



## ***Installation Instructions***

### **MP-Series Integrated Gear Motors**

(Catalog Numbers: MPG-A004-031, MPG-A004-091,  
MPG-A010-031, MPG-A010-091, MPG-B010-031, MPG-B010-091,  
MPG-A025-031, MPG-A025-091, MPG-B025-031, MPG-B025-091,  
MPG-A050-031, MPG-A050-091, MPG-B050-031, MPG-B050-091,  
MPG-A110-031, MPG-A110-091, MPG-B110-031, and MPG-B110-091)

These *Installation Instructions* describe how to install MP-Series Integrated Gear Motors. Use this document if you are responsible for designing, installing, or troubleshooting these Allen-Bradley® motors. Please read all instructions before installing your motor.

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## Receiving and Storage

The customer is responsible for inspecting the equipment before accepting the shipment from the freight company. Check the item(s) you receive against your purchase order. Notify the carrier of any shipping damage or missing items immediately.

You may store your motor in a clean and dry location within the following environmental conditions:

- storage temperature: -30° to 70° C (-22° to 158° F)
- relative humidity: 5% to 95% non-condensing
- atmosphere: non-corrosive

## Environmental Ratings

The International Protection Code or IP Rating for environmental protection of MP gear motors is:

- IP64 dust tight, splashing water

Operational temperature range for MP gear motors is:

- operating temperature: 0° to 40° C (32° to 104° F)

Vibration ratings for the MP gear motors are:

- storage (shock): 20 g peak max, 6 msec duration
- operating (vibration): 2.5 g peak max, 30 to 2000 Hz

## Motor Catalog Number Identification

**MP G - A 010 - 031 M 22**

**BRAKE**

22 = No Brake  
24 = 24V dc Holding Brake

**FEEDBACK**

M = Multi-turn High Resolution Encoder  
S = Single-turn High Resolution Encoder

**GEAR REDUCTION**

031 = 31 to 1  
091 = 91 to 1

**MOTOR FRAME SIZE**

004 = 004 Frame  
010 = 010 Frame  
025 = 025 Frame  
050 = 050 Frame  
110 = 110 Frame

**VOLTAGE RATING OF MOTOR**

A = 230 Vac  
B = 460 Vac

**SERIES TYPE**

G = Integrated Gear

**BULLETIN**

## Before You Install the Motor

1. Remove the motor carefully from its shipping container.
2. Visually inspect the motor for any damage.
3. Examine the motor frame and mounts, drive flange, mounting holes, and dowel pin hole for any defects.

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### ATTENTION



Do not open or attempt to open the motor.

Only a qualified Rockwell Automation employee can service this type of motor.

Failure to observe these safety procedures could result in personal injury or damage to equipment.

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## Installing Your Motor

The installation must comply with all local regulations and use of equipment and installation practices that promote electromagnetic compatibility and safety.

All motors have a dowel pin hole for precisely aligning the motor output on a machine. Bolt hole sizes are listed in *Mounting Dimensions* beginning on page 10, and bolt torque requirements are listed in *Housing and Output Flange Connections* beginning on page 22.

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### ATTENTION



Unmounted motors, disconnected mechanical connections, and disconnected cables are dangerous if power is applied.

Disassembled equipment should be appropriately identified (tagged-out) and access to electrical power restricted (locked-out).

Before applying power to the motor, remove any mounting bolts and screws, or other mechanical objects which could be thrown from the motor.

Failure to observe these safety procedures could result in personal injury.

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### ATTENTION



Ensure that cables are installed and restrained to prevent uneven tension or flexing at the cable connectors.

Excessive and uneven lateral force at the cable connectors may result in the connector's environmental seal opening and closing as the cable flexes.

Failure to observe these safety procedures could result in damage to the motor and its components.

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## Guidelines for Installation

Observe the following guidelines when installing the motor.

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**ATTENTION**

Damage may occur to the motor bearings, gearing, and the feedback device if sharp impact to the shaft is applied during installation or removal of the motor.

Do not strike the MP gear motor with tools during installation or removal.

Failure to observe these safety procedures could result in damage to the motor and its components.

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1. Allow sufficient clearances in the area of the motor for it to stay within its specified operating temperature range 0° to 40° C (32° to 104° F). Do not enclose the motor unless forced air is blown across the motor for cooling. A fan blowing air across the motor will improve its performance. Keep other heat producing devices away from the motor.
- 

**ATTENTION**

Outer surfaces of motor can reach high temperatures, 125° C (275° F), during motor operation.

Take precautions to prevent accidental contact with hot surfaces. Consider motor surface temperature when selecting motor mating connections and cables.

Failure to observe these safety procedures could result in personal injury or damage to equipment.

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2. Always position the motor with the connector housing pointing downward.

Note: Gearbox input and output rotations are in identical directions.

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### 3. Properly mount and align the motor.

#### A. Secure the motor to the machine mounting frame. Refer to:

- *Mounting Dimensions* beginning on page 10 for the bolt hole pattern of your motor.
- *Housing and Output Flange Connections* beginning on page 22 for the torque values for connections.

#### B. Move the output flange so the motor feedback device aligns at its electronic zero position. Encoder absolute position = 0 occurs when the dowel pin hole is aligned on the connector side of the motor and centered on the connectors. Refer to Figure 1 on page 11 for a visual reference of this alignment.

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## IMPORTANT

Proper alignment and loading of the motor are critical to achieving reliable operation throughout the lifetime of the motor.

When mounting the MP-Series Integrated Gear Motor, ensure that the connections are properly aligned and that axial and radial loads are within the specifications of the motor.

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#### C. Connect the output flange to the machine's drive assembly.

Mechanical connections to the motor flange must be rigid, secure, and properly aligned. Refer to:

- *Mounting Dimensions* beginning on page 10 for the bolt hole pattern of your motor.
- *Housing and Output Flange Connections* beginning on page 22 for the torque values for connections.
- *Motor Load Force Ratings* beginning on page 23 for guidelines to achieve 20,000 hours of motor bearing life.

### 4. Apply a high-temperature, medium-strength threadlock adhesive to the mounting bolts.

5. Attach all power, feedback, and brake cables after the motor is mounted.

- A. Use a drip loop in each cable to keep liquids flowing away from the connectors.

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**IMPORTANT**

Ensure that proper polarity is maintained when wiring a brake connector.

The holding brake is designed to hold the motor shaft at 0 rpm and to release when power is applied - it is not intended to stop motor rotation. Reversing the brake polarity could cause the brake to be applied while the motor is running. The section *Holding Brake* beginning on page 27 provides information on the electrical requirements for a brake motor.

Failure to observe proper polarity could result in damage to the motor and its components.

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- B. Use Electromagnetic Compatibility (EMC) techniques to reduce Electromagnetic Interference (EMI), commonly called noise. Noise adversely impacts motor performance by inducing stray signals. Effective techniques to counter EMI include filtering the AC power, shielding and separating signal carrying lines, and practicing good grounding techniques.
- Filter AC power by using isolated AC power transformers or properly installed AC line filters.
  - Physically separate signal lines from motor cabling and power wiring. Do not route signal wires with motor and power wires, or over the vent openings of servo drives.
  - Ground all equipment using a single-point parallel ground system that employs ground bus bars or large straps.

Refer to *System Design for Control of Electrical Noise* (GMC-SG001x-EN-P) for information on additional electrical noise reduction techniques.

6. If necessary, home the drive and motor system prior to use. Refer to your drive instructions for procedures on when and how to do this.

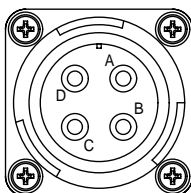


## Connector Data

The tables below list the signal descriptions for the feedback, power, and brake connector pins.

