

## STEPPERONLINE 17HS19-2004S1

# STEPPERONLINE Nema 17 Stepper Motor (Model 17HS19-2004S1) User Manual

Bipolar 2A, 59Ncm (84oz.in), 48mm Body, 4-Lead with 1m Cable and Connector

## 1. INTRODUCTION

This manual provides essential information for the proper installation, operation, and maintenance of your STEPPERONLINE Nema 17 Stepper Motor, Model 17HS19-2004S1. This motor is designed for precision motion control applications, commonly found in 3D printers, CNC machines, and other automated systems. Please read this manual thoroughly before use to ensure safe and efficient operation.

## 2. SAFETY INFORMATION

- Always disconnect power before installing, wiring, or performing maintenance on the motor.
- Ensure proper grounding to prevent electrical shock.
- Do not exceed the rated voltage and current specifications to avoid damage to the motor or driver.
- Avoid touching the motor during operation as it may become hot.
- Keep the motor away from moisture, dust, and corrosive environments.
- Handle the motor shaft carefully to prevent bending or damage.

## 3. PRODUCT OVERVIEW

The STEPPERONLINE Nema 17 Stepper Motor (17HS19-2004S1) is a high-torque, bipolar stepper motor suitable for various applications requiring precise angular positioning. Key features include:

- **High Torque:** 59 Ncm (84 oz.in) holding torque for robust performance.
- **Standard Size:** NEMA 17 frame, 48mm body length (1.65"x1.65"x1.89").
- **Bipolar Configuration:** 4-wire connection for bipolar stepper drivers.
- **Integrated Cable:** Comes with a 1-meter (39.37") cable and a 0.1" pitch connector for easy integration.
- **Electrical Ratings:** Rated current 2.0A, resistance 1.4 ohms.

