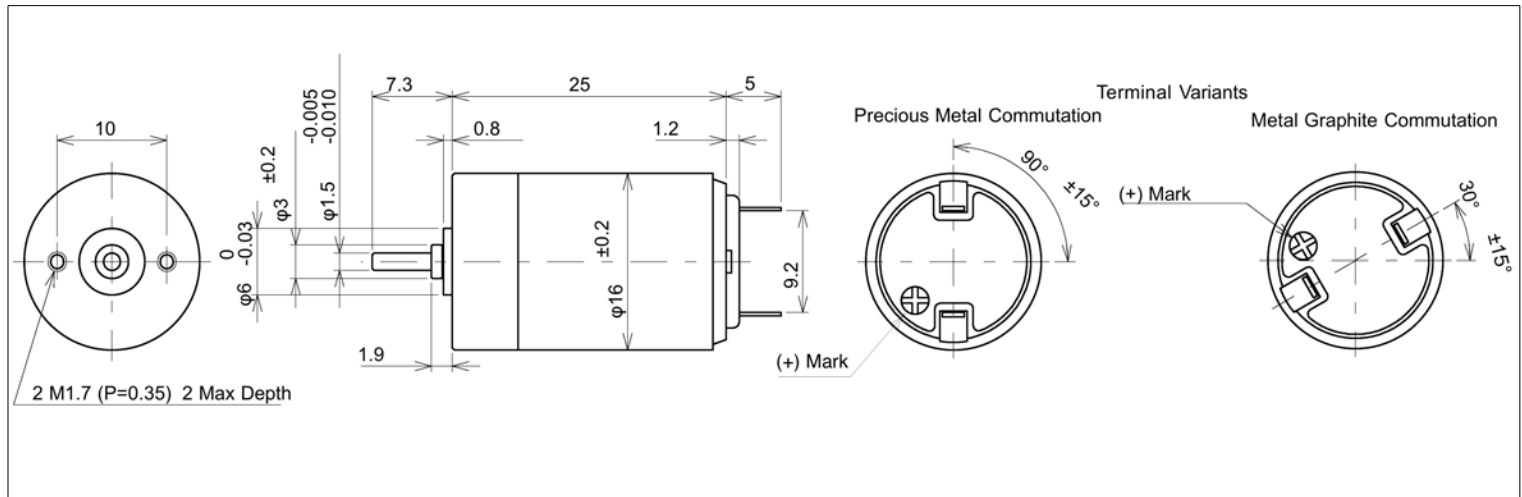


16 mm Ø Coreless DC Motor

C16P12SV020 0.58 Watts Peak

GMP

Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

Nominal Voltage	12.0 Volts	12.0 Volts	12.0 Volts
No-Load Speed	7,900 rpm	7,900 rpm	7,900 rpm
Stall Torque	3.0 mNm	31.0 gcm	0.42 oz-in
No-Load Current	0.013 Amps	0.013 Amps	0.013 Amps
Peak Output Power	0.58 Watts	0.58 Watts	0.58 Watts
Torque Constant	13.63 mNm/A	138.96 gcm/A	1.93 oz-in/A
Terminal Resistance	54.50 Ohms	54.50 Ohms	54.50 Ohms
Back-EMF Constant	1.43 V/krpm	1.43 V/krpm	1.43 V/krpm
Inductance	0.163 mH	0.163 mH	0.163 mH
Rotor Inertia	0.300 kg-m ² x10 ⁻⁷	0.300 gm cm ²	0.042 x10 ⁻⁴ oz in sec ²
Mechanical Time Constant	8.8 msec	8.8 msec	8.8 msec
Slope of Speed/Torque Curve	2,633.0 rpm/mNm	254.8 rpm/gcm	18,592.8 rpm/oz-in
Speed Constant	701 rpm/Volt	701 rpm/Volt	701 rpm/Volt
Motor Constant	1.85 mNm/√Watt	18.82 gcm/√Watt	0.26 oz-in/√Watt

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

Rated Power @ 6,500 rpm	0.33 Watts	0.33 Watts	0.33 Watts
Rated Torque @ 6,500 rpm	0.5 mNm	5.1 gcm	0.07 oz-in
Rated Current @ 6,500 rpm	0.050 Amps	0.050 Amps	0.050 Amps

Part Number: How to Order C16P12SV020 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	120 °C
Press Fit Force - Max	Bearing Type Sleeve (Optional)	Mass	24.3 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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Technical Support: (760) 451-2723

