

MP-Series Medium Inertia Servo Motor

Catalog Numbers MPM-A1151, MPM-A1152, MPM-A1153, MPM-A1302, MPM-A1304, MPM-A1651, MPM-A1652, MPM-A1653, MPM-A2152, MPM-A2153, MPM-A2154, MPM-B1151, MPM-B1152, MPM-B1153, MPM-B1302, MPM-B1304, MPM-B1651, MPM-B1652, MPM-B1653, MPM-B2152, MPM-B2153, MPM-B2154

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About the MP-Series Medium Inertia Motors

MP-Series medium-inertia motors feature resolvers, and single-turn or multi-turn high resolution encoders. They are also available with 24V DC holding brakes. These compact brushless servo motors combine the features of the MP-Series low-inertia motors with a rotor inertia that is better suited for high inertial loads.

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls, publication [SGI-1.1](#), is available from your local Rockwell Automation sales office or online at <http://literature.rockwellautomation.com> describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

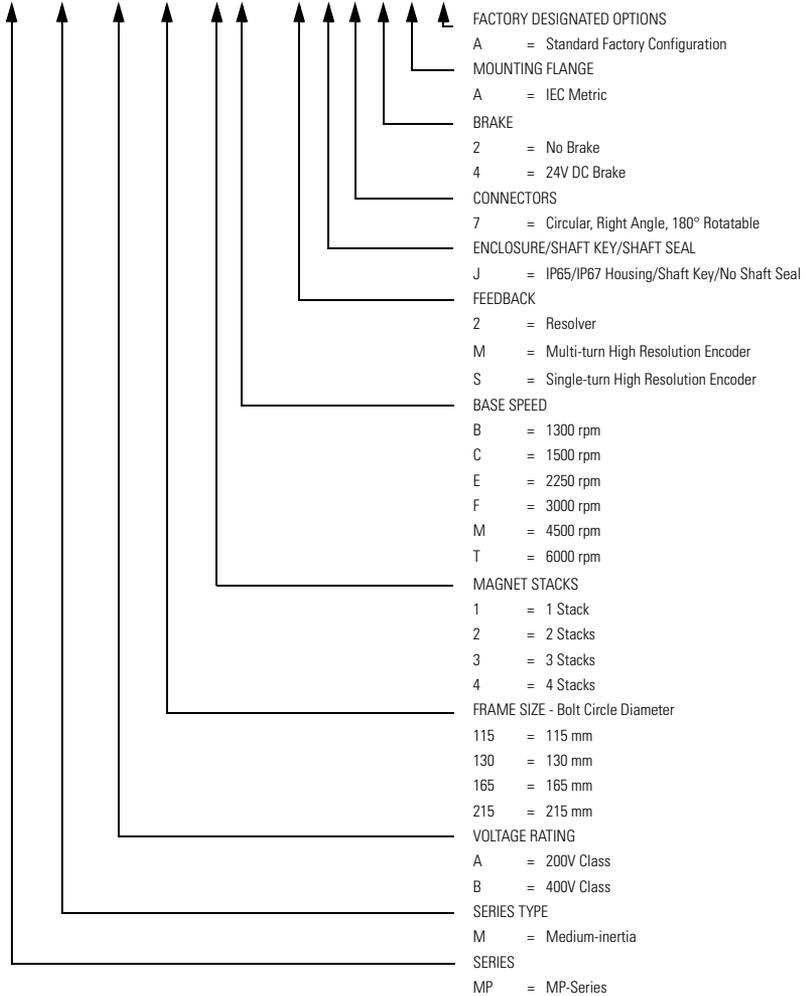
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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

<p>WARNING</p> 	<p>Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.</p>
<p>IMPORTANT</p>	<p>Identifies information that is critical for successful application and understanding of the product.</p>
<p>ATTENTION</p> 	<p>Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard and recognize the consequences.</p>
<p>SHOCK HAZARD</p> 	<p>Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.</p>
<p>BURN HAZARD</p> 	<p>Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.</p>

Catalog Number Explanation

MP M - B 115 1 F - M J 7 2 A A



Before You Begin

Remove all packing material from within and around the item. After unpacking, verify the nameplate catalog number against the purchase order.

1. Remove the motor carefully from its shipping container.
2. Visually inspect the motor frame, shaft, and mounting pilot for damage.
3. Notify the carrier of any shipping damage immediately.

ATTENTION

Do not attempt to open or modify this motor beyond changing the connector orientation as described in [Build and Route Cables](#).

Only an authorized Allen-Bradley repair center shall service this item. Refer to Rockwell Automation Support for assistance to locate the nearest repair center.

