

## PDO 2035 Packaged Pulse and Direction Step Motor Drive with Digital Oscillator

### Features

- AC input 110V or 220V switch selectable, 50-60 Hz
- DC bus voltage 28 VDC full load, 35 VDC nominal
- Switch selectable motor current from 0.125–2.0 amps/phase
- Full and half step switch selectable
- Automatic 50% idle current reduction, defeatable
- Optically isolated inputs/outputs
  - Speed, Direction, Enable: optically isolated, 5–24 V logic
  - Tach output isolated: Darlington phototransistor One pulse per motor step
- Internal Pot
  - Speed 10–1,200 steps/sec/sec or 100–12,000 (switch selectable)
  - Accel/decel 750–200K steps/sec/sec
- External Speed Pot terminal type, 1k–10k ohms
- 70 watts of usable power
- Pluggable screw terminal connectors
- Dual H-bridge, pulse width modulated amplifier switching at 20–30 KHz
- Ideal for 4, 6 or 8 leaded step motors NEMA sizes 11, 14, 17 and 23

### Description

The PDO2035 is stepper drive packaged in a rugged steel case painted black with white epoxy silk screen. Integral heat sink, mounting brackets, switch covers and connectors are included with each drive. The drive has been matched with nine recommended NEMA 11, 14, 17 & 23 motors in order to create a complete stepper motion solution.

The PDO2035 provides the user with two modes of operation to choose from, Pulse & Direction or Oscillator. The specific operation mode desired is selected during set up via DIP switch. DIP switches are also provided for setting the drive's step resolution as well as the motor current.

Pulse & Direction Mode allows the PDO2035 to receive step pulses from an indexer such as the Applied Motion's Si-100 or Si-1 or from a PLC or any other external controller.

Oscillator Mode can control speed by an onboard



potentiometer and/or by an external analog voltage. STEP input starts and stops the motor. DIR input controls direction of rotation.

The PDO2035 also provides a Tach Output and Enable Input.

A Tach Out signal is provided for measuring the motor speed. It generates 1 pulse per motor step.

ENABLE allows the user to turn off the current with a signal. The logic circuitry continues to operate, the drive "remembers" the step position even when the amplifier is disabled.

Factory set to operate at 110 volt input; the PDO2035 can be reset by the user to operate at 220 volt input by a simple switch selection.

Pluggable screw terminal blocks are provided for the motor, AC input as well as a 4 and 5 position signal input/output. Mating connectors are provided with the drive.



## PDO 2035 Technical Specifications

### POWER AMPLIFIER:

AMPLIFIER TYPE .....	Bipolar Darlington dual H-Bridge.
CURRENT CONTROL .....	Recirculating, pulse width modulated, switching at 20–30 KHz.
OUTPUT CURRENT .....	0.125–2.0 amps, dip switch selectable.
DC BUS VOLTAGE .....	35 VDC.
AC INPUT VOLTAGE .....	110 or 220 VAC (switch selectable) 50/60 Hz.
MAXIMUM OUTPUT POWER .....	70 Watts.
IDLE CURRENT REDUCTION .....	Automatic 50% idle current reduction, defeatable.
MOTOR RESOLUTION .....	Full or half step switch selectable
STATUS LED'S .....	AC power (red).