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

RoHS Compliant

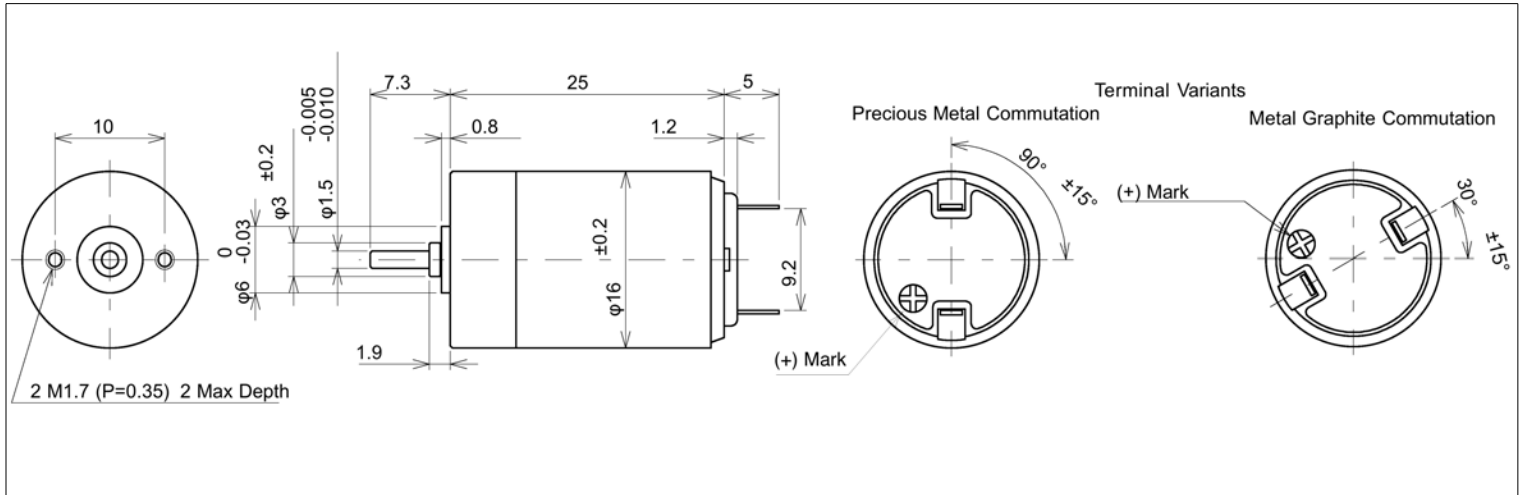
Specifications Subject to change without notice

16 mm Ø Coreless DC Motor

C16P06SV000 1.05 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	10,900 rpm	10,900 rpm	10,900 rpm
Stall Torque	3.8 mNm	39.0 gcm	0.54 oz-in
No-Load Current	0.027 Amps	0.027 Amps	0.027 Amps
Peak Output Power	1.05 Watts	1.05 Watts	1.05 Watts
Torque Constant	5.07 mNm/A	51.70 gcm/A	0.72 oz-in/A
Terminal Resistance	8.00 Ohms	8.00 Ohms	8.00 Ohms
Back-EMF Constant	0.53 V/krpm	0.53 V/krpm	0.53 V/krpm
Inductance	0.036 mH	0.036 mH	0.036 mH
Rotor Inertia	0.293 kg-m ² x10 ⁻⁷	0.293 gm cm ²	0.041 x10 ⁻⁴ oz in sec ²
Mechanical Time Constant	9.1 msec	9.1 msec	9.1 msec
Slope of Speed/Torque Curve	2,866.8 rpm/mNm	279.5 rpm/gcm	20,243.8 rpm/oz-in
Speed Constant	1,884 rpm/Volt	1,884 rpm/Volt	1,884 rpm/Volt
Motor Constant	1.79 mNm/√Watt	18.28 gcm/√Watt	0.25 oz-in/√Watt

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

Rated Power @	9,100 rpm	0.56 Watts	0.56 Watts	0.56 Watts
Rated Torque @	9,100 rpm	0.6 mNm	6.1 gcm	0.08 oz-in
Rated Current @	9,100 rpm	0.145 Amps	0.145 Amps	0.145 Amps

Part Number: How to Order C16P06SV000 Characteristics - Specifications at 22 °C

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve (Optional)	Mass	24.3 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

