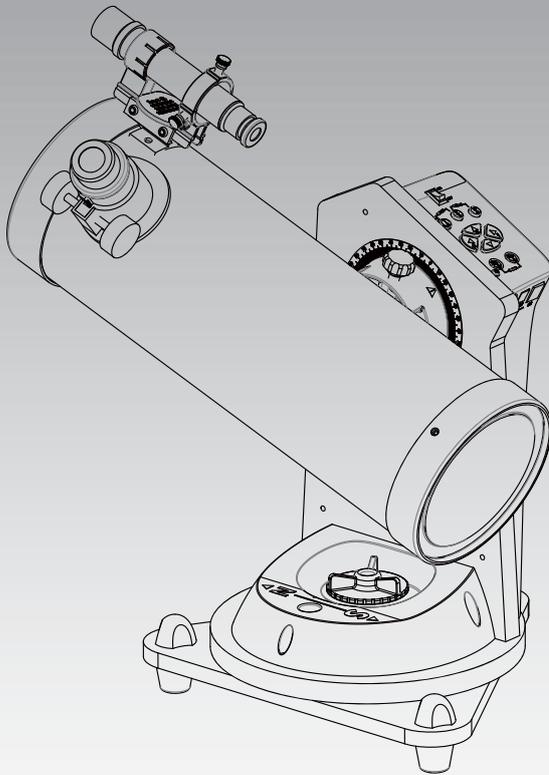
INSTRUCTION MANUAL

MiniDob Mount

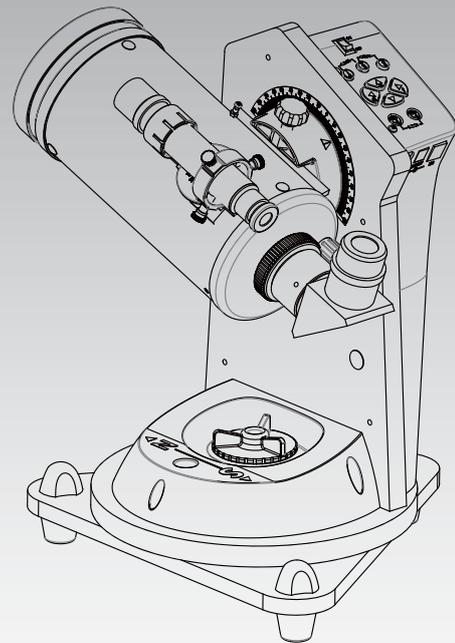
Life is so colourful

WARNING: Specific filters are required when observing the Sun.

AVOID observing the sun without a filter. Permanent and irreversible eye damage may result.



Newton Reflector



maksutov-cassegrain

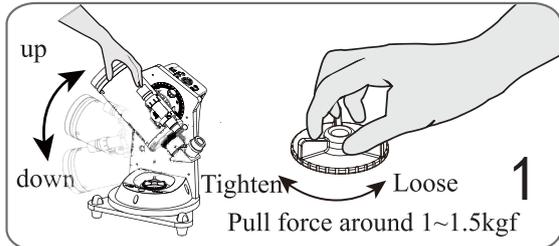
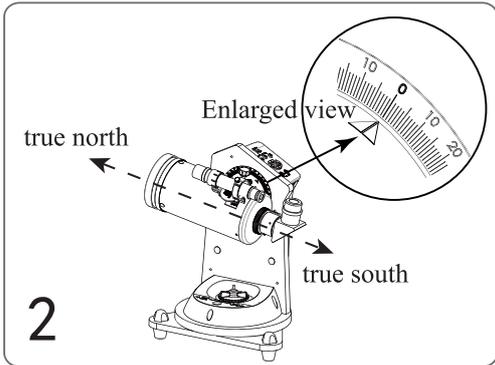
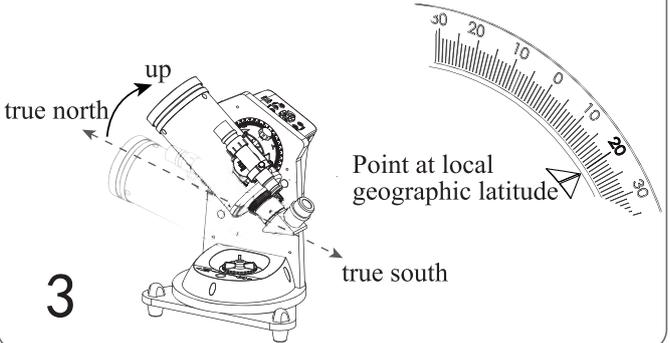
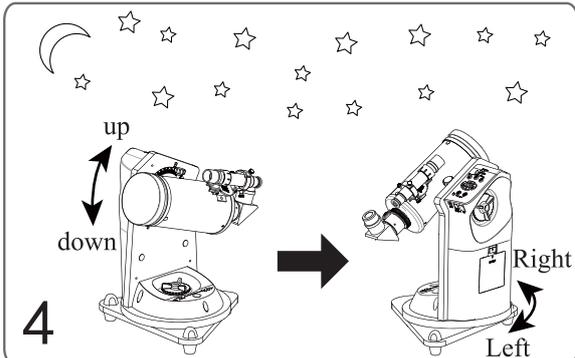
The patents applied in this product:

CA2410751, US6940642, US7228253, ZL201230417393.8, ZL201210319485.1, ZL201220443054.1, ZL201220443055.6. Counterfeiting reserved

Quick Guide for Astronomy (Unique global patented technology)

If you have used a traditional telescope before and have a basic understanding of the components, you may be able to finish the initial setting quickly and easily by following the steps below. By following these simple steps, the telescope will be ready to track the specific celestial object under observation.

For users in Northern Hemisphere

<p>1. Adjust the clutch knob (more details illustrated on page 4 figure 6 to 9) to obtain a locking force around 1 – 1.5 kg. This force enables the main tube to be locked and pushed manually.</p>	
<p>2. Aim the main tube at true North horizontally (pointing the pin at zero). Power on. If the power has already been switched on, please restart again.</p>	
<p>3. Rotate the Tube upwards, and point the pin at the local geographic latitude. Press the button $\textcircled{2}$ and $\textcircled{3}$ simultaneously to finish latitude alignment.</p>	
<p>4. You could rotate the main tube either manually or automatically to aim at a specific celestial object. (Details in Figure 6 – 9).</p>	

Quick Guide for Astronomy (Unique global patented technology)

If you have used a traditional telescope before and have a basic understanding of the components, you could finish the initial setting quickly and easily by following the steps below. Following these steps, the telescope will be ready to track the specific celestial object under observation.