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

Using Shaft Seals

A seal may be installed on the motor shaft to protect the front bearing from fluids or fine dust that could contaminate the motor bearing and reduce its lifetime. The International Protection (IP) rating for the motor may require the use of shaft seals, connectors, and cables that provide an environmental seal equal to or exceeding the rating.

- Refer to [Specifications](#) for a brief description of IP ratings for this motor.
- Refer to [Shaft Seals](#) to find the catalog numbers of seal kits for your motor.
- Refer to the Kinetix Motion Control Selection Guide, publication [GMC-SG001](#), to find environmentally sealed connectors and cables that are compatible with MP-Series motors.

Prolonging Motor Life

Thoughtful design and proper maintenance can increase the life of a servo motor. Follow these guidelines to maximize the life of a servo motor within a food processing environment:

- Always provide a drip loop in each cable to carry liquids away from the connection to the motor.
- If design requirements permit, provide shields that protect the motor housing, shaft, seals and their junctions from contamination by foreign matter or fluids.
- Replace the shaft seal at or before its expected lifetime of 12-months. Refer to [Shaft Seals](#) for more information on shaft seals.
- Inspect the motor and seals for damage or wear on a regular basis. If damage or excessive wear is observed, replace the item.
- The brake option on this servo motor is a spring-set holding brake that releases when voltage is applied to the brake coil. A separate power source is required to disengage the brake. This power source can be applied by a servo motor controller or manual operator control.

If system main power fails, holding brakes can withstand occasional use as stopping brakes. However, this creates mechanical backlash that is potentially damaging to the system, increases brake wear, and reduces brake life.

IMPORTANT

Holding brakes are not designed to stop rotation of the motor shaft, nor are they intended to be used as a safety device. They are designed to hold a motor shaft at 0 rpm for up to the rated brake holding torque.

The recommended method of preventing motor shaft rotation is a four step process: first - command the servo drive to 0 rpm, second - verify the motor is at 0 rpm, third - engage the brake; and fourth - disable the drive.

Disabling the drive removes the potential for brake wear caused by an improperly tuned servo system oscillating the shaft.

Using Couplings and Pulleys

Mechanical connections to the motor shaft, such as couplings and pulleys, require a torsionally rigid coupling or a reinforced timing belt. The high dynamic performance of servo motors can cause couplings, pulleys, or belts to loosen or slip over time. A loose or slipping connection causes system instability and can damage the motor shaft. All connections between the system and the servo motor shaft must be rigid to achieve an acceptable response from the system. Periodically inspect connections to verify their rigidity.

When mounting couplings or pulleys to the motor shaft, make sure that the connections are properly aligned and that axial and radial loads are within the specifications of the motor. Refer to [Shaft Seals](#) for guidelines to achieve 20,000 hours of motor bearing life.

ATTENTION



Damage may occur to the motor bearings and the feedback device if sharp impact is applied to the shaft during installation of couplings and pulleys. Damage to the feedback device may result from applying leverage to the motor mounting face when removing devices mounted on the motor shaft.

Do not strike the shaft, couplings, or pulleys with tools during installation or removal. Use a wheel puller to apply pressure from the user end of the shaft to remove any device from the motor shaft.

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

A shaft key provides a rigid mechanical connection with the potential for self-alignment when the key is properly installed. These sections provide additional information:

- Refer to [Product Dimensions](#) for information about the key and shaft keyway.
- Refer to [Shaft Key](#) for recommendations on how to remove and install a shaft key.

Prolonging Motor Life

Thoughtful design and proper maintenance can increase the life of this motor. Follow these guidelines to maximize the life of the motor:

- Always provide a drip loop in each cable to carry liquids away from the connection to the motor.
- If design requirements permit, provide shields that protect the motor housing, shaft, seals, and their junctions from contamination by foreign matter or fluids.
- Inspect the motor for damage or wear on a regular basis. If damage or excessive wear is observed, replace the item.

Preventing Electrical Noise

ElectroMagnetic Interference (EMI), commonly called electrical noise, can reduce motor performance. Effective techniques to counter EMI include filtering the AC power, use of shielded cables, separating signal cables from power wiring, and practicing good grounding techniques.

Follow these guidelines to avoid the effects of EMI:

- Isolate the power transformers or install line filters on all AC input power lines.
- Physically separate signal cables from motor cabling and power wiring. Do not route signal cables 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. If necessary, use additional electrical noise reduction techniques to reduce EMI in noisy environments.

