



## Si5580 Programmable Step Motor Drive



### Features

- *Si™*, Si Command Language (SCL) or SiNet Hub programming languages included with drive
- AC input 110V or 220V switch selectable, 50-60 Hz
- DC bus voltage 75 VDC full load, 80 VDC nominal
- Software selectable motor current from 0.5 – 5.5 amps/phase
- Software selectable motor resolution from 2,000 to 50,800 steps per revolution
- Software selectable idle current reduction 0, 25%, 50% or 100%
- Eight optically isolated programmable inputs 5 – 24 VDC, 2,200 ohms internal resistance. Can be configured for sinking (NPN) or sourcing (PNP) signals.
- Three optically isolated programmable outputs 12 – 24 VDC, 100mA maximum
- One optically isolated output 5 VDC dedicated to fault out
- RS-232 for PC/MMI communications
- Over current and over temperature protection
- 440 watts of usable power
- Screw terminal connectors
- Dual, MOSFET H-bridge, 3 state, pulse width modulated amplifier switching at 20 – 30 KHz
- Ideal for 4, 6 or 8 leaded step motors NEMA sizes 23 & 34
- Optional Man Machine Interface (MMI) allows machine operator to enter specific motion parameters
- CE and TUV compliant

### Description

The Si5580 is a programmable stepper drive/indexer packaged in a rugged steel case painted black with white epoxy silkscreen. Integral heat sink, mounting brackets, switch covers and connectors are included with each Si5580. The drive/indexer has been matched with twelve recommended NEMA 23 & 34 motors and comes with all operating software necessary to create a complete stepper motion solution.

The Si5580 includes Applied Motion Products', Microsoft Windows based, *Si™* software language for quick set up and ease of use. The *Si™* is ideal for stand-alone operation. For more experienced users, with software development expertise, the Si5580 also comes with Applied's Si Command Language (SCL) programming instruction set. SCL allows for control of the *Si™* drive from a host PC or PLC thus permitting the user to perform a variety of motion, I/O tasks and system status retrieval via the host.

Multiple axis applications are handled by our SiNet™ Hub Programmer, which gives you the ability to control up to 8 *Si™* drives, either stepper or servo on the same hub. Not only can you coordinate up to eight motors, the hub also has access to the inputs and outputs of all the drives, providing your program with up to 64 inputs and 24 outputs. You can also use Applied's MMI which allows the machine operator to enter specific motion commands.

Factory set to operate at 110-volt input; the Si5580 can be set by the user to operate at 220-volt input by a simply switch selection.

Pluggable screw terminal blocks are provided for the I/O, motor and AC power inputs. Mating connectors, programming cable with computer interface connector as well as all operating software are provided with each *Si™* drive.

The Si5580 is both CE and TUV compliant.

## Si5580 Technical Specifications

### POWER AMPLIFIER (MOTOR DRIVE):

|                              |   |
|------------------------------|---|
| AMPLIFIER TYPE .....         | MOSFET, dual H-Bridge.  |
| CURRENT CONTROL .....        | 3 state, pulse width modulated, switching at 20–30 KHz.   |
| OUTPUT CURRENT .....         | 0.5–5.5 amps, software selectable.  |
| POWER SUPPLY .....           | Linear, toroidal transformer based for high reliability and low noise. 110 or 220 VAC input, switch selectable. 50/60 Hz.   |
| DC BUS VOLTAGE .....         | DC voltage at nominal line voltage: 75 VDC full load, 90 VDC no load.   |
| AC INPUT VOLTAGE .....       | 110 or 220 VAC (switch selectable) 50/60 Hz.  |
| MAXIMUM OUTPUT POWER .....   | 440 watts.  |
| IDLE CURRENT REDUCTION ..... | 0%, 25%, 50%, or 100% software selectable.  |
| MOTOR RESOLUTION .....       | 13 resolutions. Steps per revolution with 1.8° motor: 2000, 5000, 10000, 12800, 18000, 20000, 21600, 25000, 25400, 25600, 36000, 50000, 50800, software selectable. |
| STATUS LED'S .....           | AC power (red)<br>Over Temperature (yellow)<br>Over Current (yellow)  |

