TILTA WLC-T05 Wireless Lens Control System User Guide

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User Guide

Contents

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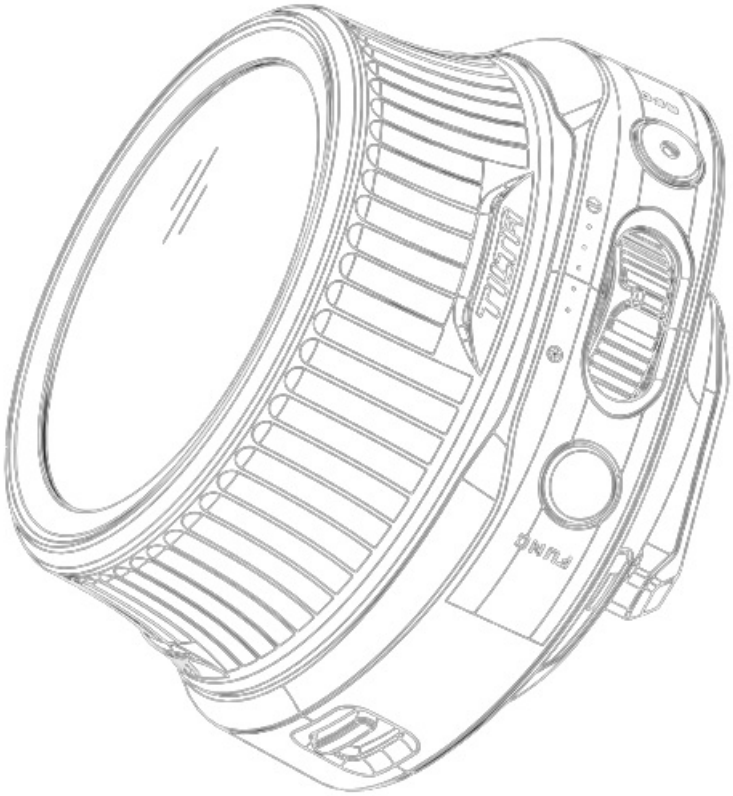

(HVIN:WLC-T05/WLC-T05-HWC)
NUCLEUS-NII
WIRELESS LENS CONTROL SYSTEM

DISCLAIMER

Thank you for purchasing a TILTA product.
Before using this product, please carefully read this document to ensure that the product has been set up correctly. The final interpretation of this document and all related documents for this product belongs to TILTA. For updates, please visit the official website at www.tilta.com for the latest product information. TILTA reserves the right to modify any information in this manual at any time without prior notice and without assuming any responsibility.
By using this product, you are deemed to have carefully read the disclaimer and warnings, understood, agreed, and accepted all the terms and content of this statement. You promise to take full responsibility for the use of this product and any consequences that may arise.
You commit to using this product only for legitimate purposes and agree to this term as well as any related regulations, policies, and guidelines set by TILTA.
TILTA is not responsible for any damages, injuries, or legal liabilities caused directly or indirectly by the use of this product. Users should follow all safety guidelines mentioned in this document, including but not limited to those mentioned. Despite the above provisions, consumer rights are still protected by local laws and regulations and are not affected by this disclaimer.
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WARNING & PRECAUTION

Before using this product, please strictly follow the instructions below. Our company assumes no responsibility for any consequences caused by improper operation or misuse.
ACCESSORY REQUIREMENTS

- Charging at temperatures higher than 40°C (104°F) or lower than 5°C (41°F) may result in decreased battery

performance, swelling, leakage, overheating, and other damage.

- Do not store the battery in an environment exceeding 60°C (140°F). The ideal storage temperature is 22°C (71.6°F) to 28°C (82.4°F).
- The battery must be charged with the charging equipment provided by TILTA. TILTA will not be responsible for any consequences resulting from charging with non-TILTA official equipment.

OPERATING ENVIRONMENT

- This device contains strong magnets. To avoid magnetic interference, please keep it away from magnetic cards, IC cards, implantable medical devices (such as pacemakers), hard drives, RAM chips, and other devices that may be affected.
- Use the battery in an environment with a temperature between -20°C (-4°F) and 45°C (113°F). Excessive temperatures can cause the battery to swell abnormally, catch fire, or even explode. Before using the device in a low- temperature environment, it is recommended to fully charge the battery at room temperature to extend its service life.
- Do not place the device near flammable or combustible materials (such as carpets and wooden products) while charging. Always pay attention to the charging process to prevent accidents.
- Store the device in a dry environment, with an ideal storage humidity not exceeding 40%.

BATTERY SAFETY

⚠ [Warning] This device is equipped with a non-removable built-in battery. please do not attempt to replace the battery yourself, as this may damage the battery or the device.

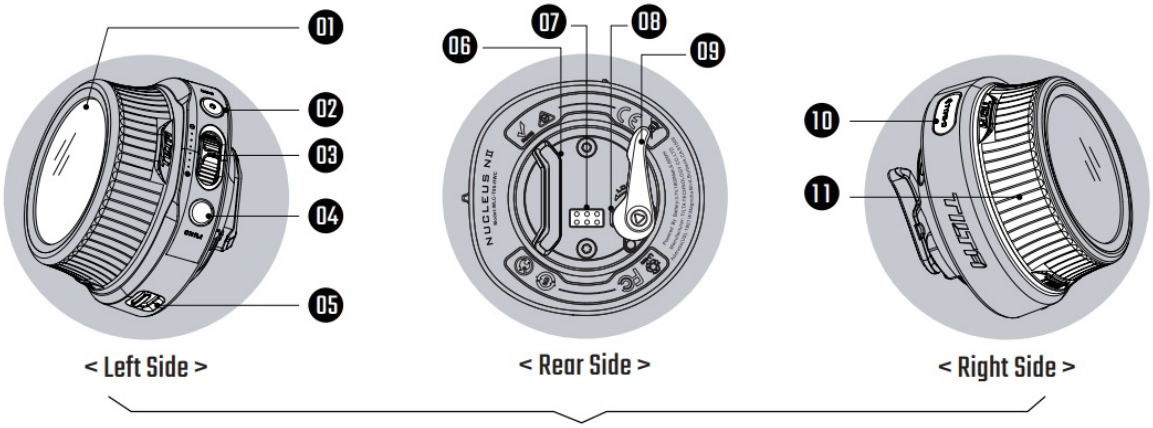
- Do not use the battery in environments with strong electrostatic or magnetic fields, as this may cause internal circuit failures in the device.
- Do not expose the battery to high temperatures or place it near heat-generating devices, such as sunlight, heaters, microwaves, ovens, or water heaters. Overheating the battery may cause it to explode.
- Do not disassemble or modify the battery, insert foreign objects, or immerse in water or other liquids, as this may cause the battery to leak, overheat, catch fire, or explode.
- The electrolyte inside the battery is highly corrosive. If it accidentally comes into contact with your skin or eyes, rinse immediately with clean water for at least 15 minutes and seek medical attention.
- Do not throw the battery into fire, as this can cause it to catch fire and explode.
- Do not drop, squeeze, or puncture the battery. Avoid subjecting the battery to external pressure, which may cause internal short circuits and overheating.
- Do not use damaged batteries.
- Do not store the battery for an extended period after it has been completely discharged, to avoid entering a deep discharge state that can cause damage to the battery cells, rendering it unable to be used again.
- Be sure to fully discharge the battery before disposing of it in a designated battery recycling bin. Batteries are hazardous chemicals and must not be disposed of in regular trash bins. For details, please follow the local laws and regulations regarding battery recycling and disposal.
- If the battery cannot be fully discharged, do not dispose of it directly in a battery recycling bin; instead, contact a professional battery recycling company for further processing.