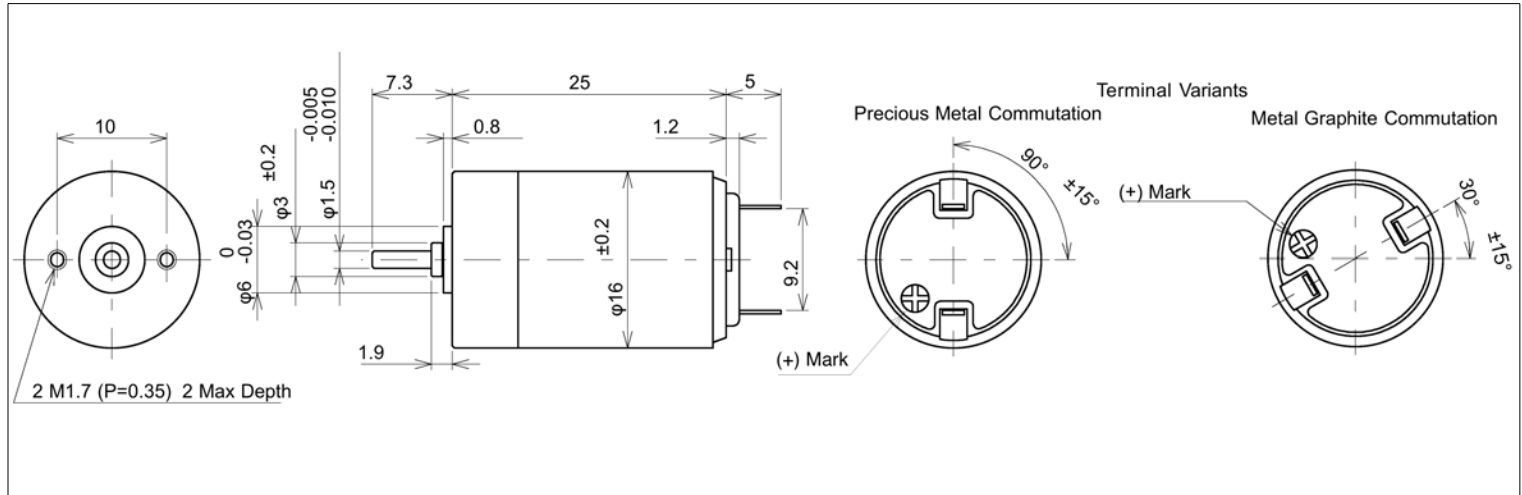
Specifications Subject to change without notice

16 mm Ø Coreless DC Motor

C16P06SV000 0.86 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	7,100 rpm	7,100 rpm	7,100 rpm
Stall Torque	4.7 mNm	48.0 gcm	0.67 oz-in
No-Load Current	0.013 Amps	0.013 Amps	0.013 Amps
Peak Output Power	0.86 Watts	0.86 Watts	0.86 Watts
Torque Constant	7.89 mNm/A	80.46 gcm/A	1.12 oz-in/A
Terminal Resistance	10.00 Ohms	10.00 Ohms	10.00 Ohms
Back-EMF Constant	0.83 V/krpm	0.83 V/krpm	0.83 V/krpm
Inductance	0.118 mH	0.118 mH	0.118 mH
Rotor Inertia	0.388 kg-m ² x10 ⁻⁷	0.388 gm cm ²	0.055 x10 ⁻⁴ oz in sec ²
Mechanical Time Constant	6.2 msec	6.2 msec	6.2 msec
Slope of Speed/Torque Curve	1,499.7 rpm/mNm	147.9 rpm/gcm	10,590.2 rpm/oz-in
Speed Constant	1,210 rpm/Volt	1,210 rpm/Volt	1,210 rpm/Volt
Motor Constant	2.50 mNm/√Watt	25.44 gcm/√Watt	0.35 oz-in/√Watt

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

Rated Power @ 6,200 rpm	0.38 Watts	0.38 Watts	0.38 Watts
Rated Torque @ 6,200 rpm	0.6 mNm	6.2 gcm	0.09 oz-in
Rated Current @ 6,200 rpm	0.090 Amps	0.090 Amps	0.090 Amps

Part Number: How to Order C16P06SV000 Characteristics - Specifications at 22 °C

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve (Optional)	Mass	24.3 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