### CONTROLLER (INDEXER) SECTION:

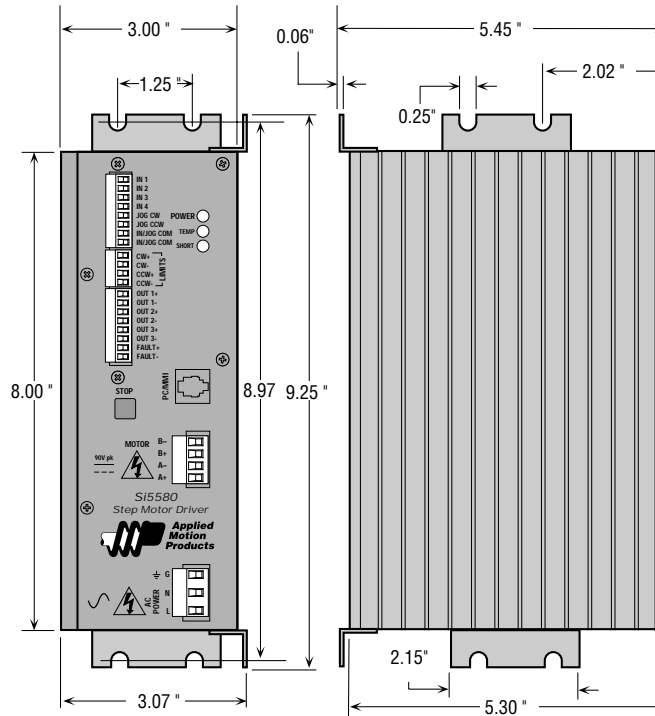
|   |   |
|---|---|
| SERIAL COMMUNICATION .....              | RS-232 programming port.  |
| INPUTS .....                            | 8 user programmable inputs. Can be used for triggering, sensing, homing, branching, jogging or limits, optically isolated 5-24 VDC.   |
| OUTPUTS .....                           | 3 general purpose, optically isolated 12–24 VDC outputs for interfacing to other equipment. Open collector and emitter. 100 mA max.   |
| PARAMETER RANGES .....                  | Distance: 1 to 16,000,000 steps. Speed: .025 to 50 revolutions per second (in any microstep resolution). Acceleration: 1 to 3,000 rev/sec/sec. Deceleration: 1 to 3,000 rev/sec/sec (set independently from acceleration). Time Delays: 0.01 to 300 seconds. Output Pulse Widths: 2 to 500 milliseconds. Iterations per repeat loop: 1 to 65,535. |
| OPTIONAL OPERATOR INTERFACE (MMI) ..... | NEMA 4/12 rated (splash proof & dust proof). 4 x 20 characters liquid crystal display (LCD) standard or backlit. 20 key membrane keypad. Overall size: 4.9 x 4.9 x 1.42 inches.   |

### SYSTEM SPECIFICATIONS:

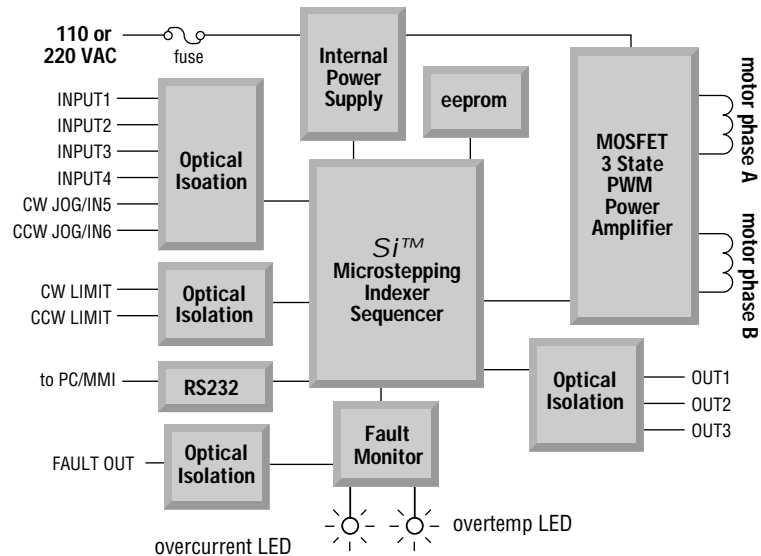
|                           |   |
|---------------------------|---|
| OVERALL SIZE .....        | 3.0 x 5.3 x 8.0 inches.   |
| CHASSIS MATERIAL .....    | Aluminum, black anodized with integral heat sink.                           |
| WEIGHT .....              | 7.8 lbs.  |
| AMBIENT TEMPERATURE ..... | 0° to 50°C (32° to 122°F).  |
| HUMIDITY .....            | Maximum of 90% non-condensing.  |
| CONNECTORS .....          | Screw terminal connectors for input power and motor, and I/O signals.       |
| MOTORS .....              | Can drive 4, 6 or 8 lead motors, NEMA sizes 11, 14, 17, 23 & 34.            |
| CASE .....                | Steel with black paint and white epoxy silk screen. Includes switch covers. |
| AGENCY APPROVAL .....     | CE & TUV.   |