MAINTENANCE & CARE

- Please keep the device clean and free of sand, dust, and other foreign objects. Use a clean, dry cloth to promptly clean any debris on the product.
- Do not subject the device and its accessories to strong impacts or vibrations, as this may damage them and cause device failure.
- If the device collides with a hard object or the screen is broken due to a strong external impact, do not touch or attempt to remove the broken parts. Instead, immediately stop using the device and promptly contact TILTA customer service.

  NOTE: The device will generate slight heat during operation, which is normal.

INTRODUCING NUCLEUS NII HAND UNIT



1. 1.6-inch Circular Touch Screen Lens & Camera Data / Parameter Display & Control
2. [REC] Button

   01 Long Press 3s: Power On / Off

   02 Long Press 8s: Force Power Off

   Single Press REC Run/Stop Function
3. Control Rocker

   Control One Assigned Motor
4. [FUNC] Button

   01 Set Marks

   02 Hold to Calibrate Lens
5. Rotation Limit Switch

   Switch TF/ DF Mode

   (TF Mode: Compatible with TILTA Wireless Follow Focus Systems;

   DF Mode: Compatible with DJI Follow Focus Systems)
6. NATO Mount

   For Mounting the Hand Unit
7. Electronic Contact Points

   01 Power the hand wheel controller via the Power Handle or Control Handle

   02 Compatible with other external devices for data transmission
8. Safety Pin

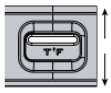
   Prevents Accidental Disconnection

9. Tie Down

   Lock to Secure a NATO Accessory
10. USB-C Port

    For PD Fast Charging
11. Hand Wheel

    Motor / Parameter Control


Switch Up to TF Mode (Limits Focus Knob Rotation to 360 Degrees)

Switch Down to DF Mode (Focus Knob can Rotate Freely)

FEATURES

	Circular Touch Screen Dynamic Interaction/350ppi
	USB-C Supports PD Fast Charging
	Built-in High Capacity Battery with Extended Life Continuous Operation for Over 7 Hours & Smart Standby up to 20 Hours

TECHNICAL DATA

- Material: Aluminum Alloy+Plastic
- Dimensions: 73*72*53mm
- Weight : 175g
- Color : Black

BATTERY USAGE GUIDELINE


Built-in Battery Capacity

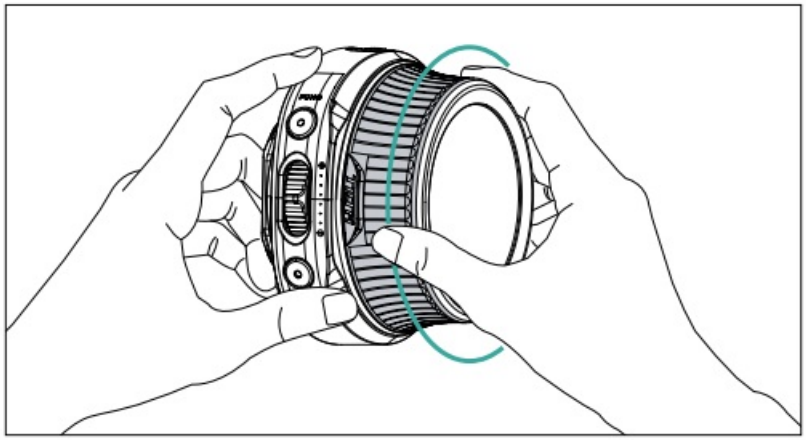
3.7V 1800mAh 6.66Wh

(1) Operating Temperature: Charging: 0°C to 45°C (32°F to 113°F); Discharging: -10°C to 60°C (14°F to 140°F)
(2) Storage Temperature: -5°C to 45°C (23°F to 113°F)
(3) Operating Humidity: 45±20% (Recommended)
(4) Warranty Period: 12 months and less than 500 charge cycles

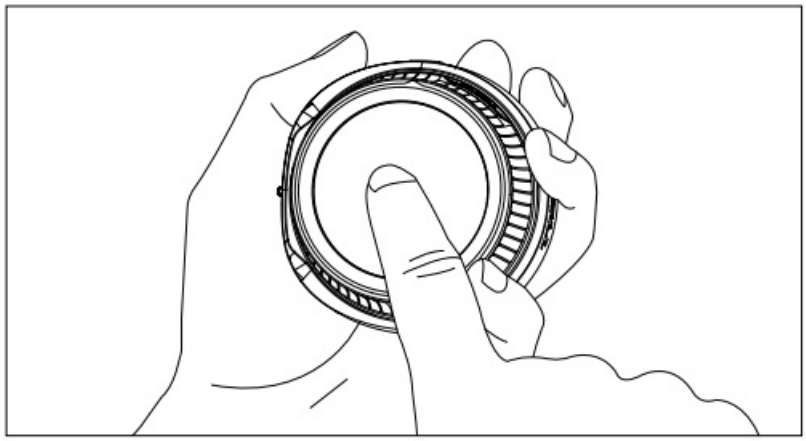
USE THE HAND UNIT

USE INDEPENDENTLY

The focus motor can be controlled by operating the hand wheel or using the control rocker.



The Nucleus-N II and some camera settings can be controlled through the touch screen.