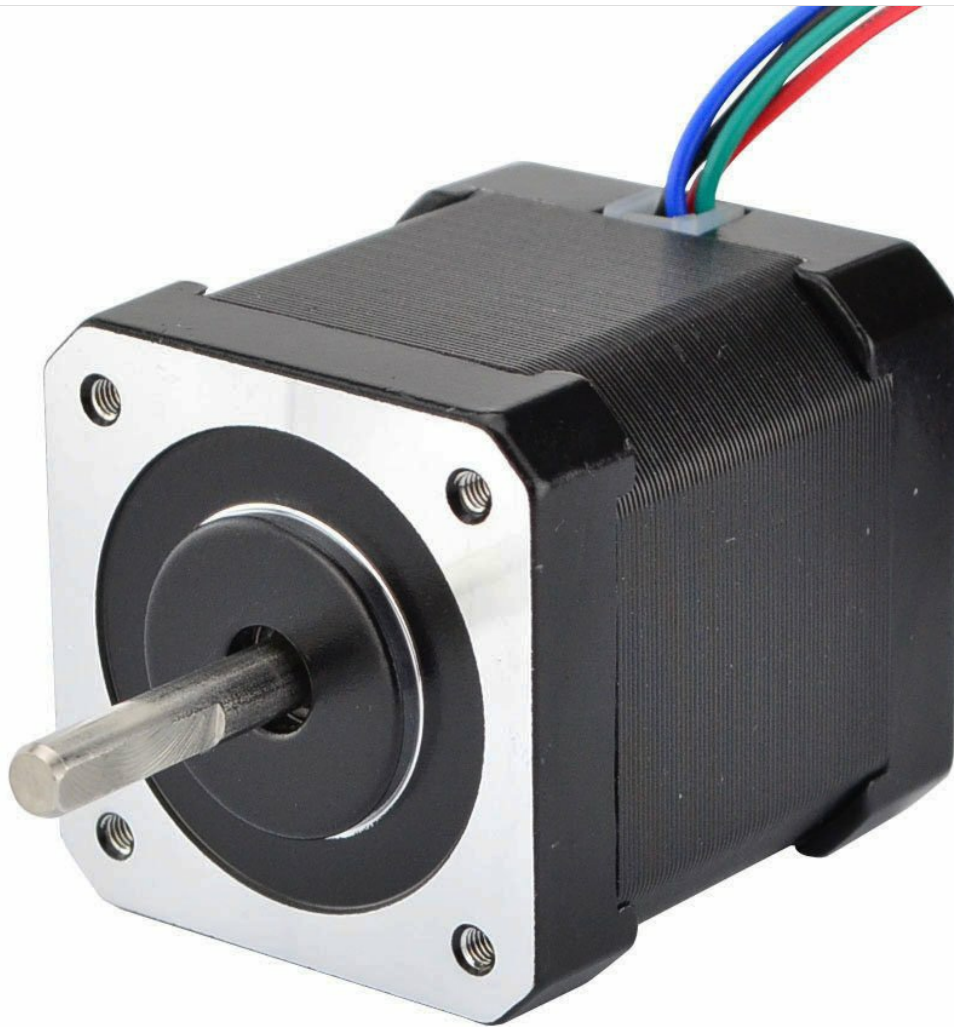


Figure 1: STEPPERONLINE Nema 17 Stepper Motor (Model 17HS19-2004S1) with its integrated cable and connector.

## 4. SPECIFICATIONS

| Feature             | Specification           |
|---------------------|-------------------------|
| Model Number        | 17HS19-2004S1           |
| Step Angle          | 1.8°                    |
| Holding Torque      | 59 Ncm (84 oz.in)       |
| Rated Current/Phase | 2.0 A                   |
| Phase Resistance    | 1.4 $\Omega$            |
| Inductance          | 3.0 mH $\pm$ 20% (1KHz) |
| Motor Length        | 48 mm                   |
| Shaft Diameter      | 5 mm (D-cut)            |
| Number of Leads     | 4                       |

| Feature        | Specification                                                          |
|----------------|------------------------------------------------------------------------|
| Cable Length   | 1 meter (39.37 inches)                                                 |
| Connector Type | 0.1" pitch, 4-pin Harwin Connector                                     |
| Rated Voltage  | 12 Volts (typical operating voltage, actual voltage depends on driver) |
| Weight         | 0.88 Pounds (approx. 0.4 kg)                                           |
| Material       | Stainless steel, copper wire, plastics, aluminum alloy                 |