Refer to System Design for Control of Electrical Noise Reference Manual, publication [GMC-RM001](#), for additional information on reducing the effects of EMI.

Build and Route Cables

Knowledgeable cable routing and careful cable construction improves system performance.

Install cables as described in these guidelines:

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

BURN HAZARD



Do not tightly gather or coil the excess length of a power cable. Heat is generated within a cable whenever power is applied. Always position a power cable so it may freely dissipate any heat.

A power cable should not be coiled, except for temporary use when building or testing a machine. If you temporarily coil a power cable, you must also derate the cable to meet local code or follow a authoritative directive, such as Engineering Section 310.15(C) of the NEC Handbook.

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

Ground Shielded Signal Wires within a Power Cable

Always connect the shield on any signal wire pair routed inside a power cable to the overall machine ground.

SHOCK HAZARD



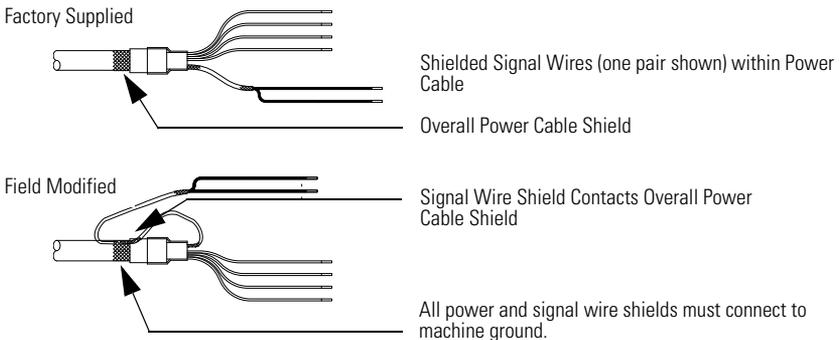
If any shield on a power cable is not grounded, high voltage can be present on that shield.

Make sure there is a connection to ground for all shield wires inside a power cable, and for the overall power cable shield.

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

If you are installing a 2090-CPBM7DF-xxAAxx or 2090-XXNPMF-xxSxx power cable, loop the signal wire pair to the overall cable shield as shown in the diagram, and clamp all of the shields together in the power-cable (chassis) ground connection on the drive.

Grounding of Signal Wire Shields in a Power Cable



Connect all signal wire shields and the overall power-cable shield to machine ground.

- The 2090-CPBM7DF-xxAFxx cable (shown) contains one signal wire pair.
- The 2090-XXNPMF-xxSxx cable contains two signal wire pairs.

The additional signal wire pair within the 2090-XXNPMF-xxSxx power cable often carries a 24V DC brake signal, but also can carry a logic signal. Grounding the shield that surrounds the signal wires reduces any voltage inductance and the effects of EMI.

Change Connector Orientation

You may rotate the connector housings up to 180 degrees.

This allows you to move the connector to a position that best protects the connection from possible environmental contaminants while providing cable access.

ATTENTION

Connectors are designed to be rotated into a fixed position during motor installation, and remain in that position without further adjustment. Strictly limit the applied forces and the number of times the connector is rotated to make sure that connectors meet the appropriate IP rating as outlined in [Specifications](#).

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

IMPORTANT

Do not use tools, such as pliers or vise-grips, to assist you in rotating either a feedback or a power/brake connector.

Only apply force to the connector. Do not apply force to or pull on the cable.

Follow these steps to rotate a feedback or power/brake connector.

1. Mount and fully seat a mating cable on either the feedback or power/brake connector.
2. Grasp the mated connector and cable plug and slowly rotate them to the outside of the motor.

ATTENTION

Apply force only to the motor connector and cable plug. Do not apply force to the cable extending from the cable plug. No tools, for example pliers or vise-grips, should be used to assist with the rotation of the connector.

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

Install the Motor

All motors include a mounting pilot for aligning the motor on the machine. Preferred fasteners are hardened steel. The installation must comply with all local regulations and use equipment and installation practices that promote safety and electromagnetic compatibility.

ATTENTION



Unmounted motors, disconnected mechanical couplings, loose shaft keys, 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 the shaft key and other mechanical couplings which could be thrown from the shaft.

Failure to observe safety precautions could result in personal injury.

ATTENTION



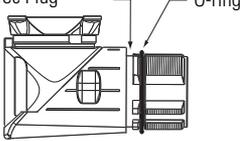
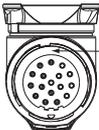
Make sure that cables are installed and restrained to prevent uneven tension or flexing at the cable connections.

Excessive and uneven lateral force on the cable can inhibit environmental sealing as the cable flexes.