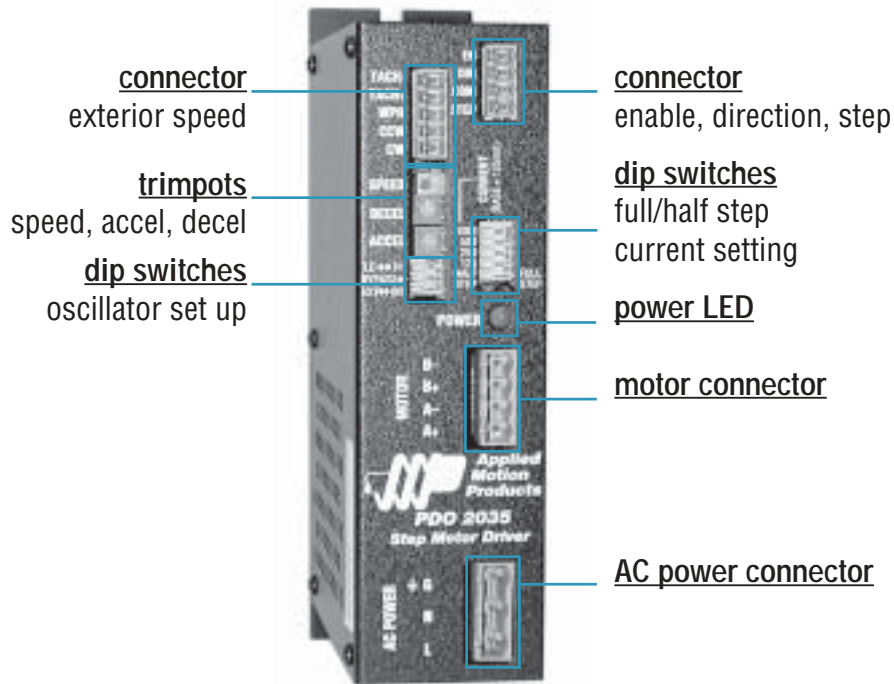
### CONTROLLER SECTION:

DIGITAL OSCILLATOR .....	Precise speed control with automatic ramps between speeds. The accel/decel rates are set by an on board potentiometer, and are adjustable from 10 to 12,000 steps/sec/sec.
SPEED SETTINGS AND RANGE .....	<b>On-Board:</b> Speed potentiometer. High speed: 100–12,000 steps/sec/sec. Low speed: 10–1,200 steps/sec/sec. <b>External:</b> External potentiometer capable.
MODES OF OPERATION .....	Two modes dip switch selectable: <b>Pulse and Direction:</b> works with pulse and direction controllers <b>Oscillator:</b> on-board potentiometers and/or an external 0–5 V analog voltage, control speed.
STEP AND DIRECTION INPUTS .....	Optically isolated: 5–24 VDC. Steps requires a 10 microsecond minimum pulse width. The direction signal setup time is 50 microsecond minimum.

### SYSTEM SPECIFICATIONS:

OVERALL SIZE .....	1.75" x 4.00" x 6.80"
CHASSIS MATERIAL .....	Aluminum, black anodized with integral heat sink.
CASE .....	Steel with black paint and white epoxy silk screen. Includes switch covers.
WEIGHT .....	3 lbs.
AMBIENT TEMPERATURE .....	0° to 50°C (32° to 122°F).
HUMIDITY .....	Maximum of 90% non-condensing.
CONNECTORS .....	Screw terminal connectors for input power and motor, and input/output signals.
MOTORS .....	Can drive 4, 6 or 8 lead motors, NEMA sizes 11– 23.