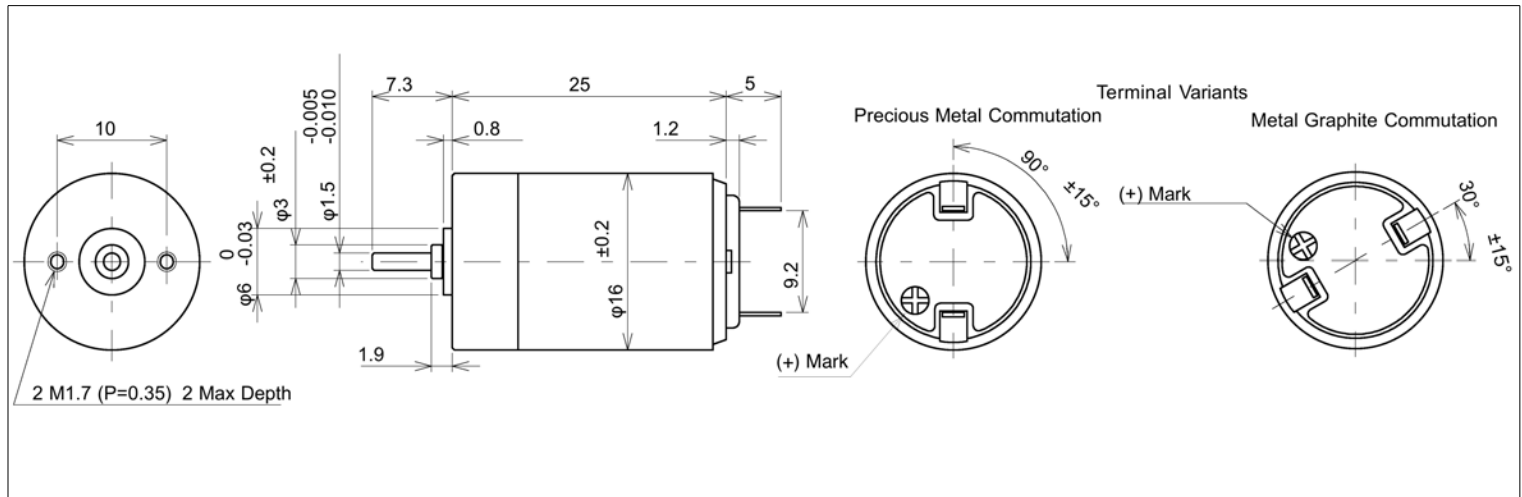
Specifications Subject to change without notice

16 mm Ø Coreless DC Motor

C16P12SV010 **1.21 Watts Peak**



Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

<i>Nominal Voltage</i>	12.0 Volts	12.0 Volts	12.0 Volts
<i>No-Load Speed</i>	10,700 rpm	10,700 rpm	10,700 rpm
<i>Stall Torque</i>	4.5 mNm	46.0 gcm	0.64 oz-in
<i>No-Load Current</i>	0.017 Amps	0.017 Amps	0.017 Amps
<i>Peak Output Power</i>	1.21 Watts	1.21 Watts	1.21 Watts
<i>Torque Constant</i>	10.30 mNm/A	105.04 gcm/A	1.46 oz-in/A
<i>Terminal Resistance</i>	27.50 Ohms	27.50 Ohms	27.50 Ohms
<i>Back-EMF Constant</i>	1.08 V/krpm	1.08 V/krpm	1.08 V/krpm
<i>Inductance</i>	0.124 mH	0.124 mH	0.124 mH
<i>Rotor Inertia</i>	0.305 kg-m ² x10 ⁻⁷	0.305 gm cm ²	0.043 x10 ⁻⁴ oz in sec ²
<i>Mechanical Time Constant</i>	7.9 msec	7.9 msec	7.9 msec
<i>Slope of Speed/Torque Curve</i>	2,380.6 rpm/mNm	232.6 rpm/gcm	16,810.4 rpm/oz-in
<i>Speed Constant</i>	927 rpm/Volt	927 rpm/Volt	927 rpm/Volt
<i>Motor Constant</i>	1.96 mNm/√Watt	20.03 gcm/√Watt	0.28 oz-in/√Watt

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

<i>Rated Power @ 8,700 rpm</i>	0.71 Watts	0.71 Watts	0.71 Watts
<i>Rated Torque @ 8,700 rpm</i>	0.9 mNm	8.8 gcm	0.12 oz-in
<i>Rated Current @ 8,700 rpm</i>	0.100 Amps	0.100 Amps	0.100 Amps