## Si5580 Technical Specifications

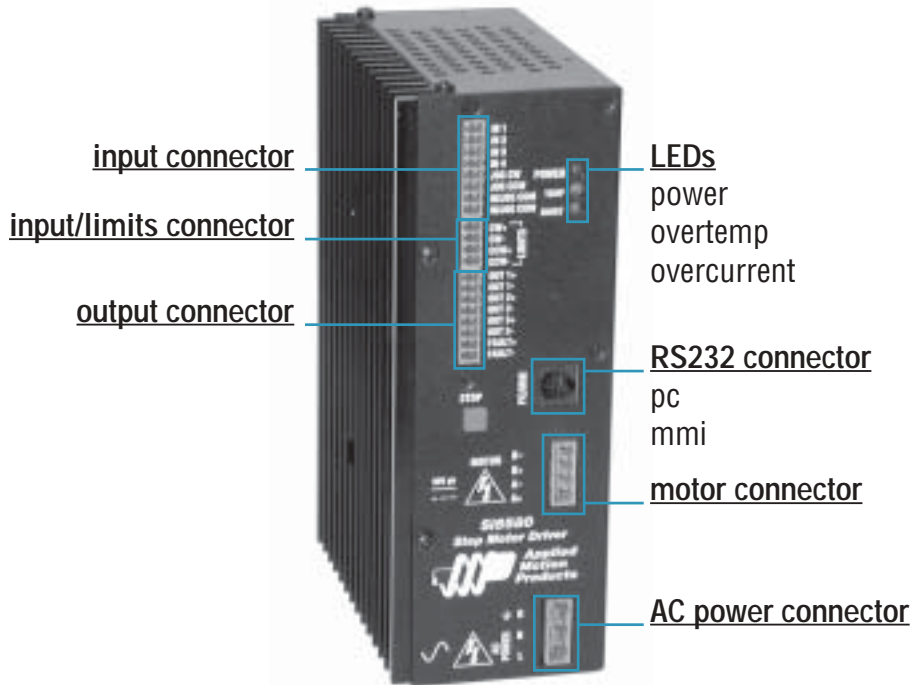
### MECHANICAL OUTLINE



### BLOCK DIAGRAM



## Si5580 Connectors and Switches



| I/O          |               | MOTOR        |    |
|--------------|---------------|--------------|----|
| position no. |               | position no. |    |
|              | 1 in 1        | 1            | B- |
|              | 2 in 2        | 2            | B+ |
|              | 3 in 3        | 3            | A- |
|              | 4 in 4        | 4            | B+ |
|              | 5 jog cw      |              |    |
|              | 6 jog ccw     |              |    |
|              | 7 in/jog com  |              |    |
|              | 8 in /jog ccw |              |    |
|              | 9 CW+         |              |    |
| LIMITS       | 10 CW-        |              |    |
|              | 11 CCW+       |              |    |
|              | 12 CCW-       |              |    |
|              | 13 out 1+     |              |    |
|              | 14 out 1-     |              |    |
|              | 15 out 2+     |              |    |
|              | 16 out 2-     |              |    |
|              | 17 out 3+     |              |    |
|              | 18 out 3-     |              |    |
|              | 19 fault+     |              |    |
|              | 20 fault-     |              |    |

| AC POWER     |     |
|--------------|-----|
| position no. |     |
|              | 1 G |
|              | 2 N |
|              | 3 L |



