

NPM

Nippon Pulse America, Inc.

Manual (Preliminary)
PRO 17/23 A/B

Integrated NEMA 17/23 Stepper Motor
+
Microstep Driver

COPYRIGHT © 2007 Nippon Pulse America, Inc.,
ALL RIGHTS RESERVED

First edition, Oct 2007

Nippon Pulse America copyrights this document. You may not reproduce or translate into any language in any form and means any part of this publication without the written permission from Nippon Pulse America.

Nippon Pulse America makes no representations or warranties regarding the content of this document. We reserve the right to revise this document any time without notice and obligation.

Table of Contents

1. Introduction.....	3
2. Part Numbering	3
3. Dimensions.....	4
<i>PRO42.....</i>	<i>4</i>
<i>PRO57.....</i>	<i>5</i>
4. Connection.....	6
<i>DB9 Connector Information</i>	<i>7</i>
<i>Encoder Connector Pin Information</i>	<i>7</i>
<i>Interface Board Pin Information</i>	<i>8</i>
5. Electrical Information	9
<i>Pulse/Dir/Disable Opto-isolated Inputs</i>	<i>9</i>
<i>Pulse Input</i>	<i>9</i>
<i>Direction Signal.....</i>	<i>9</i>
<i>Disable Signal.....</i>	<i>9</i>
<i>Power Input.....</i>	<i>9</i>
<i>+5VDC Output.....</i>	<i>10</i>
6. Configuration	11
7. Speed/Torque Curve.....	15
<i>PRO42A/B.....</i>	<i>15</i>
<i>PRO57A/B.....</i>	<i>16</i>

1. Introduction

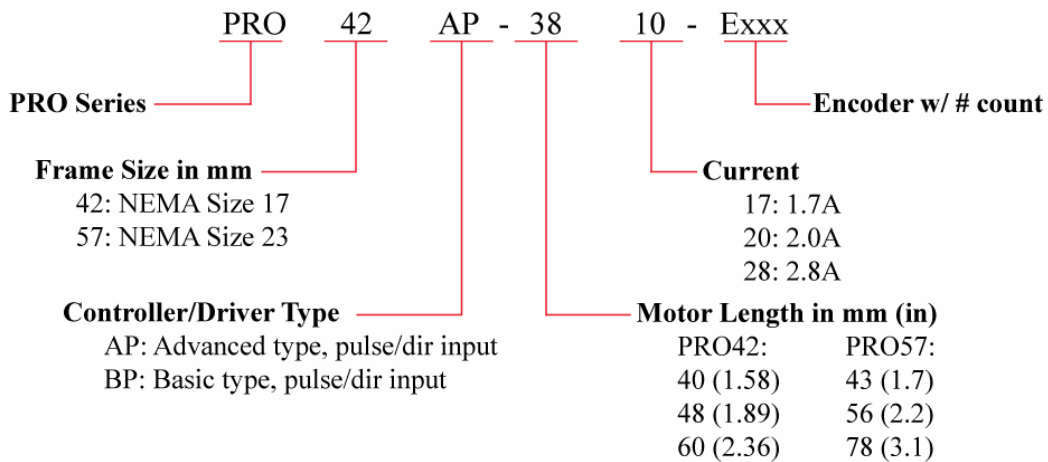
PRO series PRO42/57 is an integrated single-package NEMA17/NEMA23 Stepper Motor plus microstep driver that utilizes NPA’s dynamic Microstep Technology. Configuration of the driver is done through NPA’s Dynamic Configurator using USB 2.0.

Features / Highlights:

- Bipolar Micro Stepper Driver + NEMA 17 or NEMA 23 Motor
- Configurable Microstep Setting of any value from 2 to 500 for Advance Version, and from full to 8 for Basic Version
- 12 to 48VDC Voltage Input
- Configurable current from 100mA to 3.0A
- Pulse/Dir/Disable Opto-isolated inputs
- Motor available in different sizes and windings
- Software Configurable Settings using USB based Dynamic Configurator.