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

Verify Connector O-ring and Backshell Seal

An O-ring on the feedback connector, and a backshell seal on the feedback and power/brake connectors are necessary to achieve the maximum environmental rating. Verify the seal and O-rings are installed as described.

Location	Verify
<p data-bbox="109 1117 267 1159">Groove Reserved For SpeedTec Plug</p> 	<ul data-bbox="543 1109 953 1305" style="list-style-type: none"> • An O-ring is mounted on the external surface of the feedback connector and the power/brake connector. • The O-ring is undamaged, not twisted, and rests in the groove near the rear of the connector. • If using a feedback cable having a SpeedTec plug, the O-ring must be removed.
 <p data-bbox="301 1385 469 1471">Backshell Seal Inside Feedback and Power/Brake Connector Housing</p>	<ul data-bbox="543 1338 950 1500" style="list-style-type: none"> • A backshell seal covers the joint inside the feedback and power/brake housings. It seals the joint between the backshell and the housing of the connector. • The backshell seal is undamaged, and it is fully seated against the face of the backshell.

Mount the Motor

Follow these steps to mount the motor on a machine.

1. Provide sufficient clearance, heatsink mass, and cooling air so the motor stays within the operating temperature range of 0...40 °C (32...104 °F).

Do not enclose the motor unless cooling air is forced across the motor, and keep other heat producing devices away from the motor. Heatsink requirements are listed in a footnote to the [Specifications](#) table.

BURN HAZARD



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

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

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

2. Verify the axial and radial shaft loads of your application do not exceed those listed in the [Motor Load Force Ratings](#).
3. Position the motor on the machine with its connectors pointing downward.
4. Insert and hand-tighten the fasteners in each of the four mounting holes in the motor faceplate.

The mounting hole diameter is specified in the [Product Dimensions](#) table.

5. Align the motor on the machine using the pilot hole for alignment.
6. Tighten the fasteners within the recommended torque range.

Cat. No.	Torque Range
MPM-x115x	0.8...1.0 N•m (7...9 lb•in.)
MPM-x130x	
MPM-x165x	4...10 N•m (35...90 lb•in.)
MPM-x215x	8...20 N•m (70...180 lb•in.)

7. Rotate the shaft for electrical phasing and encoder alignment.

The index pulse occurs on a single-turn encoder when the shaft key is aligned with the connectors. Refer to [Product Dimensions](#) for a visual reference of this alignment.

Attach Motor Cables

Follow these steps to attach the feedback and power/brake cables after the motor is mounted.

ATTENTION



Make sure that cables are installed and restrained to prevent uneven tension or flexing at any motor-to-cable connections.

Excessive and uneven lateral force at the motor connectors can result in the opening-and-closing of the environmental seal as the cable flexes.

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

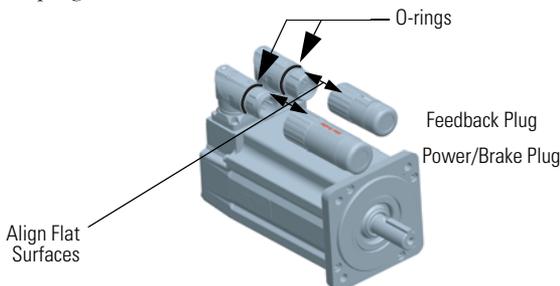
1. Form a drip loop in the cable before attaching it.

A drip loop creates a low spot in the cable. Gravity causes any liquid to flow to the spot and away from the connectors, thereby reducing the potential for any liquid to enter the connector.

2. If you use a cable with a SpeedTec plug, remove the O-ring on the feedback connector.

SpeedTec plugs require a partial revolution to lock onto the connector, whereas threaded plugs require multiple revolutions to fully lock onto the connector.

The O-ring on the connector dampens the effects of vibration at the cable-to-motor connection and creates a more secure connection for a cable with a threaded plug. O-rings interior to the cable plug provide complete environmental sealing for a cable with a SpeedTec plug or a cable with a threaded plug.



IMPORTANT

Cables requiring O-rings include power cable 2090-XXNPMF-xxSxx or 2090-CPxM4DF-xxAFxx, and feedback cable 2090-XXNFMF-Sxx or 2090-CFBM4DF-CDAFxx.

- Carefully align the flat surface on the feedback or the power/brake cable plug (shown in the diagram) with the flat surface on the motor connector.

IMPORTANT

The motor orientation shown is used to clearly show the alignment marker on each cable socket.

The recommended motor orientation when installed positions the connectors at the bottom of the motor.