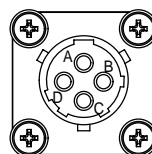
Feedback Connector	
Pin	High Resolution Encoder
A	Sin+
B	Sin-
C	Cos+
D	Cos-
E	Data+
F	Data-
G	Reserved
H	
J	
K	
L	+5V dc
M	Common
N	Reserved
P	
R	
S	
T	TS+
U	TS-
V	Reserved

Power Connector	
Pin	Signal
A	Phase U
B	Phase V
C	Phase W
D	Ground



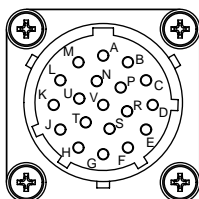
ITT Cannon  
TNM 16-4

Brake Connector	
Pin	Signal
A	BR+
B	Reserved
C	BR-
D	Reserved



ITT Cannon  
TNM 10-4

Note: Ensure that proper polarity is maintained when wiring a brake connector.



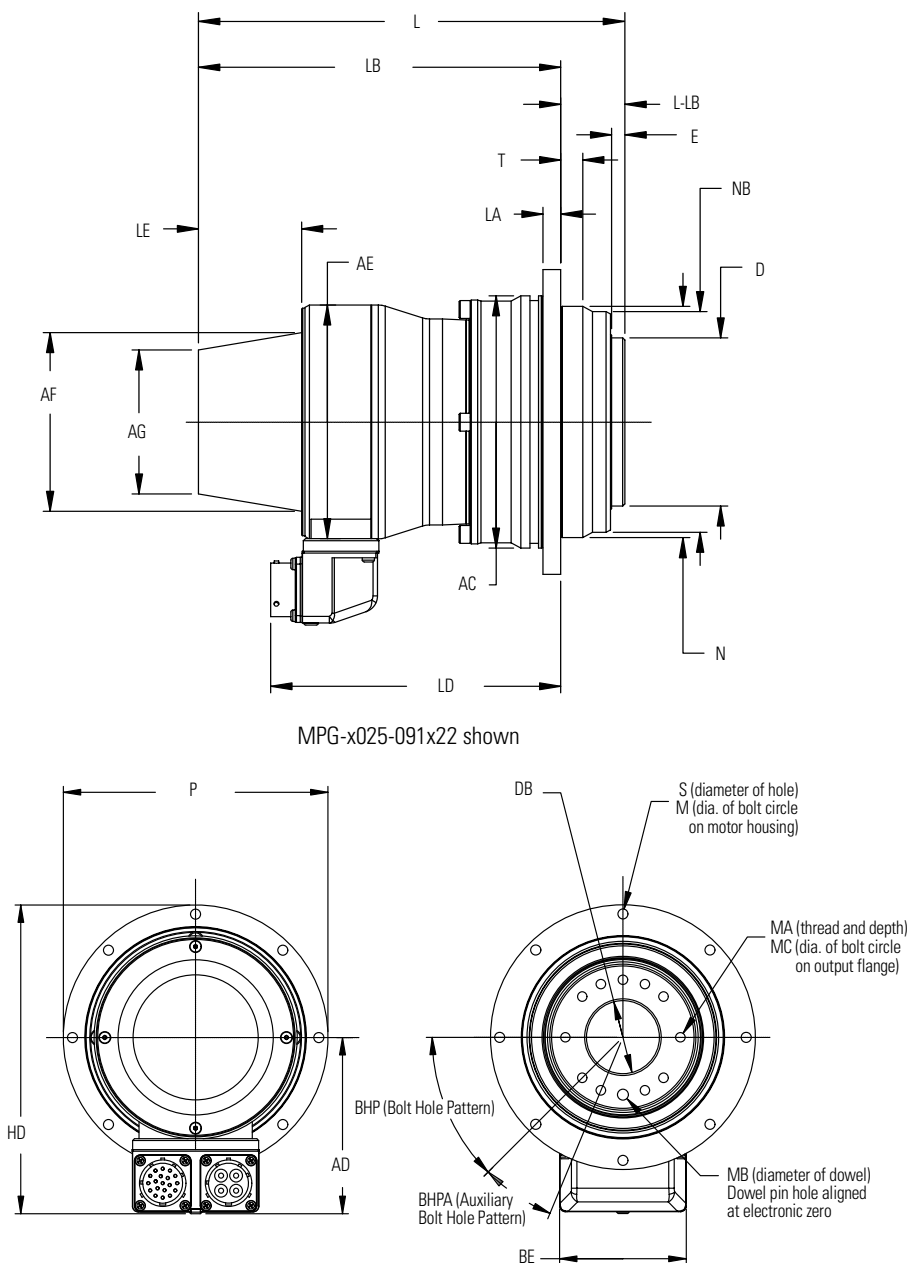
ITT Cannon  
TNM 16-19

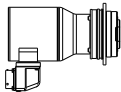
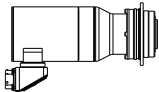
## Mounting Dimensions

Dimensions for MP-Series Integrated Gear Motors are provided on the listed pages. Refer to Figure 1 on page 11 for the dimensional symbol designations for the motors.

<b>If your motor is one of the following, then go to:</b>	<b>Page</b>
MPG-A004-031x22, MPG-A004-031x24	12
MPG-A004-091x22, MPG-A004-091x24	13
MPG-x010-031x22, MPG-x010-031x24	14
MPG-x010-091x22, MPG-x010-091x24	15
MPG-x025-031x22, MPG-x025-031x24	16
MPG-x025-091x22, MPG-x025-091x24	17
MPG-x050-031x22, MPG-x050-031x24	18
MPG-x050-091x22, MPG-x050-091x24	19
MPG-x110-031x22, MPG-x110-031x24	20
MPG-x110-091x22, MPG-x110-091x24	21

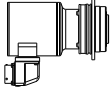
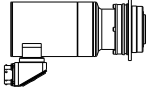
**Figure 1**  
References for Motor Mounting Dimensions



<b>Motor Dimension Symbol</b> <sup>1,2</sup>	<b>MPG-A004-031 x22</b>		<b>MPG-A004-031 x24</b>	
	mm	(in.)	mm	(in.)
<b>AC</b>	70	(2.76)	70	(2.76)
<b>AD</b>	80	(3.15)	79.1	(3.11)
<b>AE</b>	75	(2.95)	75	(2.95)
<b>AF</b>	N/A		N/A	
<b>AG</b>	N/A		N/A	
<b>BE</b>	67.7	(2.67)	88.9	(3.50)
<b>D</b>	39.975 - 40	(1.5738) - (1.5748)	39.975 - 40	(1.5738) - (1.5748)
<b>DB</b>	20 - 20.021 x 4 DP	(0.7874) - (0.7882) x (0.16) DP	20 - 20.021 x 4 DP	(0.7874) - (0.7882) x (0.16) DP
<b>E</b>	3	(0.12)	3	(0.12)
<b>HD</b>	123	(4.84)	122.1	(4.81)
<b>L</b>	156.7	(5.58)	200.2	(7.88)
<b>L-LB</b>	19.5	(0.77)	19.5	(0.77)
<b>LA</b>	4	(0.16)	4	(0.16)
<b>LB</b>	137.2	(5.40)	180.7	(7.11)
<b>LD</b>	140.9	(5.55)	189.5	(7.46)
<b>LE</b>	N/A		N/A	
<b>M</b>	79	(3.11)	79	(3.11)
<b>MA on MC</b>	M5 x 7 on 31.5 BC	M5 x (0.28) on (1.24) BC	M5 x 7 on 31.5 BC	M5 x (0.28) on (1.24) BC
<b>MB</b>	5 - 5.012 x 6 DP	(0.1967) - (0.1973) x (0.24) DP	5 - 5.012 x 6 DP	(0.1967) - (0.1973) x (0.24) DP
<b>N</b>	63.97 - 64	(2.5185) - (2.5197)	63.97 - 64	(2.5185) - (2.5197)
<b>NB</b>	63	(2.48)	63	(2.48)
<b>P</b>	86	(3.39)	86	(3.39)
<b>S on M</b>	4.5 on 79 BC	(0.18) on (3.11) BC	4.5 on 79 BC	(0.18) on (3.11) BC
<b>T</b>	7	(0.28)	7	(0.28)
<b>Bolt Hole</b>	BHP	45°		45°
<b>Patterns:</b>	BHPA	N/A		N/A
<b>Motor Outline</b>				

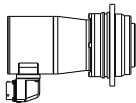
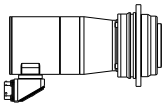
<sup>1</sup> Motors are designed to metric dimensions (inch references are mathematical conversions).