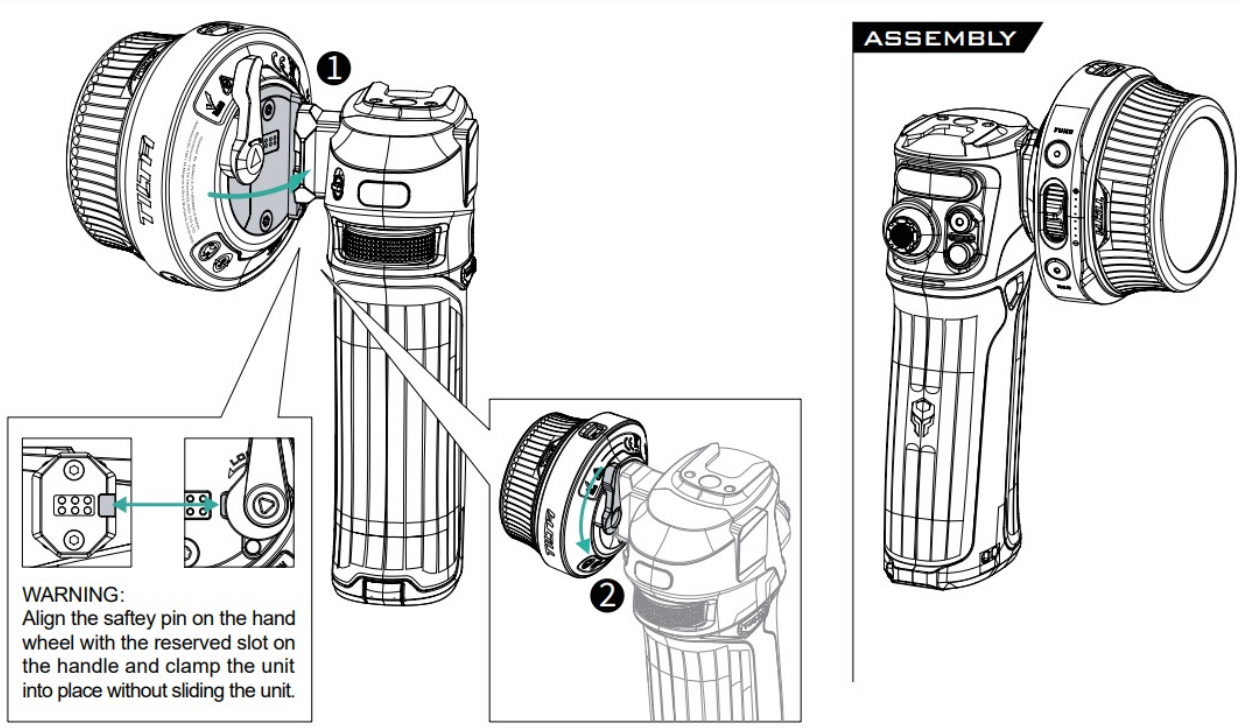


ATTACH TO OTHER ACCESSORIES

The Nucleus-N II hand unit features a NATO quick-release mount, allowing it to be attached to NATO rail. (such as NATO rail on the side of a camera cage or DJI RS 2/RS 3 Pro, etc..)

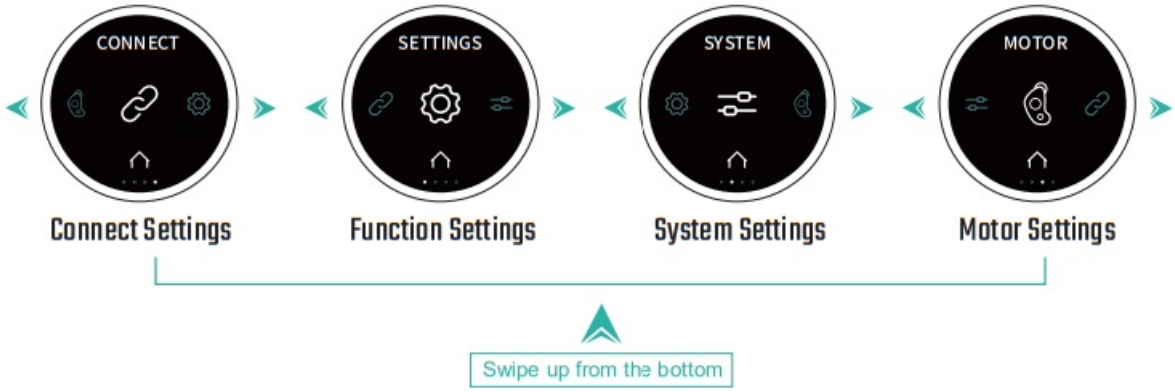
Note: When assembling and disassembling, pay attention to the contact pins on the Control Handle to prevent damage from external force.

USE WITH THE NUCLEUS NANO II CONTROL HANDLE (as shown below) Attach the hand unit to the Control handle using the NATO mount, lock the tie down to secure.



INTRODUCING THE MAIN UI

After turning on the device, the hand wheel controller will enter the main Interface. Swipe left or right to switch between the Three Main Screens. Swipe up from the bottom of the screen to access the Four Settings Menus. Swipe left or right to select the desired settings menu and tap the center icon to enter the secondary menu.
The Nucleus-N II hand unit UI consists of Three Main Screens and Four Settings Menus.
The Three Main Screens include the Camera Control Interface, Motor Parameter Interface, and Focus Distance Interface.
The Four Settings Menus are Connect Settings, Function Settings, System Settings, and Motor Settings.



Swipe up from the bottom

Camera Control Interface- REC

Camera Control Interface- STBY

13 Camera Settings Lock Button
14 REC/STBY Indicator
15 Iris Info
16 ISO Info
17 Communication Protocol Info
18 Recording Run Time
19 Shutter Speed Info
20 Color Temperature Info
21 Resolution / Data Rate / Frame Rate

Swipe left from the right

Swipe right from the left

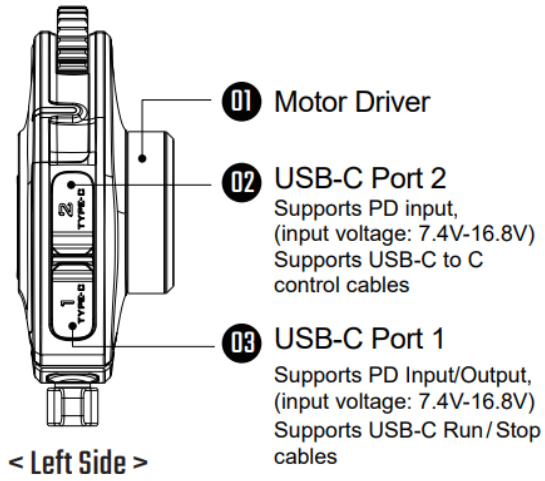
Motor Parameter Interface

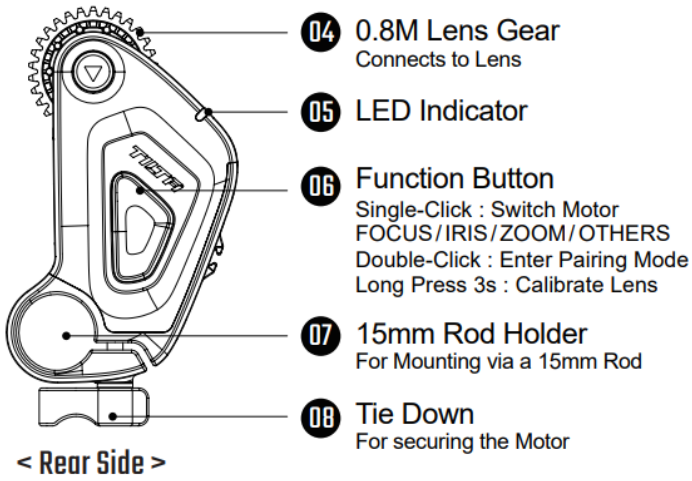
01 WIFI Status
02 Wireless Channel Indicator
A: Automatic Channel Mode
M: Manual Channel Mode
Number: Channel No.
03 Motor Parameter (0-999)
04 Motor Indicator
FOCUS Indicator / IRIS Indicator / ZOOM Indicator
05 Additional Settings (Swipe Up)
06 AF/MF Switch Button
07 Battery Information
08 Bluetooth Status
09 REC/STBY Indicator
10 Focus Knob Range Indicator
11 Set Mark Button
12 Touch Screen Lock Button