For users in Southern Hemisphere

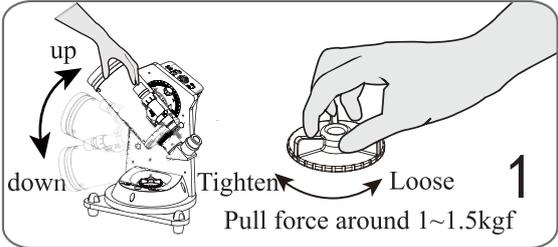
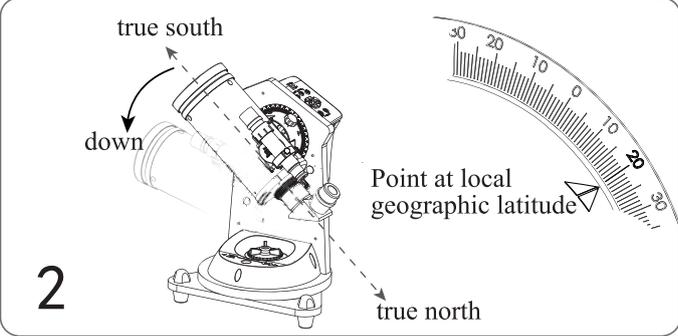
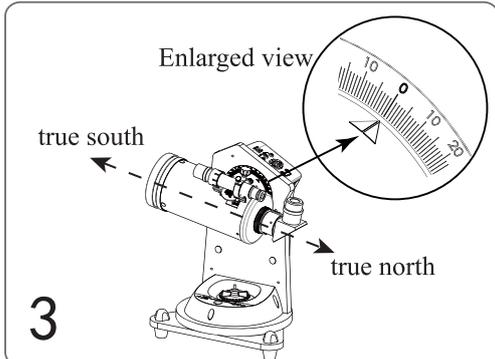
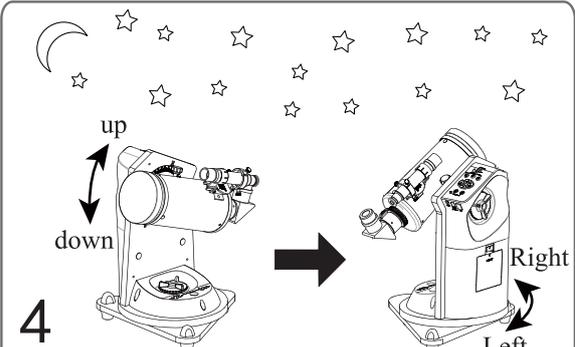
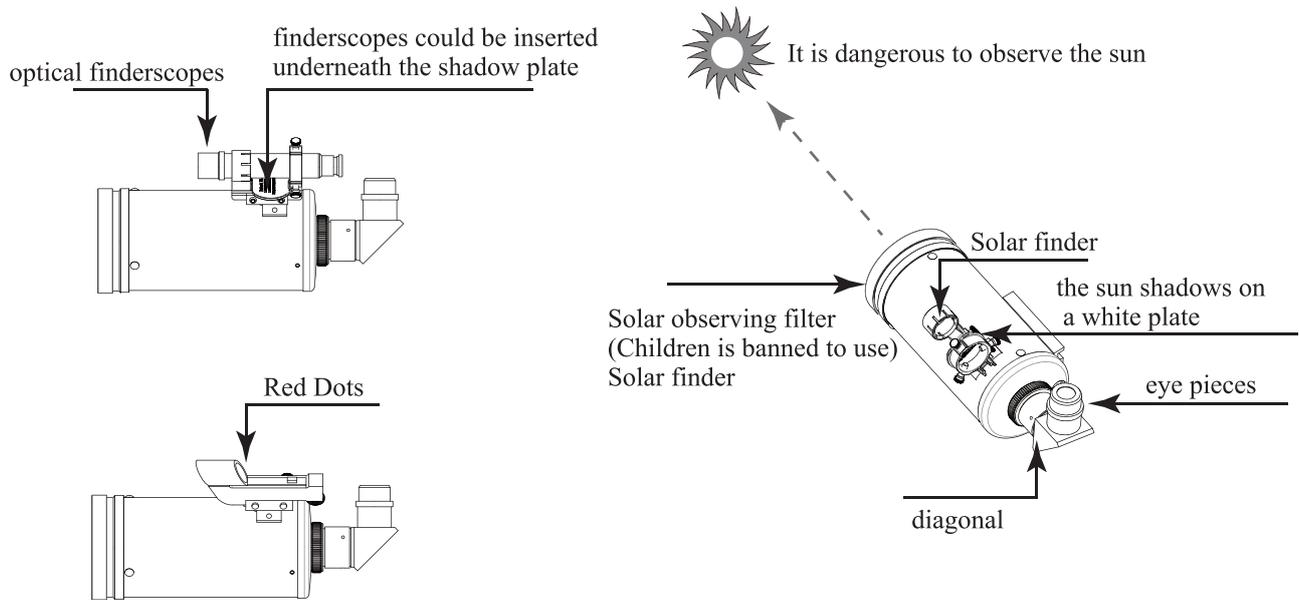
<p>1. Adjust the clutch knob (more details illustrated on page 4 figure 6 to 9) to obtain a locking force around 1 – 1.5 kg. This force enables the main tube to lock and be pushed manually.</p>	
<p>2. Aim the main tube at true South (pointing the pin at the local geographic latitude. Power on. If the power has already been turned on, please restart again.</p>	
<p>3. Rotate the Tube downwards, and point the pin at zero. Press the button “$\textcircled{2}$” and “$\textcircled{3}$” simultaneously to finish latitude alignment.</p>	
<p>4. You could rotate the main tube either manually or automatically in order to aim at a specific celestial object. (Details in Figure 6 – 9.</p>	

Illustration of Attachment Assembly

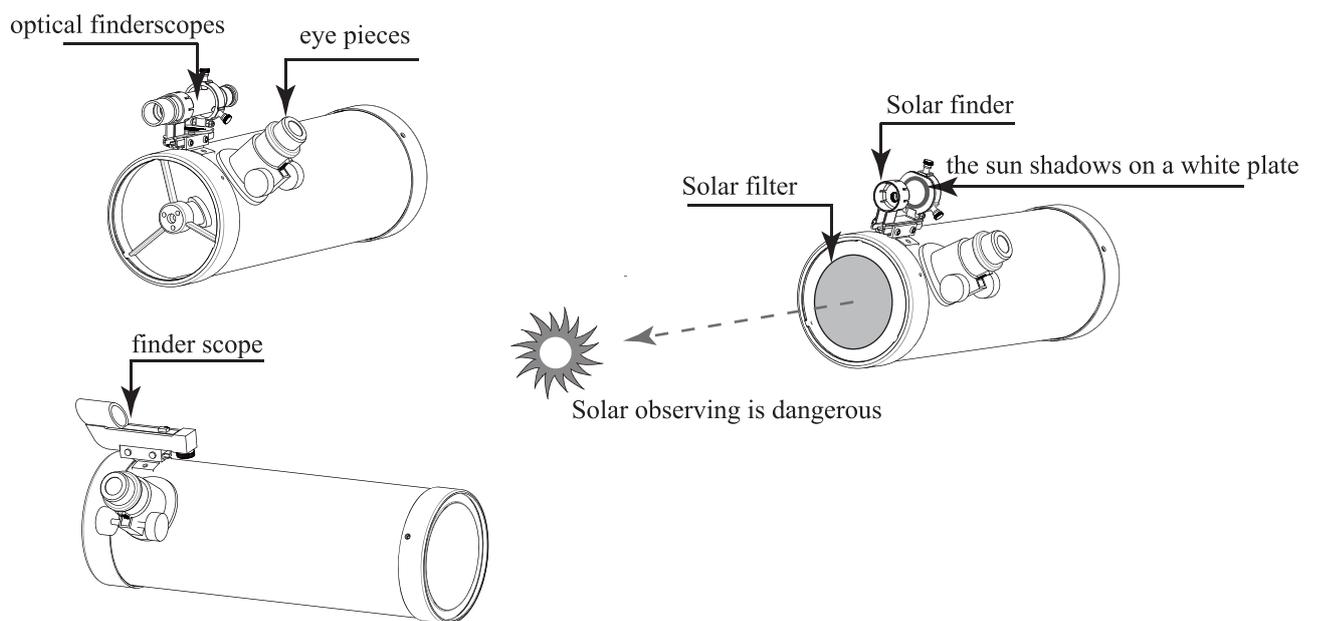
(The following required attachments are available from the retailer.)