<sup>2</sup> Abbreviations: BC = Bolt Circle, BHP/BHPA = Bolt Hole Patterns, DP = Depth.

Motor Dimension Symbol <sup>1,2</sup>	MPG-A004-091 x22		MPG-A004-091 x24	
	mm	(in.)	mm	(in.)
<b>AC</b>	70	(2.76)	70	(2.76)
<b>AD</b>	80	(3.15)	79.1	(3.11)
<b>AE</b>	75	(2.95)	75	(2.95)
<b>AF</b>	N/A		N/A	
<b>AG</b>	N/A		N/A	
<b>BE</b>	67.7	(2.67)	88.9	(3.50)
<b>D</b>	39.975 - 40	(1.5738) - (1.5748)	39.975 - 40	(1.5738) - (1.5748)
<b>DB</b>	20 - 20.021 x 4 DP	(0.7874) - (0.7882) x (0.16) DP	20 - 20.021 x 4 DP	(0.7874) - (0.7882) x (0.16) DP
<b>E</b>	3	(0.12)	3	(0.12)
<b>HD</b>	123	(4.84)	122.1	(4.81)
<b>L</b>	141.7	(5.58)	185.2	(7.29)
<b>L-LB</b>	19.5	(0.77)	19.5	(0.77)
<b>LA</b>	4	(0.16)	4	(0.16)
<b>LB</b>	122.2	(4.81)	165.7	(6.52)
<b>LD</b>	125.9	(4.96)	174.5	(6.87)
<b>LE</b>	N/A		N/A	
<b>M</b>	79	(3.11)	79	(3.11)
<b>MA on MC</b>	M5 x 7 on 31.5 BC	M5 x (0.28) on (1.24) BC	M5 x 7 on 31.5 BC	M5 x (0.28) on (1.24) BC
<b>MB</b>	5 - 5.012 x 6 DP	(0.1967) - (0.1973) x (0.24) DP	5 - 5.012 x 6 DP	(0.1967) - (0.1973) x (0.24) DP
<b>N</b>	63.97 - 64	(2.5185) - (2.5197)	63.97 - 64	(2.5185) - (2.5197)
<b>NB</b>	63	(2.48)	63	(2.48)
<b>P</b>	86	(3.39)	86	(3.39)
<b>S on M</b>	4.5 on 79 BC	(0.18) on (3.11) BC	4.5 on 79 BC	(0.18) on (3.11) BC
<b>T</b>	7	(0.28)	7	(0.28)
<b>Bolt Hole</b>	BHP	45°	45°	
<b>Patterns:</b>	BHPA	N/A	N/A	
<b>Motor Outline</b>				

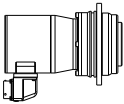
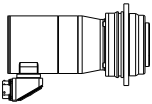
<sup>1</sup> Motors are designed to metric dimensions (inch references are mathematical conversions).

<sup>2</sup> Abbreviations: BC = Bolt Circle, BHP/BHPA = Bolt Hole Patterns, DP = Depth.

<b>Motor Dimension Symbol</b> <sup>1,2</sup>	<b>MPG-x010-031x22</b>		<b>MPG-x010-031x24</b>	
	mm	(in.)	mm	(in.)
<b>AC</b>	95.00	(3.74)	95	(3.74)
<b>AD</b>	82.60	(3.25)	81.7	(3.22)
<b>AE</b>	83.20	(3.28)	83.20	(3.28)
<b>AF</b>	N/A		N/A	
<b>AG</b>	N/A		N/A	
<b>BE</b>	67.70	(2.67)	88.90	(3.50)
<b>D</b>	62.97 - 63	(2.4791) - (2.4803)	62.97 - 63	(2.4791) - (2.4803)
<b>DB</b>	31.5 - 31.525 x 6 DP	(1.2402) - (1.2411) x (0.24) DP	31.5 - 31.525 x 6 DP	(1.2402) - (1.2411) x (0.24) DP
<b>E</b>	6.00	(0.24)	6	(0.24)
<b>HD</b>	141.60	(5.57)	140.70	(5.54)
<b>L</b>	184.5	(7.26)	219.50	(8.64)
<b>L-LB</b>	30.00	(1.18)	30.00	(1.18)
<b>LA</b>	7.00	(0.28)	7.00	(0.28)
<b>LB</b>	154.50	(6.08)	189.50	(7.46)
<b>LD</b>	156.50	(6.16)	197.10	(7.76)
<b>LE</b>	N/A		N/A	
<b>M</b>	109.00	(4.29)	109.00	(4.29)
<b>MA on MC</b>	M6 x 10 on 50 BC	M6 x (0.39) on (1.97) BC	M6 x 10 on 50 BC	M6 x (0.39) on (1.97) BC
<b>MB</b>	6 - 6.012 x 7 DP	(0.2362) - (0.2367) x (0.28) DP	6 - 6.012 x 7 DP	(0.2362) - (0.2367) x (0.28) DP
<b>N</b>	89.965 - 90	(3.5419) - (3.5433)	89.965 - 90	(3.5419) - (3.5433)
<b>NB</b>	85.00	(3.35)	85.00	(3.35)
<b>P</b>	118.00	(4.65)	118.00	(4.65)
<b>S on M</b>	5.5 on 109 BC	(0.22) on (4.29) BC	5.5 on 109 BC	(0.22) on (4.29) BC
<b>T</b>	10.00	(0.39)	10.00	(0.39)
<b>Bolt Hole/</b>	BHP	45°	45°	
<b>Patterns:</b>	BHPA	N/A	N/A	
<b>Motor Outline</b>				

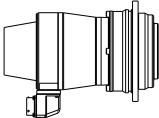
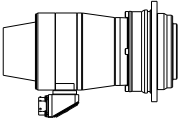
<sup>1</sup> Motors are designed to metric dimensions (inch references are mathematical conversions).

<sup>2</sup> Abbreviations: BC = Bolt Circle, BHP/BHPA = Bolt Hole Patterns, DP = Depth.