2. Part Numbering

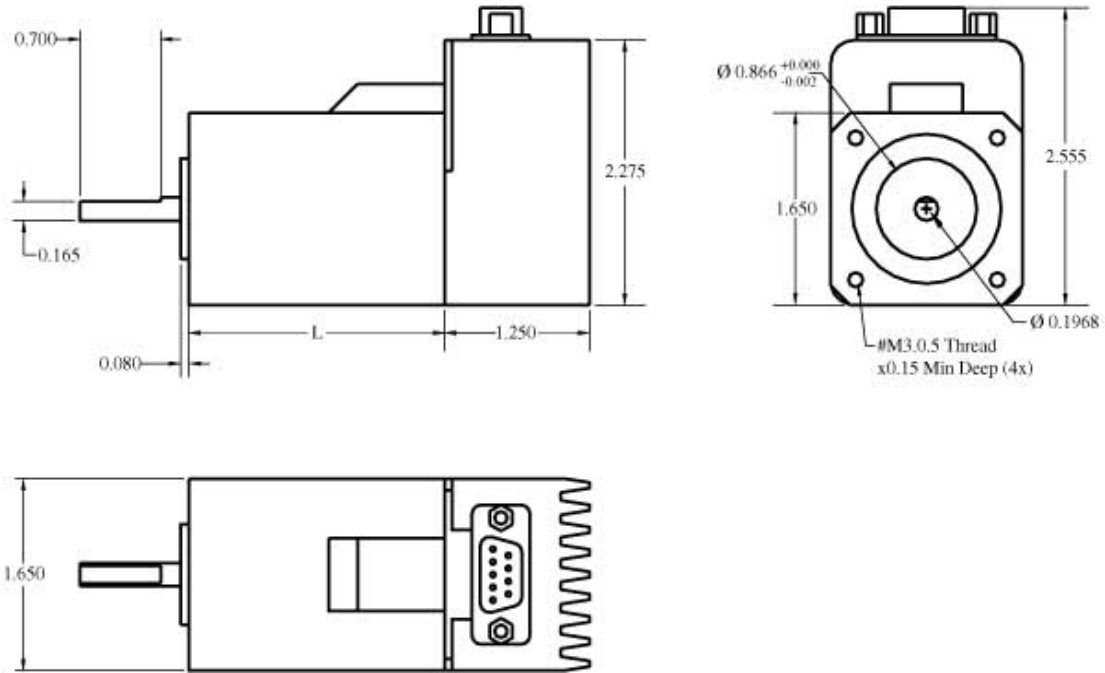
NEMA 17/23 Motor+Driver



Encoder Resolution – PRO42/57 is available with optional encoder with quadrature channels (A and B) plus index channel (Z). The encoder is available in the following resolutions: 100, 200, 250, 400, 500, 800, 1000, and 2048. Other resolutions are available upon special request. Encoder outputs are single-ended and require +5V supply.

