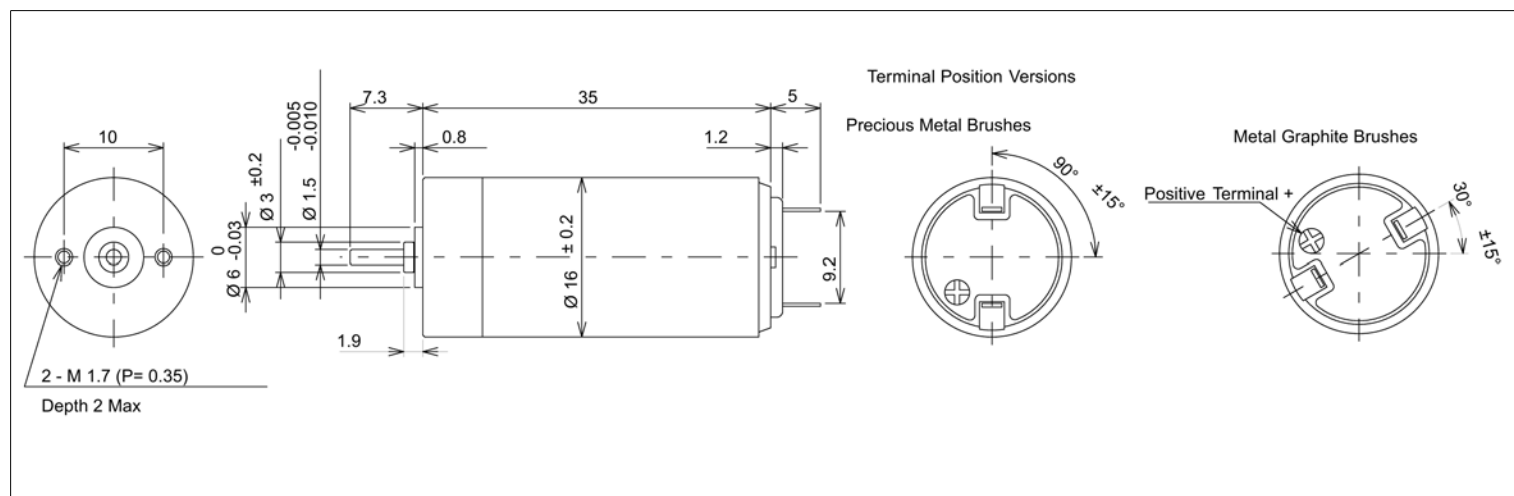


16 mm Ø Coreless DC Motor

C16P06SX000 **2.05 Watts Peak Power**



Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	6.0 Volts	6.0 Volts	6.0 Volts
No-Load Speed	6,400 rpm	6,400 rpm	6,400 rpm
Stall Torque	12.4 mNm	126.0 gcm	1.75 oz-in
No-Load Current	0.013 Amps	0.013 Amps	0.013 Amps
Peak Output Power	2.05 Watts	2.05 Watts	2.05 Watts
Torque Constant	8.87 mNm/A	90.42 gcm/A	1.26 oz-in/A
Terminal Resistance	4.30 Ohms	4.30 Ohms	4.30 Ohms
Back-EMF Constant	0.93 V/krpm	0.93 V/krpm	0.93 V/krpm
Inductance	0.086 mH	0.086 mH	0.086 mH
Rotor Inertia	0.502 kg-m ² x10 ⁻⁷	0.502 gm cm ²	0.071 x10 ⁻⁴ oz in sec ²

Mechanical Time Constant	2.7 msec	2.7 msec	2.7 msec
Slope of Speed/Torque Curve	517.3 rpm/mNm	50.8 rpm/gcm	3,652.8 rpm/oz-in
Speed Constant	1,077 rpm/Volt	1,077 rpm/Volt	1,077 rpm/Volt
Motor Constant	4.28 mNm/√Watt	43.60 gcm/√Watt	0.61 oz-in/√Watt

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

Rated Power @ 5,600 rpm	0.86 Watts	0.86 Watts	0.86 Watts
Rated Torque @ 5,600 rpm	1.5 mNm	15.0 gcm	0.21 oz-in
Rated Current @ 5,600 rpm	0.210 Amps	0.210 Amps	0.210 Amps
Part Number: How to Order	C16P06SX000	Characteristics - Specifications at	22 °C

Radial Load Rating	Radial Play	Max Temperature	60 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve	Mass	36.3 grams
Gearbox Options	Planetary & Spur. Low Backlash & Sintered Planetary. Ball Bearing versions. Special lubrication.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Complementary Outputs & Line Drivers or 2 Track Optical		
Options - Other	Metal Graphite Commutation. Ball Bearings. Wire Leads and connectors. Extended life versions.		