Motor Dimension Symbol <sup>1,2</sup>	MPG-x010-091x22		MPG-x010-091x24	
	mm	(in.)	mm	(in.)
<b>AC</b>	95.00	(3.74)	95	(3.74)
<b>AD</b>	82.60	(3.25)	81.7	(3.22)
<b>AE</b>	83.20	(3.28)	83.20	(3.28)
<b>AF</b>	N/A		N/A	
<b>AG</b>	N/A		N/A	
<b>BE</b>	67.70	(2.67)	88.90	(3.50)
<b>D</b>	62.97 - 63	(2.4791) - (2.4803)	62.97 - 63	(2.4791) - (2.4803)
<b>DB</b>	31.5 - 31.525 x 6 DP	(1.2402) - (1.2411) x (0.24) DP	31.5 - 31.525 x 6 DP	(1.2402) - (1.2411) x (0.24) DP
<b>E</b>	6.00	(0.24)	6	(0.24)
<b>HD</b>	141.60	(5.57)	140.70	(5.54)
<b>L</b>	169.5	(6.67)	204.5	(8.05)
<b>L-LB</b>	30.00	(1.18)	30.00	(1.18)
<b>LA</b>	7.00	(0.28)	7.00	(0.28)
<b>LB</b>	139.5	(5.49)	174.5	(6.87)
<b>LD</b>	141.5	(5.57)	182.1	(7.18)
<b>LE</b>	N/A		N/A	
<b>M</b>	109.00	(4.29)	109.00	(4.29)
<b>MA on MC</b>	M6 x 10 on 50 BC	M6 x (0.39) on (1.97) BC	M6 x 10 on 50 BC	M6 x (0.39) on (1.97) BC
<b>MB</b>	6 - 6.012 x 7 DP	(0.2362) - (0.2367) x (0.28) DP	6 - 6.012 x 7 DP	(0.2362) - (0.2367) x (0.28) DP
<b>N</b>	89.965 - 90	(3.5419) - (3.5433)	89.965 - 90	(3.5419) - (3.5433)
<b>NB</b>	85.00	(3.35)	85.00	(3.35)
<b>P</b>	118.00	(4.65)	118.00	(4.65)
<b>S on M</b>	5.5 on 109 BC	(0.22) on (4.29) BC	5.5 on 109 BC	(0.22) on (4.29) BC
<b>T</b>	10.00	(0.39)	10.00	(0.39)
<b>Bolt Hole/</b>	BHP	45°	45°	
<b>Patterns:</b>	BHPA	N/A	N/A	
<b>Motor Outline</b>				

<sup>1</sup> Motors are designed to metric dimensions (inch references are mathematical conversions).

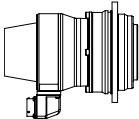
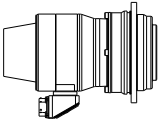
<sup>2</sup> Abbreviations: BC = Bolt Circle, BHP/BHPA = Bolt Hole Patterns, DP = Depth.

Motor Dimension Symbol <sup>1,2</sup>	MPG-x025-031x22		MPG-x025-031x24	
	mm	(in.)	mm	(in.)
<b>AC</b>	120	(4.72)	120	(4.72)
<b>AD</b>	96.5	(3.80)	95.6	(3.76)
<b>AE</b>	111.2	(4.38)	111.2	(4.38)
<b>AF</b>	85	(3.35)	85	(3.35)
<b>AG</b>	68.6	(2.70)	68.6	(2.70)
<b>BE</b>	67.7	(2.67)	88.9	(3.50)
<b>D</b>	79.97 - 80	(3.1484) - (3.1496)	79.97 - 80	(3.1484) - (3.1496)
<b>DB</b>	40 - 40.025 x 6 DP	(1.5748) - (1.5758) x (0.24) DP	40 - 40.025 x 6 DP	(1.5748) - (1.5758) x (0.24) DP
<b>E</b>	6.00	(0.24)	6	(0.24)
<b>HD</b>	169.00	(6.65)	168.1	(6.62)
<b>L</b>	222.50	(8.76)	251.10	(9.88)
<b>L-LB</b>	29.00	(1.14)	29.00	(1.14)
<b>LA</b>	8.00	(0.31)	8.00	(0.31)
<b>LB</b>	193.50	(7.62)	222.10	(8.74)
<b>LD</b>	161.00	(6.34)	170.90	(6.73)
<b>LE</b>	46.50	(1.83)	46.50	(1.83)
<b>M</b>	135.00	(5.31)	135.00	(5.31)
<b>MA on MC</b>	M6 x 12 on 63 BC	M6 x (0.47) on (2.48) BC	M6 x 12 on 63 BC	M6 x (0.47) on (2.48) BC
<b>MB</b>	6 - 6.012 x 7 DP	(0.2362) - (0.2367) x (0.28) DP	6 - 6.012 x 7 DP	(0.2362) - (0.2367) x (0.28) DP
<b>N</b>	109.965 - 110	(4.3293) - (4.3307)	109.965 - 110	(4.3293) - (4.3307)
<b>NB</b>	105.00	(4.13)	105.00	(4.13)
<b>P</b>	145.00	(5.71)	145.00	(5.71)
<b>S on M</b>	5.5 on 135 BC	(0.22) on (5.31) BC	5.5 on 135 BC	(0.22) on (5.31) BC
<b>T</b>	10.00	(0.39)	10.00	(0.39)
<b>Bolt Hole</b>	BHP	45°	45°	
<b>Patterns:</b>	BHPA	22.5°	22.5°	
<b>Motor Outline</b>				

<sup>1</sup> Motors are designed to metric dimensions (inch references are mathematical conversions).

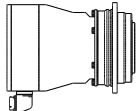
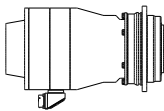
<sup>2</sup> Abbreviations: BC = Bolt Circle, BHP/BHPA = Bolt Hole Patterns, DP = Depth.



Motor Dimension Symbol <sup>1,2</sup>	MPG-x025-091x22		MPG-x025-091x24	
	mm	(in.)	mm	(in.)
<b>AC</b>	120	(4.72)	120	(4.72)
<b>AD</b>	96.5	(3.80)	95.6	(3.76)
<b>AE</b>	111.2	(4.38)	111.3	(4.38)
<b>AF</b>	85	(3.35)	85	(3.35)
<b>AG</b>	68.6	(2.70)	68.6	(2.70)
<b>BE</b>	67.7	(2.67)	88.9	(3.50)
<b>D</b>	79.97 - 80	(3.1484) - (3.1496)	79.97 - 80	(3.1484) - (3.1496)
<b>DB</b>	40 - 40.025 x 6 DP	(1.5748) - (1.5758) x (0.24) DP	40 - 40.025 x 6 DP	(1.5748) - (1.5758) x (0.24) DP
<b>E</b>	6	(0.24)	6	(0.24)
<b>HD</b>	169	(6.65)	168.1	(6.62)
<b>L</b>	192.5	(7.58)	221.1	(8.70)
<b>L-LB</b>	29	(1.14)	29	(1.14)
<b>LA</b>	8	(0.31)	8	(0.31)
<b>LB</b>	163.50	(6.44)	192.1	(7.56)
<b>LD</b>	131.00	(5.16)	140.9	(5.55)
<b>LE</b>	46.50	(1.83)	46.50	(1.83)
<b>M</b>	135.00	(5.31)	135.00	(5.31)
<b>MA on MC</b>	M6 x 12 on 63 BC	M6 x (0.47) on (2.48) BC	M6 x 12 on 63 BC	M6 x (0.47) on (2.48) BC
<b>MB</b>	6 - 6.012 x 7 DP	(0.2362) - (0.2367) x (0.28) DP	6 - 6.012 x 7 DP	(0.2362) - (0.2367) x (0.28) DP
<b>N</b>	109.965 - 110	(4.3293) - (4.3307)	109.965 - 110	(4.3293) - (4.3307)
<b>NB</b>	105.00	(4.13)	105.00	(4.13)
<b>P</b>	145.00	(5.71)	145	(5.71)
<b>S on M</b>	5.5 on 135 BC	(0.22) on (5.31) BC	5.5 on 135 BC	(0.22) on (5.31) BC
<b>T</b>	10.00	(0.39)	10.00	(0.39)
<b>Bolt Hole</b>	BHP	45°	45°	
	BHPA	22.5°	22.5°	
<b>Motor Outline</b>				

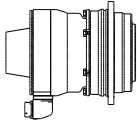
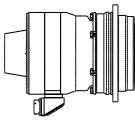
<sup>1</sup> Motors are designed to metric dimensions (inch references are mathematical conversions).

