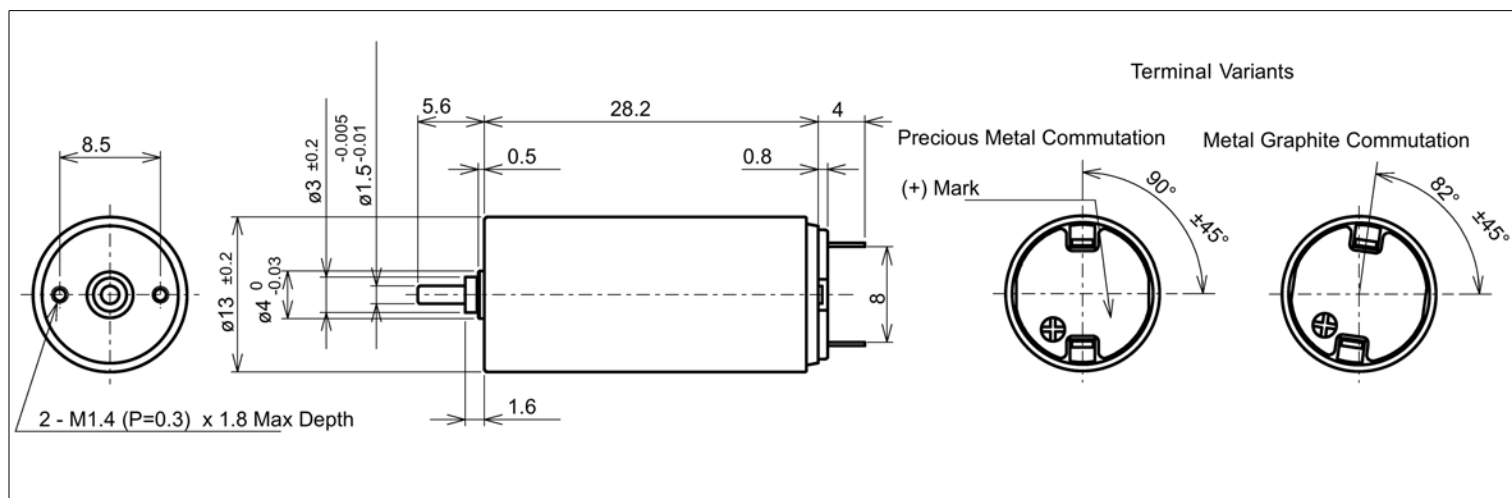


Coreless DC Motor - 13 mm Ø x 28



C13P06SY000 2.32 Watts Peak

Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	6.0 Volts	6.0 Volts	6.0 Volts
No-Load Speed	9,700 rpm	9,700 rpm	9,700 rpm
Stall Torque	9.4 mNm	95.0 gcm	1.33 oz-in
No-Load Current	0.037 Amps	0.037 Amps	0.037 Amps
Peak Output Power	2.32 Watts	2.32 Watts	2.32 Watts
Torque Constant	5.77 mNm/A	58.87 gcm/A	0.82 oz-in/A
Terminal Resistance	3.70 Ohms	3.70 Ohms	3.70 Ohms
Back-EMF Constant	0.60 V/krpm	0.60 V/krpm	0.60 V/krpm
Inductance	0.090 mH	0.090 mH	0.090 mH
Rotor Inertia	0.309 kg-m ² x10 ⁻⁷	0.309 gm cm ²	0.044 x10 ⁻⁴ oz in sec ²
Mechanical Time Constant	3.4 msec	3.4 msec	3.4 msec
Slope of Speed/Torque Curve	1,036.1 rpm/mNm	102.1 rpm/gcm	7,316.5 rpm/oz-in
Speed Constant	1,654 rpm/Volt	1,654 rpm/Volt	1,654 rpm/Volt
Motor Constant	3.00 mNm/√Watt	30.61 gcm/√Watt	0.43 oz-in/√Watt

Ratings below are at 60°C. At room temperature the ratings would be considerably higher.

Rated Power @ 8,400 rpm	0.88 Watts	0.88 Watts	0.88 Watts
Rated Torque @ 8,400 rpm	1.0 mNm	10.2 gcm	0.14 oz-in
Rated Current @ 8,400 rpm	0.310 Amps	0.310 Amps	0.310 Amps

Part Number: How to Order C13P06SY000 Characteristics - Specifications at 22 °C

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	100 °C
Press Fit Force - Max	Bearing Type Sleeve Bearings	Mass	20.4 grams
Gearbox Options	13 mm Ø Metal Planetary Gearbox P13 Series. 12 mm Ø G12 Series Precision Spur Gearbox.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Compl. Outputs & Line Drivers. Max 256 lines / channel.		
Options - Other	Metal Graphite Commutation. Wire Leads, Harness and Connectors. Lubricants. Rear Shaft.		

Global Motion Products
 Distributed by:
 Precision Motion Distributors: (925) 803-9565
 Technical Support: (760) 451-2723
<http://www.gmpwebsite.com> Email: info@gmpwebsite.com

Commutation Type: Manufactured under a Certified ISO
 9001:2008 Quality System and ISO
 Precious Metal 14001:2004 Environmental
 Management System.