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Commutation Type: **Manufactured under a Certified ISO 9001 Quality System**
 Precious Metal

RoHS Compliant

A - January 2012

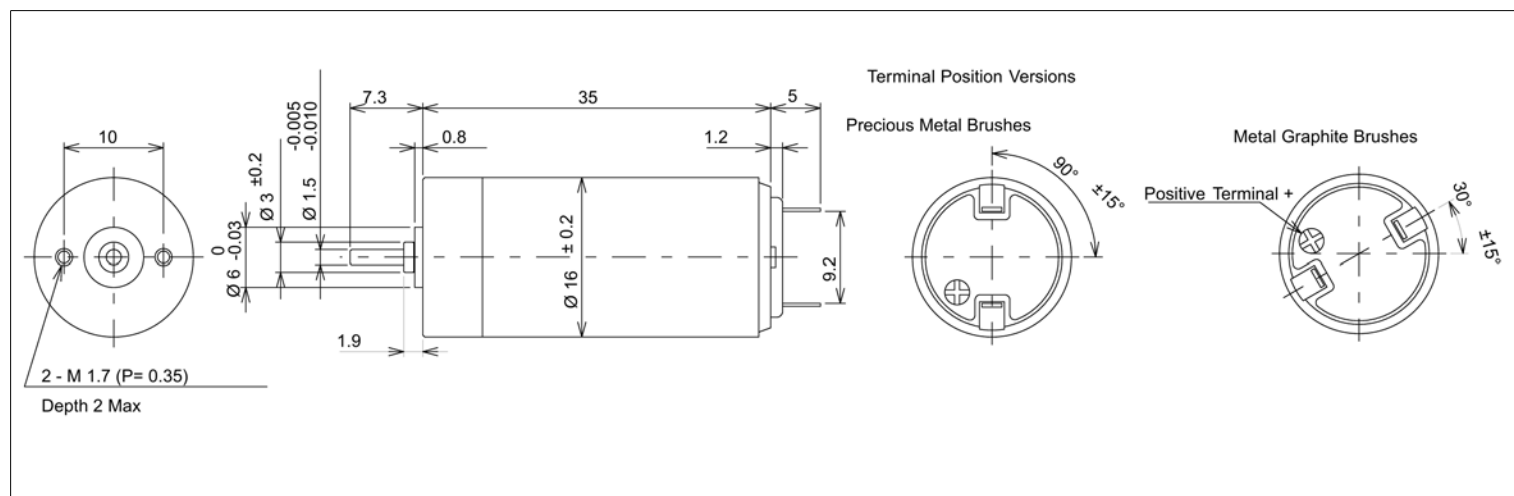
Specifications Subject to change without

16 mm Ø Coreless DC Motor

C16P12SX000 **2.65 Watts Peak Power**



Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	12.0 Volts	12.0 Volts	12.0 Volts
No-Load Speed	8,500 rpm	8,500 rpm	8,500 rpm
Stall Torque	12.1 mNm	123.0 gcm	1.71 oz-in
No-Load Current	0.013 Amps	0.013 Amps	0.013 Amps
Peak Output Power	2.65 Watts	2.65 Watts	2.65 Watts
Torque Constant	13.28 mNm/A	135.46 gcm/A	1.88 oz-in/A
Terminal Resistance	13.20 Ohms	13.20 Ohms	13.20 Ohms
Back-EMF Constant	1.39 V/krpm	1.39 V/krpm	1.39 V/krpm
Inductance	0.121 mH	0.121 mH	0.121 mH
Rotor Inertia	0.416 kg-m ² x10 ⁻⁷	0.416 gm cm ²	0.059 x10 ⁻⁴ oz in sec ²
Mechanical Time Constant	3.1 msec	3.1 msec	3.1 msec
Slope of Speed/Torque Curve	703.9 rpm/mNm	69.1 rpm/gcm	4,970.4 rpm/oz-in
Speed Constant	719 rpm/Volt	719 rpm/Volt	719 rpm/Volt
Motor Constant	3.66 mNm/√Watt	37.28 gcm/√Watt	0.52 oz-in/√Watt

