Instruction Manual

POLE FINDER

NS-10 mk Ⅱ

Kernel Hardware Engineering, Inc. Japan

[Overview]

◎ This is an electronic compass that supports polar alignment of portable equatorial mounts during astronomical observation and photography.
◎ Equipped with a 9-axis sensor, it allows for quick and easy setting of the equatorial mount's polar axis (towards Polaris) at the set latitude.
◎ It is suitable for wide-field and constellation photography with relatively short exposure times. For long exposures and photography with long focal length lenses, highly accurate adjustments using a polar alignment scope, etc., are necessary.

[Precautions]

◎ If this product is brought from a cold place, condensation may occur. If condensation occurs, please allow it to dry naturally or leave it in the same environment for a long time until the condensation disappears before use.
◎ Do not operate this product in the rain, when water droplets are present, or with wet hands.
◎ Please note in advance that our company shall not be held responsible for any damages or loss of profits caused by external factors such as malfunction, incorrect operation, defects, power outages of this product, or any claims from third parties.

[Table]

Contents
Names and Functions of Each Part
1. Charging the Internal Battery
2. Turning the Power On/Off
3. Calibrating the Magnetic Sensor
4. Calibrating the Angle Sensor
5. Adjusting the Screen Brightness
6. Setting the Magnetic Declination and Latitude of the Usage Location
7. Attaching the Fixed Plate
8. Polar Alignment
Specifications

[Contents]

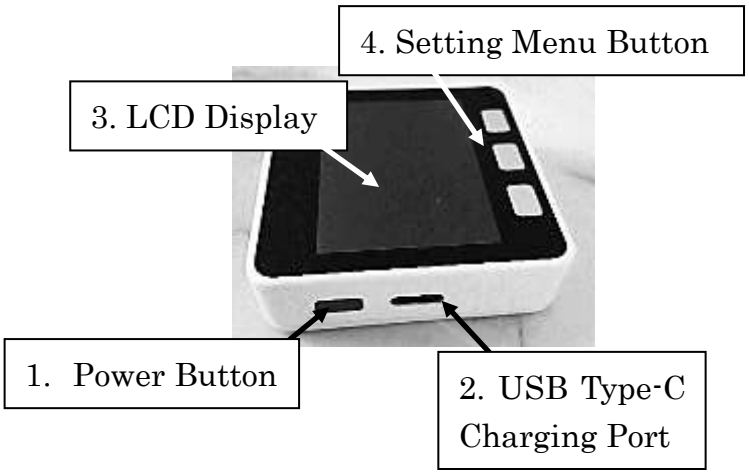
1. POLE FINDER NS-10 mkⅡ Main Unit	1
2. Fixed Plate	1
3. Label (Large)	1
4. Label (Small)	1
5. Instruction Manual (Download)	1

*Please use the large and small labels on the back of the main unit, case, fixed plate, etc.

[Names and Functions of Each Part]

■ NS-10 mkⅡ Main Unit

1. Power Button
2. USB Type-C Charging Port
3. LCD Display
4. Setting Menu Button



■ Display

1. Start Screen
2. Sensor Calibration Screen
3. Main Screen

1. Start Screen

2. Sensor Calibration Screen

3. Main Screen

1. Charging the Internal Battery

Connect the included USB Type-C cable to the USB Type-C connector on the side of the NS-10 mkⅡ main unit. Connect the USB connector at the other end of the USB cable to a USB power adapter or portable USB battery, etc., to start charging.

When an external power source is connected via the USB cable, the display screen of the main unit will automatically switch in the order of NS-10 mkⅡ Start Screen (several seconds) → Sensor Calibration Screen (60-second wait)

→ Main Screen, and charging will begin.
The battery charging status and remaining battery level can be checked in the lower right display of the Main Screen.
The power turns on automatically during charging, and it cannot be turned off.

[About Charging Indication and Battery Level]

You can check the charging status on the Main Screen display of the NS-10 mkⅡ main unit.

Screen Display	Battery Status
Charging	Charging
Full Charge	Charging Complete
100%	Fully Charged
75%	Approx. 80% Remaining
50%	Approx. 50% Remaining
25%	Approx. 20% Remaining
0%	Low Battery

◎ Be sure to charge the battery when you first purchase the product or if it has not been used for a while.
◎ If the charging or full charge indication does not appear during charging, or if the main unit temperature is high, immediately stop using it and contact our company.
◎ Leaving the battery in a fully discharged state for a long period may shorten its lifespan.
◎ The internal battery is a consumable item. Deterioration will progress even if it is stored without use.
◎ As deterioration progresses, the operating time of the main unit on a full charge will shorten.

2 Turning the Power On/Off

Press the power button once.
The display will show the Start Screen (several seconds) → Sensor Calibration Screen (60-second wait) → Main Screen in this order.
Press the power button twice in quick succession to turn off the power.