Tip: The following attachments: the solar finder, red dot, optical finderscopes (524), diagonals etc., are not standard configurations. Please purchase from the retailer according to the type of telescope and your specific requirements.

1. Illustration of Attachments Assembling for Catadioptric Tube (cassegrain system)



2. Illustration of attachment assembly for Newton Reflector



WARNING: Never use a broken solar filter

- Never look at the sun with the naked eye or with a telescope (unless you have the proper solar filter). Permanent and irreversible eye damage may result.
- When using your telescope to observe the sun (while using a proper solar filter) make sure that the finderscope has a dust cap over the objective end or remove the finderscope.
- Never use your telescope to project an image of the sun onto any surface.

The Usage of a Red-Dot

The red-dot is a non-magnified indicator. It has a lens and a little red dot. There is also a brightness adjuster, a longitude adjuster and a latitude adjuster. Underneath the red-dot finder scope, there is a 3 volt alkaline battery. When using the finder scope, please aim the telescope at an object and then rotate the longitude and latitude adjuster until the red dot overlaps the object.

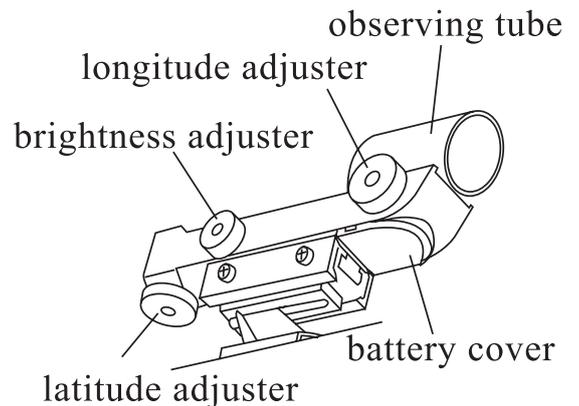
1. Remove the battery cover and remove the plastic cap on the battery (Figure 2).

2. To turn on the red-dot finder scope, rotate the brightness adjuster counter clockwise until hear the ‘click’ sound. Rotating this adjuster will increase the brightness of the red dot. Insert a low magnification eyepiece (long focal length eyepiece) into the focuser of the telescope.

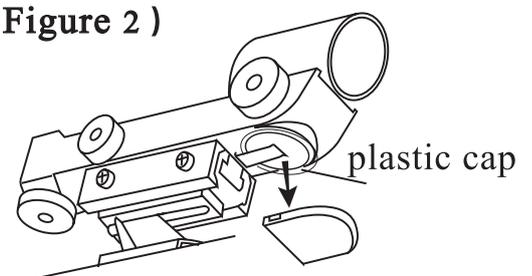
3. Aim the telescope at a clear object and adjust the object into the centre of the visual field.

4. When the red dot overlaps the object, the red-dot finder scope is exactly parallel to the telescope. Otherwise, please adjust the longitude and the latitude adjuster until the red dot overlaps the object.

(Figure 1)



(Figure 2)

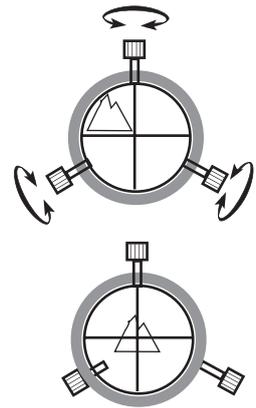


The usage of optical finderscopes

The optical finderscope on the main tube is a useful attachment. When it is aligned parallel to the telescope, it will be easy to find a specific object and move it into the centre of the visual field. Adjusting the finderscope during daylight hours may be more efficient as the object will be easier to locate.

1. Select an object over 1000 meters. Aim the main tube towards this object. Adjust your telescope until the object is in the centre of the visual field.
2. Rotate the screws of the finderscope in order to move the object in the main tube into the cross centre.

(图3)



This is a unique and versatile mount with multiple proprietary technologies.

Following removal of the telescope main tube, attachments such as: cameras, DV, monitors, floodlights etc. are also accessible on this mount. This feature adds to the flexibility of usage and meets the multi-functional requirements for both work and leisure.

Specifications and characteristics:

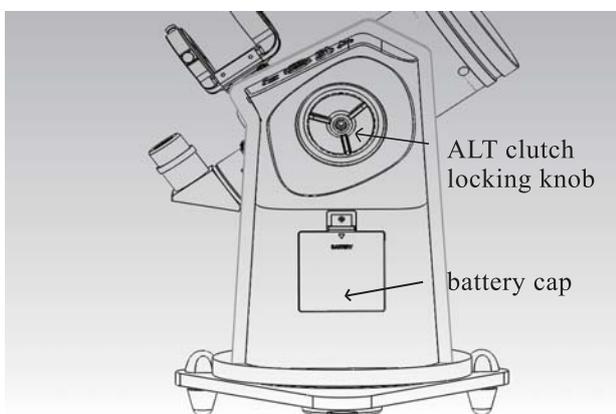
- It is possible to aim at a celestial body manually when auto tracking

The MiniDob also:

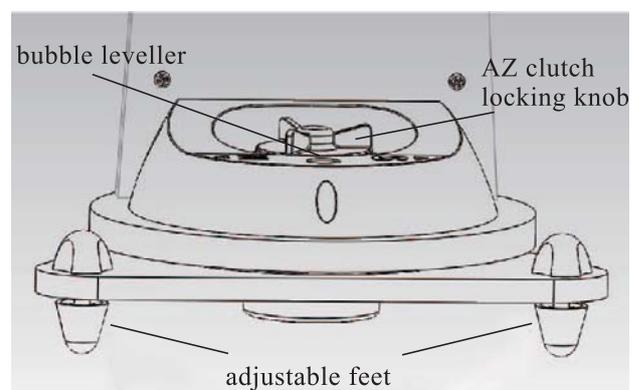
- Enables the timely tracking of celestial bodies
- Panoramic visual field or wide angle photography (only for distant view)
- Terrestrial Stored Positions to GOTO
- Cruise and Image for terrestrial positions

The position of the clutch locking knob

(Figure 4)



(Figure 5)



ALT clutch locking knob; battery cap; bubble leveller; AZ clutch locking knob; Adjustable feet.

