

Thank you for purchasing the nano.tracker! The nano.tracker is a very compact and light weight star tracker. You can bring this tracker virtually anywhere and take "star scape" pictures easily. Take the time to read through this instruction manual before using the nano.tracker.

## Precaution

### ■ Test photographing

Check if your nano.tracker works normally by taking test shots in advance.

### ■ No Compensation for Photographing

### ■ Other necessities

**Camera, ball-head, tripod, batteries are sold separately.**

#### • Camera and Lens

Supported cameras :

- 1) A camera with a bulb setting or one which has an adjustment for setting a desired shutter speed.
- 2) A camera that can be mounted with a 1/4"tripod screw (conforming to JIS standard)

Every camera that meets the above two conditions can be used. Generally, digital single-lens reflex, film-type single-reflex or lens shutter cameras with a bulb function may be used.

A modern digital camera with power-operated bulb and other recent digital cameras can also be used, but a majority of these cameras are subject to significant battery drain in the bulb mode or require dedicated cables (electromagnetic release, cable switch etc.). Read your camera's manual and check the applicability beforehand.

This product is a compact star tracker for taking star-scape pictures, so the use of telephoto lens may not be suitable. As a rough guide, you can use lenses up to 50mm (35mm full size format camera).

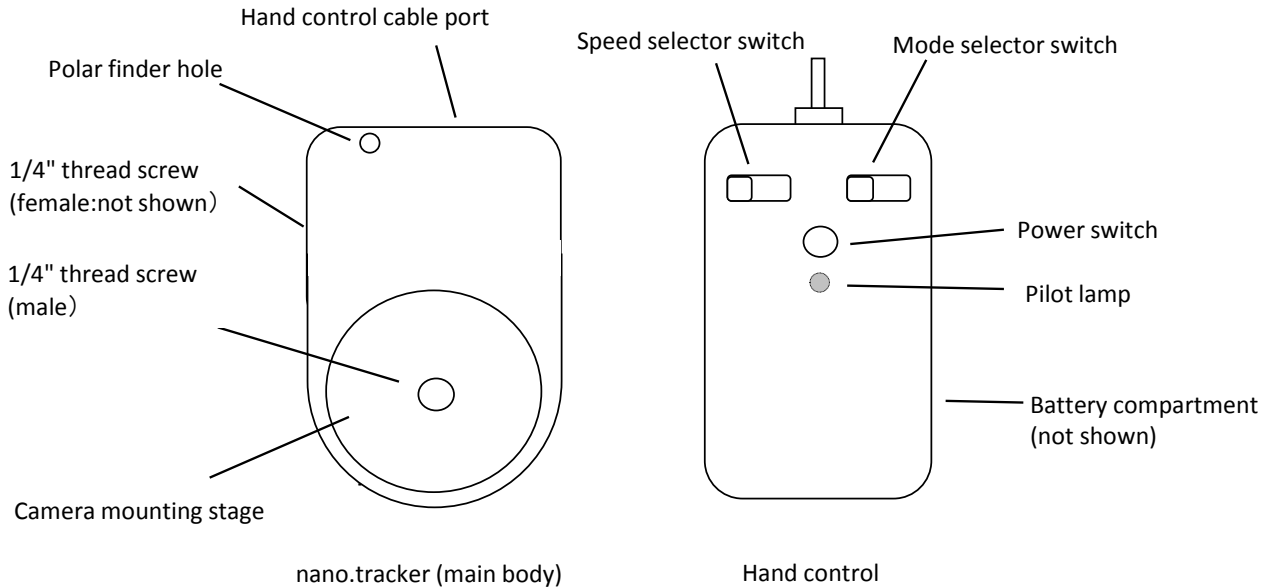
#### • Tripod

You can use a photographic tripod. A tripod with a ball-head is preferable.

#### • Power source

The nano.tracker runs on three AA batteries. For normal conditions, alkaline or Ni-MH batteries are recommended. Batteries which provide low voltage (1.2V) are not recommended. The battery capacity will drop significantly when the ambient air temperature is low, especially when it drops below 0 deg C. Therefore, take proper measures to keep the batteries at appropriate temperatures.

## Parts descriptions



## Setup and Shooting

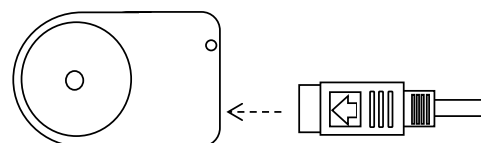
### ■ Battery installation

Your nano.tracker runs on three AA batteries (not included).

- 1, Remove the battery compartment cover from the back of the hand control.
- 2, Insert three AA batteries into the battery compartment of the hand control.
- 3, Re-attach the battery compartment cover carefully.

### ■ Attaching the nano.tracker to the tripod head and the tripod

- 1, Mount the ball head on the camera mounting stage of the nano.tracker with the 1/4" screw.  
Note: When you attach the ball head onto the nano.tracker, please hold the camera mounting stage to avoid damaging the inner gear.
- 2, Attach your nano.tracker on another ball head of a tripod with the 1/4" screw hole provided at the center of the bottom face of the nano.tracker.
- 3, Place your camera on the ball head mounted on the camera mounting stage of nano.tracker.  
Note: Make sure that all the screws and lock levers are fastened and fully tightened to avoid dropping your camera and nano.tracker.
- 4, Insert the connector of the hand control into the hand control cable port on the nano.tracker as shown in the figure.