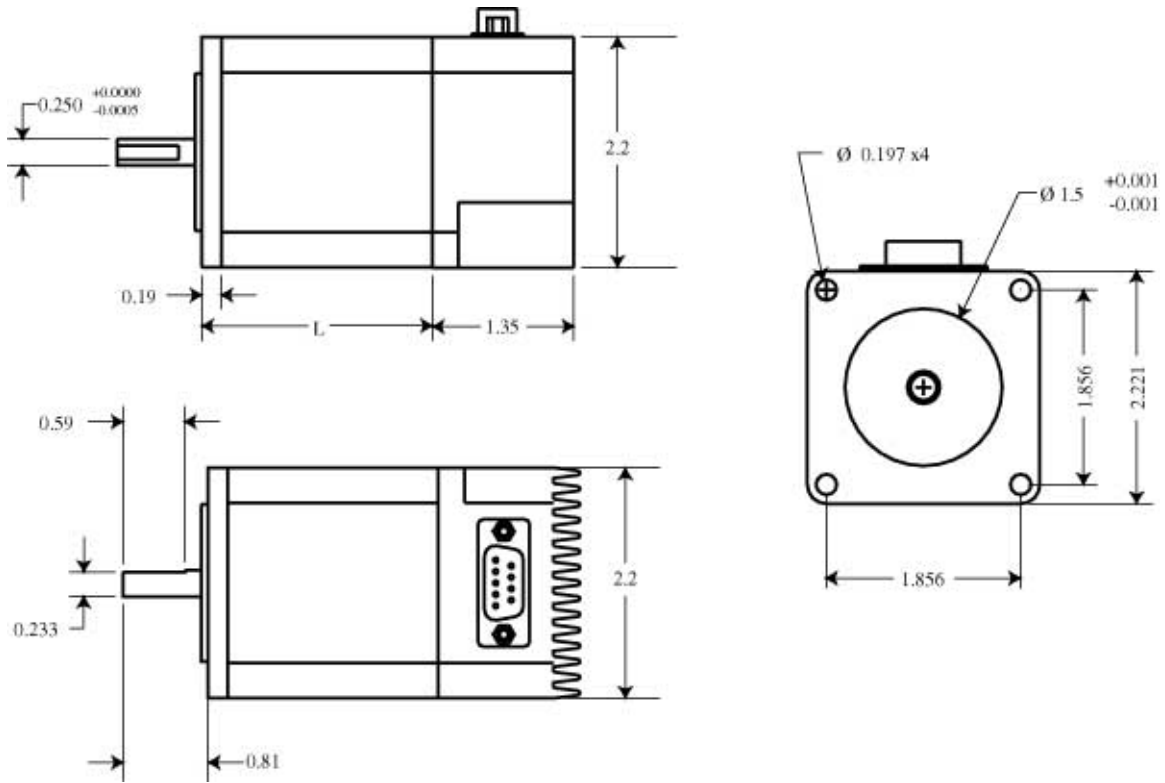
3. Dimensions

PRO42



PRO42 / NEMA Size 17	L = in (mm)
PRO42xP40 (single stack)	1.58 (40)
PRO42xP48 (double stack)	1.89 (48)
PRO42xP60 (triple stack)	2.36 (60)

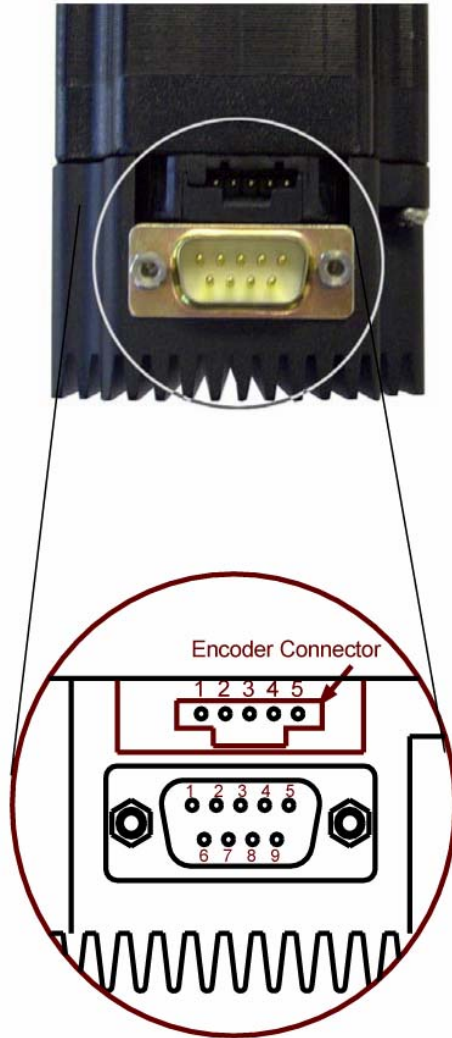
PRO57



PRO57 / NEMA Size 23	L = in (mm)
PRO57xP43 (single stack)	1.69 (43)
PRO57xP56 (double stack)	2.2 (56)
PRO57xP78 (triple stack)	3.1 (78)

4. Connection

PRO42/57 uses standard D-SUB 9 connector interface as shown on the picture below.
PRO42/57 is also available with optional encoder.