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

Rated Power @	7,100 rpm	1.46 Watts	1.46 Watts	1.46 Watts
Rated Torque @	7,100 rpm	2.0 mNm	20.0 gcm	0.28 oz-in
Rated Current @	7,100 rpm	0.190 Amps	0.190 Amps	0.190 Amps
Part Number: How to Order	C16P12SX000	Characteristics - Specifications at		22 °C

Radial Load Rating	Radial Play	Max Temperature	60 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve	Mass	36.3 grams
Gearbox Options	Planetary & Spur. Low Backlash & Sintered Planetary. Ball Bearing versions. Special lubrication.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Complementary Outputs & Line Drivers or 2 Track Optical		
Options - Other	Metal Graphite Commutation. Ball Bearings. Wire Leads and connectors. Extended life versions.		

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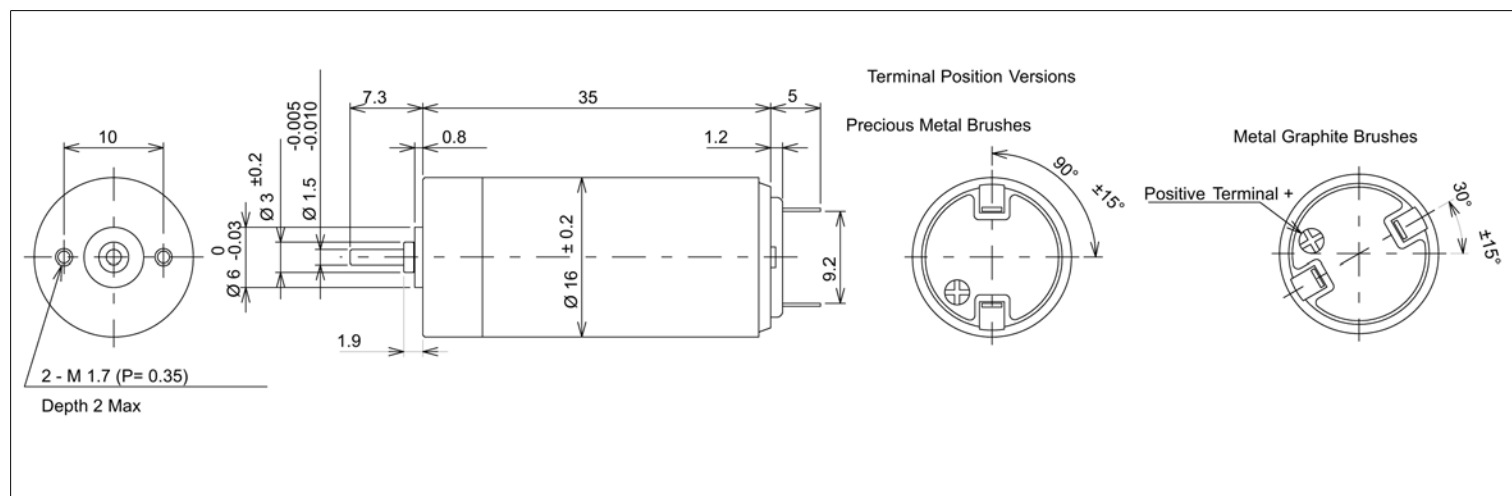
Specifications Subject to change without