3 Calibrating the Magnetic Sensor

After turning on the power and the Sensor Calibration screen appears, slowly rotate the main unit around each of the X, Y, and Z axes at least three times (time limit: 60 seconds).
Sensor Calibration is a process to calibrate the built-in geomagnetic sensor to match the surrounding environment. If there are magnetic metals or devices that generate magnetism nearby, it will not indicate the correct direction. If the magnetic field strength display on the Main Screen turns yellow or red, please move to a different location.
If you will be using the device in the same location and environment in the future, you can skip the Sensor Calibration. Press the Skip left menu button when the Sensor Calibration screen is displayed to finish the magnetic sensor calibration.

4 Calibrating the Angle Sensor

Place the main unit on a level surface.
Press the Setting right menu button on the Main Screen to display the Horizontal Calibration screen. Press the HORIZONTAL center menu button and immediately release your finger from the menu button. Also, do not touch the main unit during this calibration. "Finish" will be displayed, and the angle sensor calibration will be completed. Press the RETURN left menu button to return to the Main Screen.
Angle sensor calibration is usually sufficient to perform once after purchase. If you suspect an error in the horizontal display, perform the calibration again.

5 Adjusting the LCD Screen Brightness

Press the Setting right menu button on the Main Screen to display the LCD Brightness screen. Press the BRIGHTNESS right menu button to adjust to your desired brightness. Each press of the BRIGHTNESS right menu button will decrease the brightness setting. After reaching the lowest setting, it will return to the highest setting. Press the RETURN left menu button to return to the Main Screen.

6 Setting Magnetic Declination and Latitude

Set the magnetic declination dM and latitude Lat corresponding to your usage location. Press the dM left menu button on the Main Screen to display the dM screen. Use the UP/DOWN center and right menu buttons to set the magnetic declination of your location.

*Magnetic declination is the angle of difference between magnetic north and true north. You can check the latest magnetic declination and latitude for the country. For example in Japan, the information can be seen on the Geospatial Information Authority of Japan website.
http://maps.gsi.go.jp/

Magnetic Declination and Latitude of Major Prefectural Capitals in Japan

Declination	dM (°)	Latitude Lat (°)
Sapporo	+9.3	+43.0
Sendai	+8.1	+38.3
Tokyo	+7.2	+35.7
Nagoya	+7.4	+35.2
Kanazawa	+8.0	+36.6
Osaka	+7.2	+34.7
Tokushima	+7.2	+34.1
Hiroshima	+7.3	+34.4
Fukuoka	+7.2	+33.6
Kagoshima	+6.4	+31.6
Okinawa	+5.0	+26.2

7 Attaching the Fixed Plate

Sandwich the fixed plate between your portable equatorial mount and the tripod, and insert the tripod screw through the hole in the plate for attachment.
Choose a direction where the placement of the NS-10 mkⅡ main unit will not interfere with the equatorial mount, etc. Adjust the fixed plate so that the top of the NS-10 mkⅡ main unit (top of the screen) is oriented towards the polar axis of the equatorial mount, and then firmly tighten the tripod screw to secure it.

8 Polar Alignment

Turn on the power of the NS-10 mkⅡ main unit and place it so that the front of the main unit is against the wall of the U-shaped part of the fixed plate. Adjust the tripod or fine-adjustment platform so that the two ● markers on the screen graphic overlap at the intersection of each axis. When each ● marker completely overlaps at the intersection of each axis, the POLE and PITCH display values will match the preset magnetic declination and latitude values, and the ROLL value will be 0 (horizontal).
After completing the polar alignment, turn off the power of the main unit by pressing the power button twice in quick succession.
(Caution) If the magnetic field strength display turns yellow or red, it indicates that there is a strong magnetic source near the main unit. Reset the main unit (press the power button once) and perform Sensor Calibration very close to that location. If the issue persists, change the position of the main unit.

[Specifications]

Product Name	POLE FINDER NS-10 mkⅡ
Azimuth Range	-45° to +45°
Latitude Range	-10° to 85°
Horizontal Range	-10° to +10°
Display LCD	320 x 240 Color TFT LCD
Internal Battery	3.7 V / 150 mAh
Operation Time	Approx. 1 hour (full-charge, min. brightness)
Charging Power Input	5V～5.5 V / 500 mA (via USB Type-C)
Operating Temperature	5℃ to 35℃
Operating Humidity	20% to 80% (no condensation)
Storage Temperature	-10℃ to 50℃
Storage Humidity	10% to 90% (no condensation)
Dimensions	Main Unit: 54×54×15mm Fixed Plate: 80×180×1.5 mm
Weight	Main Unit: 35 g, Fixed Plate: 55g
Warranty Period	1 year from the date of purchase (excluding battery degradation)

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