CNCTOPBAOS PLCHANDWHEEL

CNCTOPBAOS CNC 5 Axis MPG Pendant Handwheel User Manual

Model: PLCHANDWHEEL

1. Product Overview

The CNCTOPBAOS CNC 5 Axis MPG Pendant Handwheel is a manual pulse generator designed for precise control of CNC machines. It features a 15-pin connector, an emergency stop function, and supports 5 axes with selectable pulse ratios. This device provides manual control for axis movement, enhancing precision and operational flexibility for various CNC applications.

Image 1.1: Overview of the CNCTOPBAOS CNC 5 Axis MPG Pendant Handwheel.

2. Features

- **Product Type:** 5 Axis Pendant Handwheel with Emergency Stop.
- **Switches:** Includes x1, x10, x100 selectable pulse ratio switches.
- **Axis Selection:** Dedicated switches for OFF, X, Y, Z, 4, 5 axes.
- **Response Frequency:** 0-10KHz.
- **Power Requirements:** DC5V +/- 5% supply voltage; <=80 mA supply current.
- **Output Specifications:** Output voltage >=2.5V and <=0.4V; Output current <40 mA; Drop/rise time <=5 ns.
- **Construction:** Features a high-precision metal code disc with clear fine-tuning dial scale and stable rotation.
- **Compatibility:** Compatible with DDCS V4.1, DDCS-Expert Offline Controller, Taiwan Pou Yuen M600 M500 M520i T300 series, Higerman, HANUC, GSK, opened NC, KND, Siemens, NUM, Spain FAGOR, and similar CNC systems.
- **Connectivity:** Equipped with a 15-pin plug for direct, plug-and-play connection to compatible controllers.

3. Setup and Installation

The CNCTOPBAOS MPG Pendant Handwheel is designed for straightforward installation. Follow these steps to connect the device to your CNC controller:

1. **Power Off:** Ensure your CNC controller and associated machinery are completely powered off before

making any connections.

2. **Connect 15-Pin Plug:** Locate the 15-pin D-sub connector on the handwheel cable. Connect this plug securely to the corresponding 15-pin port on your compatible CNC controller (e.g., DDCS V4.1, DDCS-Expert).
3. **Secure Connection:** Tighten any screws on the D-sub connector to prevent accidental disconnection during operation.
4. **Power On:** Once the connection is secure, power on your CNC controller. The handwheel should be recognized by the system.