Clutch Adjuster Setting Method

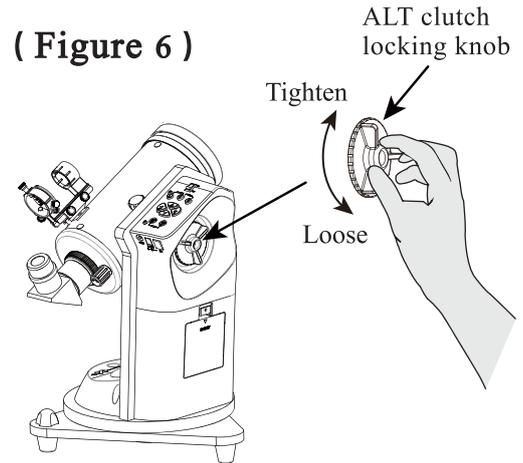
1. Assemble the diagonal, eyepiece and finderscope onto the main tube. Connect the main tube onto the mount. Ensure the main tube is steady and release the clutch. Rotate the tube until the main tube reaches a neutral balance point.

(Figure 6).

2. Manipulate the clutch adjuster (ALT clutch): clockwise to tighten and enhance the friction; counter-clockwise to loosen. Adjust the ALT clutch first to obtain a locking force around 1-1.5 kg. This force enables the main tube to lock or be manipulated manually (Figure 6-7).

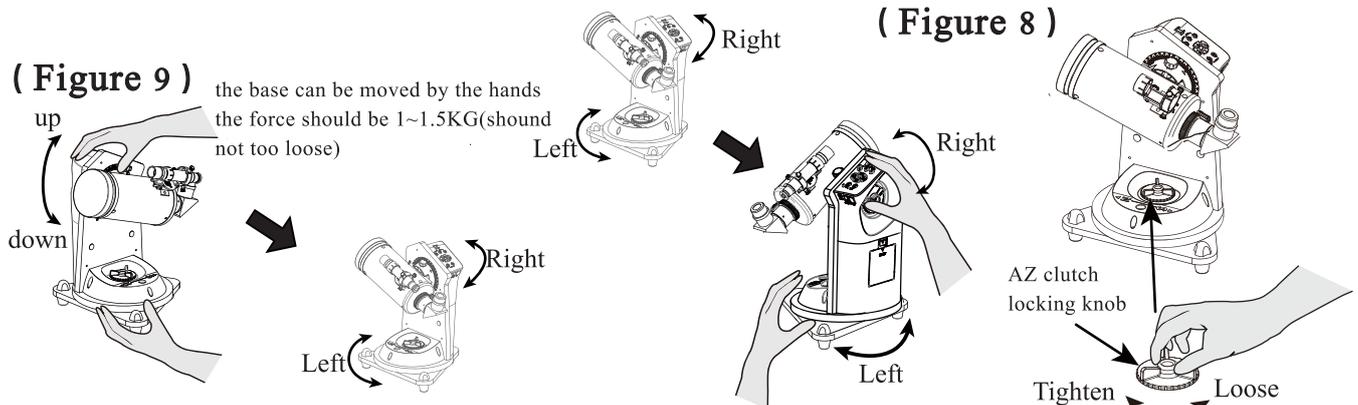
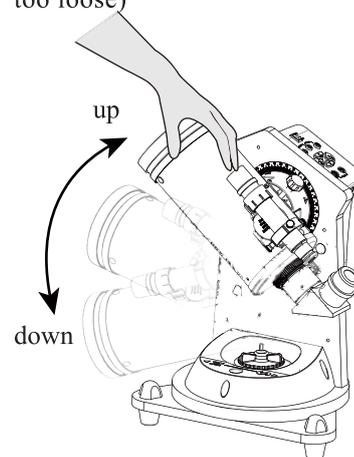
3. Adjust the AZ clutch (Figure 7) (Ensure the base is steady and will not move when pushing the main tube) (Figure 8-9). An over tightened force will affect the telescope's function.

Attention: the clutch allows for manual adjustment of the main tube when the target is being tracked by the motor. The rotated angle is recorded by the computer to enable the telescope to function normally. If the clutch is over tightened, the manual manipulation function will be voided, resulting in motorised operation only. Also, an over tightened clutch may decrease the accuracy and/or damage the accessories.



(Figure 7)

tube can be moved by hands freely
the force should be 1~1.5kgf(should not too loose)

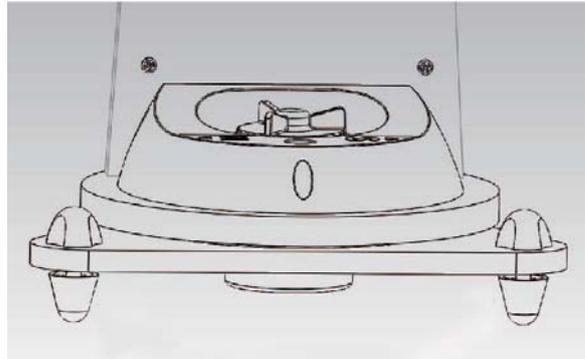


Assembly of the mount and main tube

The mount setting

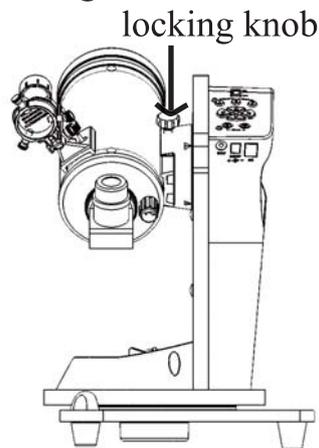
1. Position the mount on a flat surface. In order to commence astronomical observations, adjust the two feet in Figure 10 to make sure the horizontal bulb is in the centre.

(Figure 10)

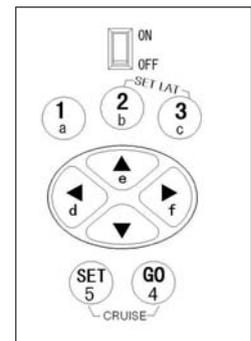


2. Loosen the lock adjuster on the mount. Affix the main tube onto the mount by tightening the lock (see Figure 11) lock adjuster

(Figure 11)



(Figure 12)



3. Speed choice key: 1,2,3,4,5; position setting key: a,b,c,d,e,f; function setting key: SET; swift GOTO key: GO(Figure 12)

Mount Power: The MiniDob Mount can be powered from the internal batteries or an external DC power supply. The battery compartment is located on the fork arm and holds eight AA alkaline batteries (not supplied). The external DC power requirement is 12-Volts DC Nominal and should supply at least 500mA of DC. The cord plug should be 2.1mm I.D. x 5.5mm O.D.x12mm, female and positive centre. The maximum voltage should not exceed 14-Volts and a minimum of 9-Volts.