16 mm Ø Coreless DC Motor

C16P24SX010 3.41 Watts Peak Power



Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	24.0 Volts	24.0 Volts	24.0 Volts
No-Load Speed	12,000 rpm	12,000 rpm	12,000 rpm
Stall Torque	11.0 mNm	113.0 gcm	1.56 oz-in
No-Load Current	0.010 Amps	0.010 Amps	0.010 Amps
Peak Output Power	3.41 Watts	3.41 Watts	3.41 Watts
Torque Constant	18.77 mNm/A	191.44 gcm/A	2.66 oz-in/A
Terminal Resistance	40.80 Ohms	40.80 Ohms	40.80 Ohms
Back-EMF Constant	1.97 V/krpm	1.97 V/krpm	1.97 V/krpm
Inductance	0.166 mH	0.166 mH	0.166 mH
Rotor Inertia	0.330 kg-m ² x10 ⁻⁷	0.330 gm cm ²	0.047 x10 ⁻⁴ oz in sec ²

Mechanical Time Constant	3.8 msec	3.8 msec	3.8 msec
Slope of Speed/Torque Curve	1,086.6 rpm/mNm	106.2 rpm/gcm	7,673.2 rpm/oz-in
Speed Constant	509 rpm/Volt	509 rpm/Volt	509 rpm/Volt
Motor Constant	2.94 mNm/√Watt	29.97 gcm/√Watt	0.42 oz-in/√Watt

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

Rated Power @ 11,000 rpm	1.13 Watts	1.13 Watts	1.13 Watts
Rated Torque @ 11,000 rpm	1.0 mNm	10.0 gcm	0.14 oz-in
Rated Current @ 11,000 rpm	0.075 Amps	0.075 Amps	0.075 Amps
Part Number: How to Order	C16P24SX010	Characteristics - Specifications at	22 °C

Radial Load Rating	Radial Play	Max Temperature	60 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve	Mass	36.3 grams
Gearbox Options	Planetary & Spur. Low Backlash & Sintered Planetary. Ball Bearing versions. Special lubrication.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Complementary Outputs & Line Drivers or 2 Track Optical		
Options - Other	Metal Graphite Commutation. Ball Bearings. Wire Leads and connectors. Extended life versions.		

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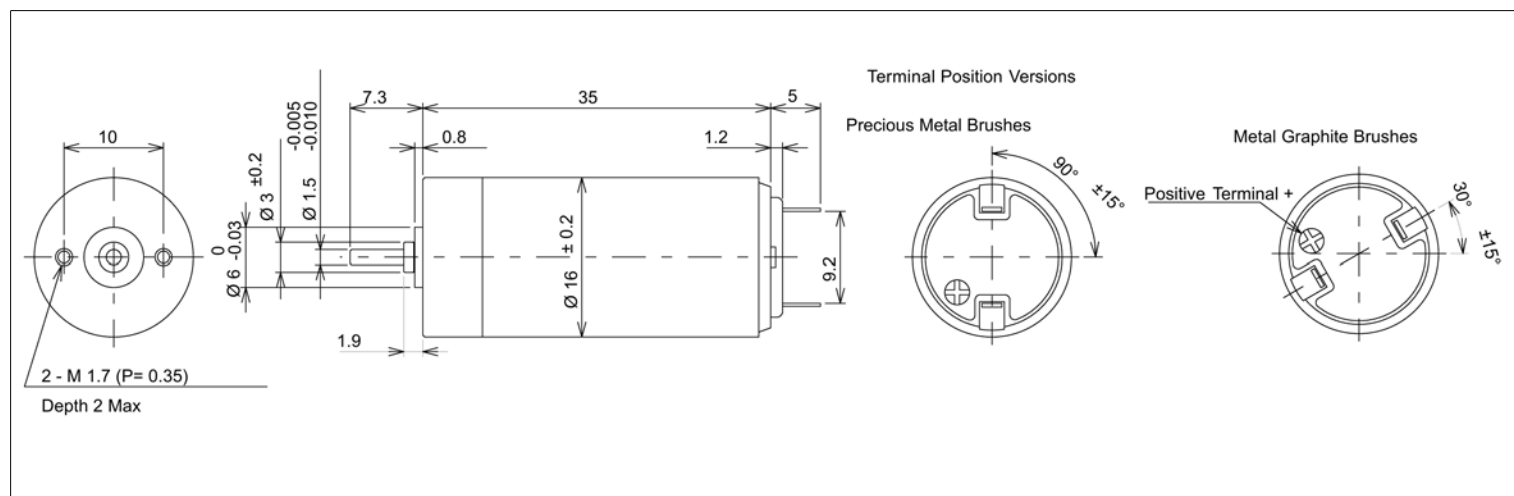
Specifications Subject to change without

