



NEMA 23 Power-Off Brake Installation Guide

Multi-Axis Positioning System for Water Blaster Testing

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1 - Overview

Since the final design of the Multi-Axis Positioning System will not include the NEMA 23 Power-Off Brakes by the end of the Spring 2025 semester, this guide explains how to install and wire the brakes to the current hardware setup. Included along with this document is a PDF manual for the brakes, which contains installation and application details, dimensional drawings, and brake specifications.

For additional technical reference, visit the Teknic website:

<https://teknic.com/products/spring-applied-power-off-brakes/NEMA-23-brake/>

2 - Mounting and Function

The NEMA 23 brakes are physically mounted, and keyed, between the motors and the gearboxes. Their main purpose is to limit motion along an axis when power is removed from the system.

Brake operates on 24V DC logic:

Logic HIGH (24V): Brake is released, allowing motion.

Logic LOW (0V): Brake is engaged, stopping motion.

To protect the circuit from inductive kickback or high-voltage spikes, a flyback diode is connected in parallel with each brake. This is included in PCB design.

3 – Wiring Instructions

The motor brakes each have two wires: one for power and one for ground.

These wires are routed from the brake assemblies into the user interface box, and then connected to the main PCB at header locations **J3** and/or **J6**.

From the PCB, the brake power lines (**B1** and/or **B2**) are routed through the emergency stop terminal block.

The circuit passes through the E-Stop, and then returns back to the corresponding **B1** and/or **B2** connections.

This wiring ensures that when the emergency stop button is pressed, electrical power to the brakes is immediately cut, causing the brakes to engage mechanically and stopping any further motion.

4 – Flyback Diode Placement

Flyback diodes are installed in parallel with the brake terminals. Place the diodes into the D1 and/or D8 pin locations on the PCB.

5 – Additional Notes

Ensure all connections match the system schematic before powering on. Use caution when handling inductive loads and verify proper diode orientation. The brake installation should be reviewed and tested during the commissioning phase to ensure proper system safety and response.