Warning:

Some simple transformer style AD-DC power can output DC Voltage that is much higher than the voltage shown on the label. Avoid using this power source.

For Astronomical Use

In the Northern Hemisphere, or when using at a different latitude than that previously, please set the AZ/ALT clutch knobs according to the instructions (see page 4, figure 6-9) before doing the following steps:

When using the mount for the first time or at different latitudes, please reset the initial position. (If at the same latitude, you may reset by following the instructions below)

1. Initial position setting:

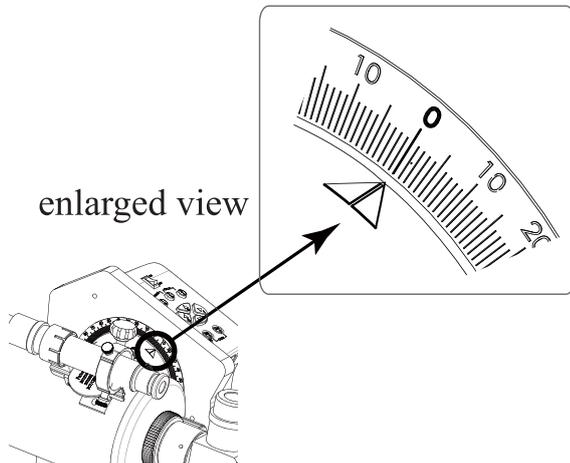
Aim the main tube at North horizontally (rotate the altitude axis until the altitude scale reads 0 according to Figure 13).

2. Power on after finishing step 1 (or restart power).

3. Rotate the altitude axis to enable the altitude scale to read local latitude (Figure 14).

(Figure 13)

the altitude scale reads 0



(Figure 14)

local latitude

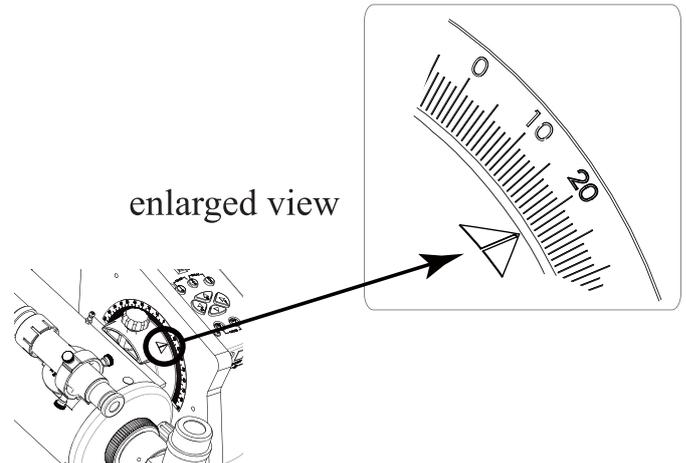
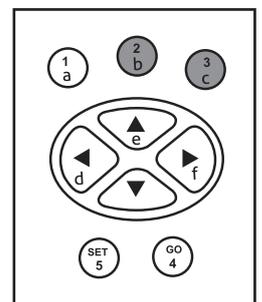


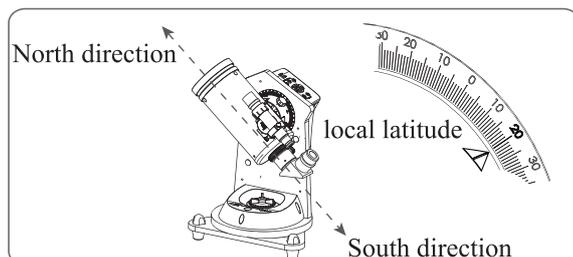
Figure 13: Ensure the altitude scale reads 0 **Figure 14:** Ensure the altitude scale read local latitude

4. By pressing button 2 and 3 (Figure 15) simultaneously, the MiniDob will recognise local latitude (Figure 15). Aim the telescope towards the object under observation: the mount will begin auto tracking.

(Figure 15)



Additional Notes: If using the mount at the same latitude location, aim the main tube to true North and rotate the altitude axis to original set local latitude. Power on or restart the power: the mount will start auto tracking.



Aim the main tube at true North and let the altitude scale read local latitude. Power on, or restart power.

Initial set-up in Southern Hemisphere or at different latitude using the mount:

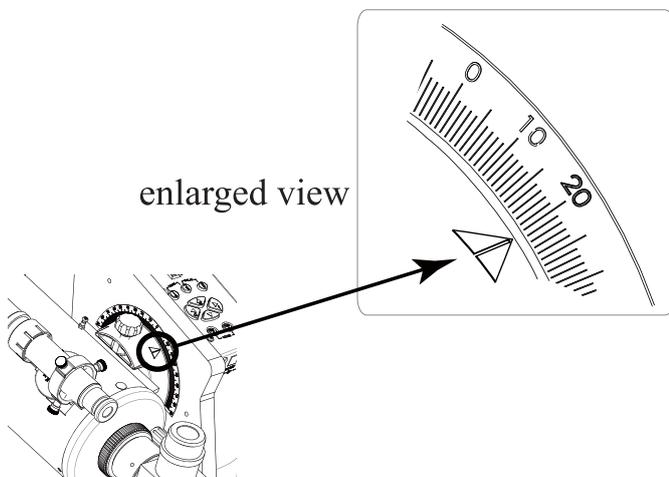
Reset the initial position (If at the same latitude, you could either do a reset or follow the instructions below).

Set the AZ/ALT clutches knobs according to the instructions (see page 4 figure 6-9 before completing the following steps):

- Use initial position setting
- Aim the main tube at South, let the dial read the local latitude according to Figure 13.
- Power on after finishing initial position setting (Or restart power).
- Rotate the altitude axis to let the dial read 0 degree (Figure 14).