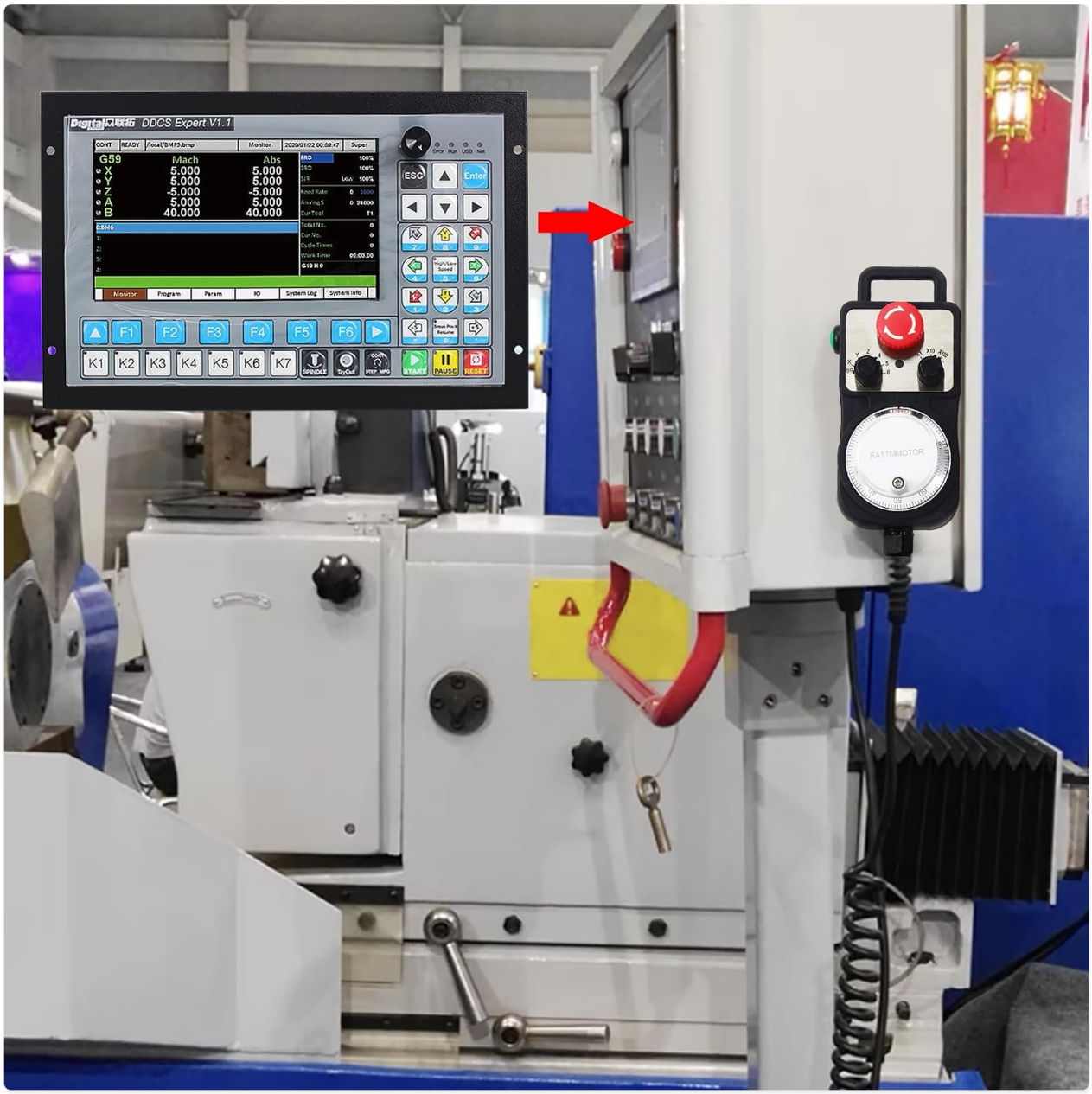


Image 3.1: The handwheel connected to a CNC controller.

4. Operating Instructions

The handwheel provides intuitive control over your CNC machine's axes. Familiarize yourself with the controls:

Image 4.1: Key components and controls of the MPG handwheel.

- **Manual Pulse Generator (MPG) Dial:** The large rotary dial on the front is used for precise manual movement of the selected axis. Turning the dial generates pulses that translate into axis motion on the CNC machine.
- **Axis Selector Switch:** This switch allows you to select which axis (X, Y, Z, 4, 5) the MPG dial will control. Set it to 'OFF' when not in use.
- **Pulse Ratio Switches (x1, x10, x100):** These switches determine the sensitivity of the MPG dial.
  - **x1:** Provides the finest movement (e.g., 1 pulse = 0.001mm).
  - **x10:** Provides medium movement (e.g., 1 pulse = 0.01mm).
  - **x100:** Provides coarser movement (e.g., 1 pulse = 0.1mm).

  Choose the appropriate ratio based on the required precision and speed of movement.
- **Emergency Stop Button:** The large red button immediately halts all machine operations when pressed. To reset, twist the button clockwise until it pops out.
- **Enable Switch:** The green button typically activates or enables the handwheel's functions. Press and hold or toggle as required by your CNC system.

- **Hanging Beam:** Use this handle for convenient carrying and positioning of the handwheel.