## ■ Polar alignment

- What is "Polar alignment" ?

Stars rise from the east and set in the west every day. This is due to the phenomenon called "diurnal motion", which results from the rotation of the earth. The center of this motion is located around Polaris, as viewed from Earth. Therefore, stars appear to rotate around Polaris. The nano.tracker can track this diurnal motion with ease because it has a polar axis that simulates the same motion as the rotational axis of Earth. For proper tracking, however, the polar axis must be set so that it's parallel with the rotational axis.

- Polar alignment in the Northern Hemisphere

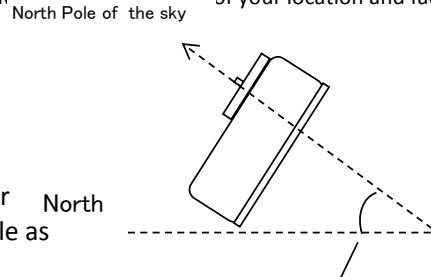
1. Move your nano.tracker up/down and to the left /right in order to find Polaris through Polar finder hole. If you can find Polaris at the center of the Polar finder hole, it is enough to take pictures with wide angle or normal lenses, such as a 50mm lens.
2. If you can't see Polaris for some reason, you can perform polar alignment by using the compass and a clinometer. Check the north direction on your compass and turn the upper face of your nano.tracker to the North.

Tilt the nano.tracker to the same angle as the latitude of your current location as shown in the figure below.

Note: The north pointed by the compass needle is "magnetic north". It isn't the same as "true north". The angle between "magnetic north" and "true north" is called "Magnetic declination". Check the "Magnetic declination" of your location and face the nano.tracker to "true north".

- Polar alignment in the Southern Hemisphere

Unfortunately, there is no star as bright as Polaris near the South Pole of the Sky. However, you can polar align in the same way as in "2". Turn the upper face of the nano.tracker to the direction of South and tilt the nano.tracker to the same angle as the latitude at your location.



e.g.: If you use the nano.tracker at 35 degrees latitude, this angle should be 35 degrees.

## ■ Functions of the hand control

You can change tracking speed and tracking direction by using the hand control.

Each arrow (→/←) means :

→ : Slide the switch to right

← : Slide the switch to left

Speed selector switch: Select the tracking speed.

← : 1x

→ : 0.5x

Mode selector switch: Select the tracking mode.

← : Northern Hemisphere mode

→ : Southern Hemisphere mode

While in the Northern Hemisphere mode → : two seconds later, the mode is changed to Southern Hemisphere.

While in the Southern Hemisphere mode ← : two seconds later, the mode is changed to Northern Hemisphere.

While in the Northern Hemisphere mode →, within two seconds ← : tracking mode is changed.

While in the Southern Hemisphere mode ←, within two seconds → : tracking mode is changed.

mode → : two seconds later, the mode is changed to Southern Hemisphere.

While in the Southern Hemisphere mode ← : two seconds later, the mode is changed to Northern Hemisphere.

While in the Northern Hemisphere mode →, within two seconds ← : tracking mode is changed.

While in the Southern Hemisphere mode ←, within two seconds → : tracking mode is changed.

Note:

When you turn on the power switch, tracking mode is the Sidereal time tracking.

Slide mode selector switch, mode is changed, Sidereal time tracking→Moon tracking→ Sun tracking →

High speed (50x)→Sidereal time tracking .

Pilot lamp indication

- Sidereal tracking : blinks once
- Moon tracking : blinks twice
- Sun tracking : blinks three times
- High speed : steady (not blinking)

## ■ Framing and Shooting

- 1, Loosen the ball head clamp and point at the target, lock the clamp.
- 2, Turn on the power switch and select the mode with the hand control.
- 3, Before taking pictures, it is better to conduct a trial run for five minutes to eliminate backlash of the gear.
- 4, Set the shutter speed to bulb or desired speed, set the aperture and ISO value.
- 5, Focus the lens to infinity manually. With an AF camera lens, even a small amount of force can operate the focus ring. Secure the ring using tape, etc. before use. The anti-vibration function can't be used for starscape photography.
- 6, Release the shutter with an electromagnetic release, cable switch etc.

Note :

Exposure time and aperture depends on the shooting environment.

Maximum load capacity of the nano.tracker is approx. 2kg (including the weight of the ball head).

You can use lenses with up to a 50mm focal length (35mm full size format camera).

When you turn on the power switch or change the framing, sometimes a camera mounting stage doesn't run for several seconds. This phenomenon due to the backlash of gears. At such time, conduct a trial run for five minutes to eliminate backlash of the gear.

## Specification

Tracking mode	: Sidereal tracking, Moon tracking, Sun tracking, High speed 50x, 0.5x Northern or Southern Hemisphere
Drive	: Stepper motor
Wheel gear	: Full-circle 50 tooth
Bearing	: 2pcs
Maximum load capacity	: 2.0kg
Polar finder hole	: FOV 8.9 degree
Power source	: 3x AA Alkaline batteries
Voltage	: DC3.6~4.5V
Battery life	: 5 hours (Alkaline batteries at 20 degree C in internal test)
Dimension	: Tracker 60x98x44mm Hand control 50x105x22mm (without the cable)
Weight	: Tracker approx. 400g Hand control approx. 80g (without batteries)

\*Specifications and appearance are subject to change without notice.

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