- Hand tighten the collar on the plug to fully seat it on the connector.
 - Threaded plug requires five to six revolutions.
 - SpeedTec plug requires approximately one-quarter of a revolution.

TIP

A fully-seated threaded plug leaves a small opening, approximately 1...4 mm (0.04...0.16 in.), between the connector and the plug.

Do not apply excessive force when mating the cable plug with the motor connector. If the plug and connector do not go together with light hand force, realign the flat surfaces and try again.

ATTENTION



Keyed connectors and cable plugs must properly align and be hand-tightened the recommended number of turns.

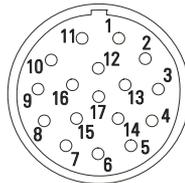
Improper alignment is indicated by the need for excessive force, such as the use of tools, to fully seat a plug.

Failure to observe safety precautions could result in damage to the motor and cable, and their components.

Connector Data

This table identifies the pinouts for the feedback connector.

M23 Feedback Connector				
Pin	MPM-Axxxx (230V) Motor with 5V Hi-Resolution Encoder	MPM-Bxxxx (460V) Motor with 9V Hi-Resolution Encoder	MPM-Bxxxx Motor with 4-Pole Resolver	
1	SIN+	SIN+	S2	
2	SIN-	SIN-	S4	
3	Cos+	COS+	S1	
4	Cos-	Cos-	S3	
5	DATA+	DATA+	R1	
6	DATA-	DATA-	R2	
7	Reserved	Reserved	Reserved	
8				
9				EPWR_5V
10				ECOM
11	Reserved	EPWR_9V		
12		ECOM		
13	TS+	TS+	TS+	
14	TS-	TS-	TS-	
15	Reserved	Reserved	Reserved	
16				
17				

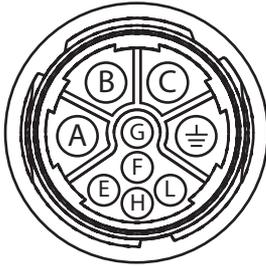


Intercontec P/N
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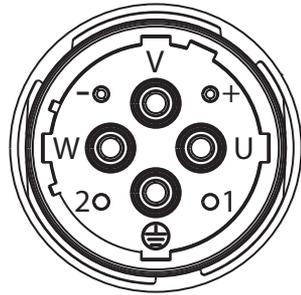
These tables identify the pinouts for power with brake connectors.

M23 Power/Brake Connector	
Pin	MPM-x115x, -x130x, -x165x, -x215x
A	Phase U
B	Phase V
C	Phase W
⊕	Ground
E	Reserved
F	BR+
G	BR-
H	Reserved
L	

M40 Power/Brake Connector	
Pin	MPM-x165x, -x215x
U	Phase U
V	Phase V
W	Phase W
⊕	Ground
+	BR+
-	BR-
1	Reserved
2	