## PDO 2035 Connectors and Switches



### INPUTS (4 pin)

position no.	
1	en
2	dir
3	com
4	step

### MOTOR

position no.	
1	B-
2	B+
3	A-
4	B+

### AC POWER

position no.	
1	G
2	N
3	L

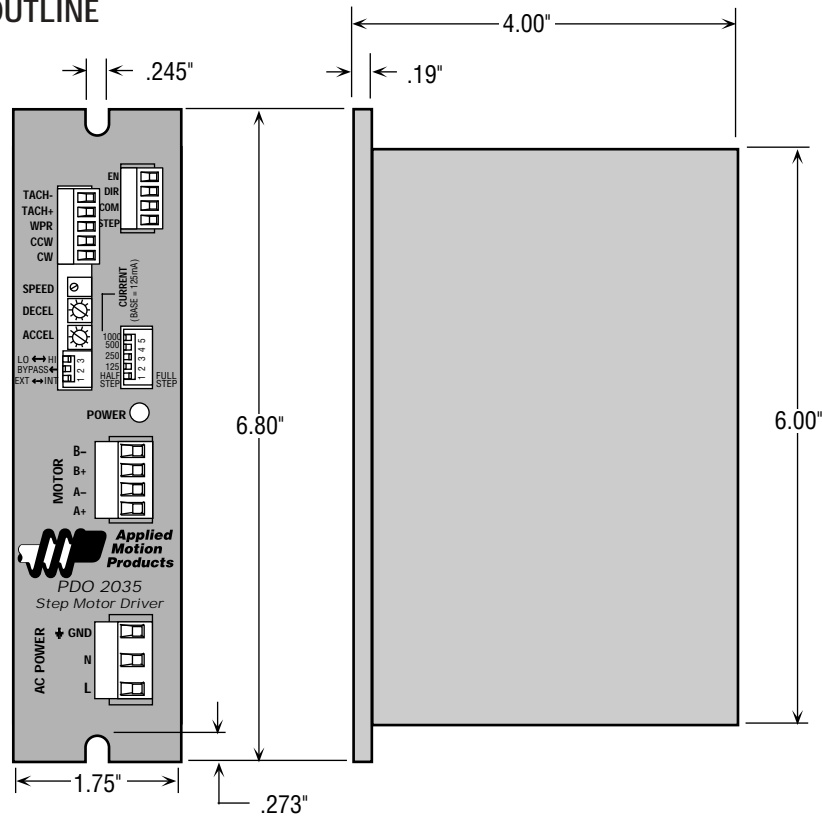
### INPUTS (5 pin)