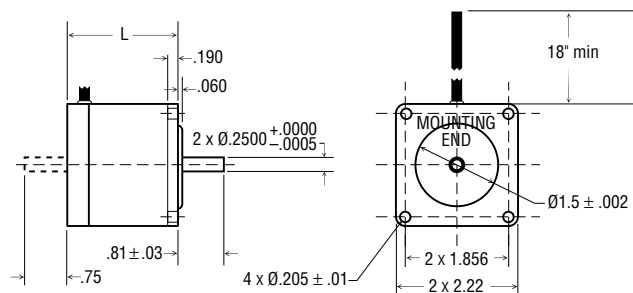
## NEMA 23 Motor Data

| FEATURES                         | RECOMMENDED MOTORS FOR Si5580 |                     |                     |                       |                       |                       |
|----------------------------------|-------------------------------|---------------------|---------------------|-----------------------|-----------------------|-----------------------|
| Motor P/N:                       | 23122                         | 23123               | 23124               | 23395                 | 23398                 | 23401                 |
| Motor Current amps               | 2.00                          | 2.50                | 3.50                | 4.24                  | 4.24                  | 4.24                  |
| Resistance Ohms                  | 1.24                          | 1.18                | 0.82                | 0.32                  | 0.38                  | 0.50                  |
| Holding Torque oz-in             | 98                            | 158                 | 225                 | 77                    | 177                   | 264                   |
| Rotor Inertia oz-in <sup>2</sup> | 0.55                          | 1.14                | 1.72                | 0.66                  | 1.64                  | 2.62                  |
| <b>Bearings</b>                  |                               |                     |                     |                       |                       |                       |
| Thrust Load (lbs)                | 25                            | 25                  | 25                  | 25                    | 25                    | 25                    |
| Radial Load (lbs)                | 15                            | 15                  | 15                  | 15                    | 15                    | 15                    |
| Radial Play inch/lbs             | .001 max<br>@ 1 lb            | .001 max<br>@ 1 lb  | .001 max<br>@ 1 lb  | .001 max<br>@ 1 lb    | .001 max<br>@ 1 lb    | .001 max<br>@ 1 lb    |
| End Play inch/lbs                | .001 max<br>@ 9 lbs           | .001 max<br>@ 9 lbs | .001 max<br>@ 9 lbs | .003 max<br>@ 2.2 lbs | .003 max<br>@ 2.2 lbs | .003 max<br>@ 2.2 lbs |
| Weight lbs.                      | 1.17                          | 2.00                | 2.80                | 1.00                  | 1.54                  | 2.20                  |

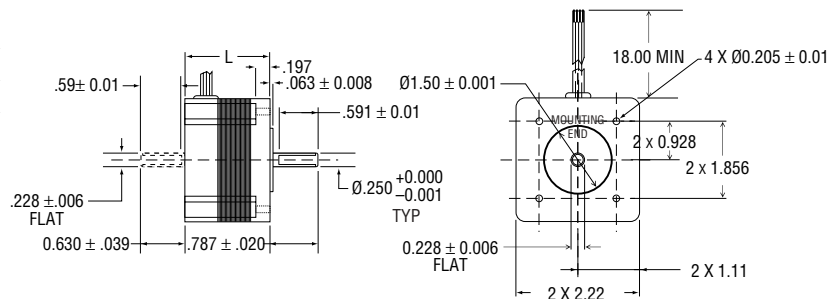
Motor current, resistance and torque ratings are with parallel connection

## NEMA 23 Motor Dimensions

| Model | L     |
|-------|-------|
| 23122 | 2.00" |
| 23123 | 3.00" |
| 23124 | 4.00" |

