

## 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<br>oz-in [N-m] | Recommended<br>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

S32X, S33X

EMK

EQ - 500 line encoder with 12-ft quick disconnect cable

EM

EQK25 - 1000 line encoder with 25-ft quick disconnect cable

C25

EQ25 - 500 line encoder with 25-ft quick disconnect cable

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.

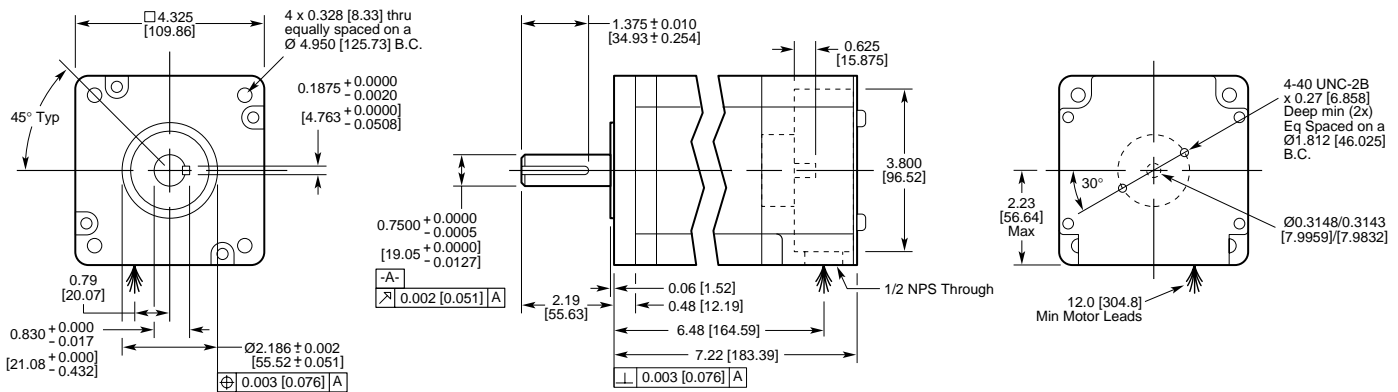




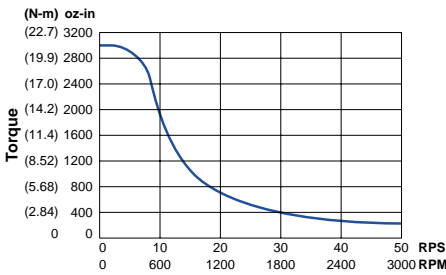
K42X Motor in [mm]

CE, cULUS certified

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 Parallel/240 Series (100% duty cycle)

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



Please note: In order to get the performance curve shown above, motors should be wired in parallel when the drive is operated from 120 VAC; and motors should be wired in series when the drive is run off 240 VAC.

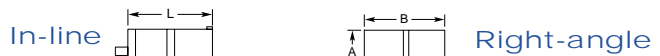
## Applying Gearmotors

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

## Motor and Encoder Data

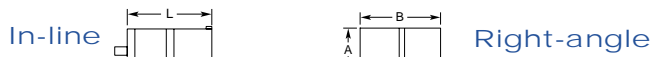
|   | K42 Series | K42 Parallel                   |
|---|------------|--------------------------------|
| Continuous Stall Torque oz-in [N-m]                     |            | 3000 [21.2]                    |
| Recommended Current/Phase Amps                          | 3.2        | 6.4                            |
| Inductance mH   | 60         | 15                             |
| Max. Motor Winding Temp. °F [°C]                        |            | 212 [100]                      |
| Rotor Inertia oz-in-s <sup>2</sup> [kg-m <sup>2</sup> ] |            | 0.156 [1.09x10 <sup>-3</sup> ] |
| Axial Shaft Load lbs [N]                                |            | 404 [1790]                     |
| Radial Shaft Load @ 0.5" [12.7 mm]                      |            | 110 [489]                      |
| Motor Weight lbs [kg]                                   |            | 18.4 [8.35]                    |
| Step Angle (full step) degrees                          |            | 1.8                            |
| How to order  |            | G-46                           |

## Performance Planetary Gearmotors



| Gear Ratio in [mm] | L          | A x B                        |
|--------------------|------------|------------------------------|
| 3 to 10            | 12 [304]   | 5.95 x 18.61 [151.3 x 472.7] |
| 16 to 100          | 13.6 [344] | 5.95 x 20.24 [151.3 x 514.1] |
| 160 to 700         | 15.2 [385] | Above 100:1, not available   |

## Value Planetary Gearmotors



| Gear Ratio in [mm] | L          | A x B                        |
|--------------------|------------|------------------------------|
| 3 to 10            | 12.4 [315] | 5.95 x 19.07 [151.3 x 484.4] |
| 16 to 100          | 14.0 [356] | 5.95 x 20.67 [151.3 x 525.0] |





# 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.