DB9 Connector Information

Pin #	Name	Description
1	Power	Power supply input (+12 VDC to +48 VDC)
2	Pulse	Pulse (or Step) opto-isolated input
3	Disable	Disable opto-isolated input
4	NC	No connection
5	+5V	+5V supply output used for ControlMax
6	Ground	Ground
7	Direction	Direction opto-isolated input
8	NC	No connection
9	Opto-supply	Opto-supply (+5 VDC)

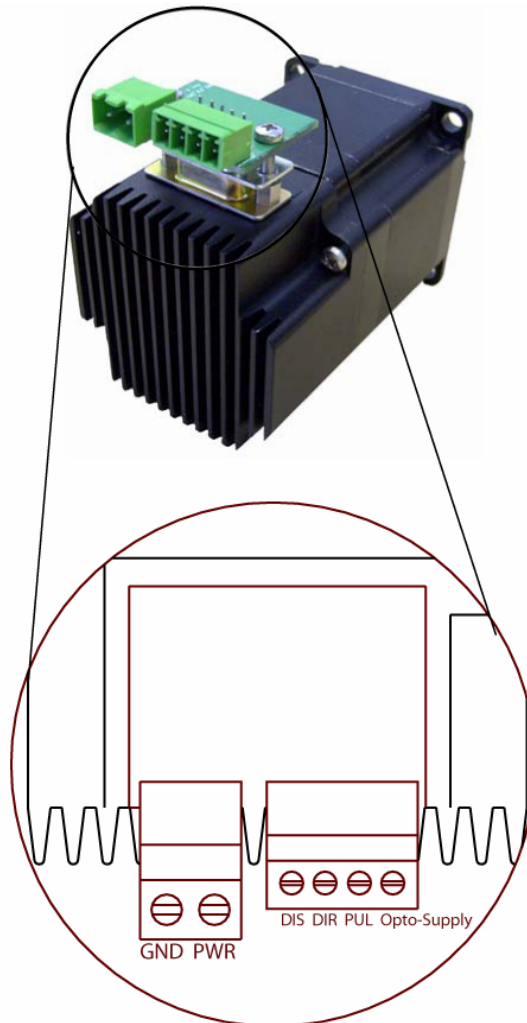
Encoder Connector Pin Information

Pin #	Name	Description
1	Ground Index	Ground
2	Index	Index Z channel
3	A	A channel
4	+5V	+5V input required to power the encoder
5	B	B channel

Encoder connector is a 0.1" (2.54mm) spacing 5-pin connector.

Interface Board Pin Information

PRO42/57 is available with optional interface board as shown below.



Two pin Connector

Name	Description
GND	Ground
PWR	Power Input +12V to +48Vdc

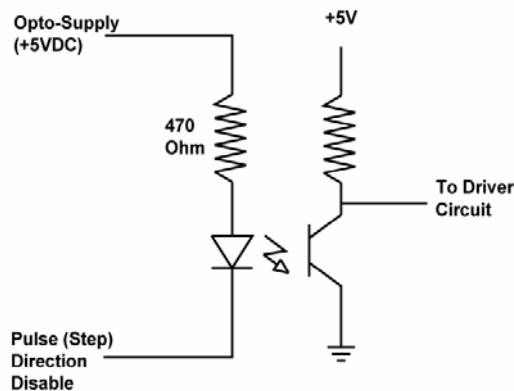
Four pin connector

Name	Description
DIS	Disable Input
DIR	Direction Input
PUL	Pulse Input
Opto-Supply	Opto Supply Input +5Vdc

5. Electrical Information

Pulse/Dir/Disable Opto-isolated Inputs

Pulse, Direction, and Disable signals are opto-isolated inputs. In order for these signals to work, +5VDC opto-supply input is required. Internal current limiting resistor of 470 Ohm used for each of the Pulse, Direction, and Disable signals. If opto-supply is greater than +5Vdc, additional current limiting resistor is required.