Focus Distance Interface

22 Focus Distance
23 Lens Manufacturer
24 Lens Model
25 Focal Length Info
26 Set Mark Button

INTRODUCING NUCLEUS NII MOTOR





TECHNICAL DATA

- Material: Aluminum Alloy+Plastic
- Dimensions: 83*46*31mm
- Weight: 80g
- Color: Black

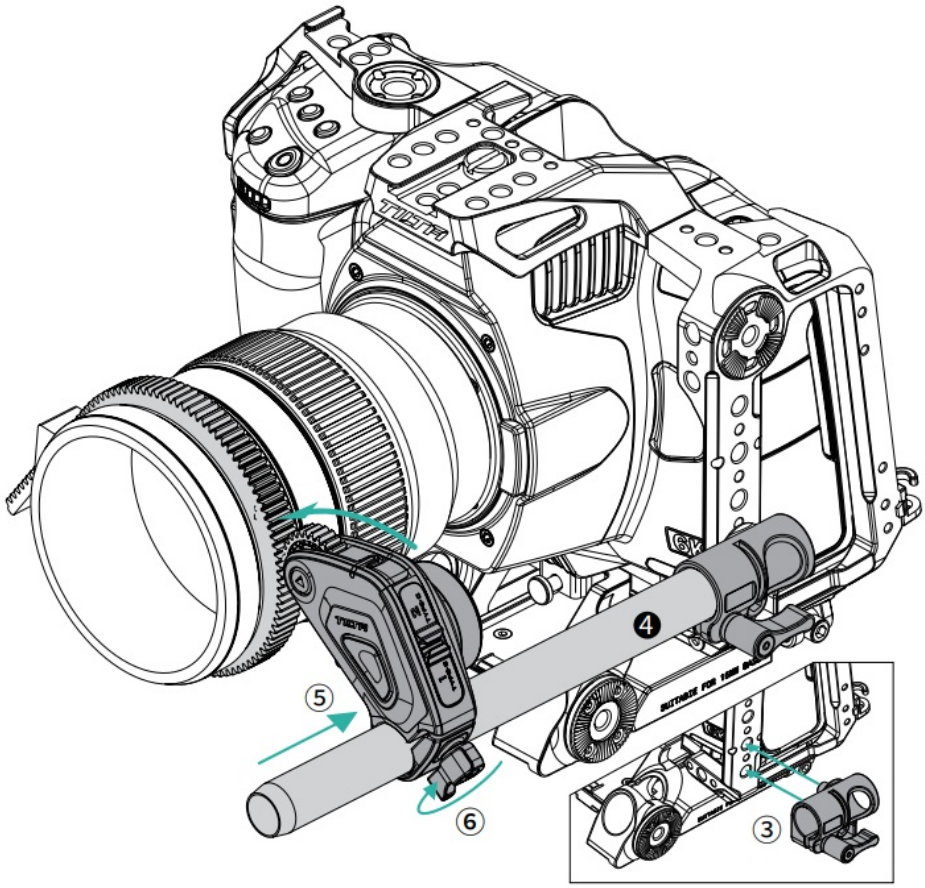
ATTACHING MOTOR TO LENS

1. Attaching Lens Gears

   Attach part ① lens gear to the lens, following the indicated direction. Secure part ② to complete the assembly.

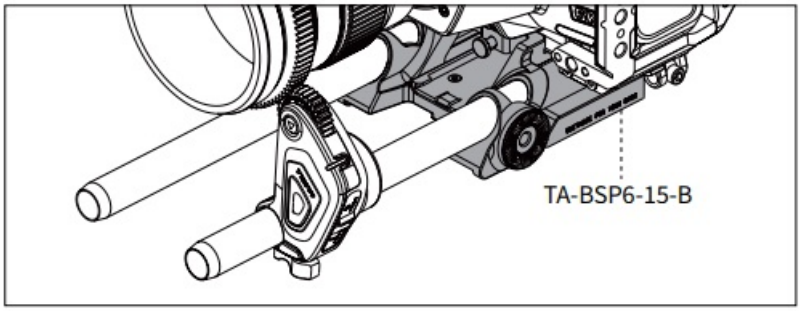
   Note: Compatible with focus rings with a 0.8 gear pitch, can be used with the adjustable lens gear included in the kit or the TILTA Seamless Focus Gear Ring **(Optional).**

   Note: If the lens comes with a 0.8 module gear ring, skip this step.



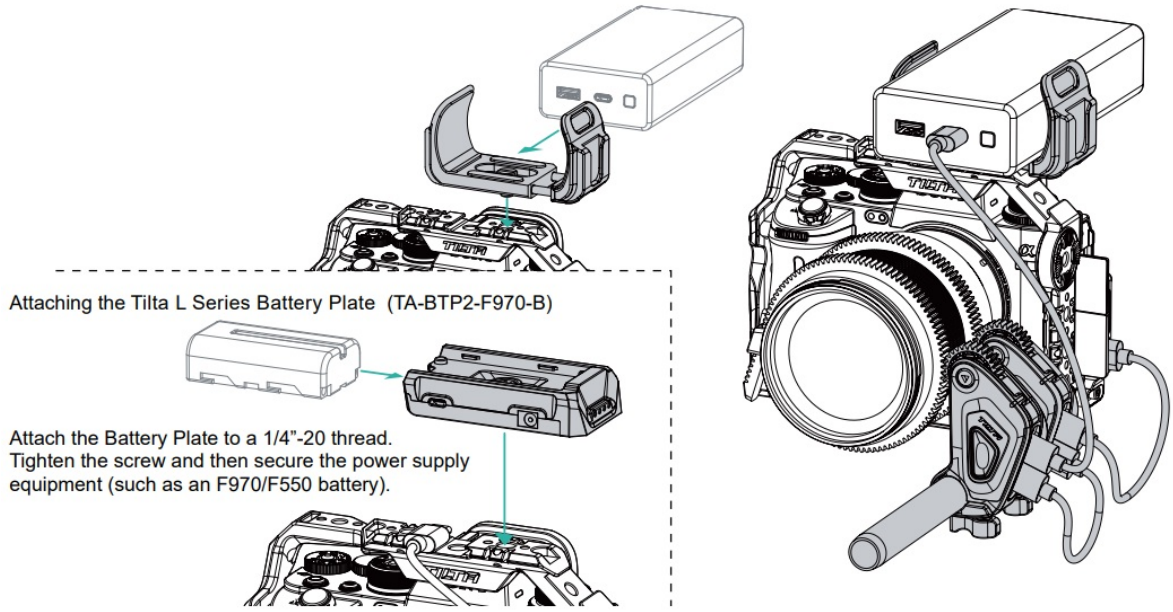
2. Attaching the Rod Holder & 15mm Rod
   Attach the ③ rod holder to the 1/4″ thread on the cage side arm, and tighten the screw. Then, secure the 15mm rod ④ to the rod holder, which will be used to attach the motor.
3. Attaching the Motor
   Mount the ⑤ motor onto the 15mm rod, adjust the motor angle, and then engage the motor gear with the adjustable lens gear and then tighten the tie down ⑥ to complete the assembly.

