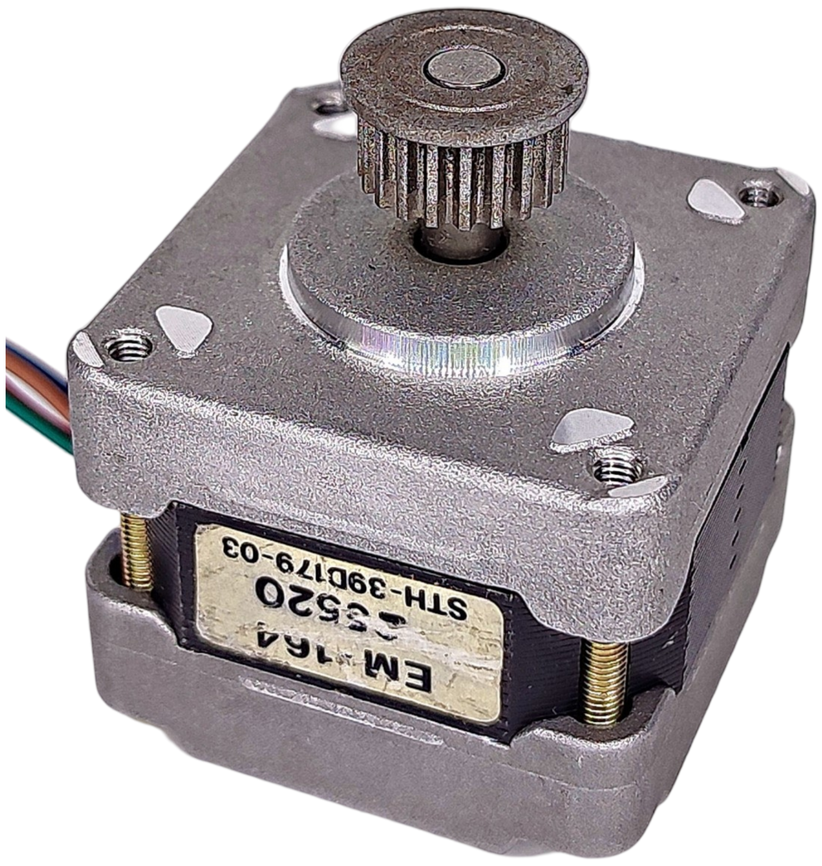
# EM-164 / STH-39D179

## Microstepping Chart




Frame Size: NEMA 16
Rated Current: DC 0.74A/Phase
Holding Torque: (unknown)
Step Angle (degrees): 1.8°
Phase Resistance: ~2.9Ω/Phase *

**Test Conditions:**

- A4988 driver used for all tests
- Tested at 25%, 50%, 75%, and 100% of the rated current
- Tested with a driver supply voltage of 12V and 24V

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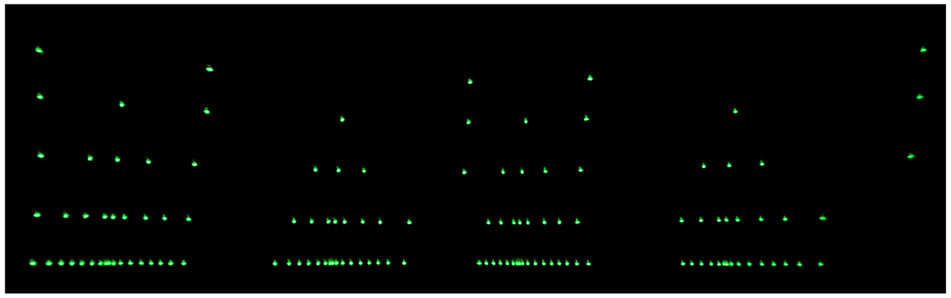
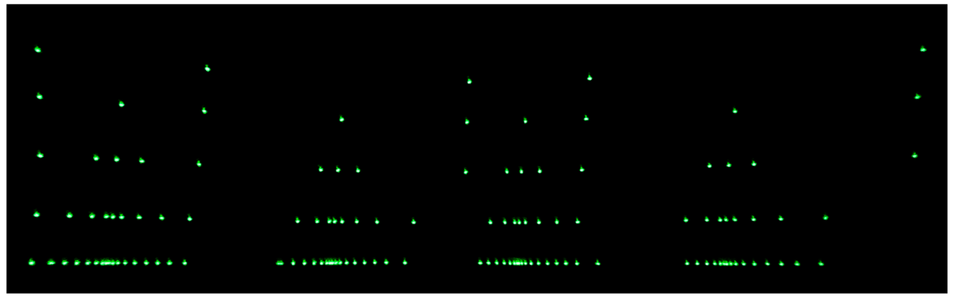
**driven at 12V**