RoHS Compliant

B - September 2013

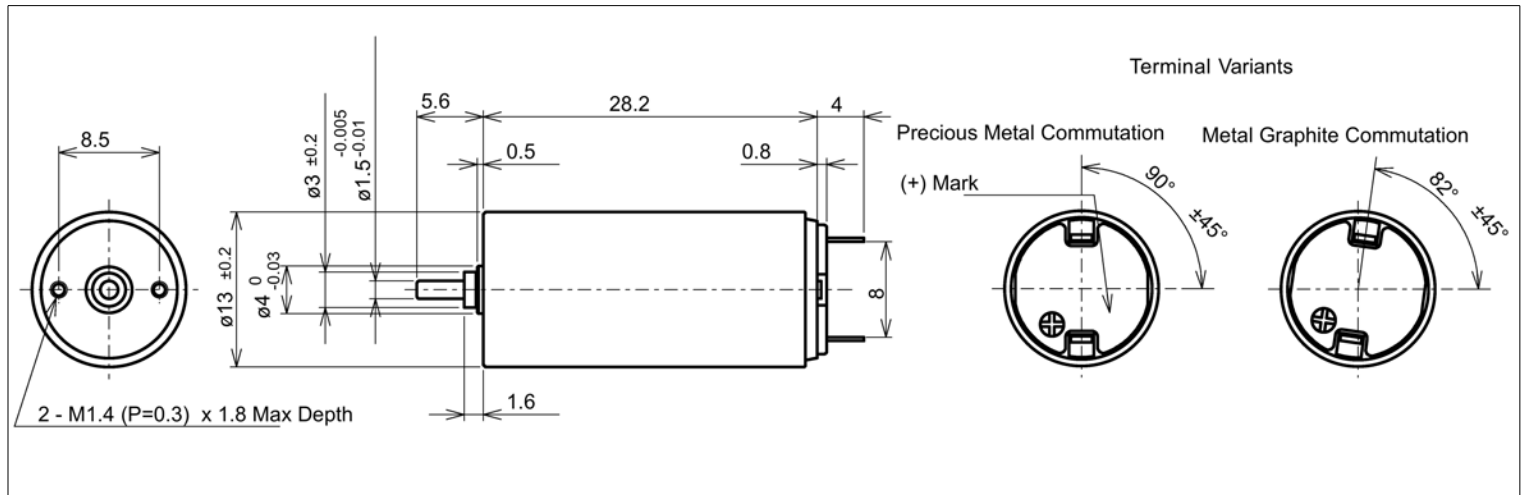
Specifications Subject to change without notice

Coreless DC Motor - 13 mm Ø x 28



C13P06SY010 1.79 Watts Peak

Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	6.0 Volts	6.0 Volts	6.0 Volts
No-Load Speed	8,600 rpm	8,600 rpm	8,600 rpm
Stall Torque	8.0 mNm	82.0 gcm	1.14 oz-in
No-Load Current	0.017 Amps	0.017 Amps	0.017 Amps
Peak Output Power	1.79 Watts	1.79 Watts	1.79 Watts
Torque Constant	6.57 mNm/A	67.01 gcm/A	0.93 oz-in/A
Terminal Resistance	4.90 Ohms	4.90 Ohms	4.90 Ohms
Back-EMF Constant	0.69 V/krpm	0.69 V/krpm	0.69 V/krpm
Inductance	0.110 mH	0.110 mH	0.110 mH
Rotor Inertia	0.296 kg-m ² x10 ⁻⁷	0.296 gm cm ²	0.042 x10 ⁻⁴ oz in sec ²

Mechanical Time Constant	3.4 msec	3.4 msec	3.4 msec
Slope of Speed/Torque Curve	1,068.7 rpm/mNm	104.9 rpm/gcm	7,546.9 rpm/oz-in
Speed Constant	1,453 rpm/Volt	1,453 rpm/Volt	1,453 rpm/Volt
Motor Constant	2.97 mNm/√Watt	30.27 gcm/√Watt	0.42 oz-in/√Watt

Ratings below are at 60°C. At room temperature the ratings would be considerably higher.

Rated Power @ 7,300 rpm	0.76 Watts	0.76 Watts	0.76 Watts
Rated Torque @ 7,300 rpm	1.0 mNm	10.2 gcm	0.14 oz-in
Rated Current @ 7,300 rpm	0.235 Amps	0.235 Amps	0.235 Amps

Part Number: How to Order C13P06SY010 Characteristics - Specifications at 22 °C

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	100 °C
Press Fit Force - Max	Bearing Type Sleeve Bearings	Mass	20.4 grams
Gearbox Options	13 mm Ø Metal Planetary Gearbox P13 Series. 12 mm Ø G12 Series Precision Spur Gearbox.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Compl. Outputs & Line Drivers. Max 256 lines / channel.		
Options - Other	Metal Graphite Commutation. Wire Leads, Harness and Connectors. Lubricants. Rear Shaft.		