(Figure 13)

local latitude



(Figure 14)

the altitude scale reads 0

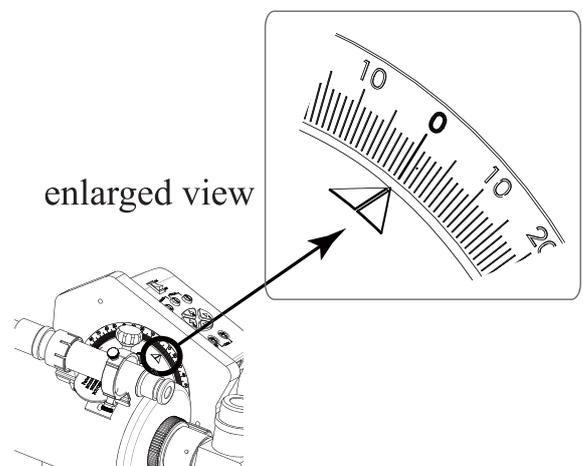
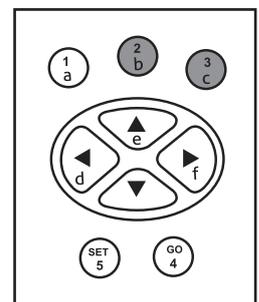


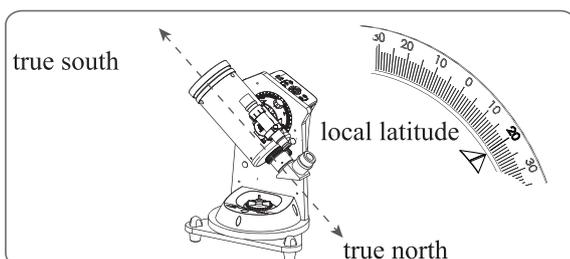
Figure 13: let the altitude scale read local latitude **Figure 14:** let the altitude scale read 0

- Press the button 2 and 3 (Figure 15) simultaneously, and the MiniDob will recognise the local latitude (Figure 15).
- Aim the telescope towards the object under observation: the mount will commence auto tracking.

(Figure 15)



Additional Notes: If using the mount in the same latitude location, aim the main tube to true South and rotate the altitude axis to original set local latitude. Power on or restart the power, the mount will begin auto tracking.



Aim the main tube at true South and let the altitude scale read local latitude. Power on, or restart power.

1. Follow the instructions below to reposition the mount:

The user can use the buttons on control panel to move the mount.

The four direction buttons are used to rotate the mount horizontally and vertically.

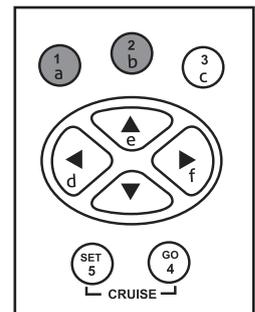
User can use the other 5 buttons to choose from 5 (rotating) speeds. Speed 1 is the slowest and Speed 5 is the fastest.

Speed 1 and Speed 2 are for centering an object in the eyepiece of the telescope.

Speed 3 and 4 are for centering an object in the red dot finder of the telescope.

Speed 5 is for rotating the mount at speed. (In order to save battery life, we recommend rotating the mount manually)

(Figure 16)



2. The celestial object function can be switched on/off by simultaneously pressing the buttons '1/a' and '2/b' (Figure 16). While tracking, the backlight of the buttons will flash twice and the internal buzzer will give two short beeps. If tracking is off, follow these guides to use the buttons to move the mount.

3. The backlight will flash once and the buzzer will give only one short beep.

4. Pressing and holding '1/a' button for approximately 5 seconds will switch the internal buzzer on/off. Pressing and holding '2/b' button for more than 5 seconds will switch the button backlight on/off.

5. If no key has been pressed within 30 minutes, tracking will cease automatically. The beep and indicators on the key may assist the user to determine whether the mount is tracking or not. If further tracking is required, press key '1' and '2' simultaneously in order to recommence tracking.

More Knowledge about Latitude Setting

In order to allow the celestial object tracking function to work properly, the MiniDob mount needs the input of local latitude. The latitude setting operation is sufficient if the observation site does not change much in latitude. However if the latitude is significantly different to the previous location, here are the steps for setting the new latitude.

- Find local latitude with a GPS, a map or other similar devices.
- For Northern Hemisphere users, rotate the altitude axis until the altitude scale reads 0 degrees. For Southern Hemisphere users, let the dial read the local latitude. Operators may rotate the altitude axis using the motor or manually.
- Turn off power, and then turn on again.
- For Northern Hemisphere users, rotate the altitude axis to let the altitude scale read local latitude. For Southern Hemisphere users, let the dial read 0 degrees.
- Press both buttons '2/b' and '3/c' simultaneously: the MiniDob will recognise the local latitude.

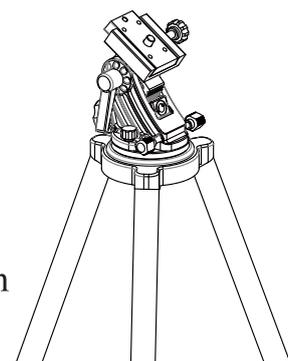
Tip: When rotating the altitude axis with the motor, use the same UP/DOWN key to end adjusting scale reading to 0 degrees or your local latitude. This will help eliminate the influence of mechanical backlash, for example, if the UP key is the last button used to set the scale to 0 degrees, you should also use UP key as the last button for setting the scale reading to your local latitude.

Tip: Tracking accuracy depends on multiple factors, such as: level of the base, accuracy of pointing to true North before turning power on, accuracy of setting local latitude, celestial object types: Sun, Moon, planet or stars or the position of the target in the sky. It is normal to find that the celestial object still drifts slowly in the eyepiece of the telescope during tracking, however the drift will be much slower compared to a telescope without tracking function.

Equatorial Tracking Mode for Celestial Body

1. Attach the MiniDOB onto an elevation degree adjustable tripod according to the figure below:

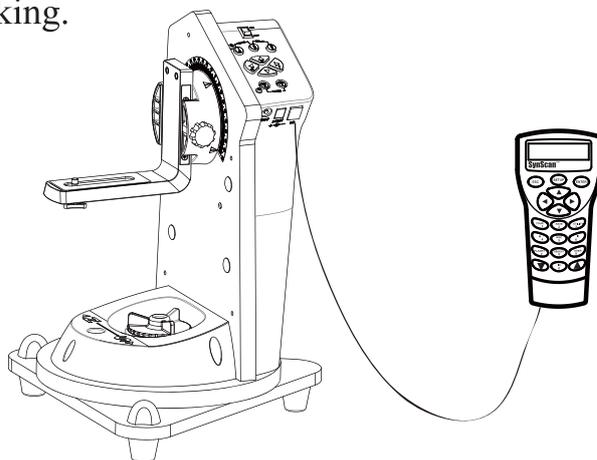
2. Users in Northern Hemisphere aim the tripod at North (Users in Southern Hemisphere aim the tripod at South). Adjust the elevation angle and ensure it equals the local geographical latitude value.



3. Set the Latitude setting for the MiniDOB according to the 'Quick Guide' (pg 3).

4. Press '5' first then 'turn on power', it should now be under the RA equatorial longitude tracking mode.

*The MiniDOB is able to attach to SynScan AZ controllers. This is for GOTO and celestial body tracking.



For Terrestrial (Land) Use

Attention: The MiniDob mount always activates the celestial object tracking function after power is turned on.

1. For terrestrial application, users should press buttons '1/a' and '2/b' simultaneously to turn off the tracking function.

2. Operators can loosen the clutches in order to rotate the mount manually, or use the buttons on the control panel to rotate the mount.

