STEPPERONLINE 23HS22-2804S

STEPPERONLINE Nema 23 CNC Stepper Motor

MODEL: 23HS22-2804S INSTRUCTION MANUAL

1. Introduction

This manual provides essential information for the proper installation, operation, and maintenance of your STEPPERONLINE Nema 23 CNC Stepper Motor, model 23HS22-2804S. Please read this manual thoroughly before using the product to ensure safe and efficient operation.

The Nema 23 stepper motor is designed for precision motion control applications, commonly found in CNC machines, 3D printers, and other automated systems. It features a 1.8-degree step angle, providing 200 steps per revolution, and a holding torque of 1.24Nm (175.6 oz.in).

2. Safety Information

⚠ **WARNING:**

- **Power Supply Connection:** Always ensure the motor is connected to a constant current or chopper drive controller. **Connecting the motor directly to a power supply will destroy the motor.**
- **Electrical Safety:** Exercise caution when working with electrical components. Ensure all power is disconnected before making or changing connections.
- **Heat:** Stepper motors can generate heat during operation. Ensure adequate ventilation or heat dissipation if operating at high currents or for extended periods.
- **Mechanical Safety:** Ensure the motor is securely mounted before operation to prevent injury or damage.

3. Product Specifications

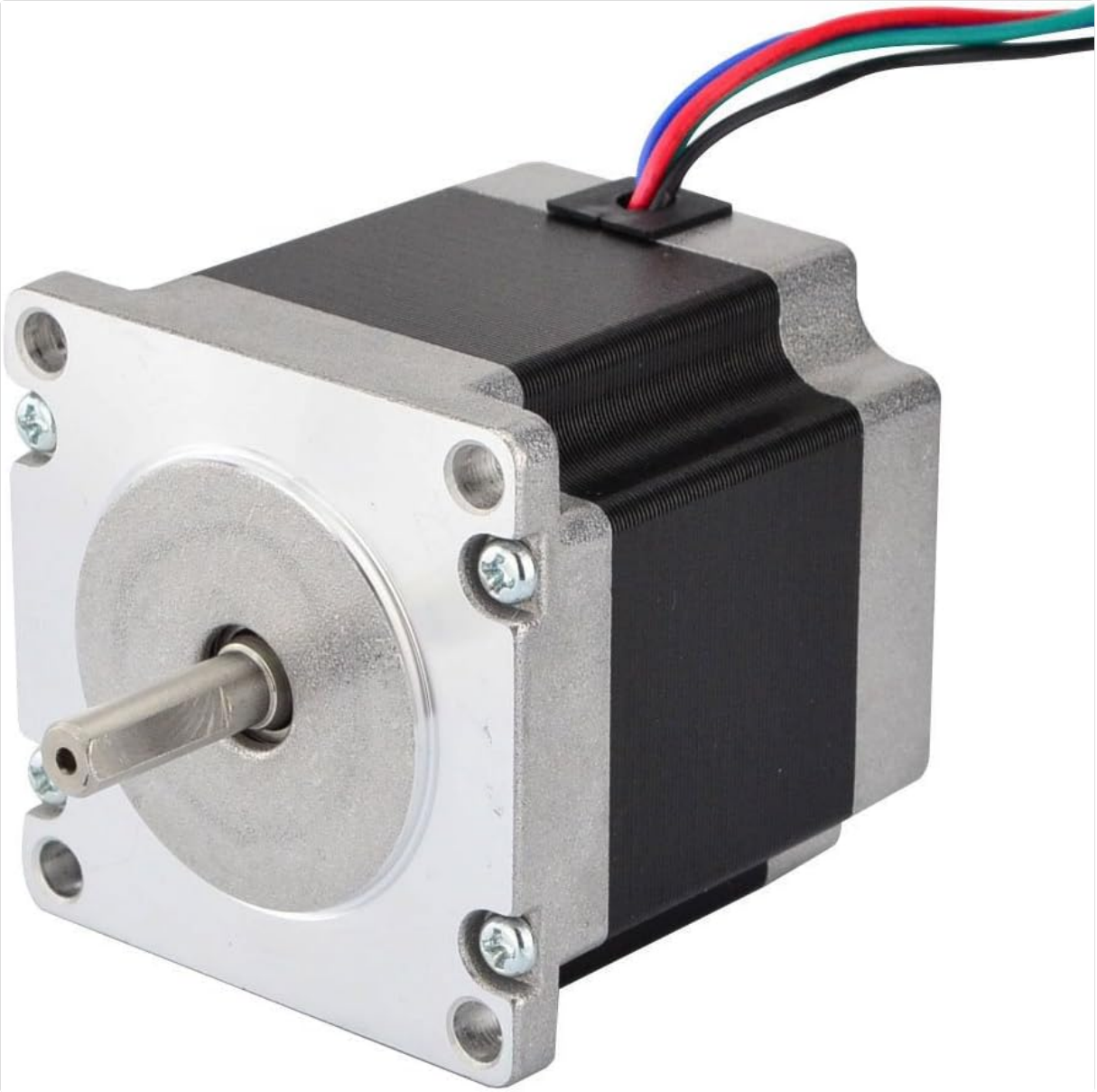


Figure 3.1: Front view of the STEPPERONLINE Nema 23 Stepper Motor.

3.1 Electrical Specifications

Parameter	Value
Manufacturer Part Number	23HS22-2804S
Motor Type	Bipolar Stepper
Step Angle	1.8 deg. (200 steps/revolution)
Holding Torque	1.24Nm (175.6 oz.in)
Rated Current/Phase	2.8A
Phase Resistance	0.9 ohms
Inductance	2.5mH +/- 20% (1KHz)

3.2 Physical Specifications

Parameter	Value
Frame Size	57 x 57mm (2.24" x 2.24")
Body Length	56mm (2.2")
Shaft Diameter	6.35mm (0.25")
Shaft Length	21mm
Number of Leads	4
Lead Length	500mm
Weight	700g (1.5 lbs)

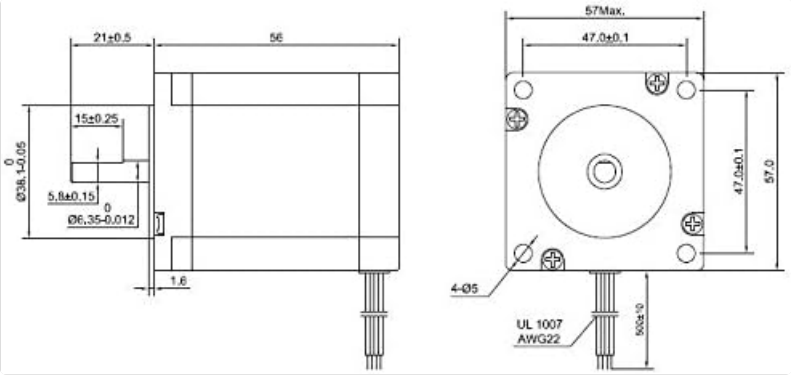


Figure 3.2: Dimensional drawing of the Nema 23 Stepper Motor (Model 23HS22-2804S) with key measurements in millimeters.

4. Setup and Wiring

Proper wiring is crucial for the correct operation of your stepper motor. Refer to the wiring diagram below for connection details.

4.1 Connection Diagram

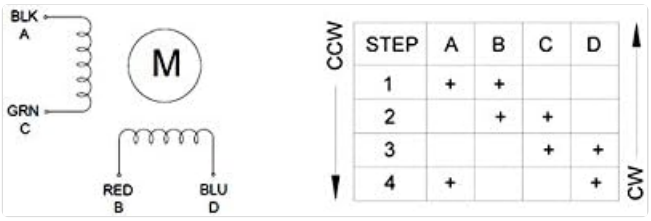


Figure 4.1: Wiring diagram and step sequence for the Nema 23 Stepper Motor. The left side shows the coil connections, and the right side illustrates the step sequence for clockwise (CW) and counter-clockwise (CCW) rotation.