Global Motion Products
 Distributed by:
 Precision Motion Distributors: (925) 803-9565
 Technical Support: (760) 451-2723
 http://www.gmpwebsite.com Email: info@gmpwebsite.com

Commutation Type: Manufactured under a Certified ISO 9001:2008 Quality System and ISO 14001:2004 Environmental Management System.
 Precious Metal

RoHS Compliant

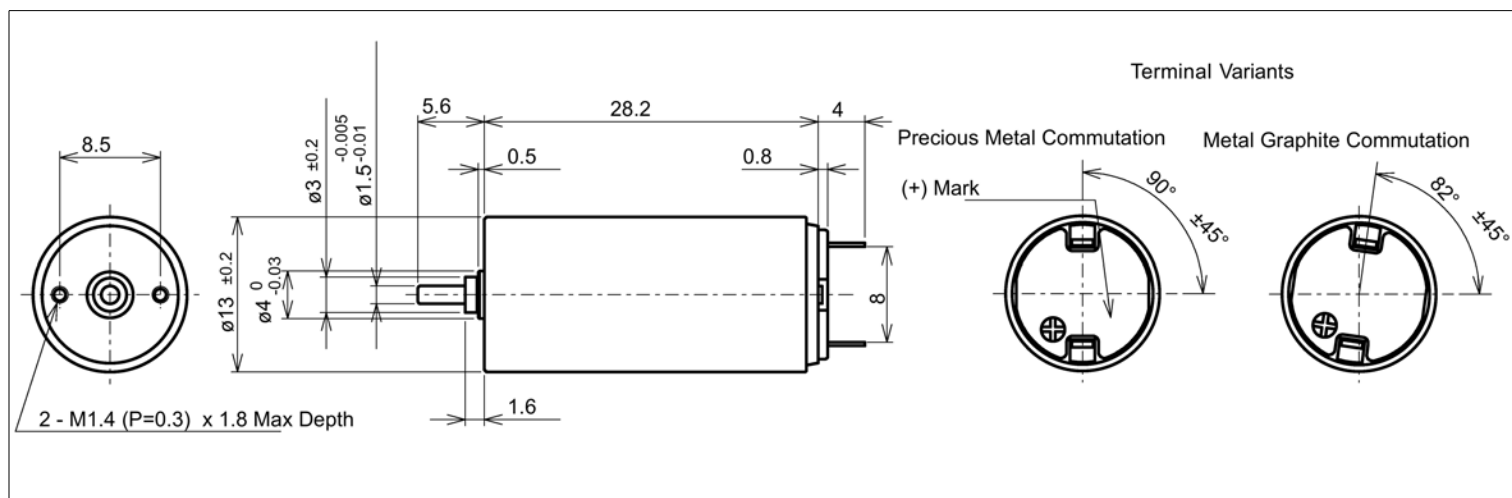
B - September 2013 Specifications Subject to change without notice

Coreless DC Motor - 13 mm Ø x 28



C13P06SY020 1.24 Watts Peak

Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	6.0 Volts	6.0 Volts	6.0 Volts
No-Load Speed	7,300 rpm	7,300 rpm	7,300 rpm
Stall Torque	6.6 mNm	67.0 gcm	0.93 oz-in
No-Load Current	0.017 Amps	0.017 Amps	0.017 Amps
Peak Output Power	1.24 Watts	1.24 Watts	1.24 Watts
Torque Constant	7.70 mNm/A	78.48 gcm/A	1.09 oz-in/A
Terminal Resistance	7.00 Ohms	7.00 Ohms	7.00 Ohms
Back-EMF Constant	0.81 V/krpm	0.81 V/krpm	0.81 V/krpm
Inductance	0.160 mH	0.160 mH	0.160 mH
Rotor Inertia	0.297 kg-m ² x10 ⁻⁷	0.297 gm cm ²	0.042 x10 ⁻⁴ oz in sec ²

Mechanical Time Constant	3.5 msec	3.5 msec	3.5 msec
Slope of Speed/Torque Curve	1,106.6 rpm/mNm	109.0 rpm/gcm	7,814.4 rpm/oz-in
Speed Constant	1,241 rpm/Volt	1,241 rpm/Volt	1,241 rpm/Volt
Motor Constant	2.91 mNm/√Watt	29.66 gcm/√Watt	0.41 oz-in/√Watt

Ratings below are at 60°C. At room temperature the ratings would be considerably higher.

Rated Power @ 6,100 rpm	0.64 Watts	0.64 Watts	0.64 Watts
Rated Torque @ 6,100 rpm	1.0 mNm	10.2 gcm	0.14 oz-in
Rated Current @ 6,100 rpm	0.190 Amps	0.190 Amps	0.190 Amps

Part Number: How to Order C13P06SY020 Characteristics - Specifications at 22 °C

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	100 °C
Press Fit Force - Max	Bearing Type Sleeve Bearings	Mass	20.4 grams
Gearbox Options	13 mm Ø Metal Planetary Gearbox P13 Series. 12 mm Ø G12 Series Precision Spur Gearbox.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Compl. Outputs & Line Drivers. Max 256 lines / channel.		
Options - Other	Metal Graphite Commutation. Wire Leads, Harness and Connectors. Lubricants. Rear Shaft.		

Global Motion Products
 Distributed by:
 Precision Motion Distributors: (925) 803-9565
 Technical Support: (760) 451-2723
 http://www.gmpwebsite.com Email: info@gmpwebsite.com

Commutation Type: Manufactured under a Certified ISO
 9001:2008 Quality System and ISO
 Precious Metal 14001:2004 Environmental
 Management System.