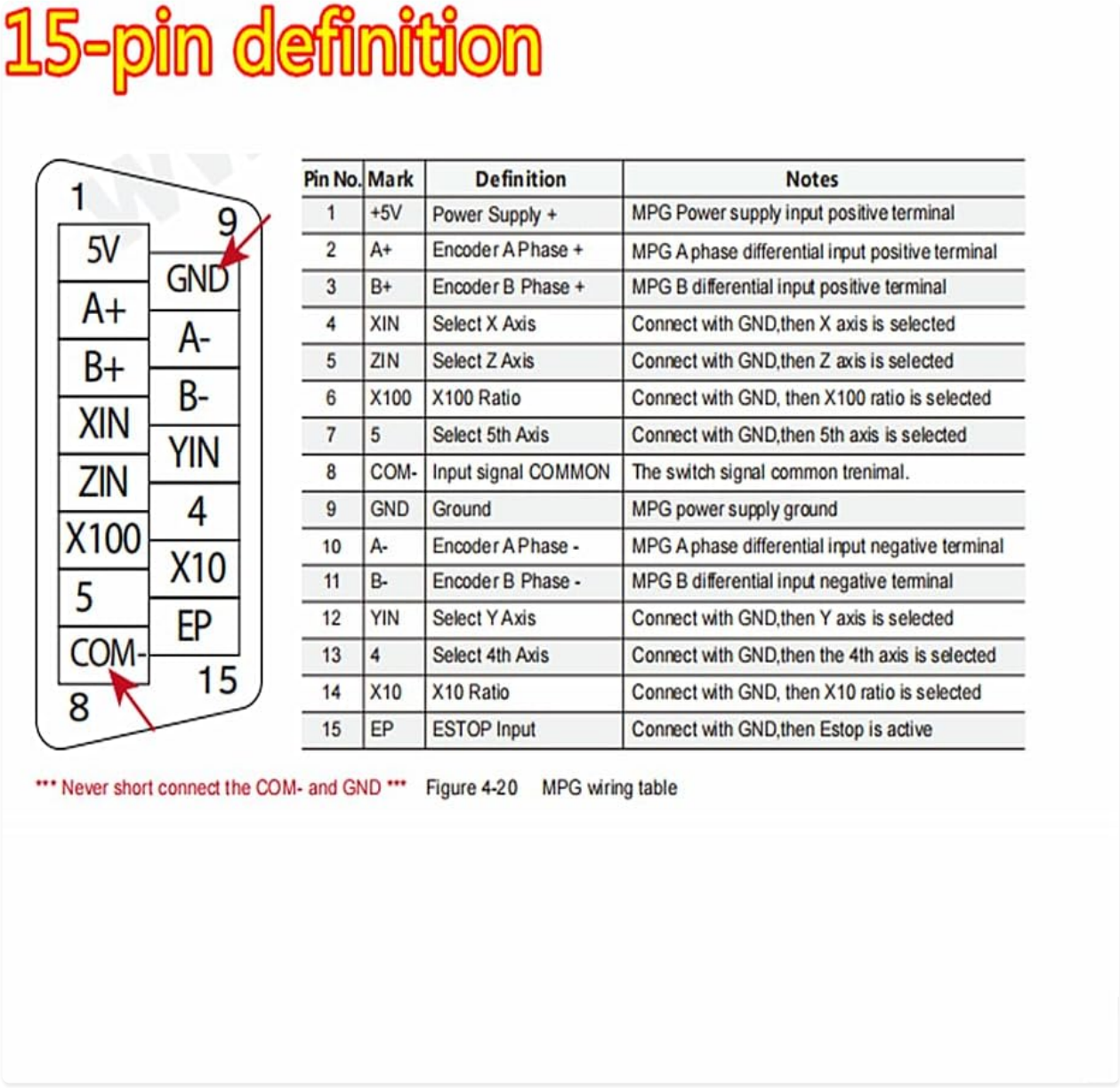
4.1. Operational Demonstration

Your browser does not support the video tag.

Video 4.1: A demonstration of the MPG handwheel in operation with a DDCS offline controller, showing axis movement and control.

5. Wiring Diagram

The following table details the pin definitions for the 15-pin connector. It is crucial to ensure correct wiring for proper functionality and to avoid damage to the handwheel or CNC controller. Always cross-reference with your specific CNC controller's documentation.



Pin No.	Mark	Definition	Notes
1	+5V	Power Supply +	MPG Power supply input positive terminal
2	A+	Encoder A Phase +	MPG A phase differential input positive terminal
3	B+	Encoder B Phase +	MPG B differential input positive terminal
4	XIN	Select X Axis	Connect with GND,then X axis is selected
5	ZIN	Select Z Axis	Connect with GND,then Z axis is selected
6	X100	X100 Ratio	Connect with GND, then X100 ratio is selected
7	5	Select 5th Axis	Connect with GND,then 5th axis is selected
8	COM-	Input signal COMMON	The switch signal common trenimal.
9	GND	Ground	MPG power supply ground
10	A-	Encoder A Phase -	MPG A phase differential input negative terminal
11	B-	Encoder B Phase -	MPG B differential input negative terminal
12	YIN	Select Y Axis	Connect with GND,then Y axis is selected
13	4	Select 4th Axis	Connect with GND,then the 4th axis is selected
14	X10	X10 Ratio	Connect with GND, then X10 ratio is selected
15	EP	ESTOP Input	Connect with GND,then Estop is active

Image 5.1: 15-pin connector wiring definition table.