The motor features 4 leads for bipolar connection. Connect these leads to your stepper motor driver according to the following color code:

- **Black:** A+
- **Green:** A-
- **Red:** B+
- **Blue:** B-

Ensure that the connections are secure and correctly matched to your stepper motor driver's terminals.

Incorrect wiring can lead to improper motor function or damage.

5. Operating Instructions

This stepper motor operates by converting digital pulses from a controller into precise mechanical rotational movements. Each pulse moves the motor by a fixed step angle (1.8 degrees in this case).

5.1 Driver Compatibility

This motor requires a constant current or chopper drive controller capable of supplying 2.8A per phase. Using a driver that cannot meet these current requirements may result in reduced torque or missed steps. Ensure your driver is appropriately sized for this motor's specifications.

5.2 Basic Operation

1. **Connect to Driver:** Wire the motor to a compatible stepper motor driver as detailed in Section 4.
2. **Power On:** Apply power to the stepper motor driver.
3. **Send Pulses:** Use your CNC controller or microcontroller to send step and direction pulses to the driver. The driver will translate these signals into the appropriate coil energization sequence to rotate the motor.
4. **Adjust Settings:** Depending on your application, you may need to adjust micro-stepping, current limits, and acceleration/deceleration settings on your driver for optimal performance.

6. Maintenance

Stepper motors are generally low-maintenance devices. However, adhering to a few guidelines can extend their lifespan and ensure reliable operation:

- **Keep Clean:** Periodically clean the motor's exterior to prevent dust and debris buildup, which can affect heat dissipation.
- **Environmental Conditions:** Operate the motor within its specified temperature and humidity ranges. Avoid exposure to excessive moisture or corrosive environments.
- **Check Connections:** Regularly inspect wiring connections for looseness or damage. Secure connections prevent intermittent operation and potential electrical issues.
- **Shaft Inspection:** Ensure the motor shaft is free from obstructions and rotates smoothly. Avoid applying excessive radial or axial loads that could damage the bearings.

7. Troubleshooting

Problem	Possible Cause	Solution
Motor does not move or vibrates	Incorrect wiring; insufficient current from driver; driver not enabled; mechanical binding.	Verify wiring against diagram (Section 4.1); check driver current settings; ensure driver is enabled; inspect mechanical load for obstructions.
Motor loses steps or stalls	Overload; acceleration/deceleration too high; insufficient current; excessive speed.	Reduce mechanical load; decrease acceleration/deceleration rates; increase driver current (within motor limits); reduce maximum speed.

Problem	Possible Cause	Solution
Motor overheats	Excessive current setting; poor ventilation; continuous high load.	Reduce driver current (if possible without losing torque); ensure adequate airflow around motor; consider adding a heatsink or fan; reduce duty cycle.
Noisy operation	Micro-stepping settings; mechanical resonance; loose mounting.	Adjust micro-stepping settings on driver; check for mechanical resonance in the system; ensure motor is securely mounted.

8. Warranty and Support

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

Manufacturer: OSM Technology Co.,Ltd.

Brand: STEPPERONLINE

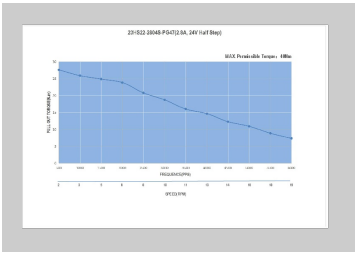
Website: www.omc-stepperonline.com

Related Documents - 23HS22-2804S

	STEPPERONLINE DM320T User Manual: 2-Phase Digital Stepper Drive Comprehensive user manual for the STEPPERONLINE DM320T 2-Phase Digital Stepper Drive, covering specifications, connections, DIP switch configurations, troubleshooting, and applications for NEMA11-17 stepper motors.
	STEPPERONLINE CL57Y Closed Loop Stepper Driver User Manual Comprehensive user manual for the STEPPERONLINE CL57Y Closed Loop Stepper Driver, detailing product introduction, specifications, installation, wiring diagrams, port definitions, status indicators, and troubleshooting.
	STEPPERONLINE ST-C01 Single Axis Stepping Motor Controller User Manual This user manual provides detailed information on the STEPPERONLINE ST-C01 Single Axis Stepping Motor Controller, including product introduction, parameters, functions, wiring, interface details, operating instructions, product size, and communication protocol.