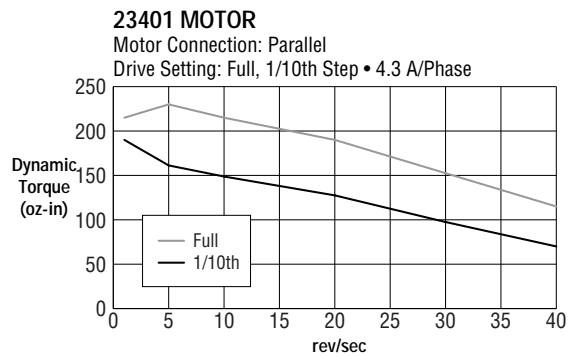
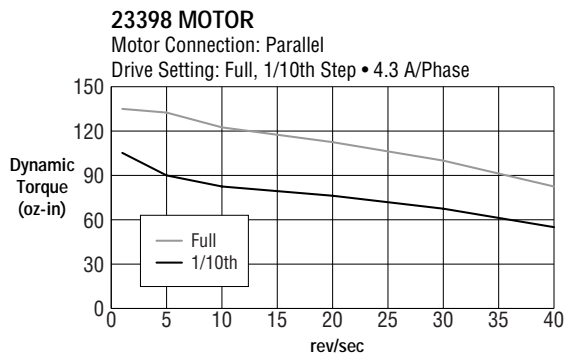
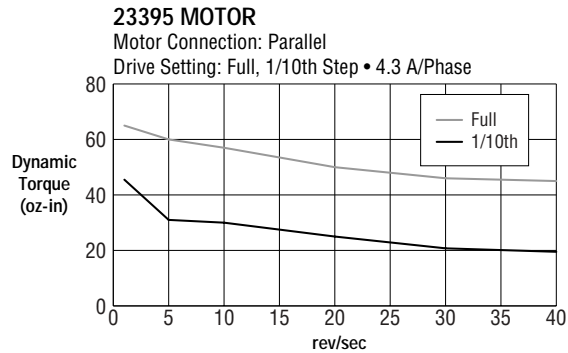
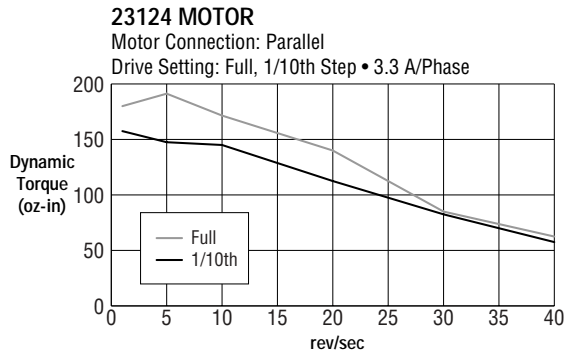
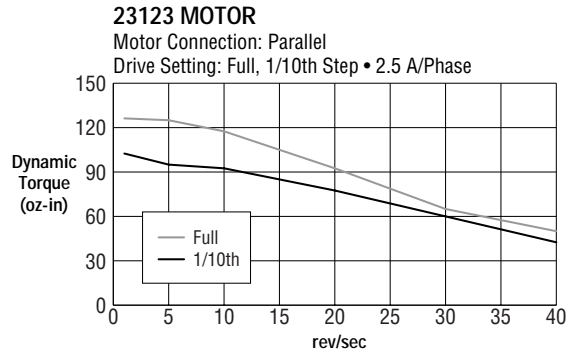
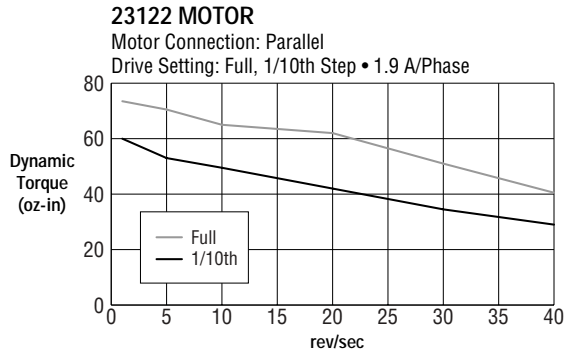


| Model | L     |
|-------|-------|
| 23395 | 1.54" |
| 23398 | 2.13" |
| 23401 | 2.99" |