Table 5.1: 15-Pin Connector Pinout

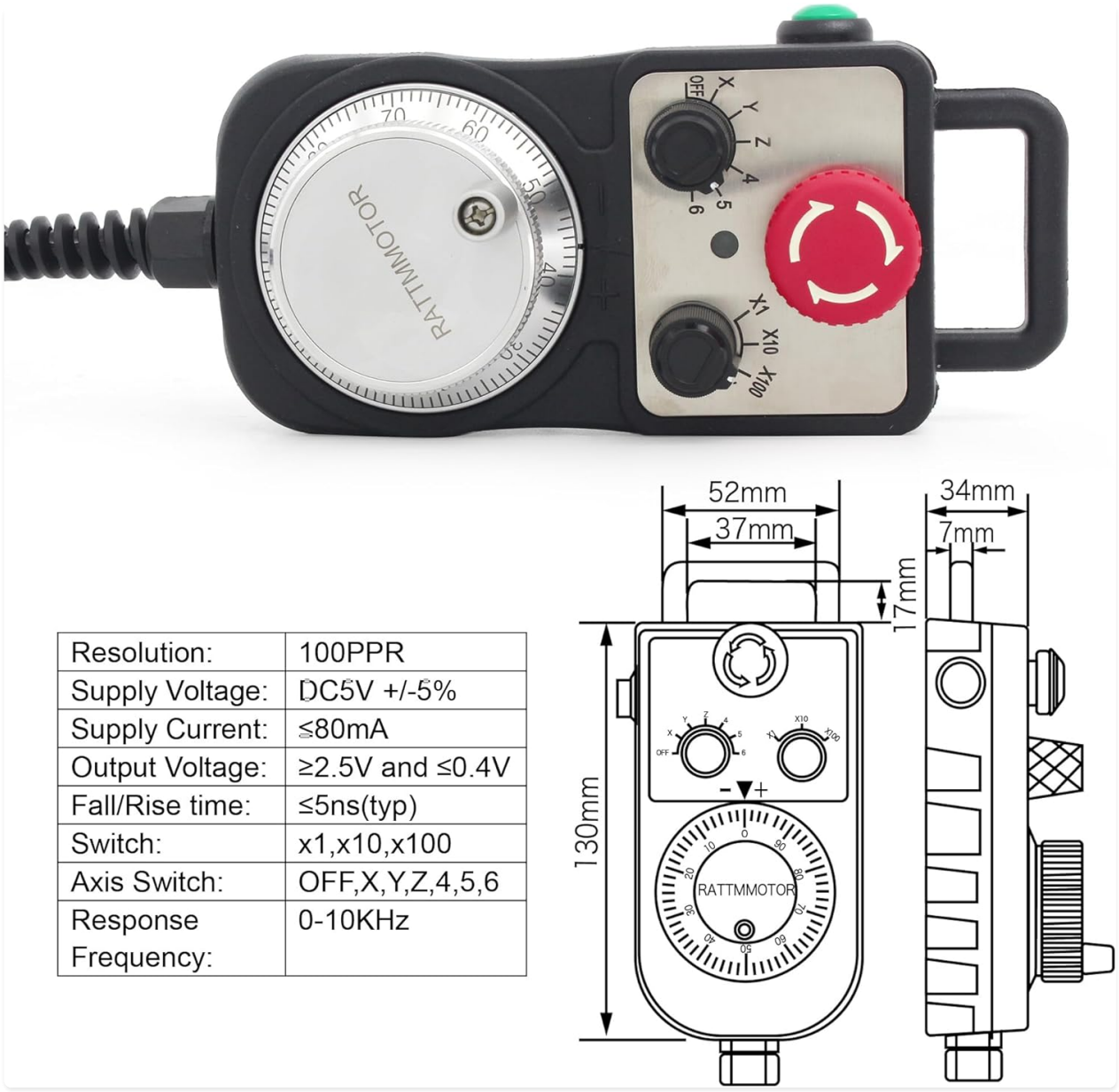
Pin No.	Mark	Definition	Notes
1	+5V	Power Supply +	MPG Power supply input positive terminal

Pin No.	Mark	Definition	Notes
2	A+	Encoder A Phase +	MPG A phase differential input positive terminal
3	B+	Encoder B Phase +	MPG B differential input positive terminal
4	XIN	Select X Axis	Connect with GND, then X axis is selected
5	ZIN	Select Z Axis	Connect with GND, then Z axis is selected
6	X100	X100 Ratio	Connect with GND, then X100 ratio is selected
7	5	Select 5th Axis	Connect with GND, then 5th axis is selected
8	COM-	Input signal COMMON	The switch signal common terminal.
9	GND	MPG power supply ground	
10	A-	Encoder A Phase -	MPG A phase differential input negative terminal
11	B-	Encoder B Phase -	MPG B differential input negative terminal
12	YIN	Select Y Axis	Connect with GND, then Y axis is selected
13	4	Select 4th Axis	Connect with GND, then the 4th axis is selected
14	X10	X10 Ratio	Connect with GND, then X10 ratio is selected
15	EP	ESTOP Input	Connect with GND, then Estop is active

Important: Never short connect the COM- and GND pins.