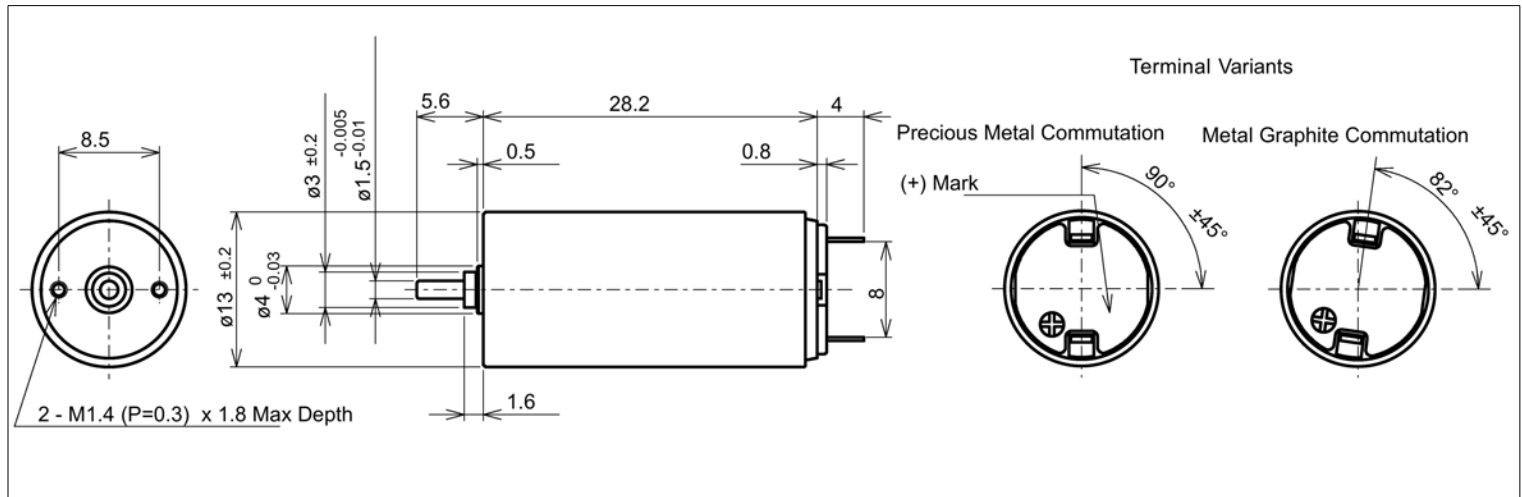
RoHS Compliant

Coreless DC Motor - 13 mm Ø x 28



C13P12SY000 3.43 Watts Peak

Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	12.0 Volts	12.0 Volts	12.0 Volts
No-Load Speed	12,100 rpm	12,100 rpm	12,100 rpm
Stall Torque	11.0 mNm	112.0 gcm	1.56 oz-in
No-Load Current	0.017 Amps	0.017 Amps	0.017 Amps
Peak Output Power	3.43 Watts	3.43 Watts	3.43 Watts
Torque Constant	9.34 mNm/A	95.20 gcm/A	1.32 oz-in/A
Terminal Resistance	10.20 Ohms	10.20 Ohms	10.20 Ohms
Back-EMF Constant	0.98 V/krpm	0.98 V/krpm	0.98 V/krpm
Inductance	0.230 mH	0.230 mH	0.230 mH
Rotor Inertia	0.294 kg-m ² x10 ⁻⁷	0.294 gm cm ²	0.042 x10 ⁻⁴ oz in sec ²

Mechanical Time Constant	3.4 msec	3.4 msec	3.4 msec
Slope of Speed/Torque Curve	1,101.6 rpm/mNm	108.0 rpm/gcm	7,779.2 rpm/oz-in
Speed Constant	1,023 rpm/Volt	1,023 rpm/Volt	1,023 rpm/Volt
Motor Constant	2.92 mNm/√Watt	29.81 gcm/√Watt	0.41 oz-in/√Watt

Ratings below are at 60°C. At room temperature the ratings would be considerably higher.

Rated Power @ 9,700 rpm	2.03 Watts	2.03 Watts	2.03 Watts
Rated Torque @ 9,700 rpm	2.0 mNm	20.4 gcm	0.28 oz-in
Rated Current @ 9,700 rpm	0.300 Amps	0.300 Amps	0.300 Amps

Part Number: How to Order C13P12SY000 Characteristics - Specifications at 22 °C

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	100 °C
Press Fit Force - Max	Bearing Type Sleeve Bearings	Mass	20.4 grams
Gearbox Options	13 mm Ø Metal Planetary Gearbox P13 Series. 12 mm Ø G12 Series Precision Spur Gearbox.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Compl. Outputs & Line Drivers. Max 256 lines / channel.		
Options - Other	Metal Graphite Commutation. Wire Leads, Harness and Connectors. Lubricants. Rear Shaft.		

Global Motion Products
 Distributed by:
 Precision Motion Distributors: (925) 803-9565
 Technical Support: (760) 451-2723
 http://www.gmpwebsite.com Email: info@gmpwebsite.com

Commutation Type: Manufactured under a Certified ISO
 Precious Metal 9001:2008 Quality System and ISO
 14001:2004 Environmental
 Management System.