Part Number: How to Order C16P12SV010 *Characteristics - Specifications at 22 °C*

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve (Optional)	Mass	24.3 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

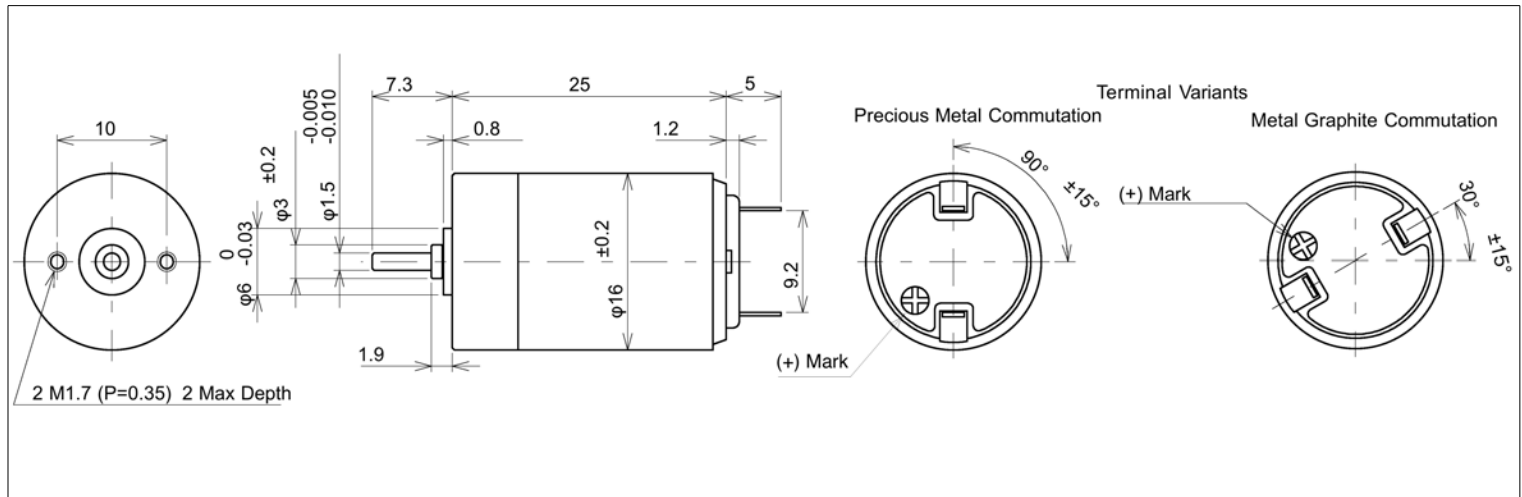
Specifications Subject to change without notice

16 mm Ø Coreless DC Motor

C16P12SV000 **4.15 Watts Peak**



Global Motion Products



Not to Scale - Dimensions in millimeters (mm)

<i>Nominal Voltage</i>	12.0 Volts	12.0 Volts	12.0 Volts
<i>No-Load Speed</i>	16,000 rpm	16,000 rpm	16,000 rpm
<i>Stall Torque</i>	10.1 mNm	103.0 gcm	1.43 oz-in
<i>No-Load Current</i>	0.023 Amps	0.023 Amps	0.023 Amps
<i>Peak Output Power</i>	4.15 Watts	4.15 Watts	4.15 Watts
<i>Torque Constant</i>	7.05 mNm/A	71.86 gcm/A	1.00 oz-in/A
<i>Terminal Resistance</i>	8.40 Ohms	8.40 Ohms	8.40 Ohms
<i>Back-EMF Constant</i>	0.74 V/krpm	0.74 V/krpm	0.74 V/krpm
<i>Inductance</i>	0.074 mH	0.074 mH	0.074 mH
<i>Rotor Inertia</i>	0.362 kg-m ² x10 ⁻⁷	0.362 gm cm ²	0.051 x10 ⁻⁴ oz in sec ²
<i>Mechanical Time Constant</i>	6.1 msec	6.1 msec	6.1 msec
<i>Slope of Speed/Torque Curve</i>	1,589.4 rpm/mNm	155.3 rpm/gcm	11,223.7 rpm/oz-in
<i>Speed Constant</i>	1,355 rpm/Volt	1,355 rpm/Volt	1,355 rpm/Volt
<i>Motor Constant</i>	2.43 mNm/√Watt	24.79 gcm/√Watt	0.34 oz-in/√Watt