<sup>2</sup> Abbreviations: BC = Bolt Circle, BHP/BHPA = Bolt Hole Pattern/Auxiliary BHP, DP = Depth.

Motor Dimension Symbol <sup>1,2</sup>	MPG-x050-031x22		MPG-x050-031x24	
	mm	(in.)	mm	(in.)
<b>AC</b>	152	(5.98)	152	(5.98)
<b>AD</b>	127	(5.00)	126.1	(4.96)
<b>AE</b>	171	(6.73)	171	(6.73)
<b>AF</b>	N/A		120	(4.72)
<b>AG</b>	N/A		104	(4.09)
<b>BE</b>	67.7	(2.67)	88.9	(3.50)
<b>D</b>	99.965 - 100	(3.9356) - (3.9370)	99.965 - 100	(3.9356) - (3.9370)
<b>DB</b>	50 - 50.025 x 6 DP	(1.9685) - (1.9695) x (0.24) DP	50 - 50.025 x 6 DP	(1.9685) - (1.9695) x (0.24) DP
<b>E</b>	6	(0.24)	6	(0.24)
<b>HD</b>	216.2	(8.51)	215.6	(8.49)
<b>L</b>	274.0	(10.79)	346	(13.63)
<b>L-LB</b>	38	(1.50)	38	(1.50)
<b>LA</b>	10	(0.39)	10	(0.39)
<b>LB</b>	236	(9.29)	308	(12.13)
<b>LD</b>	230.7	(9.08)	236.6	(9.31)
<b>LE</b>	N/A		41	(1.61)
<b>M</b>	168.0	(6.61)	168.0	(6.61)
<b>MA on MC</b>	M8 x 15 DP on 80 BC	(M8 x (0.59) DP on (3.15) BC	M8 x 15 DP on 80 BC	(M8 x (0.59) DP on (3.15) BC
<b>MB</b>	8.0 - 8.015 x 7 DP	(0.3150) - (0.3156) x (0.28) DP	8.0 - 8.015 x 7 DP	(0.3150) - (0.3156) x (0.28) DP
<b>N</b>	139.96 - 140	(5.5102) - (5.5118)	139.96 - 140	(5.5102) - (5.5118)
<b>NB</b>	136	(5.35)	136	(5.35)
<b>P</b>	179	(7.05)	179	(7.05)
<b>S on M</b>	6.6 on 168 BC	(0.26) on (6.61) BC	6.6 on 168 BC	(0.26) on (6.61) BC
<b>T</b>	14.6	(0.57)	14.6	(0.57)
<b>Bolt Hole</b>	BHP	30°	BHP	30°
<b>Patterns:</b>	BHPA	N/A	BHPA	N/A
<b>Motor Outline</b>				

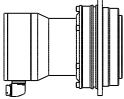
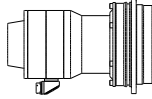
<sup>1</sup> Motors are designed to metric dimensions (inch references are mathematical conversions).

<sup>2</sup> Abbreviations: BC = Bolt Circle, BHP/BHPA = Bolt Hole Patterns, DP = Depth.

Motor Dimension Symbol <sup>1,2</sup>	MPG-x050-091x22		MPG-x050-091x24	
	mm	(in.)	mm	(in.)
<b>AC</b>	152	(5.98)	152	(5.98)
<b>AD</b>	116.5	(4.59)	115.6	(4.55)
<b>AE</b>	150.5	(5.93)	151	(5.94)
<b>AF</b>	86	(3.39)	86	(3.39)
<b>AG</b>	72	(2.83)	72	(2.83)
<b>BE</b>	67.7	(2.67)	88.9	(3.50)
<b>D</b>	99.965 - 100	(3.9356) - (3.9370)	99.965 - 100	(3.9356) - (3.9370)
<b>DB</b>	50 - 50.025 x 6 DP	(1.9685) - (1.9695) x (0.24) DP	50 - 50.025 x 6 DP	(1.9685) - (1.9695) x (0.24) DP
<b>E</b>	6	(0.24)	6	(0.24)
<b>HD</b>	206	(8.11)	205.1	(8.07)
<b>L</b>	227	(8.94)	256.5	(10.10)
<b>L-LB</b>	38	(1.50)	38	(1.50)
<b>LA</b>	10	(0.39)	10	(0.39)
<b>LB</b>	189	(7.44)	218.5	(8.60)
<b>LD</b>	156	(6.14)	161.9	(6.37)
<b>LE</b>	42	(1.65)	42	(1.65)
<b>M</b>	168.0	(6.61)	168.0	(6.61)
<b>MA on MC</b>	M8 x 15 DP on 80 BC	M8 x (0.59) DP on (3.15) BC	M8 x 15 DP on 80 BC	M8 x (0.59) DP on (3.15) BC
<b>MB</b>	8.0 - 8.015 x 7 DP	(0.3150) - (0.3156) x (0.28) DP	8.0 - 8.015 x 7 DP	(0.3150) - (0.3156) x (0.28) DP
<b>N</b>	139.96 - 140	(5.5102) - (5.5118)	139.96 - 140	(5.5102) - (5.5118)
<b>NB</b>	136	(5.35)	136	(5.35)
<b>P</b>	179	(7.05)	179	(7.05)
<b>S on M</b>	6.6 on 168 BC	(0.26) on (6.61) BC	6.6 on 168 BC	(0.26) on (6.61) BC
<b>T</b>	14.6	(0.57)	14.6	(0.57)
<b>Bolt Hole</b>	BHP	30°	30°	
<b>Patterns:</b>	BHPA	N/A	N/A	
<b>Motor Outline</b>				

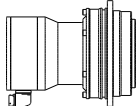
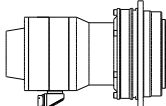
<sup>1</sup> Motors are designed to metric dimensions (inch references are mathematical conversions).

<sup>2</sup> Abbreviations: BC = Bolt Circle, BHP/BHPA = Bolt Hole Patterns, DP = Depth.

<b>Motor Dimension Symbol</b> <sup>1,2</sup>	<b>MPG-x110-031x22</b>		<b>MPG-x110-031x24</b>	
	mm	(in.)	mm	(in.)
<b>AC</b>	212	(8.35)	212	(8.35)
<b>AD</b>	127	(5.0)	126.1	(4.96)
<b>AE</b>	171	(6.73)	171	(6.73)
<b>AF</b>	N/A		120	(4.72)
<b>AG</b>	N/A		106	(4.17)
<b>BE</b>	67.7	(2.67)	88.9	(3.50)
<b>D</b>	159.96 - 160	(6.2976) - (6.2992)	159.96 - 160	(6.2976) - (6.2992)
<b>DB</b>	80 - 80.03 x 8 DP	(3.1496) - (3.1508) x (0.31) DP	80 - 80.03 x 8 DP	(3.1496) - (3.1508) x (0.31) DP
<b>E</b>	8	(0.31)	8	(0.31)
<b>HD</b>	250.5	(9.86)	249.6	(9.83)
<b>L</b>	300.0	(11.81)	372	(14.65)
<b>L-LB</b>	50	(1.97)	50	(1.97)
<b>LA</b>	12	(0.47)	12	(0.47)
<b>LB</b>	250	(9.84)	322	(12.68)
<b>LD</b>	244.7	(9.63)	250.6	(9.87)
<b>LE</b>	N/A		41	(1.61)
<b>M</b>	233	(9.17)	233	(9.17)
<b>MA on MC</b>	M10 x 20 on 125 BC	(M10 x (0.79) on (4.92) BC	M10 x 20 on 125 BC	(M10 x (0.79) on (4.92) BC
<b>MB</b>	10 - 10.015 x 10 DP	(0.3937) - (0.3943) x (0.39) DP	10 - 10.015 x 10 DP	(0.3937) - (0.3943) x (0.39) DP
<b>N</b>	199.954 - 200	(7.8722) - (7.8740)	199.954 - 200	(7.8722) - (7.8740)
<b>NB</b>	196	(7.72)	196	(7.72)
<b>P</b>	247	(9.72)	247	(9.72)
<b>S on M</b>	9 on 233 BC	(0.35) on (9.17) BC	9 on 233 BC	(0.35) on (9.17) BC
<b>T</b>	15	(0.59)	15	(0.59)
<b>Bolt Hole</b>	BHP	30°	BHP	30°
<b>Patterns:</b>	BHPA	N/A	BHPA	N/A
<b>Motor Outline</b>				

<sup>1</sup> Motors are designed to metric dimensions (inch references are mathematical conversions).