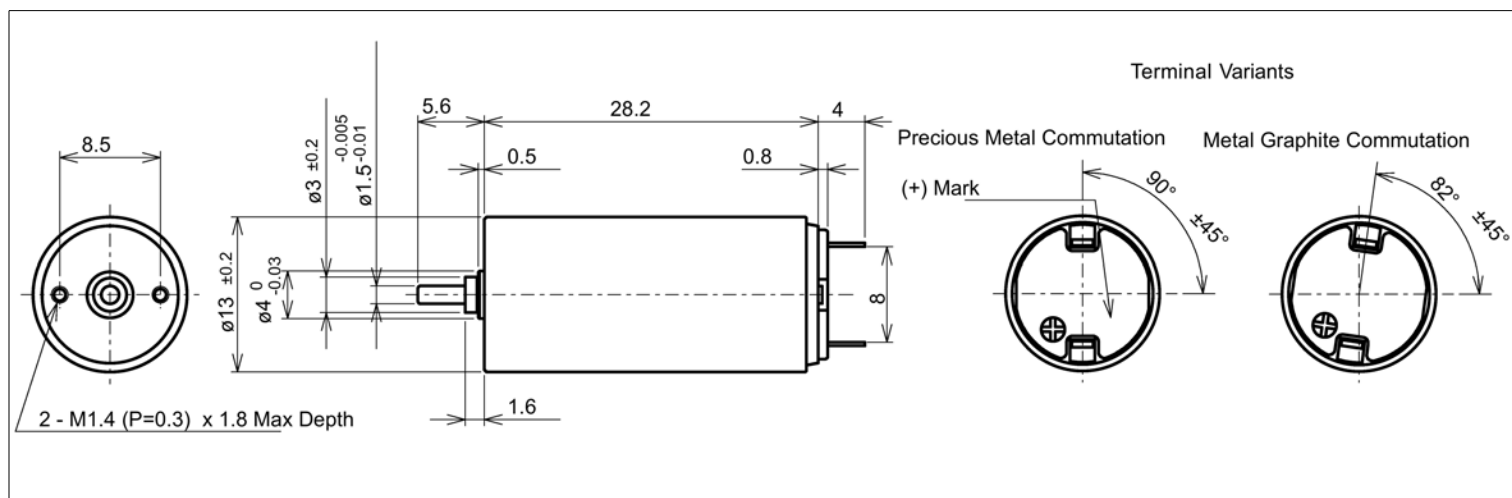
RoHS Compliant

Coreless DC Motor - 13 mm Ø x 28



C13P12SY010 2.22 Watts Peak

Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	12.0 Volts	12.0 Volts	12.0 Volts
No-Load Speed	10,120 rpm	10,120 rpm	10,120 rpm
Stall Torque	8.6 mNm	87.0 gcm	1.21 oz-in
No-Load Current	0.017 Amps	0.017 Amps	0.017 Amps
Peak Output Power	2.22 Watts	2.22 Watts	2.22 Watts
Torque Constant	11.08 mNm/A	112.98 gcm/A	1.57 oz-in/A
Terminal Resistance	15.50 Ohms	15.50 Ohms	15.50 Ohms
Back-EMF Constant	1.16 V/krpm	1.16 V/krpm	1.16 V/krpm
Inductance	0.340 mH	0.340 mH	0.340 mH
Rotor Inertia	0.282 kg-m ² x10 ⁻⁷	0.282 gm cm ²	0.040 x10 ⁻⁴ oz in sec ²
Mechanical Time Constant	3.6 msec	3.6 msec	3.6 msec
Slope of Speed/Torque Curve	1,179.8 rpm/mNm	116.3 rpm/gcm	8,331.2 rpm/oz-in
Speed Constant	862 rpm/Volt	862 rpm/Volt	862 rpm/Volt
Motor Constant	2.81 mNm/√Watt	28.70 gcm/√Watt	0.40 oz-in/√Watt

Ratings below are at 60°C. At room temperature the ratings would be considerably higher.

Rated Power @ 8,150 rpm	1.28 Watts	1.28 Watts	1.28 Watts
Rated Torque @ 8,150 rpm	1.5 mNm	15.3 gcm	0.21 oz-in
Rated Current @ 8,150 rpm	0.200 Amps	0.200 Amps	0.200 Amps

Part Number: How to Order C13P12SY010 Characteristics - Specifications at 22 °C

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	100 °C
Press Fit Force - Max	Bearing Type Sleeve Bearings	Mass	20.4 grams
Gearbox Options	13 mm Ø Metal Planetary Gearbox P13 Series. 12 mm Ø G12 Series Precision Spur Gearbox.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Compl. Outputs & Line Drivers. Max 256 lines / channel.		
Options - Other	Metal Graphite Commutation. Wire Leads, Harness and Connectors. Lubricants. Rear Shaft.		

Global Motion Products
 Distributed by:
 Precision Motion Distributors: (925) 803-9565
 Technical Support: (760) 451-2723
<http://www.gmpwebsite.com> Email: info@gmpwebsite.com

Commutation Type: Manufactured under a Certified ISO
 9001:2008 Quality System and ISO
 Precious Metal 14001:2004 Environmental
 Management System.