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

<i>Rated Power @ 13,500 rpm</i>	2.08 Watts	2.08 Watts	2.08 Watts
<i>Rated Torque @ 13,500 rpm</i>	1.6 mNm	16.3 gcm	0.23 oz-in
<i>Rated Current @ 13,500 rpm</i>	0.250 Amps	0.250 Amps	0.250 Amps

Part Number: How to Order C16P12SV000 *Characteristics - Specifications at 22 °C*

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve (Optional)	Mass	24.3 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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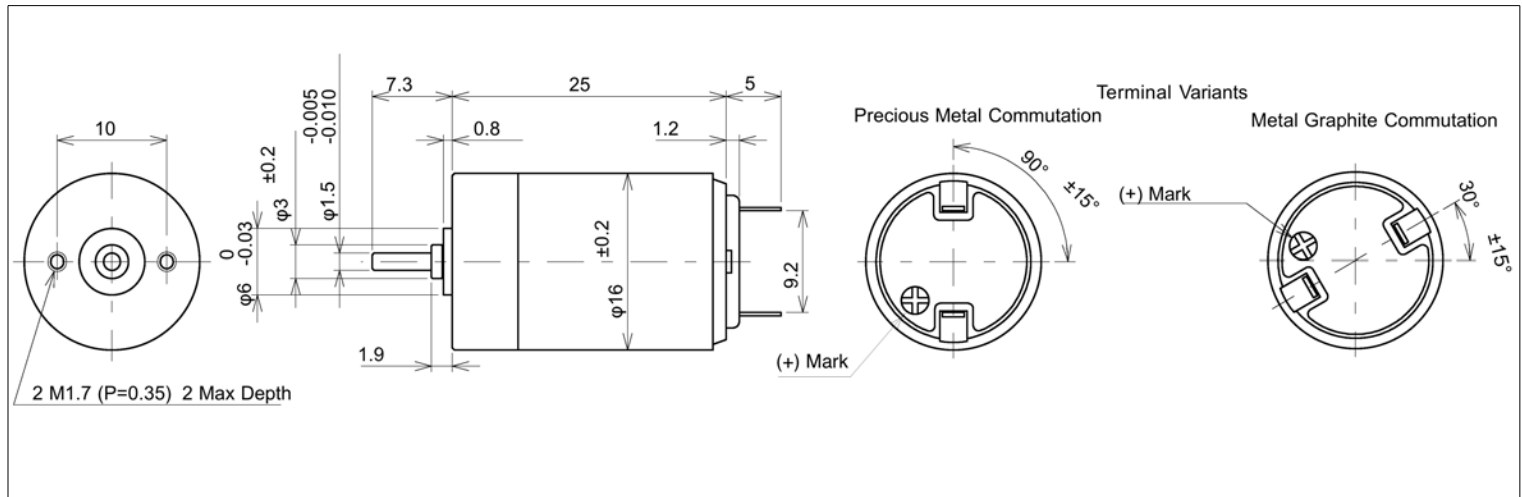
RoHS Compliant

16 mm Ø Coreless DC Motor

C16P06SV010 0.44 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	5,800 rpm	5,800 rpm	5,800 rpm
Stall Torque	3.0 mNm	31.0 gcm	0.43 oz-in
No-Load Current	0.017 Amps	0.017 Amps	0.017 Amps
Peak Output Power	0.44 Watts	0.44 Watts	0.44 Watts
Torque Constant	9.37 mNm/A	95.56 gcm/A	1.33 oz-in/A
Terminal Resistance	18.50 Ohms	18.50 Ohms	18.50 Ohms
Back-EMF Constant	0.98 V/krpm	0.98 V/krpm	0.98 V/krpm
Inductance	0.119 mH	0.119 mH	0.119 mH
Rotor Inertia	0.335 kg-m ² x10 ⁻⁷	0.335 gm cm ²	0.047 x10 ⁻⁴ oz in sec ²
Mechanical Time Constant	7.1 msec	7.1 msec	7.1 msec
Slope of Speed/Torque Curve	1,908.4 rpm/mNm	187.1 rpm/gcm	13,476.1 rpm/oz-in
Speed Constant	1,019 rpm/Volt	1,019 rpm/Volt	1,019 rpm/Volt
Motor Constant	2.18 mNm/√Watt	22.22 gcm/√Watt	0.31 oz-in/√Watt

