Applied Motion HT23-397-005

Instruction Manual for Applied Motion HT23-397-005 High Torque Step Motor

Model: HT23-397-005

1. Product Overview

The Applied Motion HT23-397-005 is a high-torque hybrid step motor designed for precise motion control applications. This NEMA 23 frame motor operates at 2.83 Amps and 5 Volts, featuring a 1.8-degree step angle and 0.9 Ohms resistance. It is suitable for various industrial and scientific applications, including 3D printers and automated machinery requiring accurate positioning.



Figure 1: Front view of the Applied Motion HT23-397-005 High Torque Step Motor, showcasing its overall appearance and compact design.

2. Safety Information

Always observe the following safety precautions to prevent injury or damage to the equipment:

- **Electrical Safety:** Ensure all power is disconnected before making or breaking electrical connections. Incorrect wiring can damage the motor or controller.
- **Mechanical Safety:** The motor shaft may rotate unexpectedly. Keep hands and loose clothing clear of moving parts. Securely mount the motor to prevent accidental movement.
- **Heat:** Motors can become hot during operation. Allow adequate ventilation and avoid touching the motor directly after prolonged use.
- **Environment:** Operate the motor in a clean, dry environment, free from excessive dust, moisture, or corrosive substances.

3. Setup and Installation

Proper installation is crucial for optimal motor performance and longevity.

3.1 Mounting the Motor

The HT23-397-005 features a NEMA 23 frame for standard mounting. Use appropriate screws and ensure the motor is securely fastened to a rigid surface to minimize vibration and ensure accurate motion.



Figure 2: Bottom view of the motor, illustrating the standard NEMA 23 mounting holes for secure attachment to a surface.



Figure 3: Side view of the motor, showing the motor body and the output shaft, which has a diameter of 1/4 inch.

3.2 Electrical Connections

Connect the motor to a compatible stepper motor driver. Refer to your driver's manual for specific wiring diagrams. The HT23-397-005 is a hybrid step motor, typically requiring four or six wires for connection. Ensure correct phase wiring to avoid damage or improper operation.

- Identify the motor's coil pairs using a multimeter if necessary.
- Connect the motor wires to the driver's output terminals according to the driver's specifications.
- Verify all connections are secure before applying power.



Figure 4: Top view of the motor, showing the integrated wiring harness for electrical connections to a motor driver.

4. Operating Instructions

The HT23-397-005 is controlled by a stepper motor driver, which receives pulse and direction signals from a motion controller (e.g., microcontroller, PLC).

4.1 Basic Operation

1. **Power On:** Apply power to the stepper motor driver. The motor will typically energize and hold its position.
2. **Send Pulses:** Each pulse signal sent to the driver will cause the motor to rotate by its step angle (1.8 degrees for this model).
3. **Direction Control:** A separate direction signal determines the rotation direction (clockwise or counter-clockwise).
4. **Microstepping:** For smoother operation and higher resolution, configure your driver for microstepping. This divides each full step into smaller microsteps.



Figure 5: Front view of the motor, highlighting the precision-machined output shaft, ready for coupling to mechanical components.

4.2 Performance Considerations

- **Current Setting:** Set the driver's current output to match the motor's rated current (2.83 Amps) to prevent overheating or reduced performance.
- **Voltage:** Ensure the power supply voltage is within the recommended range for your driver and motor (5 Volts for this motor).
- **Resonance:** Stepper motors can exhibit resonance at certain speeds. Adjusting microstepping or adding damping can mitigate this.

5. Specifications

Key technical specifications for the HT23-397-005 High Torque Step Motor:

Parameter	Value
Part Number	HT23-397-005
Manufacturer	Applied Motion Products
Step Angle	1.8 Degrees
Rated Current	2.83 Amps
Rated Voltage	5 Volts
Resistance	0.9 Ohms
Shaft Diameter	1/4 inch
Frame Size	NEMA 23
Material	Copper (windings)
Package Dimensions	6 x 6 x 4 inches



Figure 6: Close-up view of the motor's label, displaying key specifications such as part number, step angle, current, voltage, and resistance for verification.

6. Maintenance

Stepper motors are generally low-maintenance devices. However, periodic checks can extend their lifespan and ensure reliable operation.

- **Cleaning:** Keep the motor free from dust, debris, and moisture. Use a soft, dry cloth for cleaning. Avoid using solvents that could damage the motor's finish or internal components.
- **Connections:** Periodically inspect electrical connections for looseness or corrosion. Tighten any loose terminals.
- **Mounting:** Verify that the motor remains securely mounted and that mounting screws are tight.
- **Shaft and Bearings:** Check the motor shaft for any signs of wear or damage. The bearings are typically sealed and do not require lubrication.
- **Temperature:** Monitor the motor's operating temperature. Excessive heat can indicate an issue with the driver current setting, load, or ventilation.

7. Troubleshooting

If you encounter issues with your HT23-397-005 motor, consider the following common problems and solutions:

Problem	Possible Cause	Solution
Motor does not move or vibrates	Incorrect wiring; insufficient current; driver fault; motor overloaded.	Check wiring against driver manual; increase driver current (within motor limits); check driver status; reduce mechanical load.
Motor loses steps or stalls	Too high speed; insufficient current; excessive load; resonance.	Reduce acceleration/speed; increase driver current; reduce load; adjust microstepping or add damping.

Problem	Possible Cause	Solution
Motor overheats	Current set too high; inadequate ventilation; continuous high load.	Reduce driver current; ensure proper airflow around motor; consider a larger motor or duty cycle.
Erratic or noisy operation	Electrical interference; loose connections; driver issues.	Shield motor cables; check all connections; consult driver manual or replace driver.

8. Warranty and Support

For warranty information, technical support, or service inquiries regarding your Applied Motion HT23-397-005 High Torque Step Motor, please contact Applied Motion Products directly. Refer to their official website or the product packaging for the most current contact details and warranty terms.

Applied Motion Products Contact Information:

Website: www.appliedmotion.com

Phone: (800) 525-1609 (as per product label)

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