	[DM542T Full Digital Stepper Drive User's Manual] User's manual for the DM542T Full Digital Stepper Drive by StepperOnline. This manual provides detailed information on features, specifications, wiring, setup, and troubleshooting for the DM542T.
	[DM860T Fully Digital Stepper Drive User Manual] Comprehensive user manual for the StepperOnline DM860T Fully Digital Stepper Drive. Covers features, electrical and mechanical specifications, wiring, power supply selection, microstep resolution, current settings, protection functions, and troubleshooting for optimal performance.
	[EV200 Series Variable Frequency Drive User Manual | StepperOnline] Comprehensive user manual for the StepperOnline EV200 Series Variable Frequency Drive, detailing specifications, wiring, parameter settings, monitoring, and fault diagnostics.

Documents - STEPPERONLINE – 23HS22-2804S



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23HS22 2804S PG47 Torque Curve Nema 23 Stepper Motor Bipolar L 56mm w Gear Ratio 47 1 Planetary Gearbox STEPPERONLINE omc stepperonline |||

MAX. Permissible Torque40Nm 2 3 5 6 8 10 11 13 14 16 18 19 SPEED RPM ...

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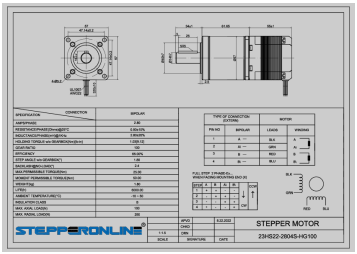

[pdf] Datasheet

23HS22 2804S HG100 Full Datasheet Nema 23 Stepper Motor L 56mm Gear Ratio 100 1 High Precision Planetary Gearbox STEPPERONLINE omc stepperonline |||

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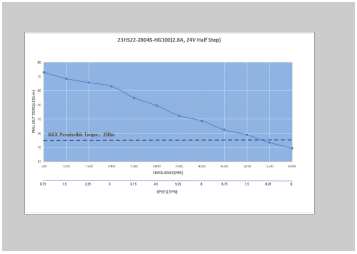

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23HS22 2804S HG100 Torque Curve Nema 23 Stepper Motor L 56mm Gear Ratio 100 1 High Precision Planetary Gearbox STEPPERONLINE omc stepperonline |||

MAX. Permissible Torque25Nm 0.75 1.5 2.25 3 3.75 4.5 5.25 SPEED RPM 6 6.75 7.5 8.25 9 ...

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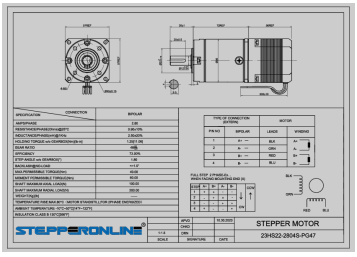

[pdf] Datasheet

23HS22 2804S PG47 Full Datasheet Nema 23 Stepper Motor Bipolar L 56mm w Gear Ratio 47 1 Planetary Gearbox STEPPERONLINE JL PC omc stepperonline |||

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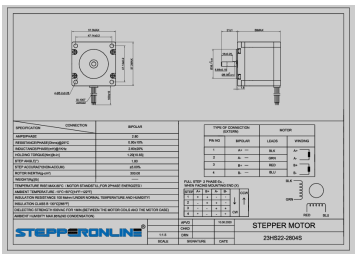

[pdf] Frequently Asked Questions Datasheet

23HS22 2804S Full Datasheet Nema 23 Bipolar 1 8deg 26Nm 178 4oz in 2 8A 5V 57x57x56mm 4 Wires STEPPERONLINE JL PC FAQ Question Curly Cable Upgrades Onefinity CNC Forum omc stepperonline quot |||

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