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

Rated Power @ 4,750 rpm	0.24 Watts	0.24 Watts	0.24 Watts
Rated Torque @ 4,750 rpm	6.9 mNm	70.1 gcm	0.97 oz-in
Rated Current @ 4,750 rpm	0.750 Amps	0.750 Amps	0.750 Amps

Part Number: How to Order C16P06SV010 Characteristics - Specifications at 22 °C

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve (Optional)	Mass	24.3 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

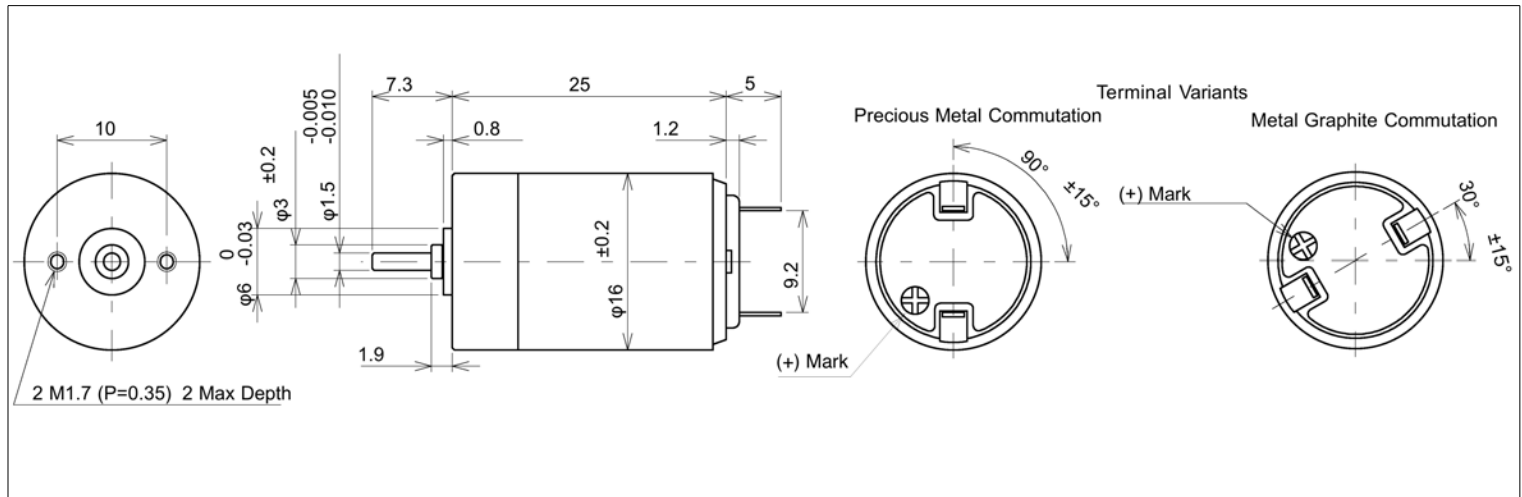
Specifications Subject to change without notice

16 mm Ø Coreless DC Motor

C16P24SV000 1.99 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	12,900 rpm	12,900 rpm	12,900 rpm
Stall Torque	6.1 mNm	62.0 gcm	0.86 oz-in
No-Load Current	0.010 Amps	0.010 Amps	0.010 Amps
Peak Output Power	1.99 Watts	1.99 Watts	1.99 Watts
Torque Constant	17.26 mNm/A	176.01 gcm/A	2.44 oz-in/A
Terminal Resistance	68.30 Ohms	68.30 Ohms	68.30 Ohms
Back-EMF Constant	1.81 V/krpm	1.81 V/krpm	1.81 V/krpm
Inductance	0.450 mH	0.450 mH	0.450 mH
Rotor Inertia	0.372 kg-m ² x10 ⁻⁷	0.372 gm cm ²	0.053 x10 ⁻⁴ oz in sec ²
Mechanical Time Constant	8.5 msec	8.5 msec	8.5 msec
Slope of Speed/Torque Curve	2,126.9 rpm/mNm	208.1 rpm/gcm	15,019.1 rpm/oz-in
Speed Constant	553 rpm/Volt	553 rpm/Volt	553 rpm/Volt
Motor Constant	2.09 mNm/√Watt	21.30 gcm/√Watt	0.30 oz-in/√Watt

