

PWX Microstepping Indexer/Drive



The PWX is a self-contained, microstepping indexer/drive. An RS-232 serial interface allows communication to a terminal or host computer for programming. Smooth and accurate motor control is provided through velocity, acceleration, and distance commands. The pulse-width modulated, bipolar motor drive is a 20 KHz, MOSFET H bridge. Programs may be stored in battery-backed RAM for later execution or repetitive motion applications. The PWX Series drives offer optically isolated input and output lines for program selection, system status, and communication. Motor current is switch-selectable, making the PWX applicable to a wide range of motors. Programmable resolutions up to 25,600 steps per revolution provides the resolution and smoothness required for critical applications.

The PWX from Precision Motion Controls ... exceptional performance at a reasonable price.

Features

- **RS-232C Interface**
- **25,600 steps/rev, 25,400 steps/rev, 20,000 steps/rev**
- **64 switch-selectable motor current ranges**
- **Short-circuit and over-temperature protection**
- **Optically-isolated input and output lines**
- **Convection cooled enclosure**
- **Self-contained power supply**
- **95 - 130 VAC, 50/60 Hz Power**

Drive Specifications

Performance (unloaded motor)

Repeatability: ± 5 arc-seconds (unidirectional)
 Accuracy: ± 5 arc-minutes (bidirectional)
 Step-to-Step Accuracy: ± 20 arc-seconds (unidirectional)
 Hysteresis: ± 3 arc-minutes

Inputs (optically isolated)

Trigger inputs: 5
 Status Outputs: 3
 Sequence Inputs: 3

Power 95 to 130 VAC, 50/60 Hz, 2A

Processor 80188 with 2K battery-backed RAM

Environmental – Operating

Drive: 0 to 60 °C measured at the heatsink
 Motor: 110 °C measured at the motor case
 Ambient: 10 to 40 °C, 0 to 95% humidity, non-cond

Environmental – Storage

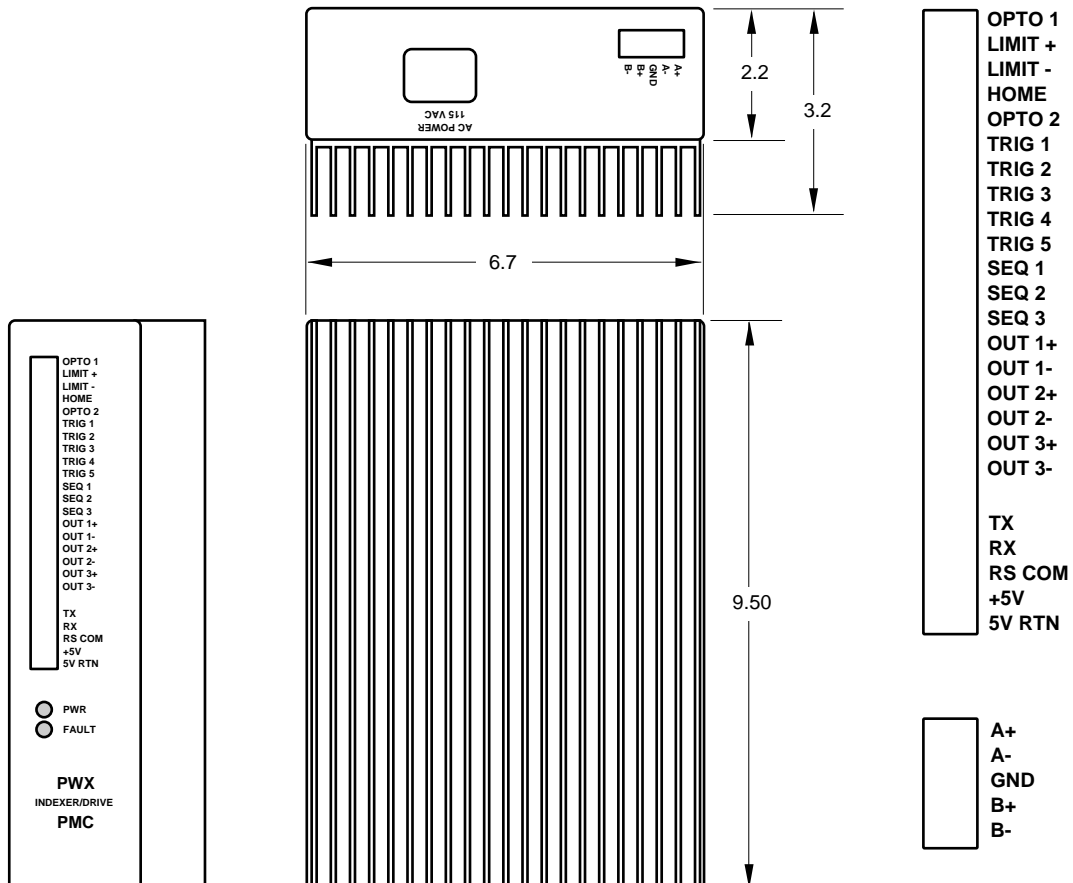
Motor + Drive: -40 to +80 °C, 0 to 95% humidity, non-condensing