<sup>2</sup> Abbreviations: BC = Bolt Circle, BHP/BHPA = Bolt Hole Patterns, DP = Depth.

Motor Dimension Symbol <sup>1,2</sup>	MPG-x110-091x22		MPG-x110-091x24	
	mm	(in.)	mm	(in.)
<b>AC</b>	212	(8.35)	212	(8.35)
<b>AD</b>	127	(5.0)	126.1	(4.96)
<b>AE</b>	171	(6.73)	171	(6.73)
<b>AF</b>	N/A		120	(4.72)
<b>AG</b>	N/A		106	(4.17)
<b>BE</b>	67.7	(2.67)	88.9	(3.50)
<b>D</b>	159.96 - 160	(6.2976) - (6.2992)	159.96 - 160	(6.2976) - (6.2992)
<b>DB</b>	80 - 80.03 x 8 DP	(3.1496) - (3.1508) x (0.31) DP	80 - 80.03 x 8 DP	(3.1496) - (3.1508) x (0.31) DP
<b>E</b>	8	(0.31)	8	(0.31)
<b>HD</b>	250.5	(9.86)	249.6	(9.83)
<b>L</b>	285	(11.22)	357	(14.06)
<b>L-LB</b>	50	(1.97)	50	(1.97)
<b>LA</b>	12	(0.47)	12	(0.47)
<b>LB</b>	235	(9.35)	307	(12.09)
<b>LD</b>	229.7	(9.04)	235.6	(9.28)
<b>LE</b>	N/A		41	(1.61)
<b>M</b>	233	(9.17)	233	(9.17)
<b>MA on MC</b>	M10 x 20 on 125 BC	(M10 x (0.79) on (4.92) BC	M10 x 20 on 125 BC	(M10 x (0.79) on (4.92) BC
<b>MB</b>	10 - 10.015 x 10 DP	(0.3937) - (0.3943) x (0.39) DP	10 - 10.015 x 10 DP	(0.3937) - (0.3943) x (0.39) DP
<b>N</b>	199.954 - 200	(7.8722) - (7.8740)	199.954 - 200	(7.8722) - (7.8740)
<b>NB</b>	196	(7.72)	196	(7.72)
<b>P</b>	247	(9.72)	247	(9.72)
<b>S on M</b>	9 on 233 BC	(0.35) on (9.17) BC	9 on 233 BC	(0.35) on (9.17) BC
<b>T</b>	15	(0.59)	15	(0.59)
<b>Bolt Hole</b>	BHP	30°	BHP	30°
<b>Patterns:</b>	BHPA	N/A	BHPA	N/A
<b>Motor Outline</b>				

<sup>1</sup> Motors are designed to metric dimensions (inch references are mathematical conversions).

<sup>2</sup> Abbreviations: BC = Bolt Circle, BHP/BHPA = Bolt Hole Patterns, DP = Depth.

## Housing and Output Flange Connections

The following table provides ISO 898-1 mounting bolt strength class requirements for the motor housing, and tightening torques for connecting the motor housing and the ISO 9409 compliant output flange to your assembly. Apply a high-temperature, medium-strength threadlock adhesive to the mounting bolts.

### IMPORTANT

A loose or slipping connection will cause system instability and may damage the MP gear motor.

All connections between the assembly and the MP gear motor must be rigid to achieve acceptable response from both the motor and the system.

Periodically inspect connections to verify their rigidity.

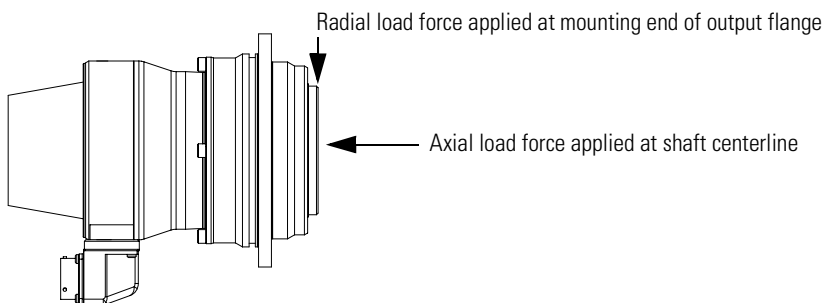
Motor	Bolt Strength Grade ISO 898-1	Torque			
		Motor Housing <sup>1</sup>	Output Flange <sup>1</sup>		
		Nm	(lb-in.)	Nm	(lb-in.)
MPG-A004	10.9	4.1	(36.3)	8.1	(72)
MPG-A010, MPG-B010	10.9	8.1	(72)	14.0	(124)
MPG-A025, MPG-B025	10.9	8.1	(72)	14.0	(124)
MPG-A050, MPG-B050	10.9	14.0	(124)	34.0	(301)
MPG-A110, MPG-B110	10.9	34.0	(301)	67.0	(593)

<sup>1</sup> Refer to *Mounting Dimensions* beginning on page 10 for hole dimensions.

## Motor Load Force Ratings

Motors are capable of operating with a sustained shaft load. The radial and axial load force location is shown in the figure, and maximum values for motors are in the following tables.

**Figure 2**  
**Load Forces on Shaft**



The following tables represent 20,000 hour  $L_{10}$  bearing fatigue life at various loads and speeds. This 20,000 hour life does not account for possible application-specific life reduction that may occur due to bearing grease contamination from external sources, improper alignment, or excessive loading.

## Radial Load Force Ratings

Motor	40 rpm		60 rpm		100 rpm		156 rpm		194 rpm	
	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)
MPG-A004-031	179	(393)	—	—	162	(356)	139	(307)	130	(286)
MPG-A004-091 <sup>1</sup>	179	(393)	179	(393)	—	—	—	—	—	—
MPG-A010-031 <sup>2</sup>	337	(743)	—	—	286	(631)	246	(543)	—	—
MPG-A010-091 <sup>3</sup>	337	(743)	330	(728)	—	—	—	—	—	—
MPG-A025-031 <sup>4</sup>	478	(1053)	—	—	406	(895)	342	(753)	—	—
MPG-A025-091 <sup>5</sup>	478	(1053)	476	(1050)	—	—	—	—	—	—
MPG-A050-031 <sup>6</sup>	1724	(3801)	1509	(3325)	1305	(2877)	—	—	—	—
MPG-A050-091 <sup>7</sup>	1724	(3801)	1602	(3530)	—	—	—	—	—	—
MPG-A110-031 <sup>8</sup>	3144	(6930)	2751	(6062)	2283	(5032)	—	—	—	—
MPG-A110-091 <sup>9</sup>	3144	(6930)	2987	(6583)	—	—	—	—	—	—
MPG-B010-031 <sup>10</sup>	337	(743)	—	—	286	(631)	246	(543)	224	(494)
MPG-B010-091 <sup>11</sup>	337	(743)	321	(707)	—	—	—	—	—	—
MPG-B025-031 <sup>12</sup>	478	(1053)	—	—	406	(895)	350	(772)	—	—
MPG-B025-091 <sup>13</sup>	478	(1053)	469	(1033)	—	—	—	—	—	—
MPG-B050-031 <sup>14</sup>	1724	(3801)	1509	(3325)	1305	(2877)	—	—	—	—
MPG-B050-091 <sup>15</sup>	1724	(3801)	1509	(3325)	—	—	—	—	—	—
MPG-B110-031 <sup>16</sup>	3144	(6930)	2751	(6062)	2407	(5305)	—	—	—	—
MPG-B110-091 <sup>17</sup>	3144	(6930)	2987	(6583)	—	—	—	—	—	—

<sup>1</sup> Measurement speeds: 40, 66 rpm.