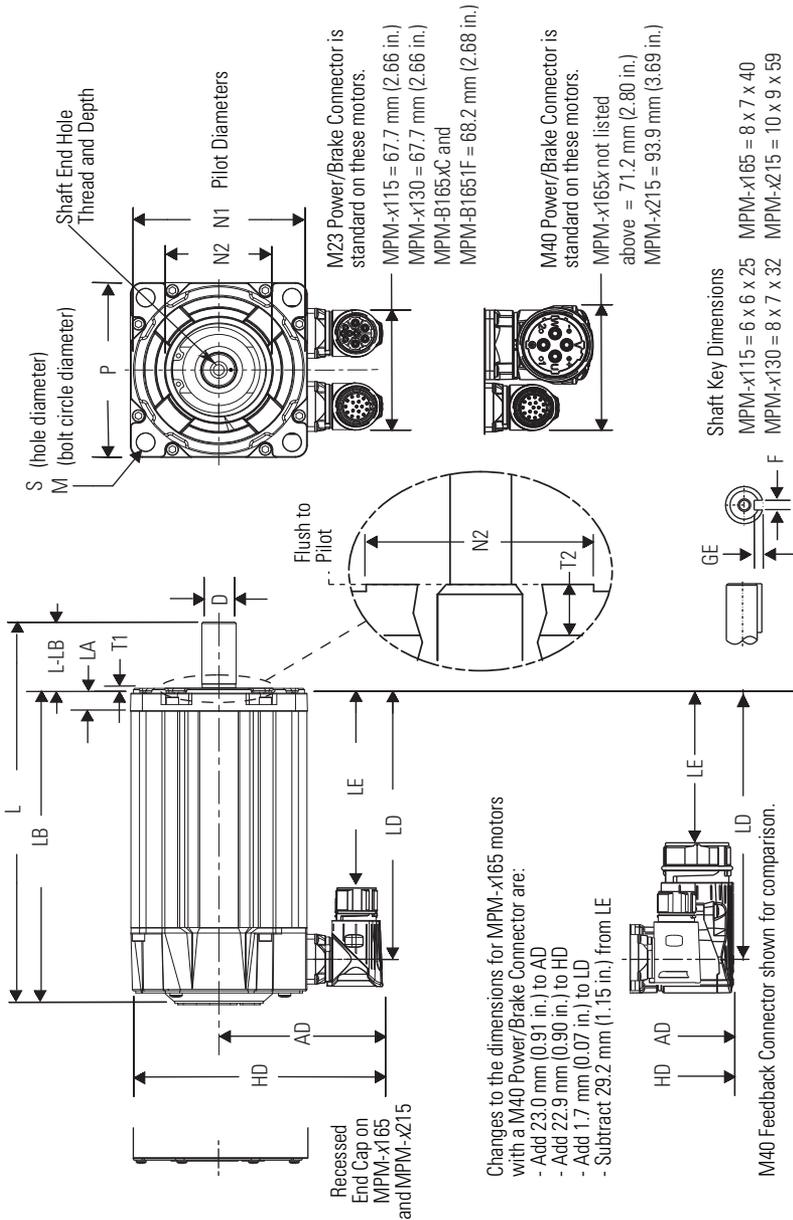


Intercontec P/N
BEDC091NN00000202000



Intercontec P/N
CEDE271NN00000051000

Product Dimensions



Motor Series MPM-A or MPM-B	AD ¹ mm (in.)	D mm (in.)	HD ¹ mm (in.)	L ² mm (in.)	L-LB ³ mm (in.)	LA mm (in.)	LB ² mm (in.)	LD ^{1,2} mm (in.)	LE ^{1,2} mm (in.)	M mm (in.)	N1 mm (in.)	N2 mm (in.)	P mm (in.)	S ⁴ mm (in.)	T1 mm (in.)	T2 mm (in.)	F ⁵ mm (in.)	GE ⁶ mm (in.)	End of Shaft Thread and Depth of Hole		
1151				189.9 (7.48)			149.9 (5.90)	124.2 (4.89)	84.1 (3.31)											M6 x 1.0 - 6H x 16 (0.63)	
1152	90.9 (3.58)	19.0 (0.748)	140.1 (5.52)	215.3 (8.48)	40.0 (1.575)	10.16 (0.40)	175.3 (6.90)	149.6 (5.89)	109.5 (4.31)	115.0 (4.528)	95.0 (3.74)	59.0 (2.32)	98.3 (3.87)	10.0 (0.401)	2.74 (0.108)	2.87 (0.113)	6.0 (0.236)	3.5 (0.138)			
1153				240.7 (9.48)			200.7 (7.90)	175.0 (6.89)	134.9 (5.31)												
1302	98.6 (3.88)	24.0 (0.945)	155.4 (6.12)	228.6 (9.0)	50.0 (1.969)	12.19 (0.48)	178.6 (7.03)	152.9 (6.02)	112.8 (4.44)	130.0 (5.118)	110.0 (4.33)	70.3 (2.77)	113.7 (4.48)	10.0 (0.401)	2.74 (0.108)	3.38 (0.133)	8.0 (0.315)	4.0 (0.158)		M8 x 1.25 - 6H x 19 (0.75)	
1304				279.4 (11.0)			229.4 (9.03)	203.7 (8.02)	163.6 (6.44)												
1651				286.6 (11.28)			226.6 (8.92)	200.2 (7.88)	160.0 (6.30)												
1652	113.4 (4.47)	28.0 (1.102)	185.2 (7.29)	337.4 (13.28)	60.0 (2.362)	14.0 (0.55)	277.4 (10.92)	251.0 (9.88)	210.8 (8.30)	165.0 (6.496)	130.0 (5.12)	81.0 (3.19)	143.5 (5.65)	12.0 (0.481)	3.12 (0.123)	3.38 (0.133)	8.0 (0.315)	4.0 (0.158)		M10 x 1.5 - 6H x 22 (0.87)	
1653				388.2 (15.28)			328.2 (12.92)	301.8 (11.88)	261.6 (10.30)												
2152				354.6 (13.96)			274.6 (10.81)	234.4 (9.23)	163.3 (6.43)												
2153	154.0 (6.06)	38.0 (1.496)	246.5 (9.70)	405.4 (15.96)	80.0 (3.149)	17.8 (0.70)	325.4 (12.81)	285.2 (11.23)	214.1 (8.43)	215.0 (8.465)	180.0 (7.09)	108.0 (4.25)	184.9 (7.28)	14.50 (0.571)	3.73 (0.147)	3.86 (0.152)	10.0 (0.394)	5.0 (0.197)		M12 x 1.75 - 6H x 28 (1.10)	
2154				456.2 (17.96)			376.2 (14.81)	336.0 (13.23)	264.9 (10.43)												