Pulse Input

Pulse input is a high-speed opto-isolated input. Maximum supported pulse input frequency is 800K pulses/second.

Direction Signal

Direction signal is an opto-isolated input and the polarity of the direction of rotation is configurable through the software using the Dynamic Configurator.

Disable Signal

Disable signal is an opto-isolated input. If there is no connection to disable signal, the driver is enabled by default. Only when the disable signal is connected to the ground of the opto-supply input, the driver is disabled and motor is free.

Power Input

Power Supply Voltage Input: 12VDC to 35VDC

Power Supply Current Requirement: 2.5A

+5VDC Output

+5VDC voltage output (regulated from the power input) is available on pin 5 of DB9 connector for powering the ControlMax plug in controller only. Any other use is not recommended.

6. Configuration

PRO42/57 configuration is done using NPA's Dynamic Configurator through the same DB9 connector also used for control. PRO42/57 has following configurable settings stored in the Flash memory of the driver.

Setting	Range	Description
Microstep	2 to 500 (A) 1 to 8 (B)	Microstep from 2 to 500 is for Advanced and from full to 8 is for Basic.
Run Current	100mA to 3.0A in 100mA increment for Advance version. 100mA to 2.5A in 100mA increment for Basic version.	Run Current is the current that is used during motion. When pulse input is detected while in Idle mode, the current is immediately set to Run Current value. *** Make sure that the current setting does not go over the recommended current to avoid damage to the driver and the motor ***
Idle Current	100mA to 3.0A in 100mA increment for Advance version. 100mA to 2.5A in 100mA increment for Basic version.	Idle Current is set when no pulse input is detected for period of time that is set in the Idle Time. Idle Current is used to lower the current supply to the motor while idle. Lower current means lower power usage and lower motor temperature. To disable the Idle Current, set the Idle Current same as the Run Current value. *** Make sure that the current setting does not go over the recommended current to avoid damage to the driver and the motor ***
Idle Time	100mSec to 10Sec in 100mSec increment	When no pulse input is detected for the period specified by Idle Time, the driver current is set to Idle mode and the current drops to Idle Current
PFD	0 to 3 Only Advanced version available	Percent Fast Decay. See Note of PFD* 0 – Slow Decay (0%) 1 – Mixed Decay (15%) 2 – Mixed Decay (48%) 3 – Fast Decay (100%) * Recommended Default
Direction Polarity	CW or CCW	Direction Polarity

Note on PFD:

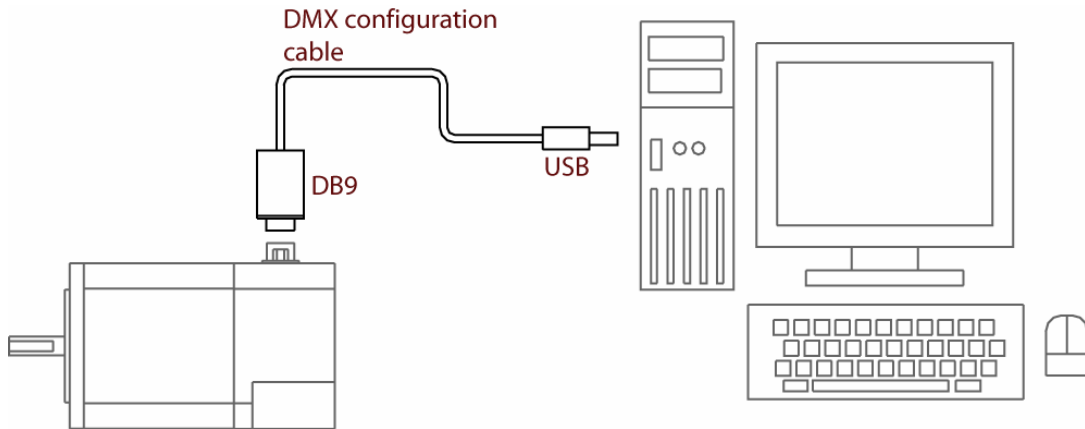
Percent Fast Decay determines the current decay mode after the over current is detected. In slow decay mode, both sink drivers are turned on for fixed time off period. Mixed Decay mode starts out in fast decay mode for portion and changes to slow decay for the remainder of the period. Fixed time off period is 10uSec. Recommended PFD default value for most application is 3 - Fast Decay.

This current decay control scheme results in reduced motor noise, increased step resolution and reduced power dissipation.

Configuration of the PRO parameters is done using NPA's Dynamic Configurator and **DMX-CFG-USB** cable. The DMX-CFG-USB is USB powered and does not require any external power during configuration.

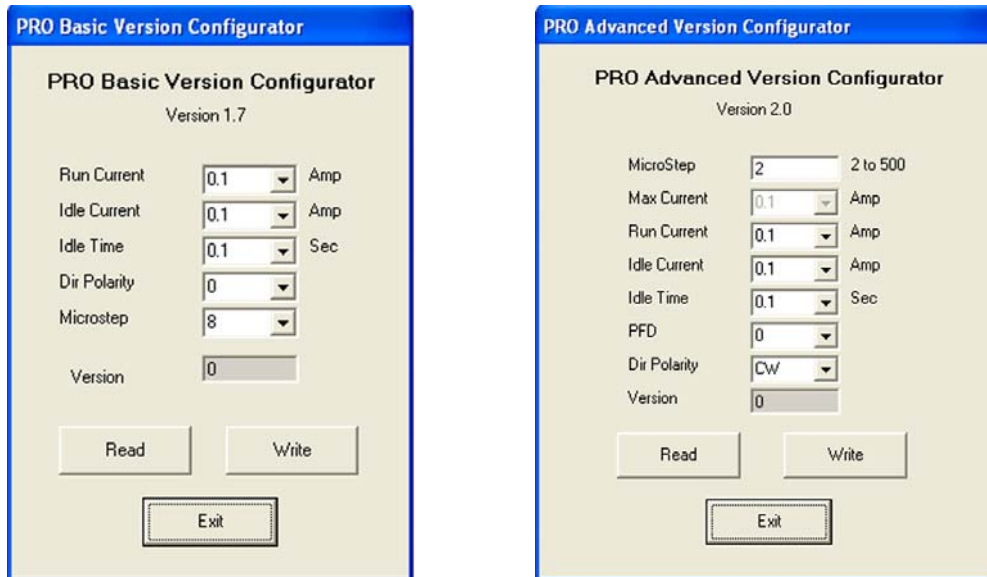


Simply connect the configuration cable between the DB9 connector of the DriveMax and USB port of PC as shown below:



Configuration cable part number	DMX-CFG-USB
USB Driver	

DiveMax42/57 comes with simple and easy to use Windows configuration program as shown below to read and write driver parameters.



