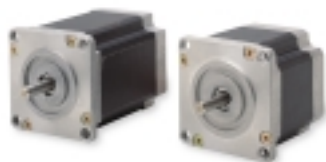


## Overview



### Features

- Sizes 17, 23, 34 and 42
- Optimized for use with IDC's microstepping controls
- Bipolar current ratings for use with IDC's microstepping controls
- High torque-to-inertia, yielding high acceleration
- 120°C rated Class B winding
- 12-ft motor cables standard
- Encoder optional (sizes 23, 34, 42); see page G-61
- Quick disconnect motor cabling option (sizes 34 and 42)

Model	Holding Torque oz-in [N-m]	Recommended Current/Phase Series [Parallel]	See page
S12	30 [0.25]	1.0 [2.0]	G-47
S21	65 [0.46]	1.2 [2.4]	G-48
S22	100 [0.71]	1.5 [3.0]	G-49
S23	125 [0.88]	1.75 [3.5]	G-50
S32	300 [2.1]	2.8 [5.6]	G-53
S33	400 [2.8]	3.5 [7.0]	G-54
P21	100 [0.7]	0.7 [13]	G-51
P22	200 [1.4]	1.0 [2.0]	G-52
P31	450 [3.2]	1.5 [3.0]	G-55
P32	920 [6.5]	1.6 [3.3]	G-56
P33	1260 [8.9]	2.0 [4.0]	G-57
P41	1250 [8.8]	2.8 [5.7]	G-58
P42	2300 [16.2]	3.3 [6.6]	G-59
K42	3000 [21.2]	3.2 [6.4]	G-60



## How To Order

Motor Models	Options	Description
S12	None	EMK - 1000 line encoder option with 12-ft, jacketed cable
S21, S22, S23	EMK	EM - 500 line encoder option with 12-ft, jacketed cable
P21, P22	EM	EQK - 1000 line encoder with 12-ft quick disconnect cable
		EQ - 500 line encoder with 12-ft quick disconnect cable
S32X, S33X	EMK	EQK25 - 1000 line encoder with 25-ft quick disconnect cable
	EM	EQ25 - 500 line encoder with 25-ft quick disconnect cable
	C25	C25 - 25-ft quick disconnect motor lead cable
P31X, P32X, P33X	EMK	A 30% torque safety margin is recommended when applying step motors.
P41X, P42X	EM	
K42X	EQK	
	EQ	
	EQK25	
	EQ25	
	C25	

Replace the Xs in the above part numbers with N, T or V:

N = 8 leads, 12 inches long

T = Series wired motor and 12-foot quick-disconnect cable included

V = Parallel wired motor and 12-foot quick-disconnect cable included



To confirm your selection, review the checklist on page G-6.

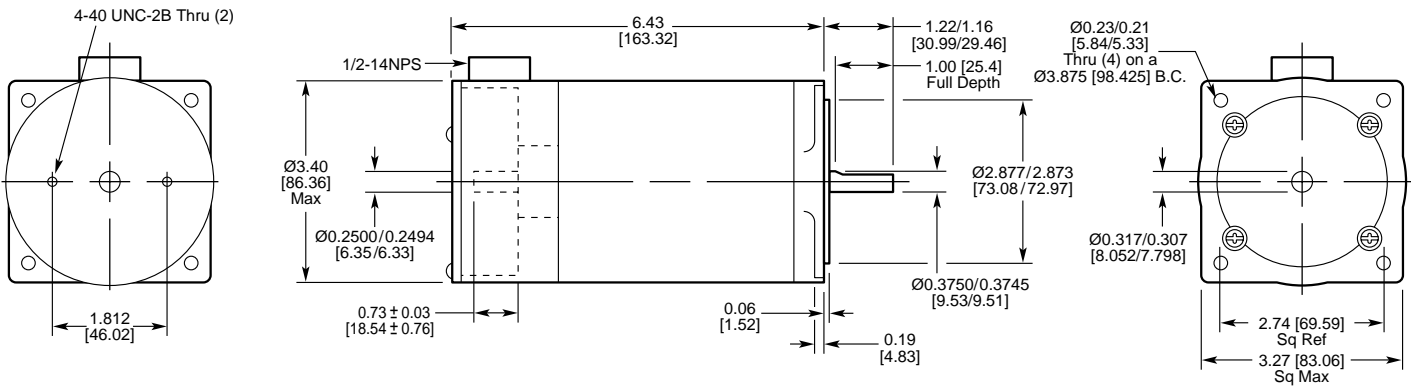




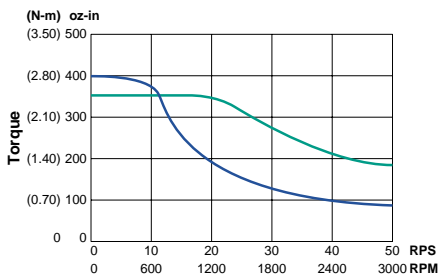
## S33X Step Motor in [mm]



x = N 12 inch, 8 conductor flying leads  
 T 12 foot, 5 conductor quick disconnect cable wired in series  
 V 12 foot, 5 conductor quick disconnect cable wired in parallel



### Motor Performance



- 120 Series (100% duty cycle)
- 120 Parallel\*/240 Series\*  
\* 50% duty cycle max above 5 rps (300 rpm)

A 30% torque safety margin is recommended when applying step motors.