RoHS Compliant

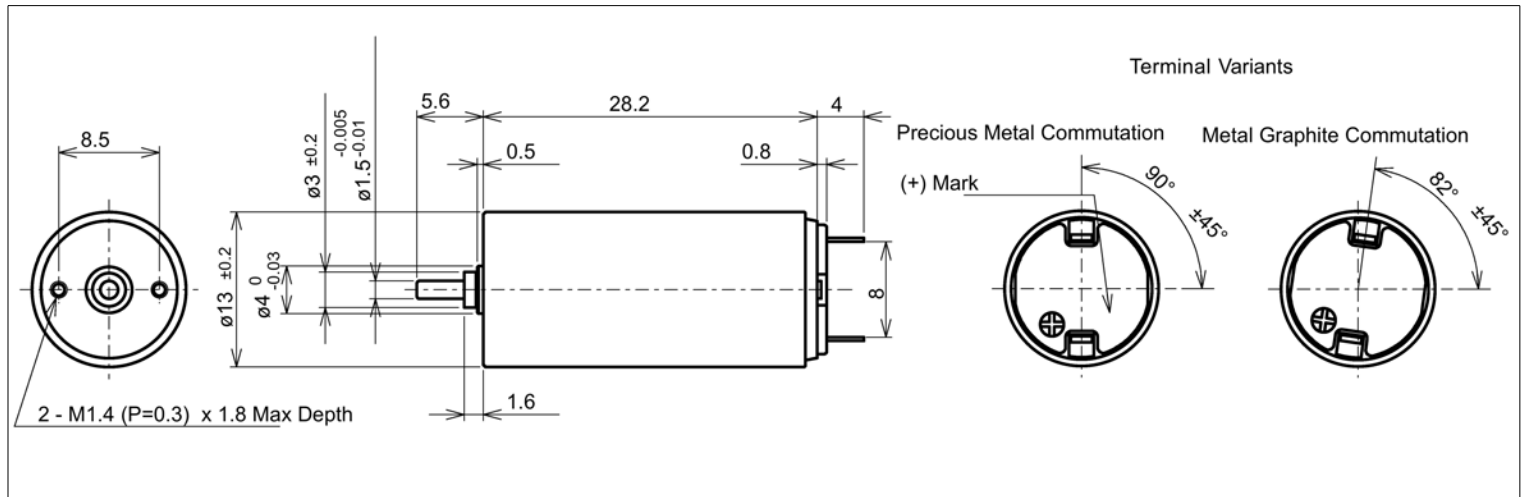
B - September 2013 Specifications Subject to change without notice

Coreless DC Motor - 13 mm Ø x 28



C13P12SY020 1.35 Watts Peak

Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	12.0 Volts	12.0 Volts	12.0 Volts
No-Load Speed	8,000 rpm	8,000 rpm	8,000 rpm
Stall Torque	6.6 mNm	67.0 gcm	0.93 oz-in
No-Load Current	0.010 Amps	0.010 Amps	0.010 Amps
Peak Output Power	1.35 Watts	1.35 Watts	1.35 Watts
Torque Constant	14.02 mNm/A	142.96 gcm/A	1.99 oz-in/A
Terminal Resistance	25.50 Ohms	25.50 Ohms	25.50 Ohms
Back-EMF Constant	1.47 V/krpm	1.47 V/krpm	1.47 V/krpm
Inductance	0.560 mH	0.560 mH	0.560 mH
Rotor Inertia	0.291 kg-m ² x10 ⁻⁷	0.291 gm cm ²	0.041 x10 ⁻⁴ oz in sec ²
Mechanical Time Constant	3.8 msec	3.8 msec	3.8 msec
Slope of Speed/Torque Curve	1,212.6 rpm/mNm	119.4 rpm/gcm	8,562.8 rpm/oz-in
Speed Constant	681 rpm/Volt	681 rpm/Volt	681 rpm/Volt
Motor Constant	2.78 mNm/√Watt	28.31 gcm/√Watt	0.39 oz-in/√Watt

Ratings below are at 60°C. At room temperature the ratings would be considerably higher.

Rated Power @ 6,500 rpm	0.82 Watts	0.82 Watts	0.82 Watts
Rated Torque @ 6,500 rpm	1.2 mNm	12.2 gcm	0.17 oz-in
Rated Current @ 6,500 rpm	0.120 Amps	0.120 Amps	0.120 Amps

Part Number: How to Order C13P12SY020 Characteristics - Specifications at 22 °C

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	100 °C
Press Fit Force - Max	Bearing Type Sleeve Bearings	Mass	20.4 grams
Gearbox Options	13 mm Ø Metal Planetary Gearbox P13 Series. 12 mm Ø G12 Series Precision Spur Gearbox.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Compl. Outputs & Line Drivers. Max 256 lines / channel.		
Options - Other	Metal Graphite Commutation. Wire Leads, Harness and Connectors. Lubricants. Rear Shaft.		

Global Motion Products
 Distributed by:
 Precision Motion Distributors: (925) 803-9565
 Technical Support: (760) 451-2723
<http://www.gmpwebsite.com> Email: info@gmpwebsite.com

Commutation Type: Manufactured under a Certified ISO
 9001:2008 Quality System and ISO
 Precious Metal 14001:2004 Environmental
 Management System.