Steps to run configuration program

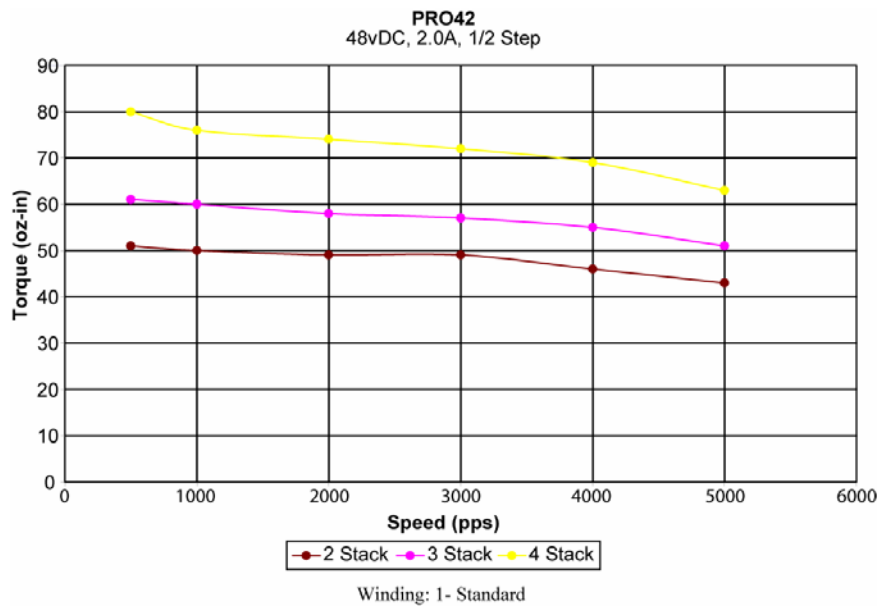
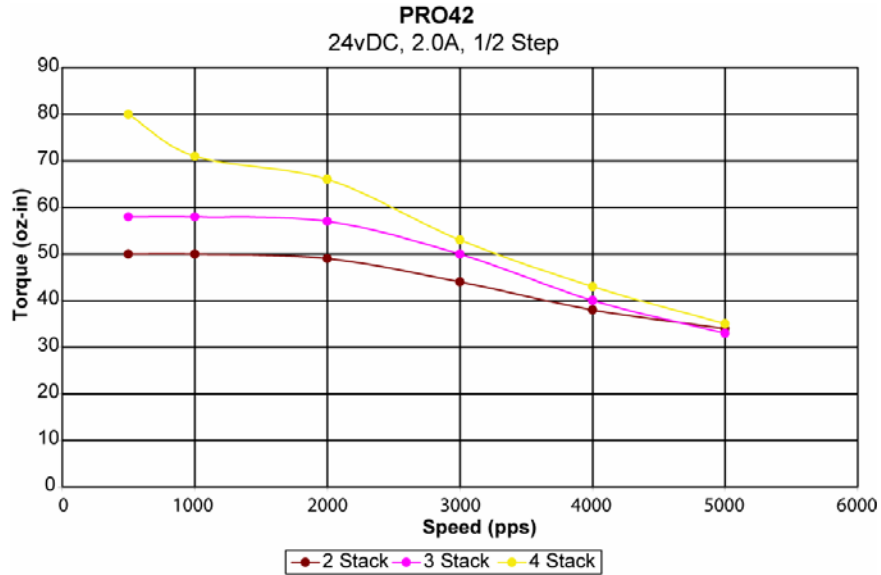
- 1) If running for the first time, download and install the latest **PRO Configurator Driver** from the NPA support website. Once the USB driver is installed, it does not need to be installed again.
- 2) Plug in the configuration cable. If plugged in for the first time, follow the typical USB device configuration steps.
- 3) Start the PRO configuration program.
- 4) Plug in the DB9 connector to DB9 of the PRO and read or write the parameters.
- 5) When writing the parameter is done, the values are permanently stored in Flash memory that are loaded and used at the power up.