16 mm Ø Coreless DC Motor

C16P06SX010 0.77 Watts Peak Power



Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	6.0 Volts	6.0 Volts	6.0 Volts
No-Load Speed	5,000 rpm	5,000 rpm	5,000 rpm
Stall Torque	6.0 mNm	61.0 gcm	0.85 oz-in
No-Load Current	0.010 Amps	0.010 Amps	0.010 Amps
Peak Output Power	0.77 Watts	0.77 Watts	0.77 Watts
Torque Constant	11.25 mNm/A	114.67 gcm/A	1.59 oz-in/A
Terminal Resistance	11.20 Ohms	11.20 Ohms	11.20 Ohms
Back-EMF Constant	1.18 V/krpm	1.18 V/krpm	1.18 V/krpm
Inductance	0.091 mH	0.091 mH	0.091 mH
Rotor Inertia	0.392 kg-m ² x10 ⁻⁷	0.392 gm cm ²	0.056 x10 ⁻⁴ oz in sec ²

Mechanical Time Constant	3.5 msec	3.5 msec	3.5 msec
Slope of Speed/Torque Curve	830.0 rpm/mNm	82.0 rpm/gcm	5,860.9 rpm/oz-in
Speed Constant	849 rpm/Volt	849 rpm/Volt	849 rpm/Volt
Motor Constant	3.36 mNm/√Watt	34.26 gcm/√Watt	0.48 oz-in/√Watt

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

Rated Power @ 4,300 rpm	0.40 Watts	0.40 Watts	0.40 Watts
Rated Torque @ 4,300 rpm	0.9 mNm	9.0 gcm	0.13 oz-in
Rated Current @ 4,300 rpm	0.190 Amps	0.190 Amps	0.190 Amps
Part Number: How to Order	C16P06SX010	Characteristics - Specifications at	22 °C

Radial Load Rating	Radial Play	Max Temperature	60 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve	Mass	36.3 grams
Gearbox Options	Planetary & Spur. Low Backlash & Sintered Planetary. Ball Bearing versions. Special lubrication.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Complementary Outputs & Line Drivers or 2 Track Optical		
Options - Other	Metal Graphite Commutation. Ball Bearings. Wire Leads and connectors. Extended life versions.		

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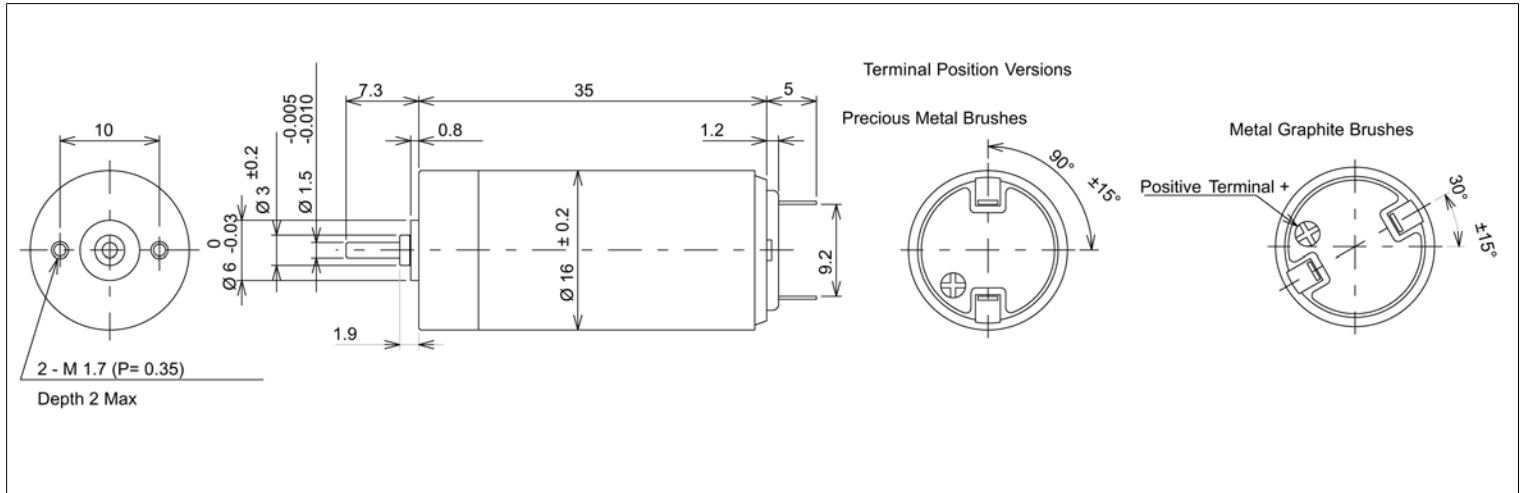
Specifications Subject to change without