# Torque Curves

## Si5580 with NEMA 23 Step Motors



## NEMA 34 Motor Data

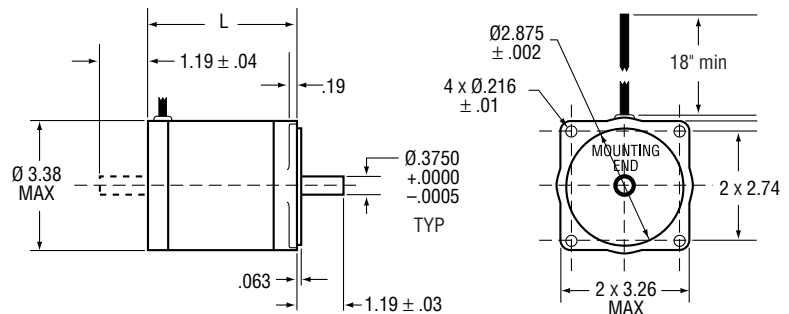
| FEATURES                         | RECOMMENDED MOTORS FOR Si5580 |                      |                      |                     |                     |                     |
|----------------------------------|-------------------------------|----------------------|----------------------|---------------------|---------------------|---------------------|
| Motor P/N:                       | 34348                         | 34349                | 34350                | 34474               | 34476               | 34478               |
| Motor Current amps               | 4.84                          | 7.07                 | 8.34                 | 6.35                | 6.35                | 5.64                |
| Resistance Ohms                  | 0.30                          | 0.25                 | 0.20                 | 0.24                | 1.50                | 0.49                |
| Holding Torque oz-in             | 212                           | 424                  | 636                  | 389                 | 861                 | 1292                |
| Rotor Inertia oz-in <sup>2</sup> | 3.66                          | 6.72                 | 10.20                | 7.65                | 14.80               | 21.90               |
| <b>Bearings</b>                  |                               |                      |                      |                     |                     |                     |
| Thrust Load (lbs)                | 50                            | 50                   | 50                   | 35                  | 35                  | 35                  |
| Radial Load (lbs)                | 25                            | 25                   | 25                   | 30                  | 30                  | 30                  |
| Radial Play inch/lbs             | .001 max<br>@ 1 lb            | .001 max<br>@ 1 lb   | .001 max<br>@ 1 lb   | .0008 max<br>@ 1 lb | .0008 max<br>@ 1 lb | .0008 max<br>@ 1 lb |
| End Play inch/lbs                | .001 max<br>@ 15 lbs          | .001 max<br>@ 15 lbs | .001 max<br>@ 15 lbs | .003 max<br>@ 1 lbs | .003 max<br>@ 1 lbs | .003 max<br>@ 1 lbs |
| Weight lbs.                      | 3.00                          | 5.40                 | 7.70                 | 3.86                | 6.18                | 8.66                |

Motor current, resistance and torque ratings are with parallel connection

## NEMA 34 Motor Dimensions

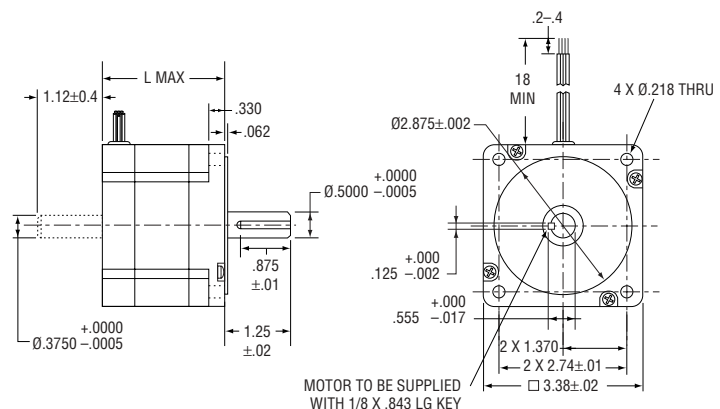
Model  
34348  
34349  
34350

L  
2.50"  
3.70"  
5.10"



Model  
34474  
34476  
34478

L  
2.60"  
3.78"  
4.96"

