

Test plan name:	Motor Precision Test (No load)
Test plan number:	E02
Revision number:	2
Date of last revision:	21 Feb 2017

### Introduction:

This plan is a test plan in for the electrical subsystem. The purpose of this test is to determine the precision of the motors. This test instructs the motor to move to a fixed distance in one direction, and then it instructs it to move back to the original position. There should be no difference between the starting position and the ending position.

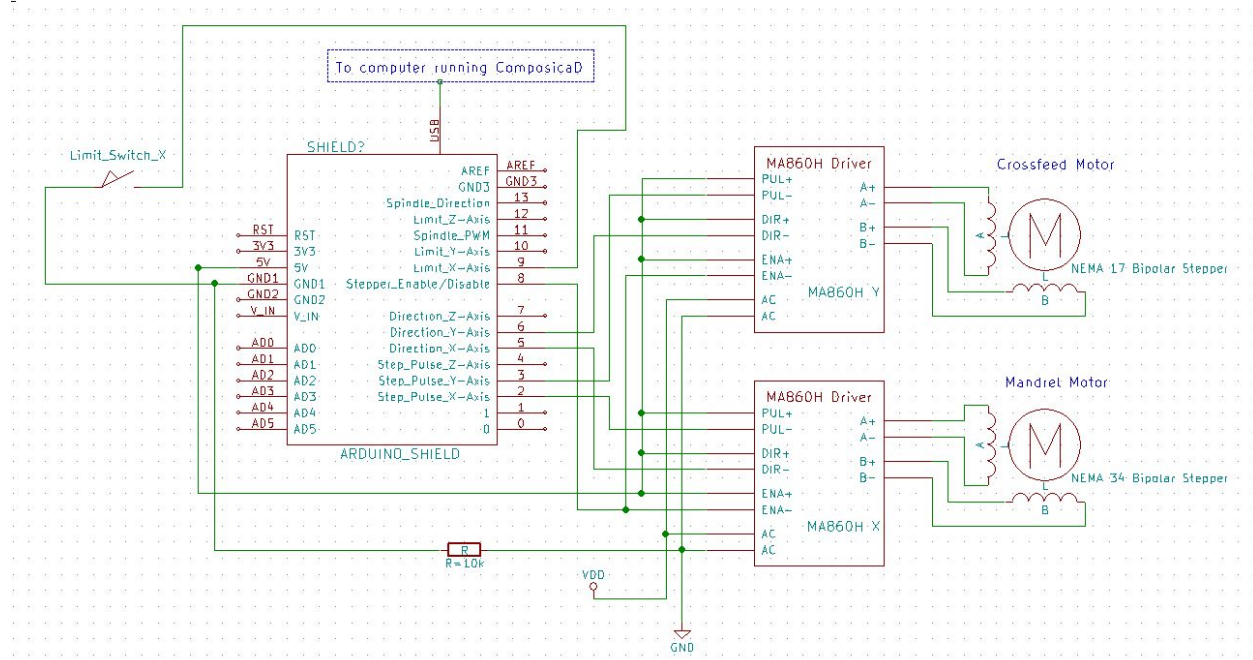
No testing equipment is required outside of basic lab equipment. There is no impact of this test on the project budget. This test is a basic test for the electrical subsystem.

### Features to be Tested

- Motor precision (not directly tied to an engineering requirement, but supports the motor precision requirement)

### Approach

The electrical subsystems will be wired up as per the wiring diagram below.



Issue a command to move the motors some distance at full speed, preferably around 30 rotations. Issue another command to move the motors back to the original position, again at full

speed. Note any difference between the starting position and the ending position. This test should be conducted for both motors. This test should be repeated five times.

The same process should be repeated again, but this time the motors should move at half speed.

**Data:**

<b>Nema 34, Full Speed</b>	<b>Difference in Starting and Ending Position</b>
Trial 1	0
Trial 2	0
Trial 3	0
Trial 4	0
Trial 5	0

<b>Nema 34, Half Speed</b>	<b>Difference in Starting and Ending Position</b>
Trial 1	0
Trial 2	0
Trial 3	0
Trial 4	0
Trial 5	0

<b>Nema 14, Full Speed</b>	<b>Difference in Starting and Ending Position</b>
Trial 1	0
Trial 2	0
Trial 3	0
Trial 4	0
Trial 5	0

<b>Nema 14, Half Speed</b>	<b>Difference in Starting and Ending Position</b>
Trial 1	0
Trial 2	0
Trial 3	0
Trial 4	0
Trial 5	0

**Pass/Fail Criteria:**

<b>Requirement</b>	<b>Pass/Fail</b>
Nema 34 at full speed never has a difference between starting and ending position.	Pass
Nema 34 at half speed never has a difference between starting and ending position.	Pass
Nema 14 at full speed never has a difference between starting and ending position.	Pass
Nema 14 at half speed never has a difference between starting and ending position.	Pass

**Conclusions:**

This test was completed as expected. There was never a difference between the starting and ending positions at various speeds. The microstep level was set such that the motors would move at the maximum speed that they could move at without stalling. This test should be rerun on the assembled subsystem. (It will be to satisfy engineering requirements in the full-system test.)

**Additional Considerations:**

- Microstep level may be a consideration. The level of microstepping used on the test should be noted.
- This test is completed without a load on the spindle. Results may vary with load. Another test should be conducted to address this concern.