- 1 See the diagram for dimension changes to MPM-x165x motors with an M40 power connector.
 - 2 For motors with a brake (MPM-xxxxx-xx4xx), adjust dimensions with these values:
 - MPM-x115 motors add 48.5 mm (1.91 in.) to L, LB, LD, and LE.
 - MPM-x130 motors add 48.5 mm (1.91 in.) to L, LB, LD, and LE.
 - MPM-x165 motors add 51.5 mm (2.03 in.) to L, LB, LD, and LE.
 - MPM-x215 motors add 88.9 mm (3.50 in.) to L, LB, LD, and LE.
- 3 Tolerance is ±0.7 (±0.028).
 - 4 Tolerance is +0.36 (±0.007) for MPM-x115 and MPM-x130 motors, and +0.43 (±0.008) for MPM-x165 and MPM-x215 motors.
 - 5 Tolerance is -0.03 (-0.001).
 - 6 Tolerance is -0.1 (-0.004) for MPM-x115x, -0.2 (-0.007) for MPM-x130x and MPM-x165x, and -0.2 (-0.008) for MPM-x215x.

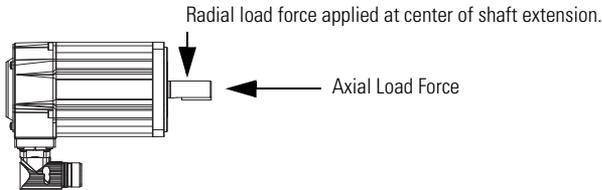
Refer to Kinetix Motion Control Selection Guide, publication [GMC-SG001](#), for pilot and shaft tolerances.

Motor Load Force Ratings

Motors are capable of operating with a sustained shaft load. The load force locations are shown in the figure and maximum values are in the tables.

Loads are measured in kilograms, pounds are mathematical conversions.

Load Forces on Shaft



The 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 can occur due to bearing grease contamination from external sources.

Radial Load Force Ratings

Motor MPM-A or MPM-B	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	5000 rpm kg (lb)	7000 rpm kg (lb)
1151	77 (170)	61 (134)	54 (119)	45 (99)	40 (88)
1152	84 (185)	66 (145)	58 (128)	49 (108)	43 (95)
1153	88 (194)	70 (154)	61 (134)	51 (112)	46 (101)
1302	105 (231)	83 (183)	72 (159)	61 (134)	54 (119)
1304	115 (253)	91 (200)	80 (176)	67 (148)	—
1651	141 (311)	112 (247)	97 (214)	82 (181)	—
1652	151 (333)	119 (262)	104 (229)	—	—
1653	156 (344)	123 (271)	107 (236)	—	—
2152	216 (476)	171 (377)	149 (328)	—	—
2153	228 (502)	180 (396)	156 (344)	—	—
2154	235 (518)	185 (407)	161 (355)	—	—

Axial Load Force Ratings (maximum radial load)

Motor MPM-A or MPM-B	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	5000 rpm kg (lb)	7000 rpm kg (lb)
1151	29 (64)	22 (48)	18 (40)	14 (31)	12 (26)
1152	31 (68)	23 (51)	19 (42)	15 (33)	13 (29)
1153	33 (73)	24 (53)	20 (44)	16 (35)	14 (31)
1302	26 (57)	19 (42)	16 (35)	13 (29)	11 (24)
1304	30 (66)	22 (48)	18 (40)	15 (33)	—
1651	37 (81)	28 (62)	23 (51)	18 (40)	—
1652	41 (90)	30 (66)	25 (55)	—	—
1653	43 (95)	32 (70)	27 (59)	—	—
2152	55 (121)	40 (88)	34 (75)	—	—
2153	60 (132)	44 (97)	36 (79)	—	—
2154	63 (139)	46 (101)	38 (84)	—	—

Axial Load Force Ratings (zero radial load)