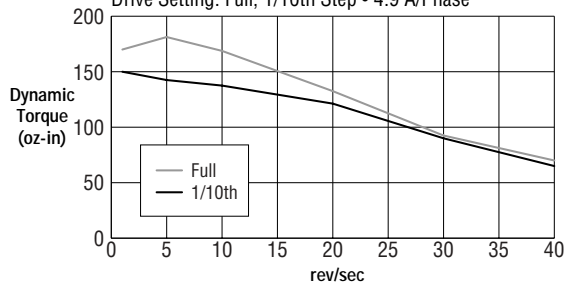


# Torque Curves

## Si5580 with NEMA 34 Step Motors

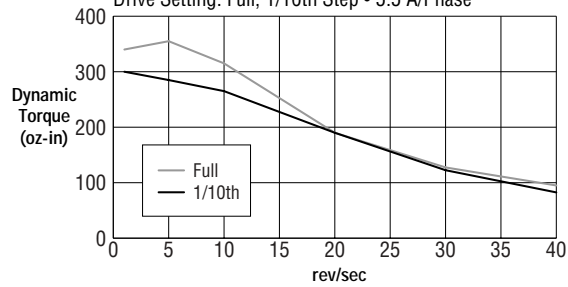
### 34348 MOTOR

Motor Connection: Parallel  
 Drive Setting: Full, 1/10th Step • 4.9 A/Phase



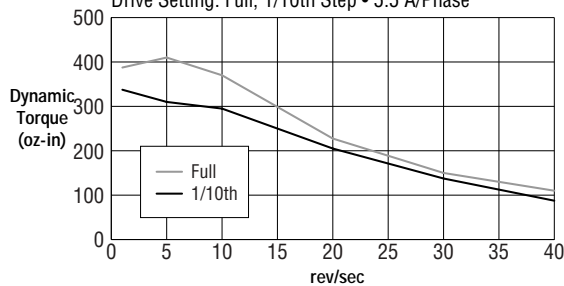
### 34349 MOTOR

Motor Connection: Parallel  
 Drive Setting: Full, 1/10th Step • 5.5 A/Phase



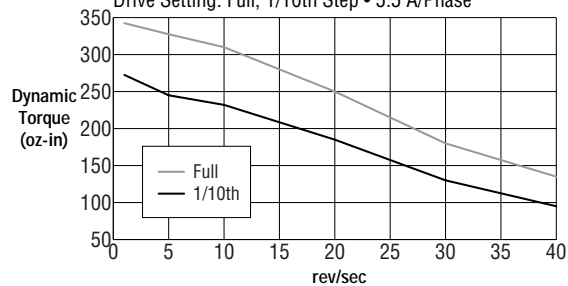
### 34350 MOTOR

Motor Connection: Parallel  
 Drive Setting: Full, 1/10th Step • 5.5 A/Phase



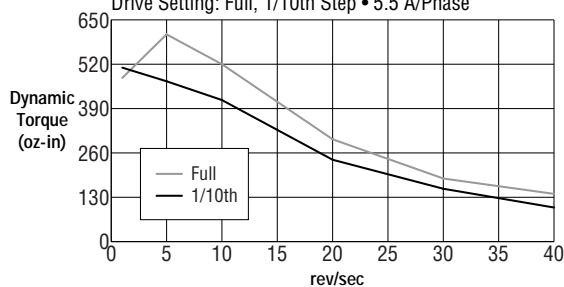
### 34474 MOTOR

Motor Connection: Parallel  
 Drive Setting: Full, 1/10th Step • 5.5 A/Phase



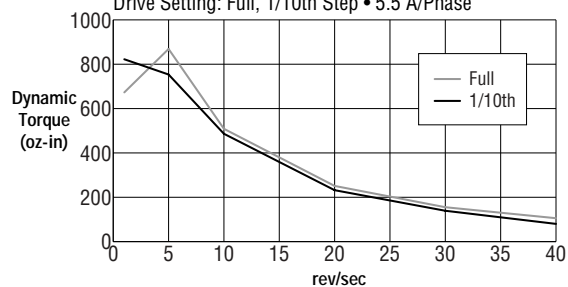
### 34476 MOTOR

Motor Connection: Parallel  
 Drive Setting: Full, 1/10th Step • 5.5 A/Phase



### 34478 MOTOR

Motor Connection: Parallel  
 Drive Setting: Full, 1/10th Step • 5.5 A/Phase





# Si5580 Ordering Information

## COMPLETE SYSTEM ORDERING

| Drive Type | Motor System Number | Step Motor Description          |
|------------|---------------------|---------------------------------|
| PDO 5580   | 23122               | NEMA 23 one stack               |
| Si5580     | 23123               | NEMA 23 two stack               |
|            | 23124               | NEMA 23 three stack             |
|            | 23395               | NEMA 23 high torque one stack   |
|            | 23398               | NEMA 23 high torque two stack   |
|            | 23401               | NEMA 23 high torque three stack |
|            | 34348               | NEMA 34 one stack               |
|            | 34349               | NEMA 34 two stack               |
|            | 34350               | NEMA 34 three stack             |
|            | 34474               | NEMA 34 high torque one stack   |
|            | 34476               | NEMA 34 high torque two stack   |
|            | 34478               | NEMA 34 high torque three stack |

System Ordering Example: Si5580 - 23122

## DRIVE ONLY ORDERING

| Drive Type | Description  |
|------------|--|
| PDO 5580   | Packaged 5.5 amps, 80 VDC, 110/220 VAC input. Microstepping pulse & direction/oscillator drive.                        |
| Si5580     | Packaged 5.5 amps, 80 VDC, 110/220 VAC input. Microstepping fully programmable drive/indexer with <i>Si™</i> software. |

## OPTIONAL ACCESSORIES

| Type   | Description                                 |
|--------|---|
| MMI-01 | Standard man-machine interface.             |
| MMI-02 | Man-machine interface with backlit display. |