Warning: Do not run S32 or S33 motors wired in parallel with a NextStep 240 drive or SmartStep 240. Motors will exceed their rated temperatures and be damaged. All motors should be wired in series when run with the NextStep 240 or SmartStep 240.

### Applying Gearmotors

- See page I-1 for IDC gearmotor information and for how to determine gearmotor performance

### Motor and Encoder Data

	S33 Series	S33 Parallel
Continuous Stall Torque oz-in [N-m]	400 [2.8]	350 [2.5]
Recommended Current/Phase Amps	3.5	7.0
Inductance mH	10	2.5
Max. Motor Winding Temp. °F [°C]	212 [100]	
Rotor Inertia oz-in-s <sup>2</sup> [kg-m <sup>2</sup> ]	0.0265 [1.88x10 <sup>-4</sup> ]	
Axial Shaft Load lbs [N]	10 [44]	
Radial Shaft Load @ 0.75" [19 mm]	20 [89]	
Motor Weight lbs [kg]	8.3 [3.8]	
Step Angle (full step) degrees	1.8	
How to order	G-46	

### Performance Planetary Gearmotors

	In-line	Right-angle
<b>Gear Ratio</b> in [mm]	L	A x B
3 to 10	10.6 [270.0]	5.20 x 15.59 [132.1 x 396.0]
16 to 100	11.7 [297.0]	5.20 x 16.72 [132.1 x 424.7]
160 to 700	13.0 [331.0]	Above 100:1, not available

### Value Planetary Gearmotors

	In-line	Right-angle
<b>Gear Ratio</b> in [mm]	L	A x B
3 to 10	11.0 [279]	5.20 x 15.96 [132.1 x 405.4]
16 to 100	12.2 [310]	5.20 x 17.23 [132.1 x 437.6]



# Specifications

Encoder  
Options

The -EMK option provides an incremental 1000 line rotary encoder coupled to the rear shaft of our S, P and K Series step motors.

The -EM option provides an incremental 500 line rotary encoder coupled to the rear shaft of our S, P and K Series step motors.

An encoder is typically used with the SmartStep, S6961 and S6962 programmable step motor controls to provide stall detection and position maintenance. Encoders are also commonly used with displays to provide position information, or to provide position feedback to your own controller when using our NextStep® or S6002 drive.

-EM and -EMK are compatible with:  
S, P and K Series step motors and gearmotors, sizes 23, 34 and 42

### Electrical

<b>Output Format</b>	Incremental, dual square wave quadrature, with index.
<b>-EMK Pulses Per Revolution</b>	1000 line (4000 post-quadrature), one index line
<b>-EM Pulses Per Revolution</b>	500 line (2000 post-quadrature), one index line
<b>Supply Voltage</b>	5VDC $\pm$ 5 %
<b>Current Requirements</b>	140 mA
<b>Frequency</b>	100 kHz pre-quadrature, max.

### Mechanical

<b>Outline Dimensions</b>	Adds 1.0 inch to the length of 23 frame motors. No dimension change on 34 and 42 frame motors.
<b>Speed</b>	6000 rpm max
<b>Weight</b>	6 oz
<b>Cable</b>	12-foot cable standard

### Environmental

<b>Operating Temperature</b>	-10° to 70°C (S Series, P2X Series), -10° to 100°C (P3X, P4X & K Series)
<b>Storage Temperature</b>	-20° to 70°C (S Series, P2X Series), -30° to 110°C (P3X, P4X & K Series)
<b>Housing</b>	Drip-proof
<b>Vibration</b>	10 to 200 Hz @ 5Gs (S & P2X Series), 5-2000 Hz @ 10 Gs (P3X, P4X & K Series)
<b>Shock</b>	100G for 6 ms (S & P2X Series), 50 G for 11 ms (P3X, P4X & K Series)

### Notes:

- S32, S33, P31, P32, P33, P41, P42, and K42 motors: the encoder is housed inside the rear plate of the motor.
- The encoder adds 1.0 inch to the length of the S21, S22, S23, P21 and P22 motors.
- The encoder cable can be extended by the customer to a maximum of 100 feet if a high quality shielded, twisted pair cable is used.