6. Specifications

Detailed technical specifications for the CNCTOPBAOS CNC 5 Axis MPG Pendant Handwheel:



Resolution:	100PPR
Supply Voltage:	DC5V +/-5%
Supply Current:	≤80mA
Output Voltage:	≥2.5V and ≤0.4V
Fall/Rise time:	≤5ns(typ)
Switch:	x1,x10,x100
Axis Switch:	OFF,X,Y,Z,4,5,6
Response Frequency:	0-10KHz

Image 6.1: Dimensions and key specifications of the handwheel.

- **Model Number:** PLCHANDWHEEL
- **Resolution:** 100PPR (Pulses Per Revolution)
- **Supply Voltage:** DC5V +/- 5%
- **Supply Current:** ≤80 mA
- **Output Voltage:** ≥2.5V (High) and ≤0.4V (Low)
- **Output Current:** <40 mA
- **Drop/Rise Time:** ≤5 ns (typical)
- **Switch Ratios:** x1, x10, x100 selectable
- **Axis Selection:** OFF, X, Y, Z, 4, 5
- **Response Frequency:** 0-10KHz
- **Material:** Plastic
- **Item Weight:** Approximately 1.57 pounds (0.71 kg)
- **Package Dimensions:** Approximately 9.76 x 5.16 x 3.43 inches (24.8 x 13.1 x 8.7 cm)
- **Manufacturer:** Changzhou Rattm Motor Co.,Ltd

7. Maintenance

To ensure the longevity and reliable performance of your MPG Pendant Handwheel, adhere to the following maintenance guidelines:

- **Cleaning:** Keep the handwheel clean and free from dust, metal shavings, and other debris. Use a soft, dry cloth for cleaning. Avoid abrasive cleaners or solvents.
- **Environmental Conditions:** Avoid exposing the device to excessive moisture, high humidity, or extreme temperatures. Operate within recommended environmental specifications.
- **Cable and Connector Inspection:** Regularly inspect the coiled cable and the 15-pin connector for any signs of wear, cuts, kinks, or damage. Replace if necessary to prevent intermittent connections or electrical issues.
- **Storage:** When not in use, store the handwheel in a clean, dry environment, away from direct sunlight and corrosive materials.

8. Troubleshooting

If you encounter issues with your MPG Pendant Handwheel, consider the following troubleshooting steps:

- **Handwheel Not Responding:**
  - **Check Connections:** Ensure the 15-pin connector is firmly seated in the CNC controller's port and any retaining screws are tightened.
  - **Power Verification:** Confirm that the CNC controller is powered on and receiving power.
  - **Enable Switch:** Ensure the 'Enable' switch on the handwheel is activated.
  - **Emergency Stop:** Check if the emergency stop button is pressed. If so, twist it clockwise to release and reset.
- **Incorrect Axis Movement or No Movement:**
  - **Axis Selection:** Verify that the correct axis (X, Y, Z, 4, or 5) is selected on the handwheel's axis selector switch.
  - **Pulse Ratio:** Experiment with different pulse ratio settings (x1, x10, x100) to see if the sensitivity is affecting movement.
  - **Wiring Discrepancies:** Refer to the Wiring Diagram (Section 5) and your CNC controller's manual. Some controllers may have variations in pin assignments. Incorrect wiring is a common cause of non-functionality or erratic behavior.
- **Erratic or Unstable Movement:**
  - **Interference:** Ensure the handwheel and its cable are not exposed to strong electromagnetic interference from other machinery.
  - **Cable Integrity:** Inspect the cable for any damage that might cause signal loss or interference.

9. Warranty and Support

For information regarding product warranty, technical support, or service, please refer to the documentation provided with your purchase or contact CNCTOPBAOS customer service directly. Ensure you have your product model number (PLCHANDWHEEL) and purchase details available when seeking support.