Using a NSA12 with non-Newport controllers

Technical Note NSA12

Note: In order to connect the NSA12 to controllers other than NSC200 contact Newport Corporation Application Engineers at 800-222-6440

The NSA12 is a miniature motorized actuator that is designed to work with Newport's NSC200 Hand-held Controller. The warranty on the NSA12 will be voided if used with and damaged by a controller other than a Newport controller. Newport **discourages** the use of other third party controllers with this actuator for the following reasons:

- Only 1 limit signal (negative) is present.
- The current and duty cycle must be strictly controlled.

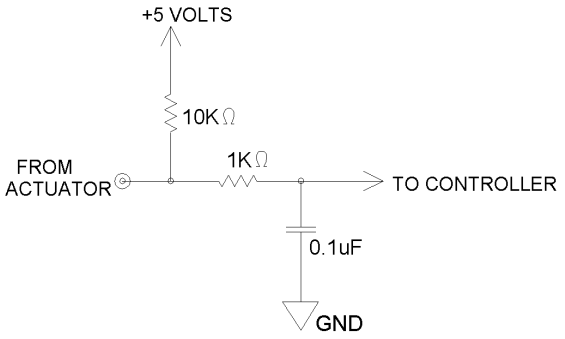
If the NSA12 is used with any controller other than the Newport NSC200 Hand-held Controller, the following must be understood and implemented:

- The actuator **must be homed** to the negative limit upon initialization (**Power On**). Because the NSA12 is an open loop actuator, this homing process is required for a controller to validate current actuator position. The NSC200 controller homing routine includes motion to the negative limit and 10um in the positive direction.

- Positive software limits must be established because there is no positive limit. If the actuator is initializated, (power on) without being homed, and the motor is energized so that the shaft extends (out / away) from the casing, it could continue moving until the lead screw jams and could damage the motor!
  If the actuator gets jammed, it is impossible to manually turn the lead screw "back" and un-jam it! Attempting to do so will break internal components.

- The Negative limit is activated with the plunger retracted (pulled) into the casing. See the suggested pull-up resistor circuit for the negative limit below.

Suggested Pull-up circuit for the negative limit:



- **Never** use more than the NSA12 specifications rated values (especially current) presented in the table below.

NSA-12 Specifications:

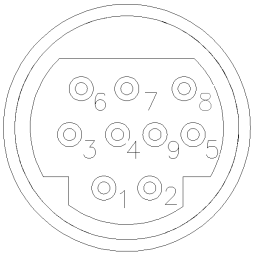
Winding	Bipolar	
Travel/step (full step)	0.00025 in	(0.00635 mm)
Suggested mini-step size	64	
Travel/step (mini-step 64)	0.0000039 in	(0.00009906 mm)
Operating voltage	15 V	
Current/phase	340 mA	
Resistance/phase	14.7 Ohm	
Inductance/phase	8.5 mH	
Power consumption	3.4 W	
Rotor inertia	1.2 gcm2	

- Because of the screw pitch (not back-drivable), Newport recommends to **Always** remove power to the motor when a move is done. Because of the fine screw pitch there is no need to energize the motor with a "holding current". Leaving the motor ON continuously will heat up the actuator excessively and degrade it's performance. A "torque reduction" scheme could be used to reduce the heat, but it is strongly recommended to cut motor power off completely when not moving.

- If any of the above instructions are not followed, the actuators will be **damaged** or **destroyed** and the warranty will be voided.

When connecting the NSA12 to a (third party) controller, either make up a "pigtail" that accepts the round, male, 9-pin mini – DIN plug (Kycon, p/n: KMDM-GEO-9P, Connect-Tech P/N MD9P or standard 8-Pin mini-DIN or equivalent) and ends in a connector that is compatible with the controller, or, cut off the round 9-pin male plug and connect it to a connector that is compatible with the controller. See the Male 9 pin connector pin-out's table below.

Front View of NSA12's 9 Pin Connector:



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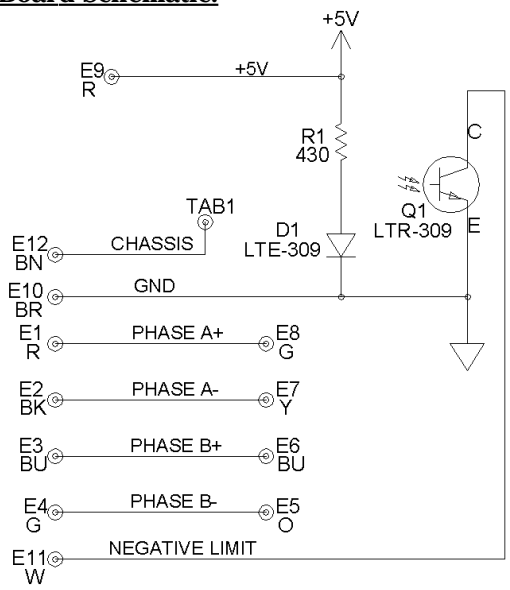
Male 9 pin connector pin-out's:

Pin Number	Signal	Wire Color	Wire Size
Pin 1	Negative Limit	White	28 AWG
Pin 2	Phase A+	Green	28 AWG
Pin 3	+5 Volts	Red	28 AWG
Pin 4	Phase B-	Orange	28 AWG
Pin 5	Phase B+	Blue	28 AWG
Pin 6	Phase A-	Yellow	28 AWG
Pin 7	GND (0 Volt)	Black	28 AWG
Pin 8	Connected to Pin 7	N/A	N/A
Pin 9	Not Used	N/A	N/A

Remember that +5 Volts and ground are needed to activate the negative limit signal.

Motor Board Schematic:



For more information or questions please contact Newport Corporation Application Engineers at 800-222-6440.

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