**driven at 24V**

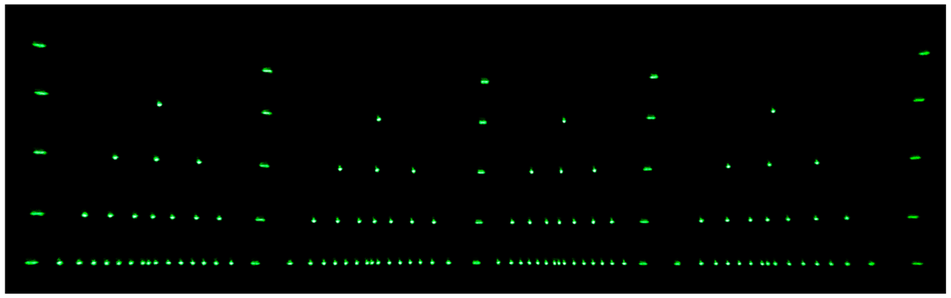
**0.185A**



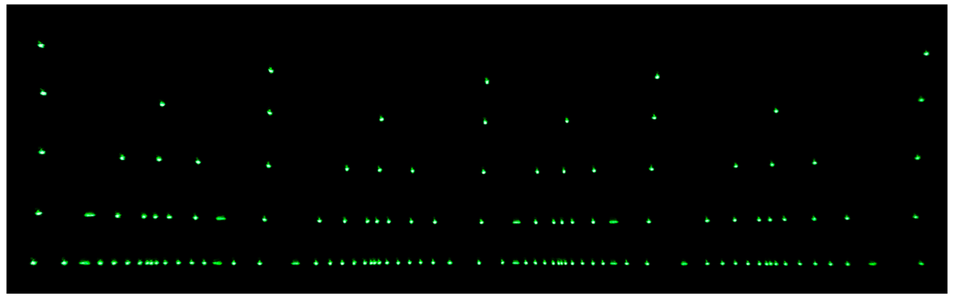
**0.185A**



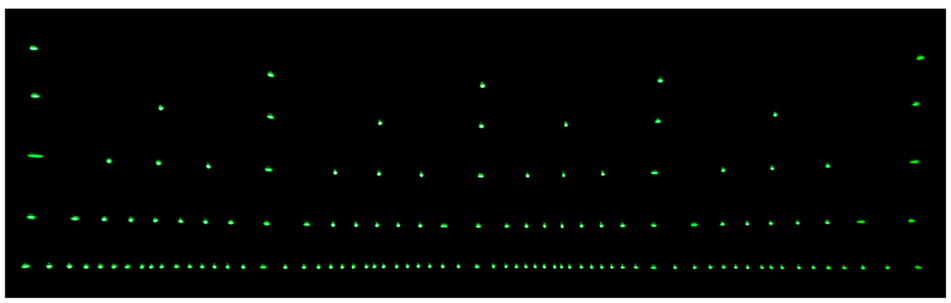
**0.370A**



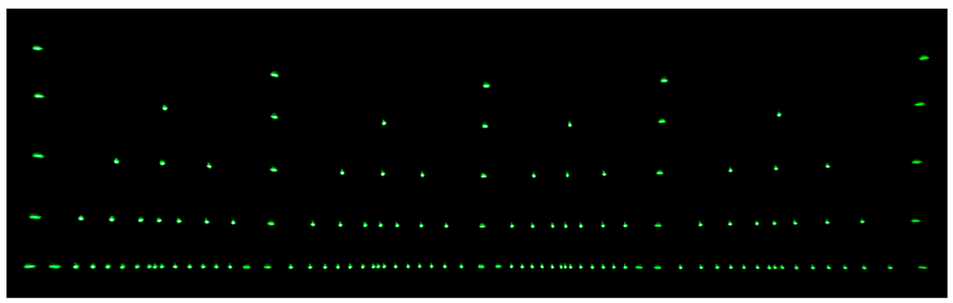
**0.370A**



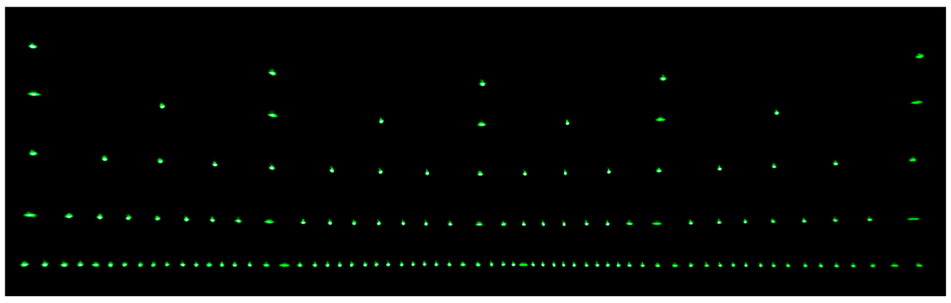
**0.555A**



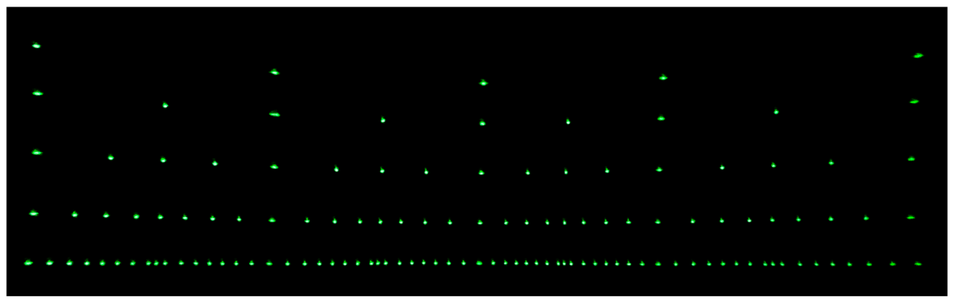
**0.555A**



**0.740A**



**0.740A**



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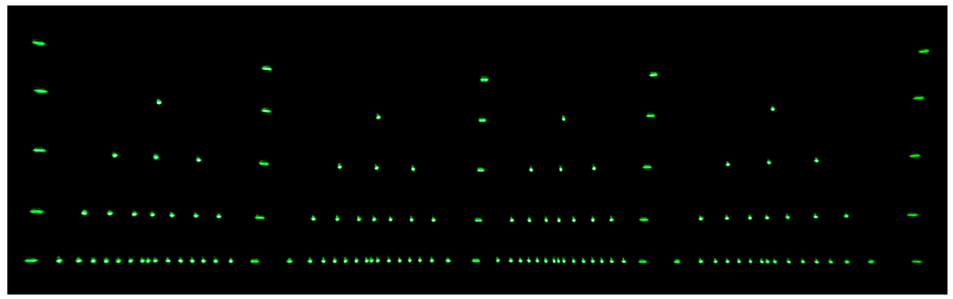
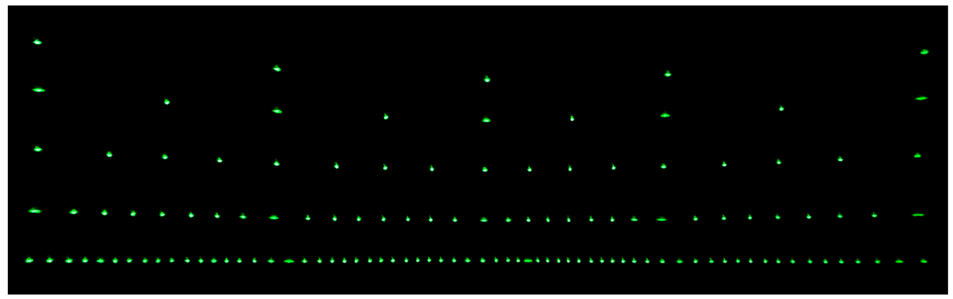
**phase current 0.370A**

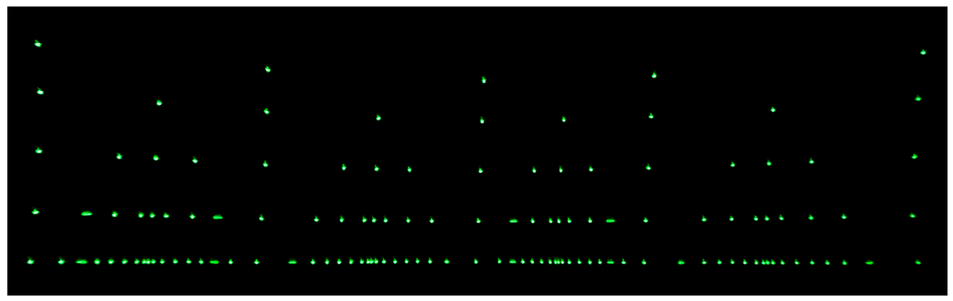