<sup>2</sup> Measurement speeds: 40, 100, 157 rpm.

<sup>3</sup> Measurement speeds: 40, 65 rpm.

<sup>4</sup> Measurement speeds: 40, 100, 158 rpm.

<sup>5</sup> Measurement speeds: 40, 62 rpm.

<sup>6</sup> Measurement speeds: 20, 50, 81 rpm.

<sup>7</sup> Measurement speeds: 20, 41 rpm.

<sup>8</sup> Measurement speeds: 20, 50, 93 rpm.

<sup>9</sup> Measurement speeds: 20, 38 rpm.

<sup>10</sup> Measurement speeds: 40, 100, 157, 208 rpm.

<sup>11</sup> Measurement speeds: 40, 71 rpm.

<sup>12</sup> Measurement speeds: 40, 100, 156 rpm.

<sup>13</sup> Measurement speeds: 40, 65 rpm.

<sup>14</sup> Measurement speeds: 20, 50, 81 rpm.

<sup>15</sup> Measurement speeds: 20, 50 rpm.

<sup>16</sup> Measurement speeds: 20, 50, 78 rpm.

<sup>17</sup> Measurement speeds: 20, 38 rpm.



## Axial Load Force Ratings (Maximum Radial Load)

Motor	40 rpm		60 rpm		100 rpm		156 rpm		194 rpm	
	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)
MPG-A004-031	166	(366)	102	(225)	—	—	88	(194)	82	(180)
MPG-A004-091 <sup>1</sup>	166	(366)	123	(272)	—	—	—	—	—	—
MPG-A010-031 <sup>2</sup>	219	(483)	—	—	201	(443)	173	(381)	—	—
MPG-A010-091 <sup>3</sup>	219	(483)	219	(483)	—	—	—	—	—	—
MPG-A025-031 <sup>4</sup>	407	(897)	—	—	254	(559)	213	(471)	—	—
MPG-A025-091 <sup>5</sup>	407	(897)	298	(656)	—	—	—	—	—	—
MPG-A050-031 <sup>6</sup>	625	(1378)	456	(1004)	394	(868)	—	—	—	—
MPG-A050-091 <sup>7</sup>	625	(1378)	483	(1066)	—	—	—	—	—	—
MPG-A110-031 <sup>8</sup>	1025	(2259)	862	(1899)	715	(1577)	—	—	—	—
MPG-A110-091 <sup>9</sup>	1025	(2259)	936	(2063)	—	—	—	—	—	—
MPG-B010-031 <sup>10</sup>	219	(483)	—	—	201	(443)	173	(381)	157	(347)
MPG-B010-091 <sup>11</sup>	219	(483)	219	(483)	—	—	—	—	—	—
MPG-B025-031 <sup>12</sup>	407	(897)	—	—	254	(559)	219	(482)	—	—
MPG-B025-091 <sup>13</sup>	407	(897)	293	(645)	—	—	—	—	—	—
MPG-B050-031 <sup>14</sup>	625	(1378)	456	(1004)	394	(868)	—	—	—	—
MPG-B050-091 <sup>15</sup>	625	(1378)	456	(1004)	—	—	—	—	—	—
MPG-B110-031 <sup>16</sup>	1025	(2259)	862	(1899)	754	(1662)	—	—	—	—
MPG-B110-091 <sup>17</sup>	1025	(2259)	936	(2063)	—	—	—	—	—	—

<sup>1</sup> Measurement speeds: 40, 66 rpm.

<sup>2</sup> Measurement speeds: 40, 100, 157 rpm.

<sup>3</sup> Measurement speeds: 40, 65 rpm.

<sup>4</sup> Measurement speeds: 40, 100, 158 rpm.

<sup>5</sup> Measurement speeds: 40, 62 rpm.

<sup>6</sup> Measurement speeds: 20, 50, 81 rpm.

<sup>7</sup> Measurement speeds: 20, 41 rpm.

<sup>8</sup> Measurement speeds: 20, 50, 93 rpm.

<sup>9</sup> Measurement speeds: 20, 38 rpm.

<sup>10</sup> Measurement speeds: 40, 100, 157, 208 rpm.

<sup>11</sup> Measurement speeds: 40, 71 rpm.

<sup>12</sup> Measurement speeds: 40, 100, 156 rpm.

<sup>13</sup> Measurement speeds: 40, 65 rpm.

<sup>14</sup> Measurement speeds: 20, 50, 81 rpm.

<sup>15</sup> Measurement speeds: 20, 50 rpm.

<sup>16</sup> Measurement speeds: 20, 50, 78 rpm.

<sup>17</sup> Measurement speeds: 20, 38 rpm.

## Axial Load Force Ratings (Zero Radial Load)

<b>Motor</b>	<b>Full rpm range</b>	
	kg	(lb)
MPG-A004-031 <sup>1</sup>	166	(366)
MPG-A004-091 <sup>2</sup>	166	(366)
MPG-A010-031 <sup>3</sup>	219	(483)
MPG-A010-091 <sup>4</sup>	219	(483)
MPG-A025-031 <sup>5</sup>	423	(933)
MPG-A025-091 <sup>6</sup>	423	(933)
MPG-A050-031 <sup>7</sup>	625	(1378)
MPG-A050-091 <sup>8</sup>	625	(1378)
MPG-A110-031 <sup>9</sup>	1025	(2259)
MPG-A110-091 <sup>10</sup>	1025	(2259)
MPG-B010-031 <sup>11</sup>	219	(483)
MPG-B010-091 <sup>12</sup>	219	(483)
MPG-B025-031 <sup>13</sup>	423	(933)
MPG-B025-091 <sup>14</sup>	423	(933)
MPG-B050-031 <sup>15</sup>	625	(1378)
MPG-B050-091 <sup>16</sup>	625	(1378)
MPG-B110-031 <sup>17</sup>	1025	(2259)
MPG-B110-091 <sup>18</sup>	1025	(2259)

<sup>1</sup> Measurement speeds: 40, 100, 156, 194 rpm.

<sup>2</sup> Measurement speeds: 40, 66 rpm.

<sup>3</sup> Measurement speeds: 40, 100, 157 rpm.

<sup>4</sup> Measurement speeds: 40, 65 rpm.

<sup>5</sup> Measurement speeds: 40, 100, 158 rpm.

<sup>6</sup> Measurement speeds: 40, 62 rpm.

<sup>7</sup> Measurement speeds: 20, 50, 81 rpm.

<sup>8</sup> Measurement speeds: 20, 41 rpm.

<sup>9</sup> Measurement speeds: 20, 50, 93 rpm.

<sup>10</sup> Measurement speeds: 20, 38 rpm.

<sup>11</sup> Measurement speeds: 40, 100, 157, 208 rpm.

<sup>12</sup> Measurement speeds: 40, 71 rpm.

<sup>13</sup> Measurement speeds: 40, 100, 156 rpm.