3. The MiniDob mount can store 6 preset positions and retrieve these positions when required.

- Point the mount (with telescope, camera etc.) to an object of interest, and then press button 'SET' plus one of the buttons 'a' to 'f'. The current position of the mount will be stored and represented with that button ('a' to 'f').

- Press button 'GO' plus one of the buttons 'a' to 'f', the mount will move to the preset position represented by the button ('a' to 'f').

Tip: to ensure the best accuracy for your position choices, it is important that you use the 'up' and 'right' direction buttons as the final keys before you actually set your position choice.

For Panoramic and Wide Angle Photography

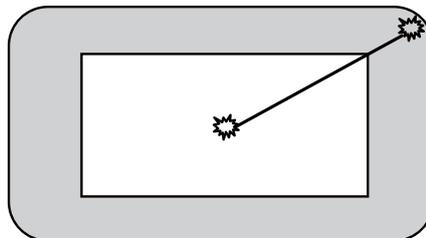
General Operation

1. Attach the digital camera (DC) onto the L shape adapter and connect the shutter release with SNAP interface onto the mount.

2. Setting the 'field of view' (FOV) for DC.

- Level the camera with the mount. Look through the viewfinder window of the camera or look at the LCD display and select a landmark object in the centre of the FOV. Switch off power of the MiniDob mount and then switch on again.

- Rotate the mount and move the object into one of the corners of the view finder or the LCD screen. Press buttons 'SET/5' and '1/a' to save the position. The MiniDob will double the movement to get the full field of view (Figure below).



3. Set the highest altitude angle of photography. Look through the view finder of the camera and use the UP button to rotate the altitude axis to the desired highest point of photography, and then press buttons "SET/5" and "UP" to save the position. Following these steps all the LED's will flicker and the setting will be achieved.

4. Set the lowest altitude angle of photography. Look through the view finder of the camera and use the DOWN button to rotate the altitude axis to the desired lowest point of photography, and then press buttons “SET/5” and “DOWN” to save the position. Following these steps the LED’s will flicker and the setting will be achieved.

5. To set the horizontal range for photography:

If a 360° panoramic view photograph is required, there will be no extra setting needed, and the panoramic function can commence. Press the combination key “1/a” and “3/c” to begin this function. After the photography has been accomplished, the camera will return to its initial position.

If the photographic requirement is less than 360°, it is necessary to rotate the horizontal axis to the left boundary and press “5/SET” and “LEFT/d”. Also, rotate the horizontal axis to the right boundary and press “5” and “RIGHT/f”. After this setting, press the combination key “1/a” and “3/c”, the mount will be transformed into wide angle photographic mode. Following photography, the camera will return to its initial position.

6. During picture taking, users can press the “5/SET” button to pause. Release the SET button to resume the operation.

7. When the MiniDob stops at a pre-stored position, by default the active time of the shutter triggering signal is 3 seconds. Operators can press button a-f and button DOWN to change the time to 1-5, 7 and 10 seconds during movement.

8. Press buttons “DOWN” and “RIGHT/f” to suspend the operation. If you wish to begin again, the mount will commence a new circulation of photography (Figure 21)

Tip: Before setting, press and hold key 5. Then press the corresponding keys (see instruction no.5). The data for setting the FOV (field of view), lowest and highest latitude angle will permanently be recorded by the controller, even if it has been powered off. Only a data reset could retrieve the initial setting. Under the same photographic circumstances, users simply need to rotate the camera onto the horizontal position and then power on to continue another panoramic photography session. In these circumstances resetting is unnecessary.

Terrestrial Stored Position or Cruise Photography and Videoing

Normal Operation

It is possible to set up to six different positions (key a to e): the mount is capable of rotating among these positions. DVs and DCs are able to be attached on to the mount. If a DV and DC are attached simultaneously, press 5/SET and 4/GO keys, both of these facilities will commence working (Figure 19).

Setting Method

Rotate the mount manually or by automatic motor driver, and aim the telescope to the desired objects. Press the key “SET/5” and “1/a” simultaneously to set the first position. Similarly, six positions are able be set in the same method (key a to e).

Following achievement of the setting, choose a proper speed from the key “a” to “e” and then press it.

If turn off the MiniDOB, the six memorised positions will be erased automatically.

Therefore, reset these positions is necessary when turning on the MiniDOB next time.

After the setting, select the key “1” to “5” to obtain a proper speed and press it.

Speed 1: 15"/second Speed 2: 1'/second

Speed 3: 2'/second Speed 4: 4'/second

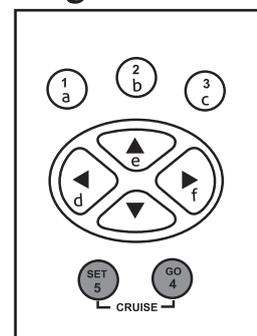
Speed 5: 2.5°/second

Tip:

Speed 1 to 4 are suitable for time-lapse photography, and speed 5 are for normal photography.

When activating the videoing mode, please follow the steps below to realise time-lapse or normal photography.

(Figure 19)



Select the mount rotating speed according to the photography requirement. Press “1”, “2” “3” or “4” for time-lapse photography; press “5” for normal photography.

Hold the key “4” and then press “DOWN” key to activate the photographic and video mode (time-lapse or normal photography).

Operators can press the seven buttons “a-f” and “DOWN” to change the time up to “1,2,3,10,25,40 and 120” seconds during each exposure.

If there is only one position being set, time lapse photography is available for a targeted object.

During the cruising, user can press the SET button to pause/resume the mount.

The mount does not stop between cruising cycles.

Press button “DOWN” and “RIGHT/f” to stop the cruising.

Key: The time interval between each shooting of time-lapse photography can be selected according to different requirements. The following suggestions can be referenced:

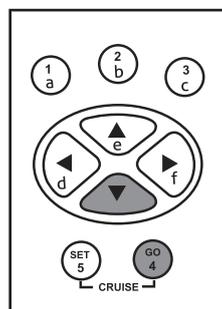
1. For fast moving clouds, exposure time interval can be 1 second; for slowly moving clouds, this interval can be 10 seconds; time interval can be 25 seconds for the sun moving in the clear sky (wide angle); time interval can be 40 seconds for stars moving in the sky (wide angle); 1 second for fast moving crowds and vehicles; 120 seconds for plant growing; 10 seconds for shadows moving on the ground.

2. Different visual effects can be obtained by selecting different exposure time and exposure intervals for a specific scene.

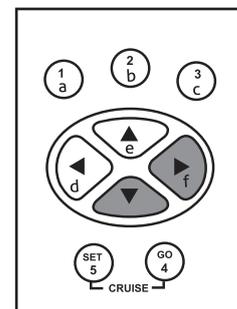
3. If “5” and “4” are pressed simultaneously, the apparatus will commence the terrestrial stored position photographic and video mode (Figure 19). When the mount rotates to each preserved position, an exposure will commence (The camera used for this application should have an external shutter control port which can connect to the SNAP port on the MiniDob with a proper cable.). Having photographed the six positions, the mount will automatically continue to repeat the previous work. If key “4” is pressed, each cycle will continue at one minute intervals, which transfers the mount into intermission mode. If “4” is pressed again, the continuous mode will be recovered. The intermission time could be set through the keys a to f and DOWN.