RoHS Compliant

B - September 2013

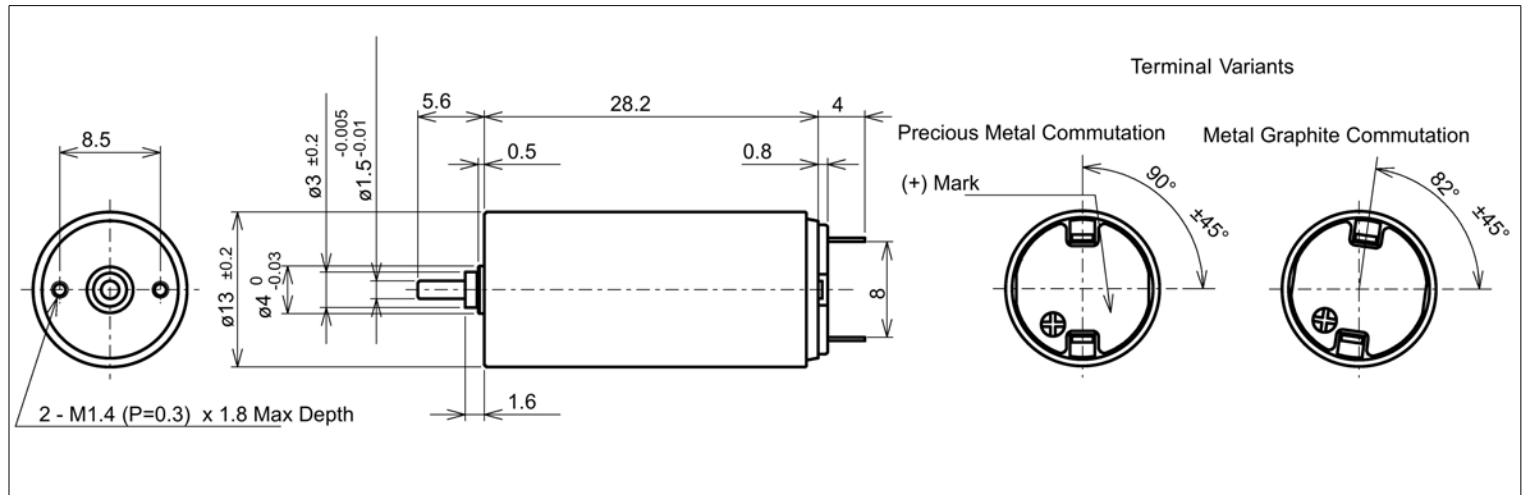
Specifications Subject to change without notice

Coreless DC Motor - 13 mm Ø x 28



C13P24SY000 3.20 Watts Peak

Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	24.0 Volts	24.0 Volts	24.0 Volts
No-Load Speed	12,200 rpm	12,200 rpm	12,200 rpm
Stall Torque	10.2 mNm	104.0 gcm	1.44 oz-in
No-Load Current	0.010 Amps	0.010 Amps	0.010 Amps
Peak Output Power	3.20 Watts	3.20 Watts	3.20 Watts
Torque Constant	18.45 mNm/A	188.09 gcm/A	2.61 oz-in/A
Terminal Resistance	43.40 Ohms	43.40 Ohms	43.40 Ohms
Back-EMF Constant	1.93 V/krpm	1.93 V/krpm	1.93 V/krpm
Inductance	0.930 mH	0.930 mH	0.930 mH
Rotor Inertia	0.292 kg-m ² x10 ⁻⁷	0.292 gm cm ²	0.041 x10 ⁻⁴ oz in sec ²

Mechanical Time Constant	3.7 msec	3.7 msec	3.7 msec
Slope of Speed/Torque Curve	1,196.0 rpm/mNm	117.3 rpm/gcm	8,445.8 rpm/oz-in
Speed Constant	518 rpm/Volt	518 rpm/Volt	518 rpm/Volt
Motor Constant	2.80 mNm/√Watt	28.55 gcm/√Watt	0.40 oz-in/√Watt

Ratings below are at 60°C. At room temperature the ratings would be considerably higher.

Rated Power @ 9,700 rpm	2.03 Watts	2.03 Watts	2.03 Watts
Rated Torque @ 9,700 rpm	2.0 mNm	20.4 gcm	0.28 oz-in
Rated Current @ 9,700 rpm	0.145 Amps	0.145 Amps	0.145 Amps

Part Number: How to Order C13P24SY000 Characteristics - Specifications at 22 °C

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	100 °C
Press Fit Force - Max	Bearing Type Sleeve Bearings	Mass	20.4 grams
Gearbox Options	13 mm Ø Metal Planetary Gearbox P13 Series. 12 mm Ø G12 Series Precision Spur Gearbox.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Compl. Outputs & Line Drivers. Max 256 lines / channel.		
Options - Other	Metal Graphite Commutation. Wire Leads, Harness and Connectors. Lubricants. Rear Shaft.		

Global Motion Products
 Distributed by:
 Precision Motion Distributors: (925) 803-9565
 Technical Support: (760) 451-2723
<http://www.gmpwebsite.com> Email: info@gmpwebsite.com

Commutation Type: Manufactured under a Certified ISO
 9001:2008 Quality System and ISO
 Precious Metal 14001:2004 Environmental
 Management System.