<sup>14</sup> Measurement speeds: 40, 65 rpm.

<sup>15</sup> Measurement speeds: 20, 50, 81 rpm.

<sup>16</sup> Measurement speeds: 20, 50 rpm.

<sup>17</sup> Measurement speeds: 20, 50, 78 rpm.

<sup>18</sup> Measurement speeds: 20, 38 rpm.

## Holding Brake

A 24V dc holding brake is an option on the MP-Series Integrated Gear Motor. The following tables provide specifications on the brake.

### IMPORTANT

Ensure that proper polarity is maintained when wiring a brake connector.

Description	Gear Ratio	MPG-A004-xxx	MPG-A010-xxx, MPG-B010-xxx	MPG-A025-xxx, MPG-B025-xxx
Type		Permanent Magnet		
Holding Torque	-031	25 Nm (221 lb-in.)	68 Nm (602 lb-in.)	68 Nm (602 lb-in.)
	-091	32 Nm (283 lb-in.)	80 Nm (708 lb-in.)	205 Nm (1819 lb-in.)
Backlash		None with brake engaged		
Voltage Input		21.6 to 25.4V dc		
Current Input 24V dc, 20 <sup>0</sup> to 30 <sup>0</sup> C (68 <sup>0</sup> to 86 <sup>0</sup> F)		~0.33 A	~0.45 A	~0.45 A
Coil Resistance at 20 <sup>0</sup> C (68 <sup>0</sup> F)		67 to 77 Ohms	48.7 to 56 Ohms	48.7 to 56 Ohms
Coil Resistance at 40 <sup>0</sup> C (104 <sup>0</sup> F), operating at maximum continuous stall torque		72 to 83 Ohms	52 to 61 Ohms	48 to 55 Ohms
Release Time Delay (when voltage is applied)		22 ms	25 ms	25 ms
Engage Time (when voltage is removed)		7 ms	6 ms	6 ms

Description	Gear Ratio	MPG-A050-xxx, MPG-B050-xxx	MPG-A110-xxx, MPG-B110-xxx
Type		Permanent Magnet	
Holding Torque	-031	193 Nm (1711 lb-in.)	693 Nm (6137 lb-in.)
	-091	500 Nm (4425 lb-in.)	1300 Nm (11506 lb-in.)
Backlash		None with brake engaged	
Voltage Input		21.6 to 25.4V dc	
Current Input 24V dc, 20 <sup>0</sup> to 30 <sup>0</sup> C (68 <sup>0</sup> to 86 <sup>0</sup> F)		~0.5 A	~1.0 A
Coil Resistance at 20 <sup>0</sup> C (68 <sup>0</sup> F)		44.7 to 51.3 Ohms	22.4 to 25.6 Ohms
Coil Resistance at 40 <sup>0</sup> C (104 <sup>0</sup> F), operating at maximum continuous stall torque		48 to 55 Ohms	24 to 28 Ohms
Release Time Delay (when voltage is applied)		35 ms	35 ms
Engage Time (when voltage is removed)		7 ms	7 ms

## Cables and Connector Kits

Factory manufactured feedback and power cables are available in standard cable lengths. They provide environmental sealing and proper shield termination to an IP66 rating, which exceeds the MP gear motor's IP64 rating. For a complete listing of available cables refer to your drive's installation manual, contact your nearest Rockwell Automation sales office, or access the information from the web sites referenced in *Related Documentation* on page 30.

### Building and Installing Cables

Knowledgeable cable routing and careful cable construction improves system electromagnetic compatibility (EMC).

To build and install cables, perform the following steps:

1. Keep wire lengths as short as physically possible.
2. Route signal cables (encoder, serial, analog, and brake) away from motor and power wiring.
3. Separate cables by 0.3 m (1 ft) minimum for every 9 m (30 ft) of parallel run.
4. Ground both ends of the encoder cable shield and twist the signal wire pairs to prevent electromagnetic interference (EMI) from other equipment.

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**ATTENTION**

High voltage can be present on the shield of a power cable, if the shield is not grounded.

Ensure there is a connection to ground for any power cable shield.

Failure to observe these safety procedures could result in personal injury or damage to equipment.

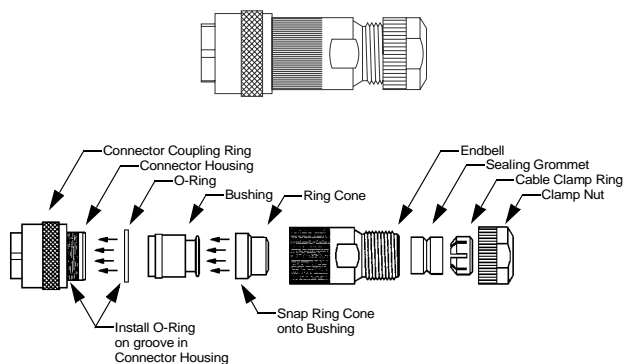
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If you choose to build your own cables, the following connector kits are available for MP-Series Integrated Gear Motors. These solder-type connectors mate with the motor-mounted connectors and provide environmental sealing with shield termination.

Each connector kit includes the requisite number and size of solder-type contact pins, a connector housing, and a connector backshell. As an example, finished and exploded views of the connector kit are shown below.

Catalog Number	Connector Type	Accepts Wire Gauge <sup>1</sup>		Accepts Cable Diameter Gauge	
		mm <sup>2</sup>	(AWG)	mm <sup>2</sup>	(in.)
2090-MPPC-S	Power - Straight	2.5-4.0	(14-12)	7.9-12.4	(0.31-0.49)
2090-MPFC-S	Feedback - Straight				
2090-MPBC-S	Brake - Straight			4.3-7.4	(0.17-0.29)

<sup>1</sup> Refer to your drive's installation manual for recommended wire gauges.



## Gear Lubricant

Gear units are permanently lubricated at the factory.

## Related Documentation

The following documents contain additional information concerning related Allen-Bradley products. To obtain a copy, contact your local Rockwell Automation office or distributor, or access on-line at: [www.theautomationbookstore.com](http://www.theautomationbookstore.com) or [www.ab.com/manuals/gmc](http://www.ab.com/manuals/gmc).

<b>For information about:</b>	<b>Read this document:</b>	<b>Publication Number</b>
Small Frame ( $\leq 165$ mm) MP Motors	<i>MP-Series Brushless Servo Motor Manuals</i>	MP-IN001x-EN-P
Large Frame ( $\geq 215$ mm) MP Motors		MP-IN002x-EN-P
Connecting to an Ultra5000™ drive	<i>Ultra5000 Intelligent Positioning Drives Installation Manual</i>	2098-IN001x-EN-P
Connecting to an Ultra3000™ drive	<i>Ultra3000 Digital Servo Drives Installation Manual</i>	2098-IN003x-EN-P
Connecting to an Kinetix™ 6000 drive	<i>Kinetix 6000 Multi-Axis Servo Drive Installation Manual</i>	2094-IN001x-EN-P
A glossary of industrial automation terms and abbreviations	<i>Allen-Bradley Industrial Automation Glossary</i>	AG-7.1
How to minimize and control system-level noise	<i>System Design for Control of Electrical Noise</i>	GMC-RM001x-EN-P
An overview of Allen-Bradley motion controls and systems, including information about MP-Series motors.	<i>Motion Control Selection Guide</i>	GMC-SG001x-EN-P

## Notes

For more information refer to our web site: [www.ab.com/motion](http://www.ab.com/motion)  
For Allen-Bradley Technical Support information refer to: [www.ab.com/support](http://www.ab.com/support) or Tel: (1) 440.646.5800

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[www.rockwellautomation.com](http://www.rockwellautomation.com)

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