If a pause is required, press and hold key “4” and the letter keys (a to e). The mount will commence the object to object mode. If press the key “4” and “DOWN” together, the mount will commence the video mode and the mount will rotate slowly between the six preserved positions (see figure 20). When the direction keys “f” and “DOWN” are pressed simultaneously, the present mode will be cancelled (Figure 21).

(Figure 20)

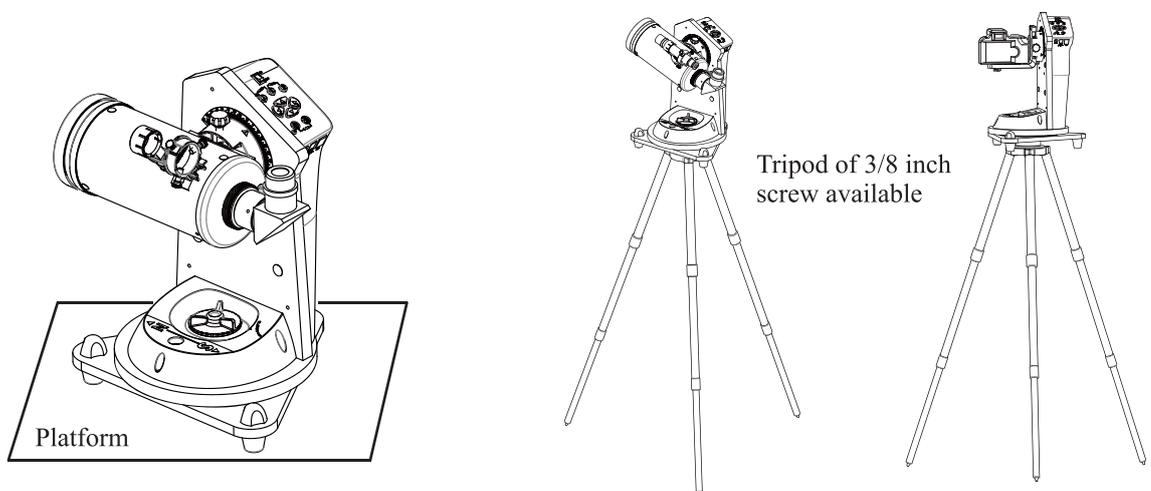
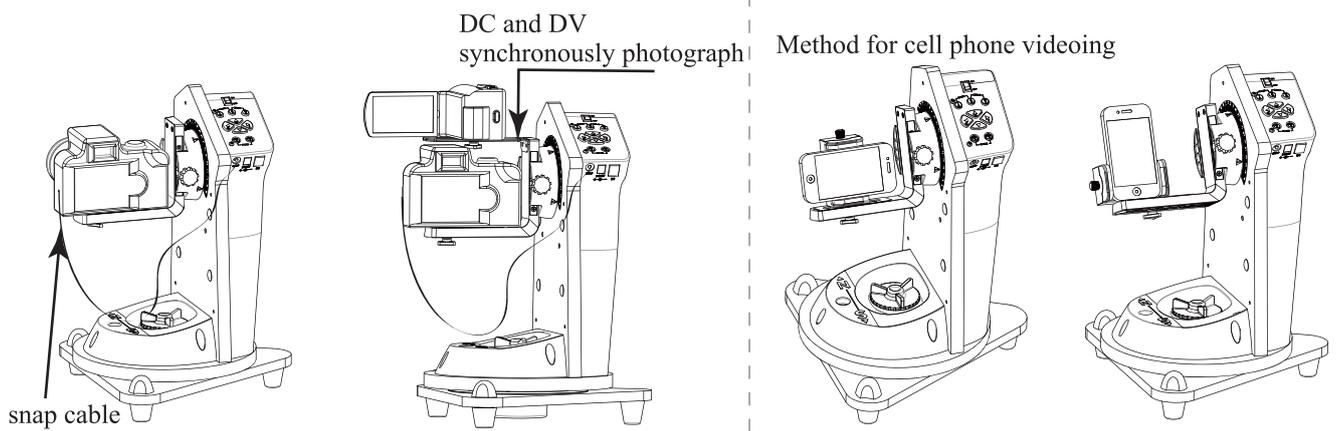
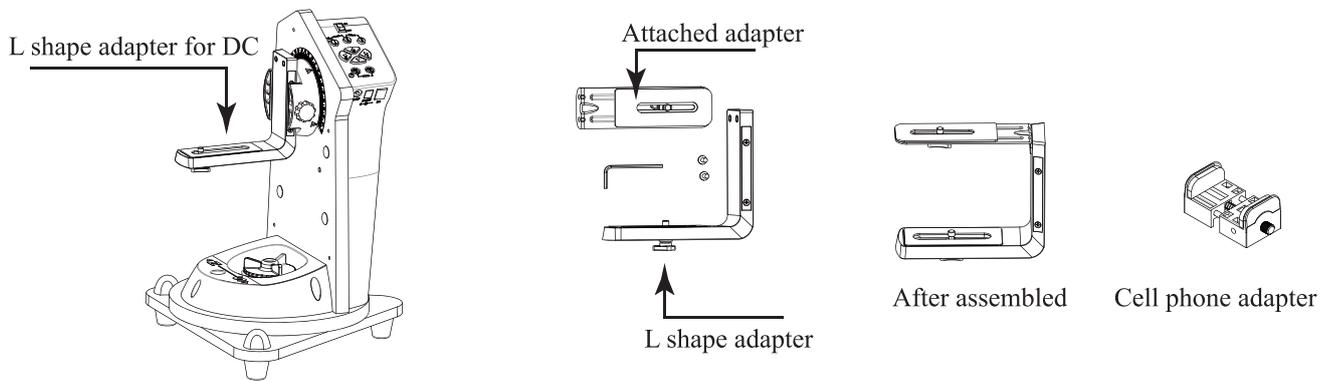


(Figure 21)



In the video mode, it is necessary to press and hold key ‘4’ first and then press the ‘DOWN’ key. After being powered off, the preserved six positions will be erased and another new setting is required for next power on.

This high tech product offers flexible usage, is multi-functional, easily operated and multi-patented. Apart from the field of astronomy, the MiniDob has further functions as illustrated below.



This product is designed to be highly portable and can be either mounted onto a platform or attached to a tripod.

WARNING

Users **MUST** apply a proper solar filter to observe the sun. When observing the sun (while using a proper solar filter) with your telescope, **make sure** that the finderscope has a dust cap over the objective end or remove the finderscope. **Never** use an eyepiece solar filter or a Herschel wedge. **Never** use your telescope to project an image of the sun onto any surface. Resulting internal heat build-up may damage the telescope and any accessories attached.