Optional TILTA rod adapters for motor assembly Including: 15mm Single Rod Holders and LWS Baseplates



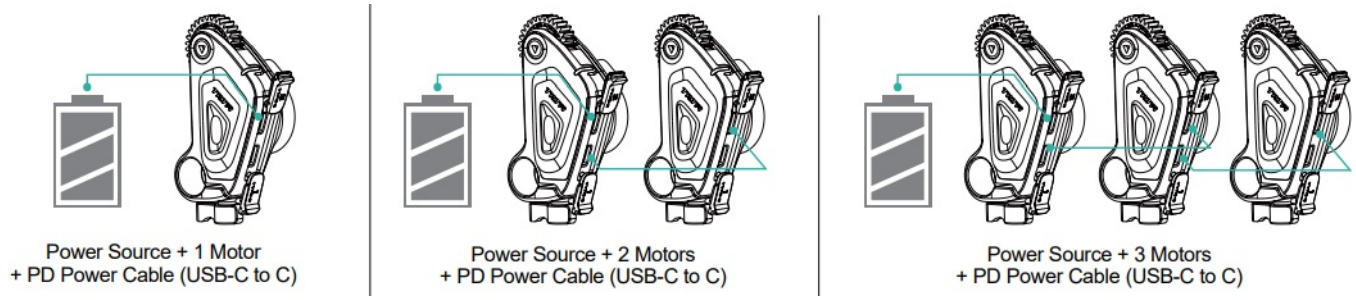
MOTOR POWERING GUIDELINE

You can use TILTA's Universal Power Bank Holder or TILTA's L Series Battery Plate (Optional) for supporting various power options, in order to supply power to the focus motor via the USB-C port (PD protocol).
Attaching the Universal Power Bank Holder (TA-UPBH-B)
Attach the Universal Power Bank Holder to a 1/4"-20 thread. Tighten the screw and then secure the power supply equipment (such as a power bank).



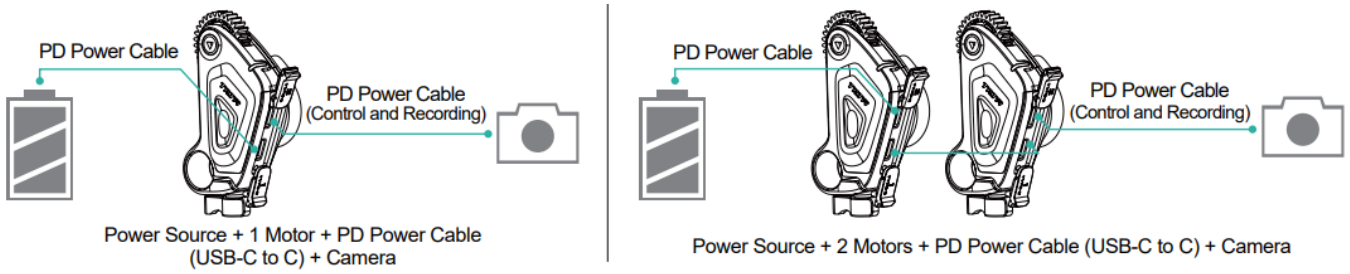
MOTOR CABLE SETUP

Note: When using multiple motors, you can connect them in series by using the USB-C (PD protocol) for passthrough power.

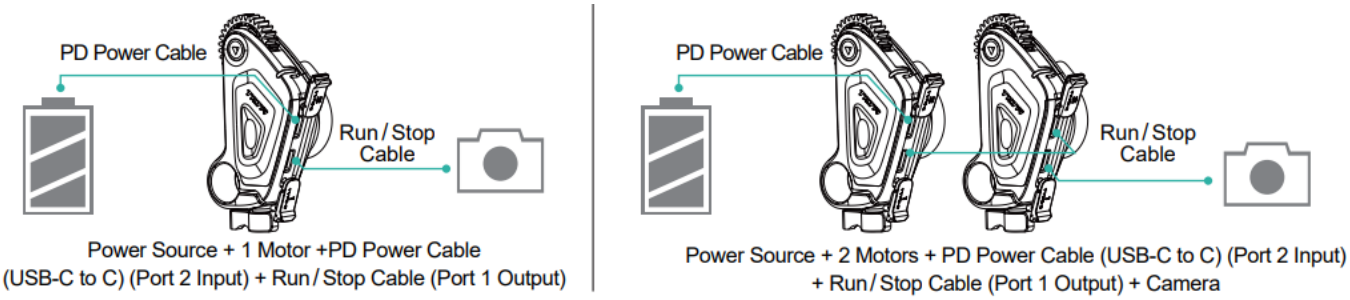


USB-C TO C CABLE

Note: When connecting multiple motors in series, use Port 2 as the power input for the first motor and connect the second motor via Port 1 on both motors. Use Port 2 on the last motor to connect to the camera.



USB-C RUN/STOP CABLE



Note: When using a USB-C Run Stop Cable, use Port 2 as the power input for the first motor and connect the

next motor from Port 1 to Port 2, leaving Port 1 on the last motor open for the Run / Stop Cable.

INDICATOR LIGHT

White: Motor is not assigned to any function
Purple: FOCUS
Purple Light: Pairing completed, motor assigned to FOCUS.
Green: IRIS
Green Light: Pairing completed, motor assigned to IRIS.
Blue: ZOOM
Blue Light: Pairing completed, motor assigned to ZOOM.
Yellow: OTHERS
Yellow Light: Pairing completed, motor assigned to OTHERS.
Red & White Lights Flashing: Wireless module configuration in progress
Green & White Lights Flashing: Channel configuration in progress
Red & Blue Lights Flashing: Automatic calibration in progress
Yellow & White Lights Flashing: Manual calibration in progress
Green & Red Lights Flashing: Motor unlocking (non-controllable state)
Red Light Flashing: Motor Error Detected

Purple Light Flashing: Motor FOCUS, voltage below 6V
Green Light Flashing: Motor IRIS, voltage below 6V
Blue Light Flashing: Motor ZOOM, voltage below 6V
Yellow Light Flashing: Motor OTHERS, voltage below 6V
→ Voltage below 6V, PD protocol disabled

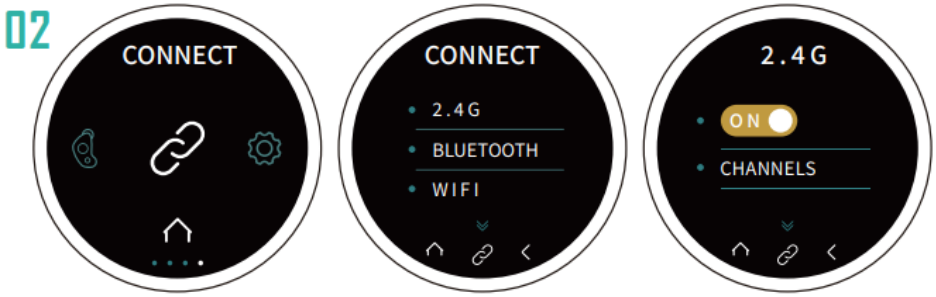
Purple & Cyan Lights Flashing: Motor FOCUS, voltage above 6V
Green & Cyan Lights Flashing: Motor IRIS, voltage above 6V
Blue & Cyan Lights Flashing: Motor ZOOM, voltage above 6V
Yellow & Cyan Lights Flashing: Motor OTHERS, voltage above 6V
→ Voltage above 6V, PD protocol enabled