7. Speed/Torque Curve

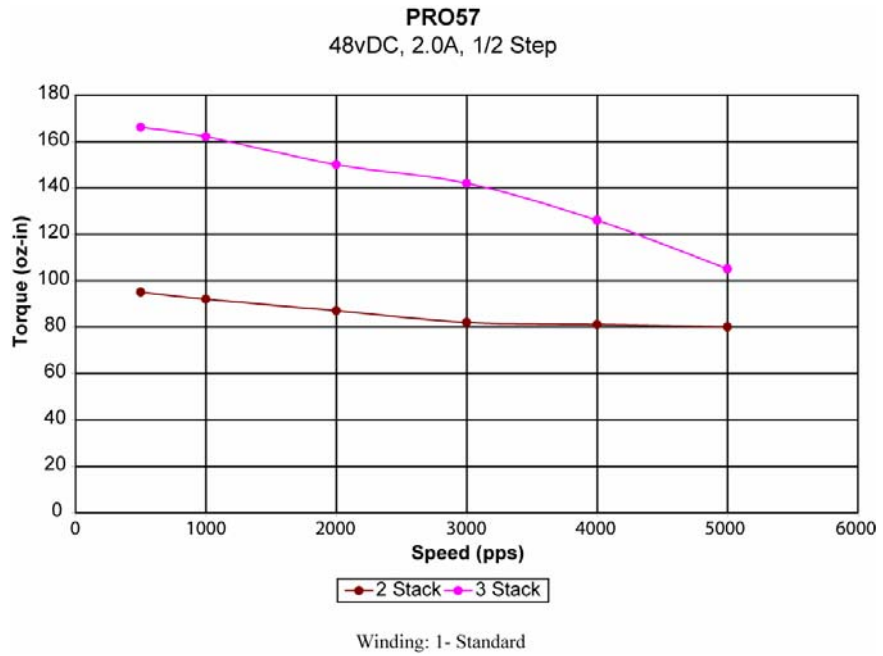
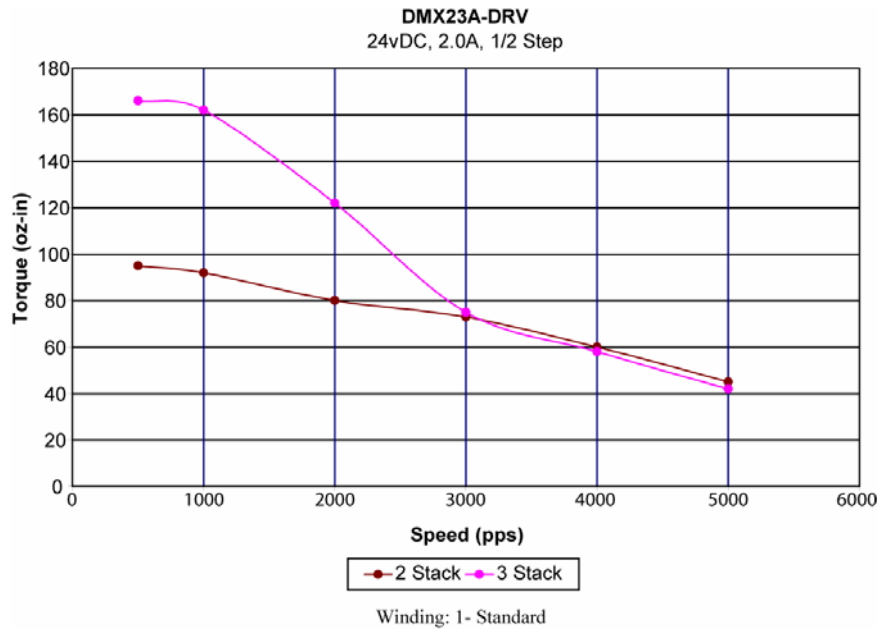
Notes:

*All Speed/Torque curves are for standard winding (1) motors
Different Speed/Torque motors available upon request.*

PRO42



PRO57A/B



NPM

Nippon Pulse America, Inc.

4 Corporate Drive

Radford, VA 24141 U.S.A.

Tel: 540-633-1677

E-mail: info@nipponpulse.com

URL: www.nipponpulse.com