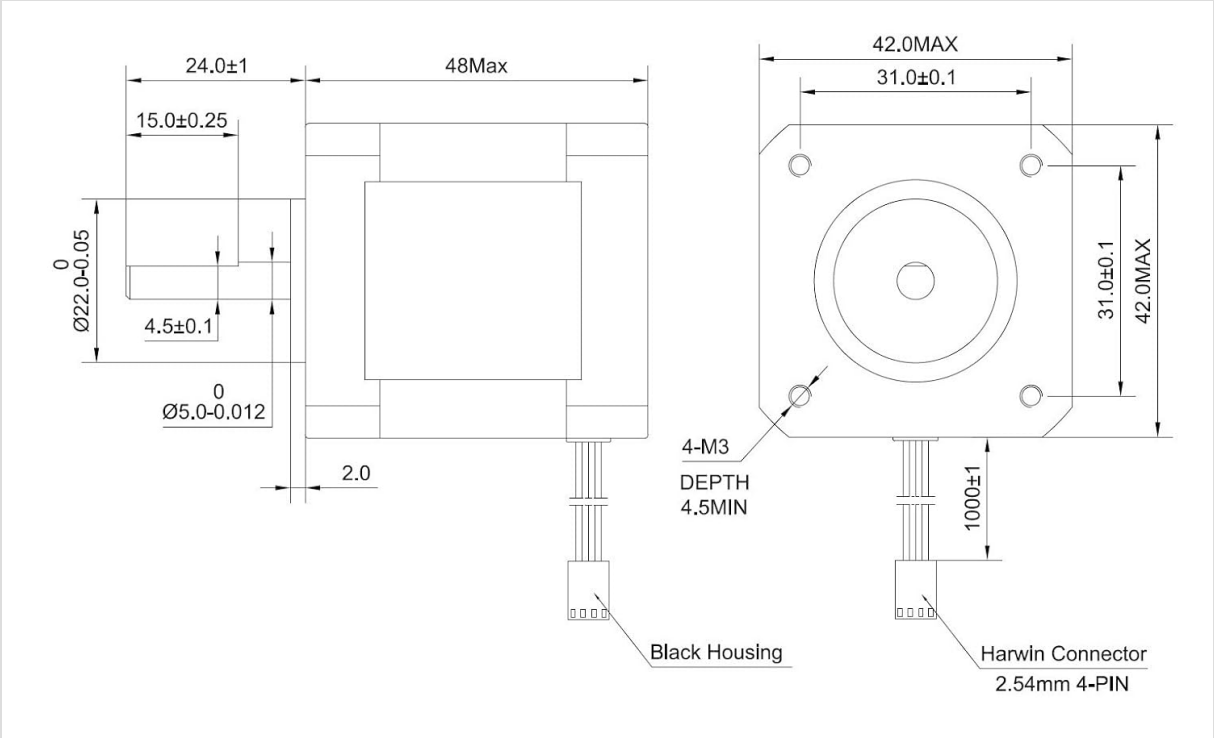


Figure 2: Dimensional drawing showing the motor's physical dimensions and mounting hole pattern.

## 5. SETUP

### 5.1 Mounting

The motor features a standard NEMA 17 mounting pattern. Secure the motor using four M3 screws (not included) into the mounting holes on the front face. Ensure the motor is firmly attached to a stable surface to prevent vibrations and ensure accurate movement.



Figure 3: Rear view of the motor, showing the product label and mounting screw locations.

## 5.2 Wiring

This is a 4-lead bipolar stepper motor. It requires a compatible stepper motor driver (e.g., A4988, DRV8825, TMC2209) to operate. The motor comes with a 1-meter cable terminated with a 4-pin connector. The wiring configuration is crucial for correct operation.



Figure 4: Close-up of the 4-pin connector, showing the wire colors: Black, Green, Red, Blue. Refer to the wiring diagram below to connect the motor to your stepper driver. The motor has two coils, typically referred to as Coil A and Coil B. Each coil has two leads.

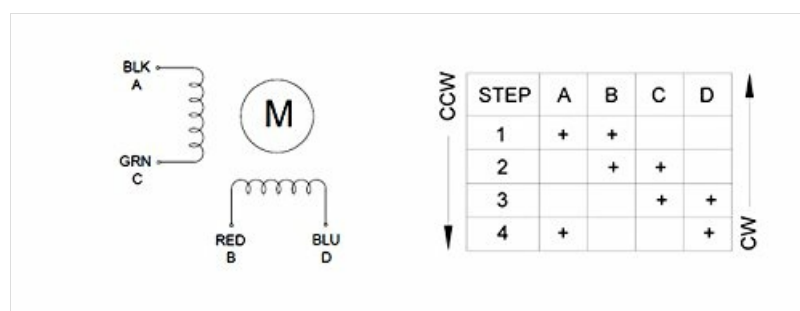


Figure 5: Wiring diagram and step sequence for the 17HS19-2004S1 motor. Black and Green wires form one coil (A), Red and Blue wires form the other coil (B).

- **Coil A:** Black (A) and Green (C)
- **Coil B:** Red (B) and Blue (D)

Connect these pairs to the corresponding A+, A-, B+, B- terminals on your stepper motor driver. If the motor rotates in the opposite direction to what is desired, reverse the connection of **one** of the coil pairs (e.g., swap Black and Green wires, or swap Red and Blue wires). Do not swap both pairs, as this will not change the direction.

**Note on Wire Identification:** In some cases, wire colors may vary or not be clearly labeled. To identify coil pairs, manually spin the motor shaft. Then, touch two wires together. If the shaft becomes noticeably harder to spin, those two wires belong to the same coil. Repeat for the remaining two wires to identify the second coil.