**phase current 0.740A**

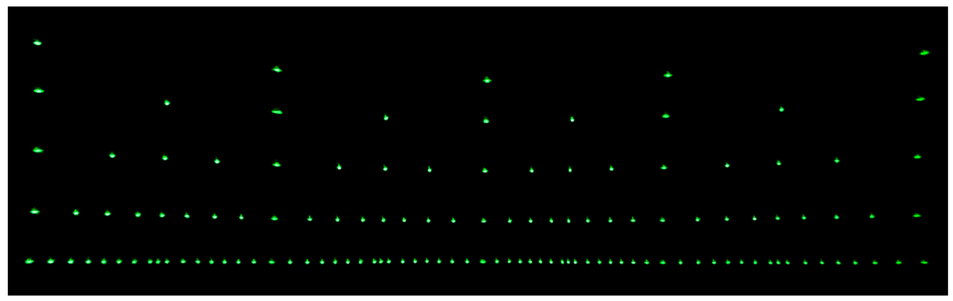
**drive voltage 12V**





**drive voltage 24V**





## Notes:

- Every pattern was created at the indicated voltage and current levels by a laser galvo projector with the X-mirror actuated by the test subject. In automated fashion, a line of dots was drawn with the driver set to full steps, then the same row in half steps lined up underneath, then quarter steps, etc., all the way down to sixteenth steps.
- Due to the limited exposure duration of my camera, some combinations of drive current and voltage resulted in motion blur from the mirror 'bouncing' more than usual before settling at its intended target position. Other than in extreme cases, this should not significantly impact data accuracy.
- * This stepper motor was originally unipolar with a phase resistance of about 5.9 ohms, but I reconfigured the windings for a bipolar arrangement. I decided to wire both halves of the coils (left and right of the center tap, figuratively speaking) in parallel to reduce inductance for faster maximum speeds.