PAIRING

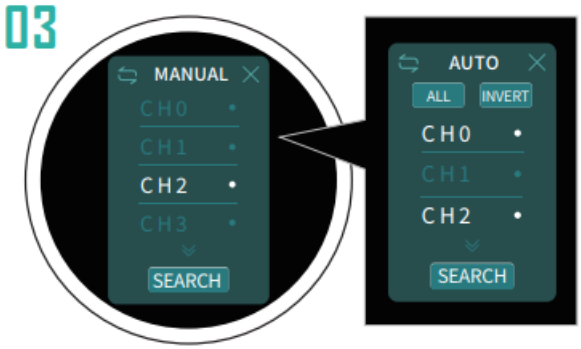
THE NUCLEUS-N II HAND UNIT PAIRING WITH THE NUCLEUS-N II MOTOR

01

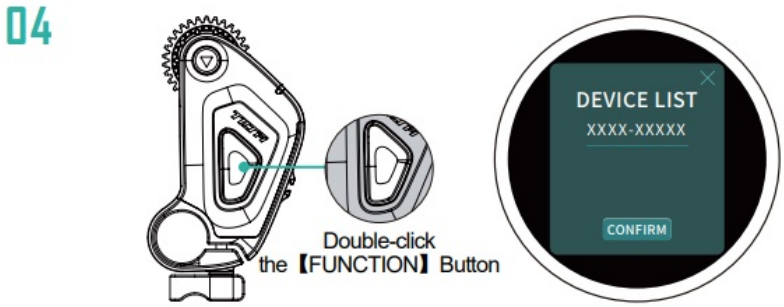
Enter the hand wheel controller's main interface, swipe from bottom to top to access the menu



Choose CONNECT - 2.4G mode, then turn ON and click CHANNELS to enter the Auto / Manual Channel mode.



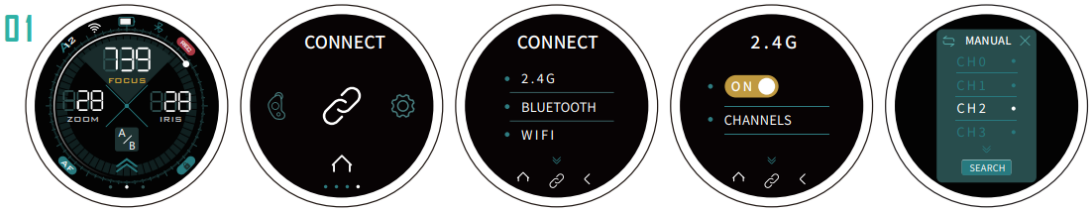
Manual Channel Mode ⇆ Auto Channel Mode
Search for available channels through Auto / Manual Channel mode



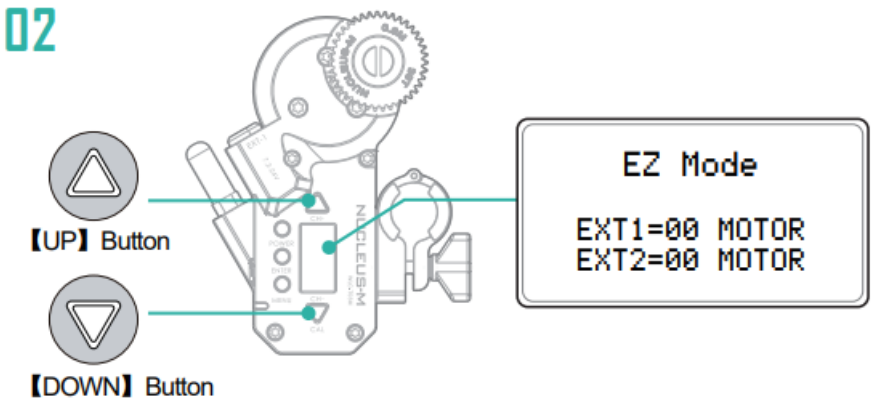
After connecting power to motor port 1 or port 2, Double-click the FUNCTION Button, the indicator light will flash, indicating it's in pairing mode. When the motor is detected on the hand wheel controller's interface, click CONFIRM , when the motor indicator light (purple / green / blue / yellow) remains constant, pairing is completed .

Note: Click the top-left corner switch icon ⇆ to switch search modes; Auto Channel Mode can automatically select channels based on network conditions, with the option to disable specific channels in the menu; Manual Channel Mode allows specifying a single channel.

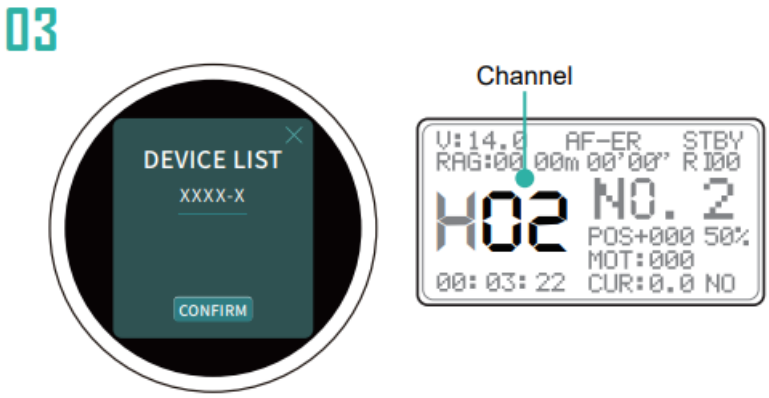
THE NUCLEUS-N II HAND UNIT PAIRING WITH THE NUCLEUS-M MOTOR (METHOD1)



Enter the hand wheel controller's menu, select CONNECT - 2.4 G mode, then turn ON and click CHANNELS to switch to manual channel mode. Select an available channel (e.g., CH2), then SEARCH .



After connecting power to Nucleus-M motor, long-press the UP and DOWN button to initiate EZ Mode pairing.

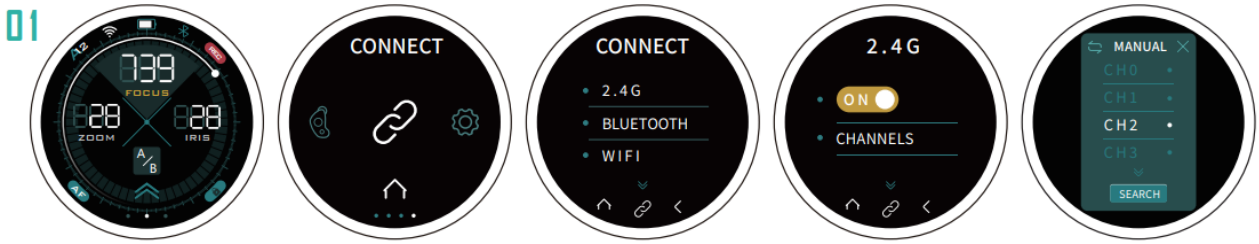


After finding the motor on the hand wheel controller's interface, click CONFIRM to complete pairing. The motor's screen will display the corresponding channel (e.g., 02).