16 mm Ø Coreless DC Motor

C16P12SX010 3.52 Watts Peak Power



Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	12.0 Volts	12.0 Volts	12.0 Volts
No-Load Speed	11,200 rpm	11,200 rpm	11,200 rpm
Stall Torque	12.1 mNm	124.0 gcm	1.72 oz-in
No-Load Current	0.013 Amps	0.013 Amps	0.013 Amps
Peak Output Power	3.52 Watts	3.52 Watts	3.52 Watts

Torque Constant	10.12 mNm/A	103.17 gcm/A	1.43 oz-in/A
Terminal Resistance	10.00 Ohms	10.00 Ohms	10.00 Ohms
Back-EMF Constant	1.06 V/krpm	1.06 V/krpm	1.06 V/krpm
Inductance	0.137 mH	0.137 mH	0.137 mH
Rotor Inertia	0.374 kg-m ² x10 ⁻⁷	0.374 gm cm ²	0.053 x10 ⁻⁴ oz in sec ²

Mechanical Time Constant	3.7 msec	3.7 msec	3.7 msec
Slope of Speed/Torque Curve	922.5 rpm/mNm	90.3 rpm/gcm	6,514.1 rpm/oz-in
Speed Constant	944 rpm/Volt	944 rpm/Volt	944 rpm/Volt
Motor Constant	3.20 mNm/√Watt	32.63 gcm/√Watt	0.45 oz-in/√Watt

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

Rated Power @ 9,800 rpm	1.46 Watts	1.46 Watts	1.46 Watts
Rated Torque @ 9,800 rpm	1.4 mNm	14.5 gcm	0.20 oz-in
Rated Current @ 9,800 rpm	0.190 Amps	0.190 Amps	0.190 Amps
Part Number: How to Order	C16P12SX010	Characteristics - Specifications at	22 °C

Radial Load Rating	Radial Play	Max Temperature	60 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve	Mass	36.3 grams
Gearbox Options	Planetary & Spur. Low Backlash & Sintered Planetary. Ball Bearing versions. Special lubrication.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Complementary Outputs & Line Drivers or 2 Track Optical		
Options - Other	Metal Graphite Commutation. Ball Bearings. Wire Leads and connectors. Extended life versions.		