## 6. OPERATING INSTRUCTIONS

Stepper motors operate by receiving pulsed signals from a stepper motor driver, which in turn receives commands from a microcontroller (e.g., Arduino, Raspberry Pi) or a CNC controller. The driver translates these pulses into precise angular movements of the motor shaft.

### 6.1 Driver Configuration

Configure your stepper motor driver according to its specific manual and the motor's specifications:

- **Current Setting:** Set the driver's current limit to match or be slightly below the motor's rated current of 2.0A. A common practice is to set it around 75% of the rated current (e.g., 1.5A) to reduce heat and extend motor life, while still providing ample torque. Refer to your driver's datasheet for current setting procedures.
- **Microstepping:** Most modern stepper drivers support microstepping, which divides each full step into smaller increments, resulting in smoother motion and reduced resonance. Configure microstepping settings (e.g., 1/8, 1/16, 1/32 steps) based on your application's precision and speed requirements.
- **Voltage:** While the motor is rated for 12V, stepper drivers often use higher voltages (e.g., 24V, 36V) to achieve higher speeds and torque, especially with current-limiting drivers. Ensure your power supply voltage is compatible with your driver.

### 6.2 Initial Test

After wiring and configuring the driver, perform a low-speed test run to verify correct operation and direction. Adjust settings as needed.

## 7. MAINTENANCE

The STEPPERONLINE Nema 17 Stepper Motor is designed for durability and requires minimal maintenance. However, periodic checks can help ensure long-term performance:

- **Cleanliness:** Keep the motor free from dust, debris, and moisture. Use a soft, dry cloth to wipe the exterior.
- **Connections:** Periodically inspect all wiring connections for tightness and signs of wear or corrosion. Ensure the connector is securely seated.
- **Shaft:** Check the motor shaft for any signs of bending or damage. Ensure any attached pulleys or gears are properly aligned and secured.
- **Temperature:** Monitor the motor's operating temperature. While it's normal for stepper motors to get warm, excessive heat (too hot to touch for more than a second) may indicate an issue with current settings, load, or cooling.

## 8. TROUBLESHOOTING

| Problem | Possible Cause | Solution |
|---------|----------------|----------|
|---------|----------------|----------|

| Problem                                      | Possible Cause                                                            | Solution                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Motor does not move or vibrates erratically. | Incorrect wiring, insufficient current, driver fault, excessive load.     | <ul style="list-style-type: none"> <li>◦ Verify wiring against the diagram (Figure 5).</li> <li>◦ Check driver current settings; increase if too low, but do not exceed 2.0A.</li> <li>◦ Ensure the motor is not overloaded.</li> <li>◦ Test with a known-good driver if possible.</li> </ul>                           |
| Motor moves in the wrong direction.          | Incorrect coil polarity.                                                  | Reverse the connection of <b>one</b> coil pair (e.g., swap Black and Green wires, or Red and Blue wires).                                                                                                                                                                                                               |
| Motor is excessively hot.                    | Current setting too high, insufficient cooling, prolonged high load.      | <ul style="list-style-type: none"> <li>◦ Reduce the driver's current setting (e.g., to 1.5A).</li> <li>◦ Ensure adequate ventilation around the motor.</li> <li>◦ Check for mechanical binding or excessive load on the motor.</li> </ul>                                                                               |
| Skipped steps or loss of position.           | Insufficient current, excessive speed, mechanical binding, driver issues. | <ul style="list-style-type: none"> <li>◦ Increase driver current (up to 2.0A max).</li> <li>◦ Reduce acceleration or maximum speed settings in your controller software.</li> <li>◦ Inspect mechanical components for friction or obstructions.</li> <li>◦ Ensure the power supply is stable and sufficient.</li> </ul> |

## 9. WARRANTY AND SUPPORT

For warranty information and technical support, please refer to the official STEPPERONLINE website or contact your retailer. Keep your purchase receipt as proof of purchase.

For additional resources and community support, consider visiting online forums dedicated to 3D printing and CNC, where many users share experiences and solutions related to stepper motors.