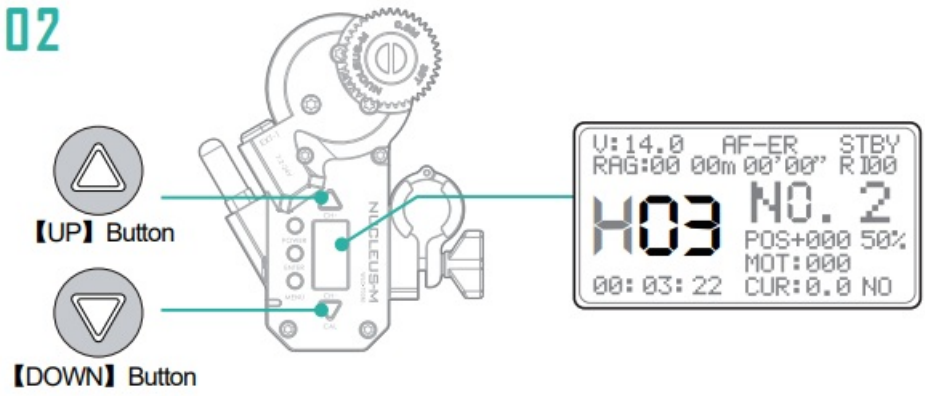
Note: The Nucleus-N II hand unit pairs with both the Nucleus-M motor and VND motor through the hand unit 2.4G manual channel mode.

PAIRING

THE NUCLEUS-N II HAND UNIT PAIRING WITH THE NUCLEUS-M MOTOR (METHOD 2)



Enter the hand wheel controller's menu, select CONNECT - 2.4 G mode, then turn ON and click CHANNELS to switch to manual channel mode. Select an available channel (e.g., CH3), then exit this interface.

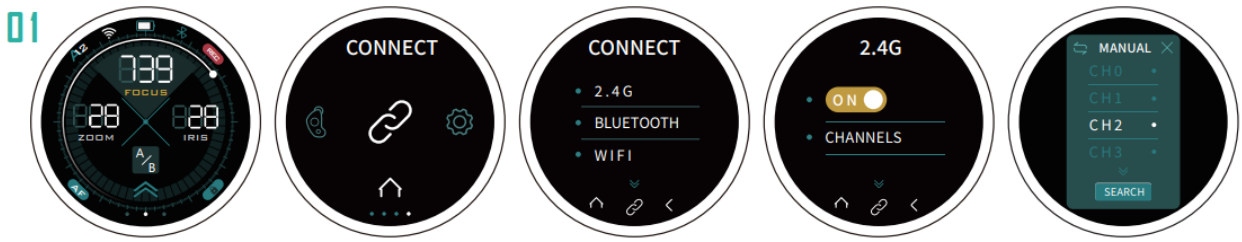


After connecting power to the Nucleus-M motor, long-press the POWER button to power on. Adjust the channel to match the hand unit by double-clicking the UP or DOWN button.

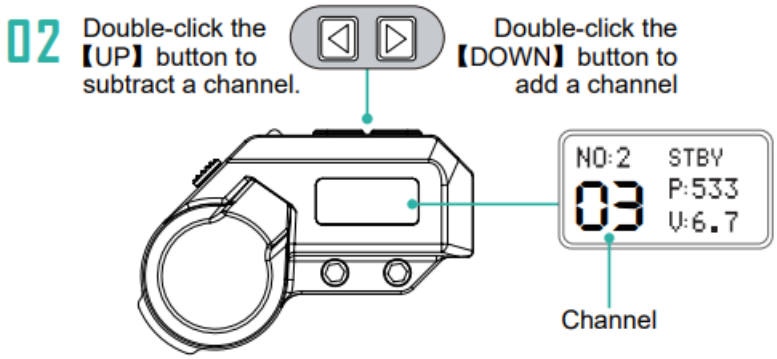
THE NUCLEUS-M MOTOR NUMBER SETTING

After connecting power to the Nucleus-M motor, double-click the MENU button to access the menu. Select MOTOR NO. , press ENTER , and adjust the motor number by clicking the UP or DOWN button. Adjust the motor number to 1 (purple), 2 (green), 3 (blue), or 4 (yellow) to control the Nucleus-M motor by using the corresponding components of the Nucleus-N II hand wheel controller or multi-functional control handle.

THE NUCLEUS-N II HAND UNIT PAIRING WITH VND MOTOR

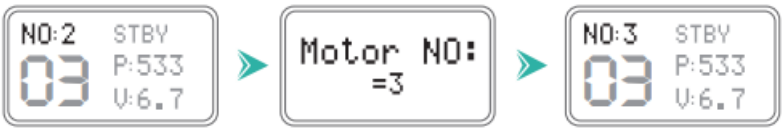


Enter the hand wheel controller's menu, select CONNECT - 2.4 G mode, then turn ON and click CHANNELS to switch to manual channel mode. Select an available channel (e.g., CH3), then exit this interface.



After connecting power to the VND motor, press and hold the DOWN button to power it on. Adjust the channel to match the handwheel by double-clicking the UP or DOWN button.

Triple-click the UP button to enter the motor number setting:



Adjust the motor number by clicking the UP or DOWN button (it will automatically exit after 10 seconds of inactivity, or you can exit by triple-clicking the UP/DOWN button).

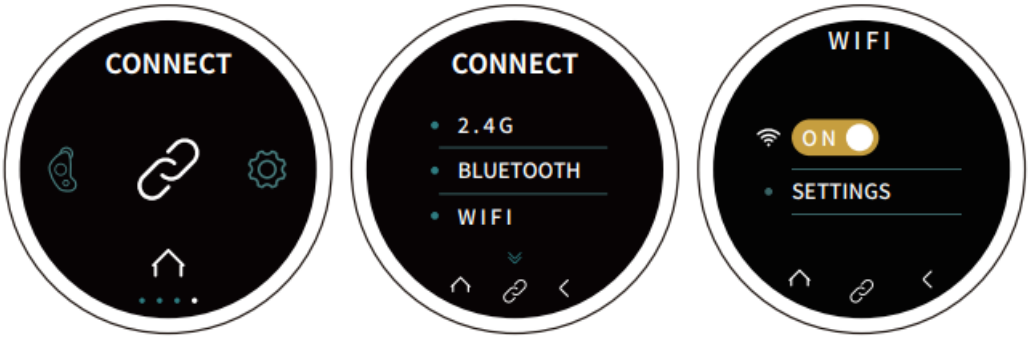
Assign motor numbers 1 (purple), 2 (green), 3 (blue), and 4 (yellow) to control the corresponding components via the Nucleus-N II hand wheel controller or multifunction control handle to operate the motor.