Indexer Range

Position: $\pm 32,000,000$ steps (1,250 revolutions)
 Velocity: 0.001 to 35.000 rev/sec
 Acceleration: 0.01 to 99.99 rev/sec²

Motor Specifications

Model	NEMA 23			NEMA 34			NEMA 42	
	PWX-60	PWX-90	PWX-120	PWX-140	PWX-260	PWX-380	PWX-450	PWX-1200
Static Torque (oz-in):	60	90	120	140	260	380	450	1200
Rotor Inertia (oz-in):	0.48	1.28	1.75	3.50	6.70	10.24	21.5	44.0
Bearing Thrust Load (lb):	25	25	25	50	50	50	50	50
Bearing Radial Load (lb):	15	15	15	25	25	25	25	25
End Play for 1 lb Load (in):	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Radial Play for 0.5 lb Load (in):	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008



Indexer Commands

Command Format

PWX Indexer Commands have four Sections of ASCII characters:

[Device Address][Command][Parameter][Delimiter]

Device Address: single character from 0 to 7

Command: a 1 to 3 character command beginning with an alpha character

Parameter: numeric value for command (i.e., velocity, acceleration, distance)

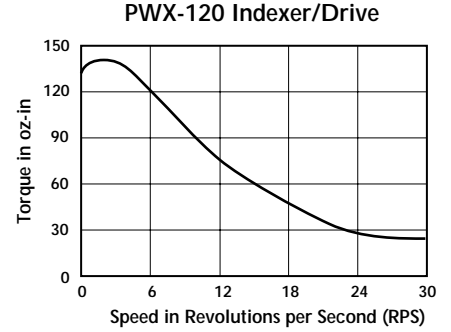
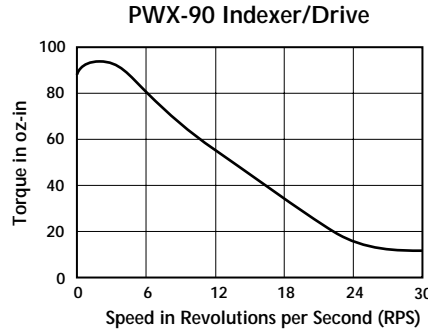
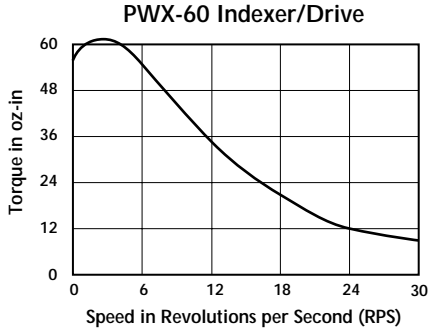
Delimiter: a space or carriage return to signify the end of the command

<u>Command</u>	<u>Description</u>
A(num)	Set acceleration (0.01 - 99.99 revs/sec ²)
AC(num)	Changes acceleration in continuous velocity mode (num) = 0.01 - 99.99 revs/sec ²
C	Continue; enables program execution after a PS (pause) command
CA(num)	Changes acceleration in a predefined move (num) = 0.01 - 99.99 revs/sec ²
CTM(num)	Constant velocity time delay (num) = 0.01 - 99.99 seconds
CTR(num)	Trigger Constant Velocity Mode; (num) = trigger input
CV(num)	Changes velocity in a predefined move (num) = 0.001 - 35.00 revs/sec
D(num)	Distance; number of steps to move (num) = ± 32,000,000 steps
DN	Done; response sent from indexer if move is complete (if enabled)
G	Go command; initiates start of move
H	Changes direction of next move
GH(num)	Go Home with direction and velocity specified; (num) = ±0.01 - 50.00 rev/sec
K	Kill; terminates any move immediately
L(num)	Loop; from L to N; (num) = 1 - 64,000 times
LD(num)	Limit Disable; (num) = 0 - 3 to select limit
LS	Limit Sensed; response sent when limit encountered and limits are enabled
MC	Mode Continuous; runs constantly at specified velocity
MPI	Incremental Mode; distance commands are relative to the present position
MPA	Absolute Mode; all distances are relative to the Home Position
N	Loop Command Delimiter
OSB(num)	Home Sensor Qualifier; (num) determines polarity and reference edge of home sensor