position no.	
1	tach-
2	tach+
3	wpr
4	ccw
5	cw

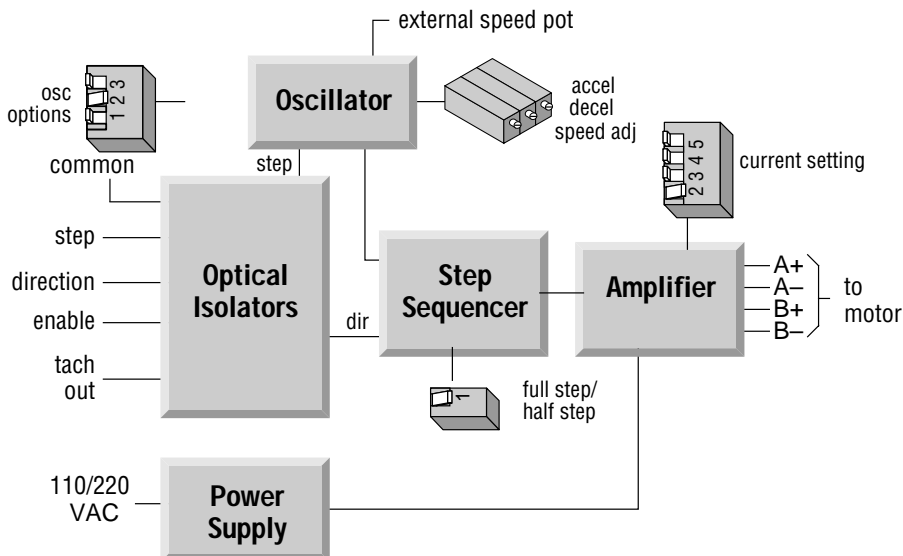


## PDO 2035 Technical Drawings

### MECHANICAL OUTLINE



### BLOCK DIAGRAM



## NEMA 11, 14, 17 Motor Data

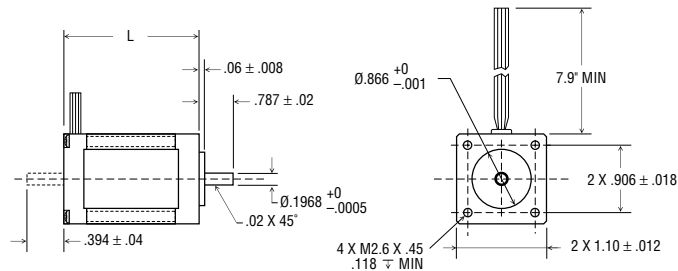
RECOMMENDED MOTORS FOR PDO 2035						
FEATURES	11	11	14	17	17	17
Motor P/N:	11012	11013	14842	17068	17071	17075
Motor Current amps	1.00	1.00	1.00	1.34	1.70	1.70
Resistance Ohms	1.40	2.00	4.30	2.10	1.70	1.70
Holding Torque oz-in	7.4	15.3	26	31.4	51	62.6
Rotor Inertia oz-in <sup>2</sup>	0.044	0.098	0.109	0.19	0.29	0.37
<b>Bearings</b>						
Thrust Load (lbs)	3.0	3.0	3.0	3.0	3.0	3.0
Radial Load (lbs)	5.0	5.0	5.0	5.0	5.0	5.0
Radial Play inch/lbs	.001 max @ 1 lb	.001 max @ 1 lb	.0004 max @ 1 lb	.0008 max @ 1 lb	.0008 max @ 1 lb	.0008 max @ 1 lb
End Play inch/lbs	.003 max @ 2 lbs	.003 max @ 2 lbs	.0004 max @ 2 lbs	.003 max @ 2.2 lbs	.003 max @ 2.2 lbs	.003 max @ 2.2 lbs
Weight lbs.	0.26	0.39	0.47	0.44	0.57	0.73

Motor current, resistance and torque ratings are with parallel connection

## NEMA 11, 14, 17 Motor Dimensions

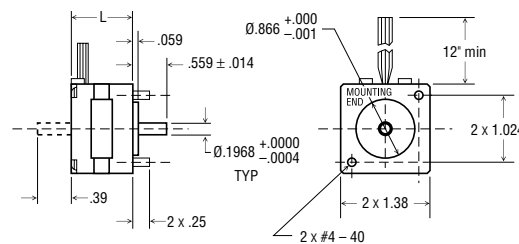
### NEMA 11

Model	L
11012	1.32"
11013	1.87"



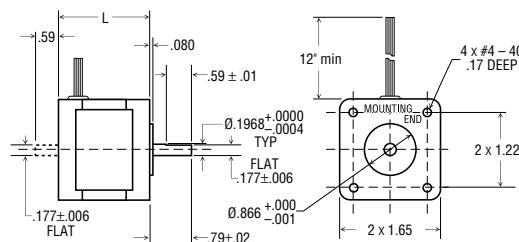
### NEMA 14

Model	L
14842	1.57"



### NEMA 17

Model	L
17068	1.30"
17071	1.54"
17075	1.85"





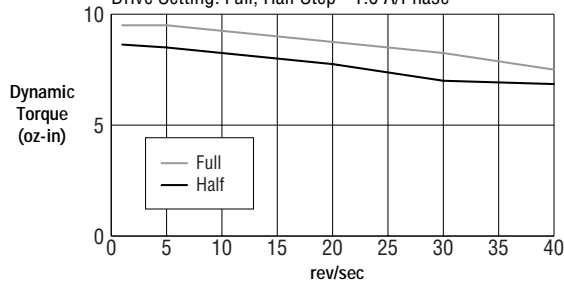
## Torque Curves

### PDO 2035 with NEMA 11, 14, 17 Step Motors

#### 11012 MOTOR

Motor Connection: 4 Lead Bipolar

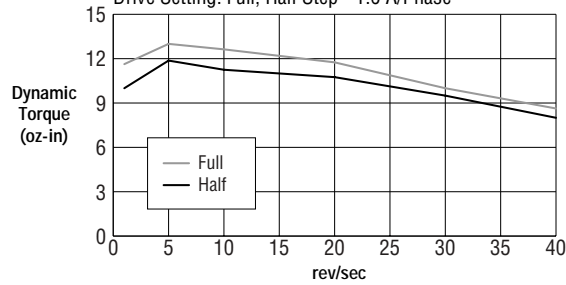
Drive Setting: Full, Half Step • 1.0 A/Phase