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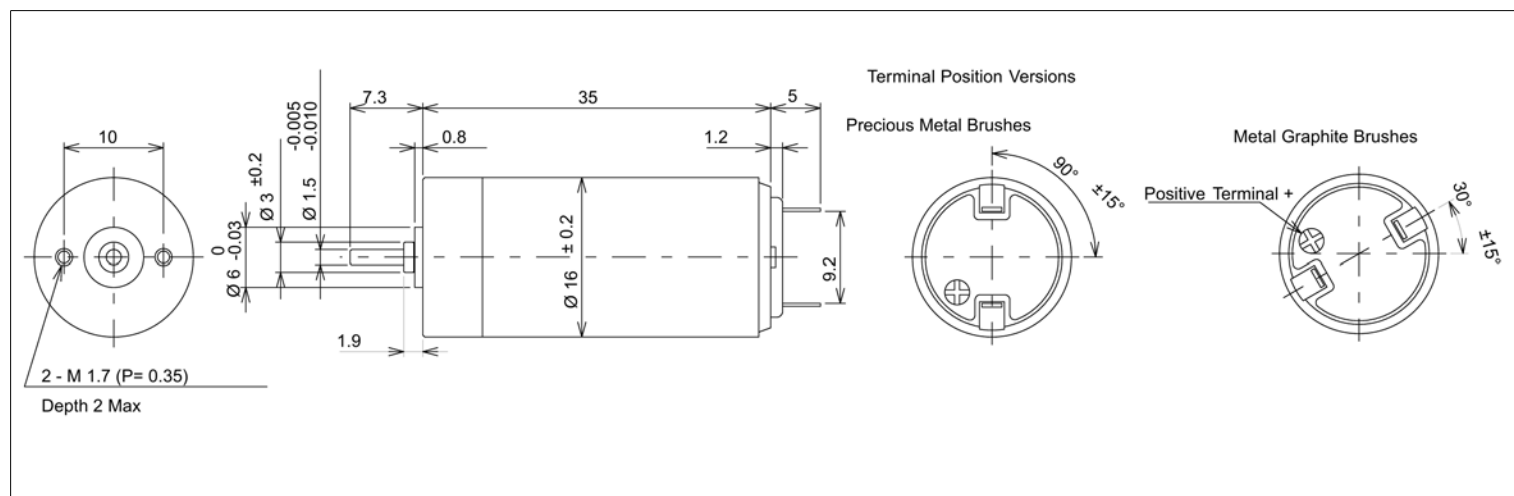
RoHS Compliant

16 mm Ø Coreless DC Motor

C16P24SX000 4.68 Watts Peak Power



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	14.8 mNm	151.0 gcm	2.10 oz-in
No-Load Current	0.010 Amps	0.010 Amps	0.010 Amps
Peak Output Power	4.68 Watts	4.68 Watts	4.68 Watts
Torque Constant	18.55 mNm/A	189.16 gcm/A	2.63 oz-in/A
Terminal Resistance	30.00 Ohms	30.00 Ohms	30.00 Ohms
Back-EMF Constant	1.94 V/krpm	1.94 V/krpm	1.94 V/krpm
Inductance	0.190 mH	0.190 mH	0.190 mH
Rotor Inertia	0.392 kg-m ² x10 ⁻⁷	0.392 gm cm ²	0.056 x10 ⁻⁴ oz in sec ²
Mechanical Time Constant	3.4 msec	3.4 msec	3.4 msec
Slope of Speed/Torque Curve	822.1 rpm/mNm	80.8 rpm/gcm	5,805.1 rpm/oz-in
Speed Constant	515 rpm/Volt	515 rpm/Volt	515 rpm/Volt
Motor Constant	3.39 mNm/√Watt	34.54 gcm/√Watt	0.48 oz-in/√Watt

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

Rated Power @ 11,500 rpm	1.18 Watts	1.18 Watts	1.18 Watts
Rated Torque @ 11,500 rpm	1.0 mNm	10.0 gcm	0.14 oz-in
Rated Current @ 11,500 rpm	0.130 Amps	0.130 Amps	0.130 Amps
Part Number: How to Order	C16P24SX000	Characteristics - Specifications at	22 °C

Radial Load Rating	Radial Play	Max Temperature	60 °C
Radial Load Distance	Thrust Play ≤ 0.300 mm	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve	Mass	36.3 grams
Gearbox Options	Planetary & Spur. Low Backlash & Sintered Planetary. Ball Bearing versions. Special lubrication.		
Encoder Options	Integral 3 Channel Magnetoresistive w/ Complementary Outputs & Line Drivers or 2 Track Optical		
Options - Other	Metal Graphite Commutation. Ball Bearings. Wire Leads and connectors. Extended life versions.		