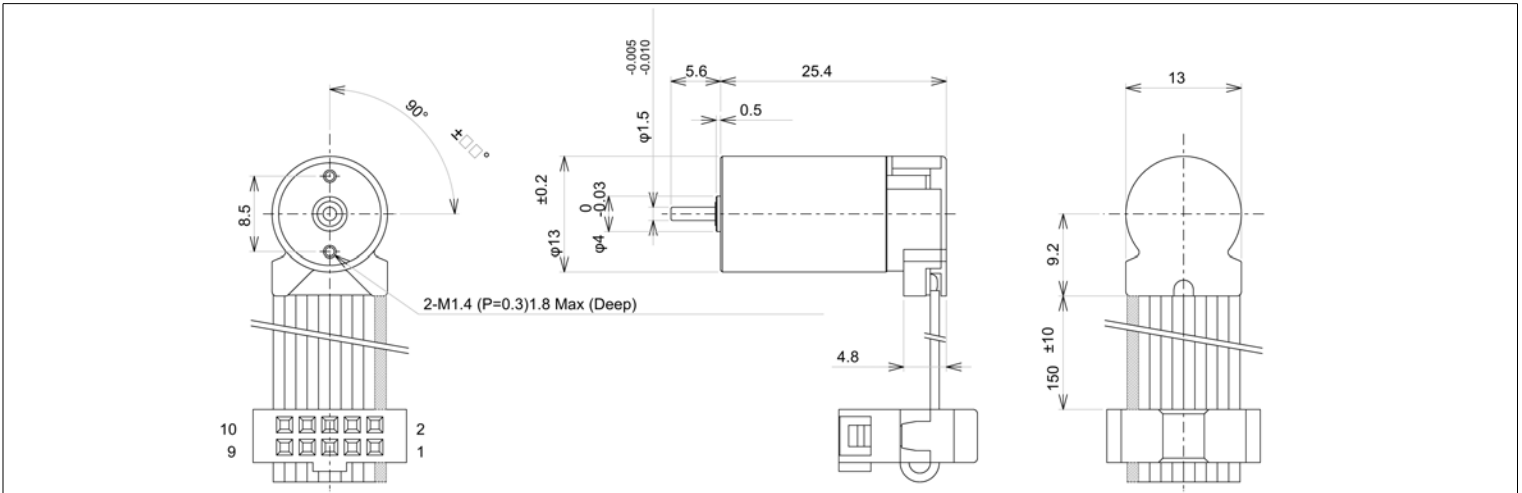
RoHS Compliant

B - September 2013

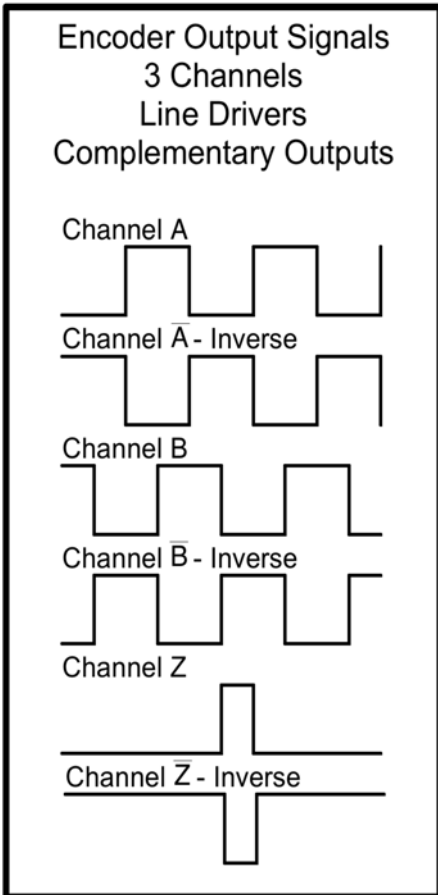
Specifications Subject to change without notice

13 mm Ø Encoder - 3 Channel

Series EM13xxxxZ50 - Line Drive - Compl. Out



Not to Scale - Dimensions in millimeters (mm)



Supply Voltage - Max	5.20 Volt
Supply Voltage - Min	4.75 Volt
Supply Current - Max	≤ 25 mA
Output Current - Max	≤ 5 mA
Max Temp - Operating	60°C
Min Temp - Operating	-10°C
Relative Humidity - Operating	20% to 85%

Above Drawing is for encoder mounted to 13 mm diameter x 20 mm long Coreless dc motor.

Encoder is compatible with 13 mm diameter x 20 mm and x 28 mm long Coreless dc motors.

Length increase for integrated encoder is 5.7 mm.

Counts per Track per Rev.
32, 64, 128, 256

Maximum Frequency Response
Corresponds to a motor rotor speed of 18,750 rpm

Pinout Details	
Connector Pin Number	Function
1	Motor +
2	Vcc
3	Ground
4	Motor -
5	Channel A - Inv
6	Channel A
7	Channel B - Inv
8	Channel B
9	Channel Z - Inv
10	Channel Z

Connector Details	
Manufacturer:	Molex
Housing Assembly:	54559-1011
Upper Housing:	54560-1011
Strain Relief:	54561-1011
Flat Band Cable:	AWG#28

This Encoder Is Only Available Mounted To A Global Motion Products Coreless DC Motor. It Is Not Sold Separately.

Line Drivers, Complementary Outputs, and Index Track can be ignored. Utilize only signals needed. This encoder employs a Magnetoresistive Effect Element. It can be integrated into a range of 13 mm diameter coreless dc motors that have options for either 12 mm Ø spur or 13 mm Ø planetary gearboxes.

Similar versions of this encoder are available for 10 and 16 mm/17 mm diameter coreless dc motors. A 16 mm diameter 2 Channel Optical version also is available. This encoder is not sold separately.

Characteristics and Specifications at 22°C

Global Motion Products
Distributed by:
Precision Motion Distributors: (925) 803-9565
Technical Support: (760) 451-2723
<http://www.gmpwebsite.com> Email: info@gmpwebsite.com

Manufactured under a Certified ISO 9001:2008 Quality System.

RoHS Compliant