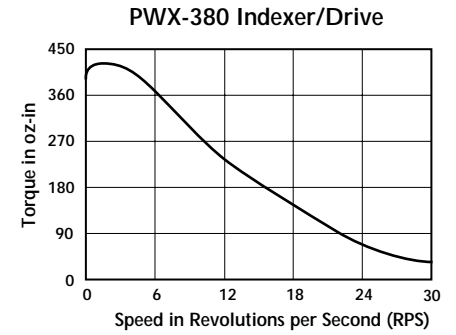
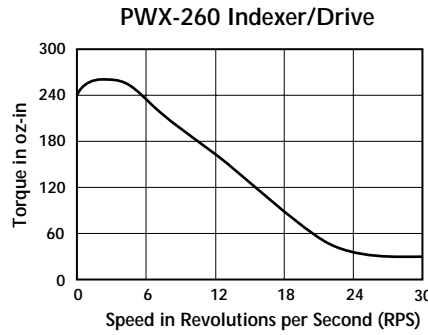
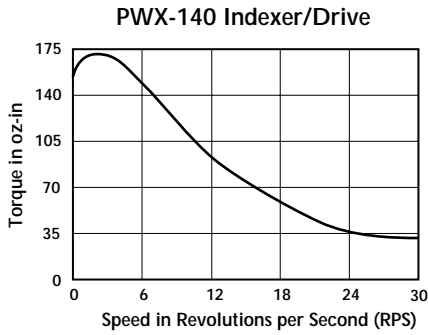
<u>Command</u>	<u>Description</u>
PS	Pause; inhibits further commands from being processed until Continue is received
PR	Report Position; responds with an ASCII value from ± 32,000,000
PZ	Zero Absolute Position Counter
RA(num)	(num) = 1 Report Hex value limits and trigger (num) = 2 Report Hex value pause, trigger, limit, sequence, loop (num) = 3 Sequence inputs hex value 0-7 (num) = 4 step size and wave shape selection
RC	Return Current Position; responds in Hex
S	Stop; immediately decelerate motor and stop
SCA(num)	Automatic Standby Mode; (num) = 0 Motor current always at full value (num) = 1 Motor current to 1/2 after 1 second of no movement
SSA(num)	Echo On/Off; (num) = 0 (ON) or 1 (OFF)
SN(num)	Debounce sequence inputs. num = 0 - 5000
ST(num)	Shut Down; num = 1 sets motor current to zero
T(num)	Time Delay; (num) = 0.01 - 99.99 seconds
Test	Test; run at 0.1 rev/sec continuously
TR(num)	Wait for trigger
V(num)	Velocity; (num) = 0.001 - 35.00 revs/sec
VC(num)	Change Velocity; interactive command for use in Continuous Mode
WV(num)	Waveform select (num) = 0 to 4.
XD(num)	Start Sequence Definition; (num) = 0 - 7
XP(num)	Run sequence (0-7) on power-up. num = 8 disable power-up
XR(num)	Run Sequence; (num) = 0 - 7
XT	End sequence and save
XC(num)	Request sequence check sum
XU(num)	Upload sequence
Y	Terminate loop when N is next encountered
Z	Reset; equivalent to power up

Speed versus Torque Curves

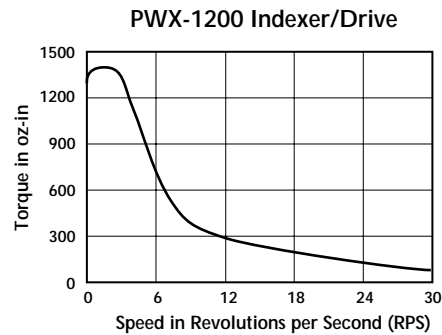
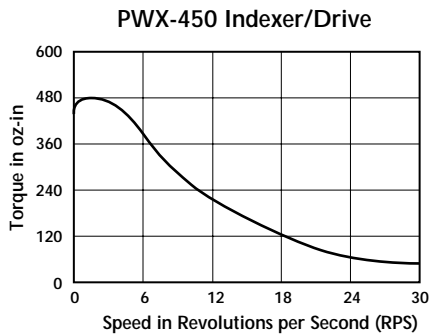
NEMA 23 Series Motors



NEMA 34 Series Motors



NEMA 42 Series Motors



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