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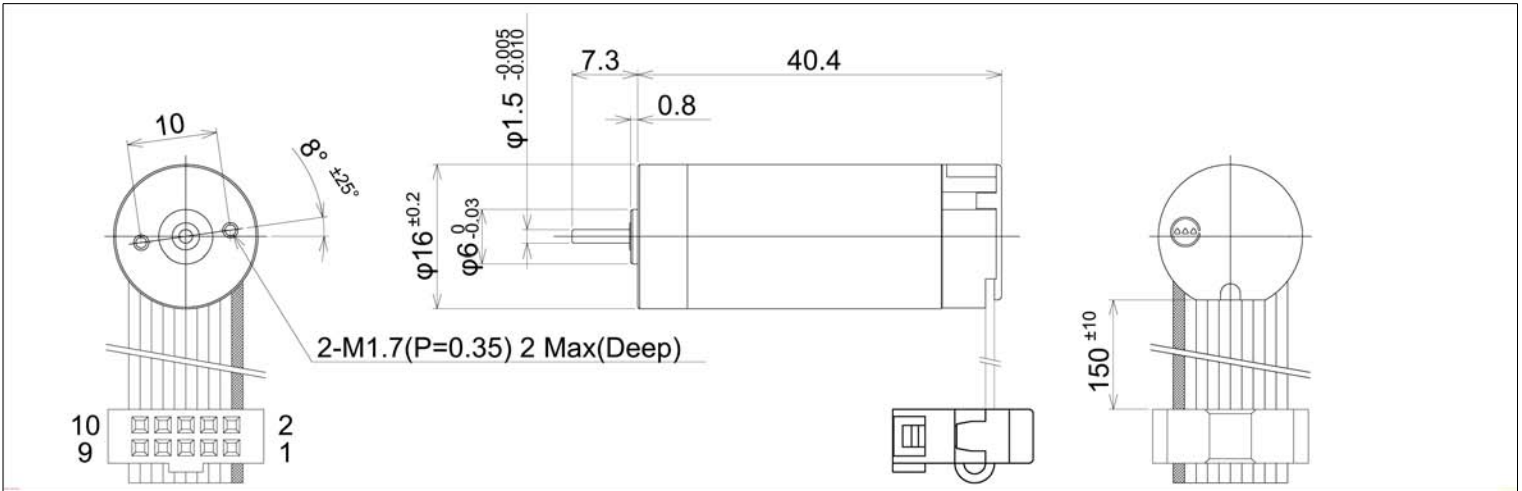
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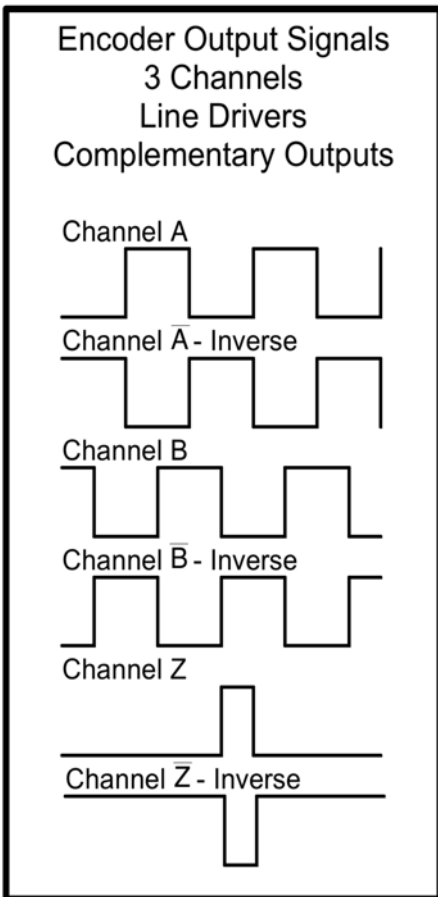
Specifications Subject to change without

16 mm Ø Encoder - 3 Channel

Series EM16xxxxZ50 - Line Drive - Compl. Out



Not to Scale - Dimensions in millimeters (mm)



Supply Voltage - Max	5.25 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 16 mm diameter x 35 mm long Coreless dc motor.
Encoder is compatible with 16 mm diameter x 25 mm and x 35 mm long and 17 mm diameter x 35 mm long Coreless dc motors. Length increase for integrated encoder is less than 5 mm.

Counts per Track per Rev.
64, 128, 256, 512

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 16 and 17 mm diameter coreless dc motors that have options for either spur or planetary gearboxes.

Similar versions of this encoder are available for 10 and 13 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

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