FIRMWARE UPDATE

HAND WHEEL CONTROLLER – FIRMWARE UPDATE

1. Enter the hand wheel controller's main interface, swipe from bottom to top to access the menu.

2. Choose CONNECT - WIFI mode, then turn ON and click SETTINGS to enter the WIFI searching mode.



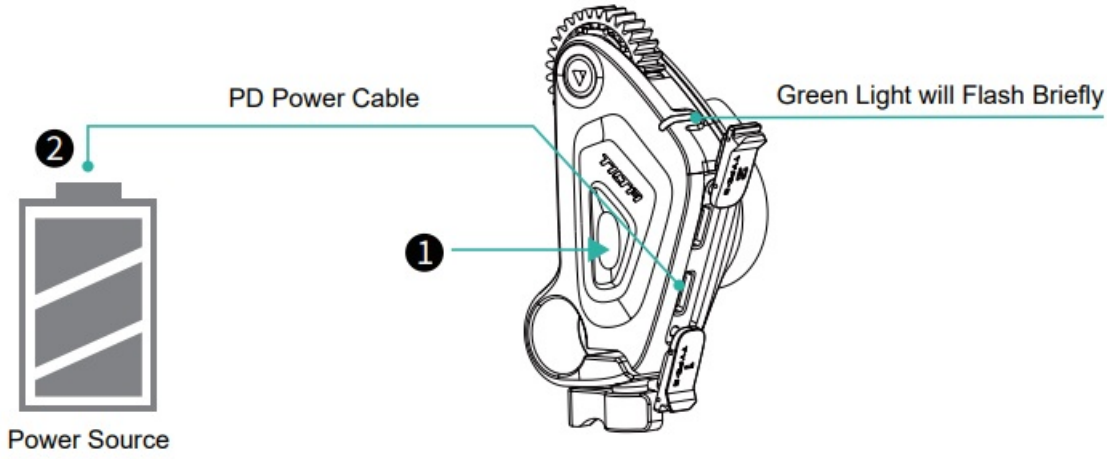
3. Click on SEARCH to find available WiFi networks, enter the password, then click OK , when the green check mark icon appears, the connection is successful.

4. Enter the hand wheel controller's menu, select SYSTEM - FIRMWARE UPDATE , choose to update the hand wheel HAND WHEEL-M , and click CONFIRM to start the update. Once the update progress reaches 100%, the update is complete and the menu will return to the main interface.

Note: Only the HAND WHEEL-M hardware requires online updates, while other hardware can be updated offline once the Hand Wheel-M component update is completed.

MOTOR – FIRMWARE UPDATE

1. If the hand wheel controller has already been updated press and hold the motor's FUNCTION button ① and then connect power ② . A green light will flash briefly, which means the motor is in update mode.

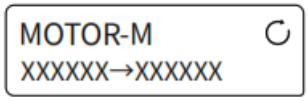


2. Enter the hand wheel controller's menu, select SYSTEM - FIRMWARE UPDATE , choose to update the motor, such as MOTOR-M and click CONFIRM to start the update. Once the update progress reaches 100%, the update is complete. If you need to update MOTOR-S afterward, you should first disconnect the motor's power and then repeat the above update process.

⚠ When the hand wheel controller is already connected to the internet, access SYSTEM - FIRMWARE UPDATE . A SERVER window will pop up. Please select the appropriate server based on your location, and then proceed with the update.

To check if the hardware needs an update:
① Check if there is a version number with an arrow "→" below the hardware. If there is, it means the current version requires a firmware update, as shown below.

② If there is no version number with an arrow "→" below the hardware, it means the current version does not require a firmware update, as shown below.



NUCLEUS NANO II HAND WHEEL CONTROLLER

- When the hand wheel controller is connected to the internet, the system will automatically detect the latest firmware version.
- During the update process, the screen will restart. Please wait for the update to complete. After finishing, the controller's menu will return to the main interface.
- When updating the HAND WHEEL-M hardware, firmware for other hardware such as HAND WHEEL-S , MOTOR-M , MOTOR-S ,and CONTROL HANDLE will be downloaded simultaneously. Subsequent updates for motors and handles will not require an internet connection.
- After updating the handwheel, check the current firmware version.
- If the controller fails to update in a connected state or if the update is interrupted, please check the network status or restart the controller.
- HAND WHEEL-M : Hand Wheel main control firmware
  HAND WHEEL-S : Hand Wheel peripheral device management firmware
  MOTOR-M : Motor-end camera control firmware; MOTOR-S : Motor control firmware
  CONTROL HANDLE : Control handle firmware

NUCLEUS NANO II MOTOR

- Before updating the motor firmware, make sure that the hand wheel controller has previously updated to the latest version.
- Before updating, ensure that the hand wheel controller has a battery level of at least 50% and no other motors are currently undergoing a firmware update.
- During the update process, do not plug or unplug the motor's power or turn off the hand wheel controller. If this happens, reconnect the motor's power and repeat the update operation.
- Multiple motors cannot undergo firmware updates simultaneously. Only one motor can be updated at a time to avoid signal interference.
- When completing firmware updates, if proceeding with the next firmware update, you need to disconnect the motor's power before proceeding.
- The motor needs to be paired with the hand wheel controller before viewing the current version number of the firmware update.
- If the motor accidentally enters firmware update mode by pressing the FUNCTION Button, please disconnect the motor's power first and reconnect power.
- If the update progress remains between 5% and 6%, or if the download speed is too slow, please turn off the hand wheel controller and restart it. Then repeat the above-mentioned update steps.

IC CAUTION:
This device complies with Industry Canada license-exempt RSS standard(s).
Operation is subject to the following two conditions:
(1) This device may not cause interference, and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.
To maintain compliance with RSS-102 RF Exposure guidelines, This equipment should be installed and operated with minimum 20cm distance between the radiator and your body: Use only the supplied antenna.

FCC WARNING:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

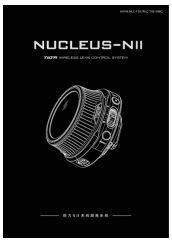
NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.
However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
— Reorient or relocate the receiving antenna.
— Increase the separation between the equipment and receiver.
— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
— Consult the dealer or an experienced radio/TV technician for help.
To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum 20cm distance between the radiator and your body: Use only the supplied antenna.

NUCLEUS NANO II WIRELESS LENS CONTROL SYSTEM
For more instructions, please scan the QR code in the image. Enter the model number WLC-T05 to obtain the electronic version of the product manual.

Scan to follow Tilta WeChat account	Scan the QR

WWW.TILTA.COM

Documents / Resources

	**TILTA WLC-T05 Wireless Lens Control System** [pdf] User Guide WLC-T05, N II, WLC-T05 Wireless Lens Control System, WLC-T05, Wireless Lens Control System, Lens Control System, Control System, System

References

- **Tilta - Camera Cages | Ecosystem for DJI | Wireless Follow Focus**