#### 11013 MOTOR

Motor Connection: 4 Lead Bipolar

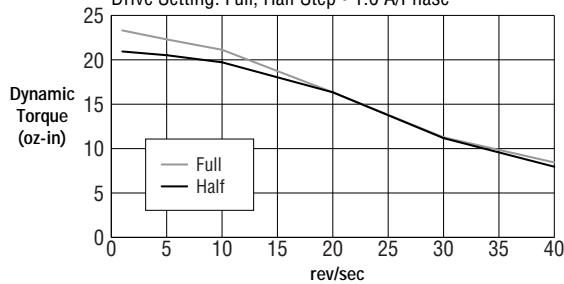
Drive Setting: Full, Half Step • 1.0 A/Phase



#### 14842 MOTOR

Motor Connection: Parallel

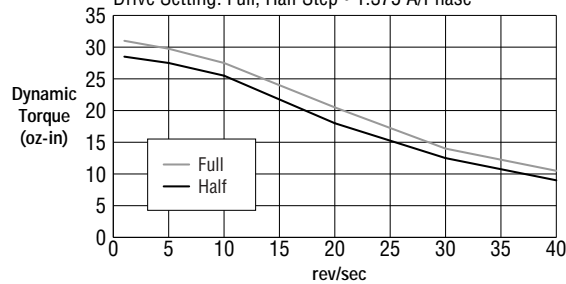
Drive Setting: Full, Half Step • 1.0 A/Phase



#### 17068 MOTOR

Motor Connection: Parallel

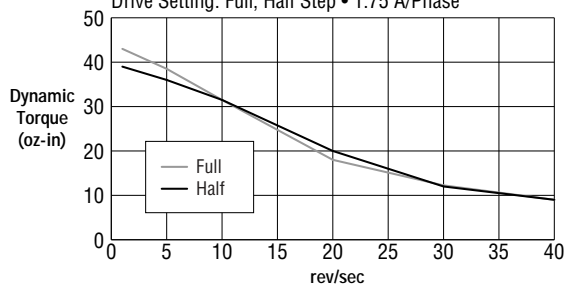
Drive Setting: Full, Half Step • 1.375 A/Phase



#### 17071 MOTOR

Motor Connection: Parallel

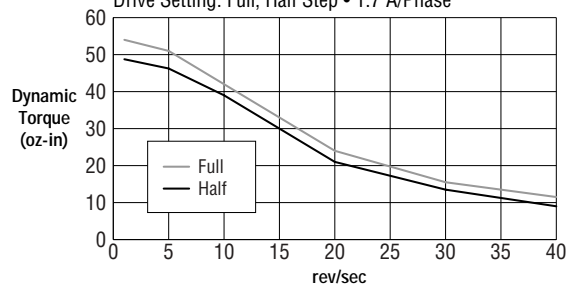
Drive Setting: Full, Half Step • 1.75 A/Phase



#### 17075 MOTOR

Motor Connection: Parallel

Drive Setting: Full, Half Step • 1.7 A/Phase



## NEMA 23 Motor Data

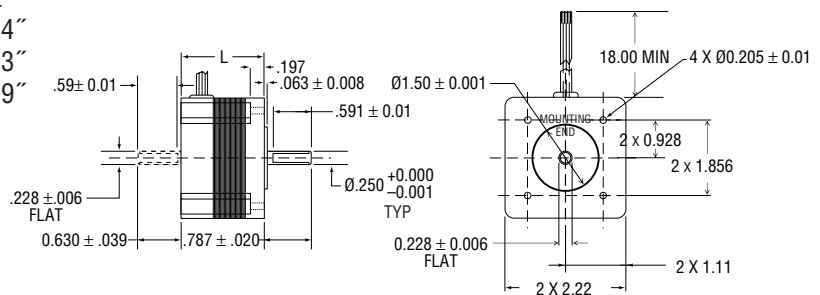
FEATURES	RECOMMENDED MOTORS FOR PDO 2035		
Motor P/N:	23394	23397	23400
Motor Current amps	2.83	2.83	2.83
Resistance Ohms	0.07	0.90	1.10
Holding Torque oz-in	77	177	264
Rotor Inertia oz-in <sup>2</sup>	0.66	1.64	2.62
<b>Bearings</b>			
Thrust Load (lbs)	25	25	25
Radial Load (lbs)	15	15	15
Radial Play inch/lbs	.001 max @ 1 lb	.001 max @ 1 lb	.001 max @ 1 lb
End Play inch/lbs	.003 max @ 2.2 lbs	.003 max @ 2.2 lbs	.003 max @ 2.2 lbs
Weight lbs.	1.00	1.54	2.20