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

Rated Power @ 10,800 rpm	1.11 Watts	1.11 Watts	1.11 Watts
Rated Torque @ 10,800 rpm	1.1 mNm	11.4 gcm	0.16 oz-in
Rated Current @ 10,800 rpm	0.075 Amps	0.075 Amps	0.075 Amps

Part Number: How to Order C16P24SV000 Characteristics - Specifications at 22 °C

Radial Load Rating	Radial Play	Max Temperature	65 °C
Radial Load Distance	Thrust Play	Min Temperature	-10 °C
Axial Load	Magnet Type NdFeB	Max Winding Temp	120 °C
Press Fit Force - Max	Bearing Type Sleeve (Optional)	Mass	24.3 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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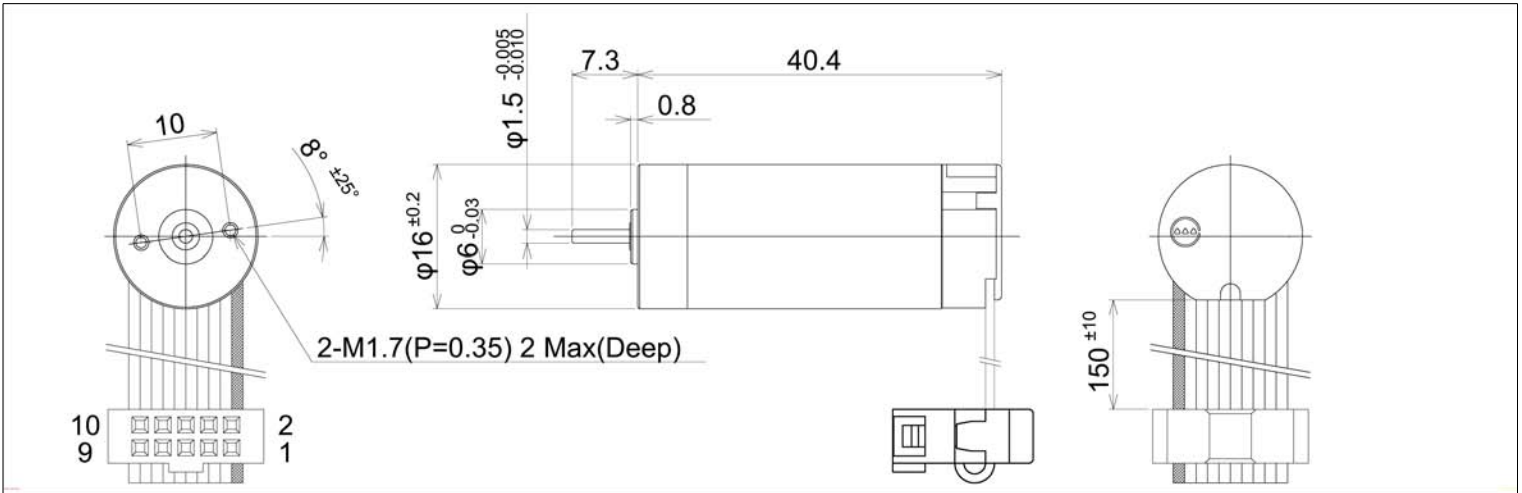
Commutation Type: **Manufactured under a Certified ISO 9001 Quality System**
Precious Metal

RoHS Compliant

Specifications Subject to change without notice

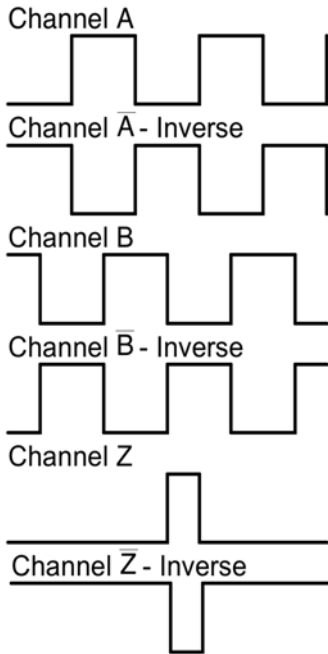
16 mm Ø Encoder - 3 Channel

Series EM16xxxxZ50 - Line Drive - Compl. Out



Not to Scale - Dimensions in millimeters (mm)

Encoder Output Signals 3 Channels Line Drivers Complementary Outputs



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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