Motor current, resistance and torque ratings are with parallel connection

## NEMA 23 Motor Dimensions

Model  
23393  
23396  
23399

L  
1.54"  
2.13"  
2.99"



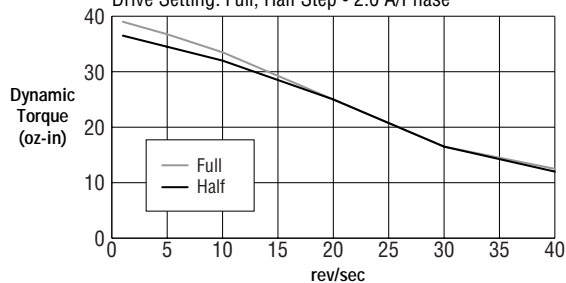


# Torque Curves

## PDO 2035 with NEMA 23 Step Motors

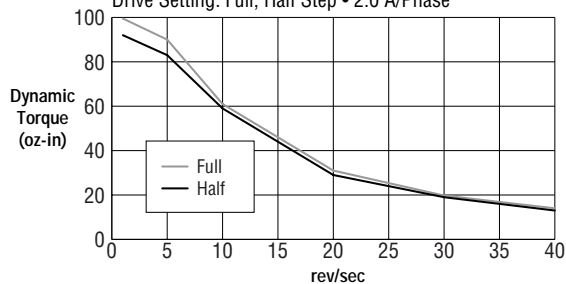
### 23394 MOTOR

Motor Connection: Parallel  
Drive Setting: Full, Half Step • 2.0 A/Phase



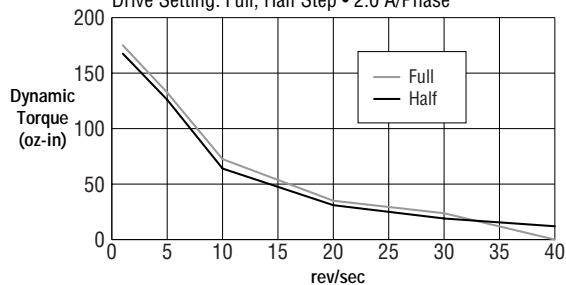
### 23397 MOTOR

Motor Connection: Parallel  
Drive Setting: Full, Half Step • 2.0 A/Phase



### 23400 MOTOR

Motor Connection: Parallel  
Drive Setting: Full, Half Step • 2.0 A/Phase







# PDO 2035 Ordering Information

## COMPLETE SYSTEM ORDERING

Drive Type	Motor System Number	Step Motor Description
PDO 2035	11012	NEMA 11 high torque one stack
	11013	NEMA 11 high torque two stack
	14842	NEMA 14 two stack
	17068	NEMA 17 high torque one stack
	17071	NEMA 17 high torque two stack
	17075	NEMA 17 high torque three stack
	23394	NEMA 23 high torque one stack
	23397	NEMA 23 high torque two stack
	23400	NEMA 23 high torque three stack

System Ordering Example: PDO 2035 - 17068

## DRIVE ONLY ORDERING

Drive Type	Description
PDO 2035	Packaged 2.0 amps, 35 VDC, 110/220 VAC input. Pulse & direction/oscillator drive.