Motor MPM-A or MPM-B	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	5000 rpm kg (lb)	7000 rpm kg (lb)
1151	46 (101)	34 (75)	28 (62)	23 (51)	19 (42)
1152	46 (101)	34 (75)	28 (62)	23 (51)	19 (42)
1153	46 (101)	34 (75)	28 (62)	23 (51)	19 (42)
1302	46 (101)	34 (75)	28 (62)	23 (51)	19 (42)
1304	46 (101)	34 (75)	28 (62)	23 (51)	—
1651	61 (134)	44 (97)	38 (84)	30 (66)	—
1652	61 (134)	44 (97)	38 (84)	—	—
1653	61 (134)	44 (97)	38 (84)	—	—
2152	90 (198)	65 (143)	54 (119)	—	—
2153	90 (198)	65 (143)	54 (119)	—	—
2154	90 (198)	65 (143)	54 (119)	—	—

Accessory Kits

Accessories for MP-Series medium-inertia motors include cables, shaft seals, shaft keys, and a sealing air kit.

Motor Cables

Factory manufactured feedback and power cables are available in standard cable lengths. They provide proper shield termination, and environmental sealing up to and including the IP rating of the motor. For a complete listing of available cables refer to your drive manual, contact your nearest Rockwell Automation sales office, or access the information from the references in [Additional Resources](#).

Refer to the Kinetix Motion Control Selection Guide, publication [GMC-SG001](#), for information on ordering feedback cables, power/brake cables, and connector kits.

Shaft Seals

A shaft seal is a barrier to moisture and particles entering the motor bearings.

Catalog numbers and dimensions for replacement Nitrile shaft seals are listed in this table.

Motor	Shaft Seal Cat. Nos.	Inside Diameter	Outside Diameter	Width
		mm (in.)	mm (in.)	mm (in.)
MPM-x115x	MPL-SSN-A4B4	20 (0.79)	52 (2.05)	7 (0.28)
MPM-x130x	MPL-SSN-A5B5	25 (0.98)	62 (2.44)	7 (0.28)
MPM-x165x	MPL-SSN-F1655	30 (1.18)	72 (2.83)	8 (0.315)
MPM-x215x	MPL-SST-A6B6	40 (1.57)	90 (3.54)	8 (0.315)

IMPORTANT

Shaft seals must be lubricated. Lubricant is supplied with shaft seal kits.

Refer to the Shaft-seal Kits Installation Instructions, publication [2090-IN012](#), for instructions on how to install a shaft seal.

Shaft Key

Shaft keys are constructed of steel. The specified tolerance provides an interference fit (slightly larger than the opening) for a secure and rigid connection.

ATTENTION

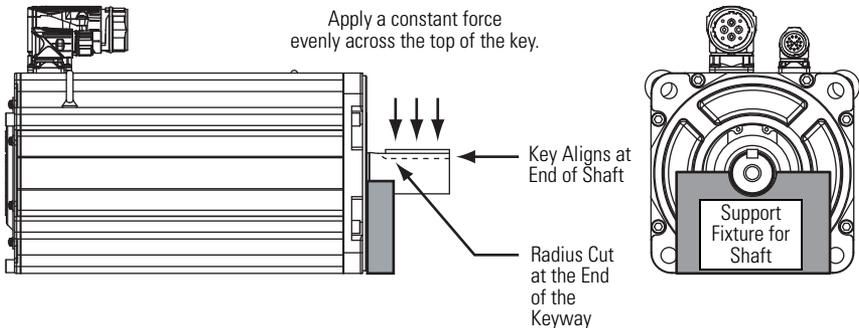


Damage can occur to the motor bearings and the feedback device if sharp impact is applied to the shaft during installation of couplings and pulleys, or a shaft key. Damage to the feedback device can result by applying leverage from the motor mounting face to remove devices mounted on the motor shaft.

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

Follow these steps to install a shaft key.

1. Remove the shaft key, if present, using one of these methods:
 - Lift the key by grasping it with pliers or a similar tool.
 - Lever the key with a screwdriver inserted between the key and the bottom of the slot.
2. Install a shaft key by performing this procedure.
 - a. Verify the replacement key matches the keyway in the shaft and the mating mechanical connection (coupling or pulley).
 - b. Align the front of the key with the front of the motor shaft. This prevents interference with the key by the end-of-cut radius.
 - c. Support the underside of the shaft with a fixture, and use a device to apply a controlled force that presses the key into the keyway.



Sealing Air Pressure Kit

A sealing air pressure kit (catalog number MPF-7-AIR-PURGE) is available for field installation on an M23 feedback connector. Positive air pressure supplied through this kit provides an additional level of protection for the motor against the ingress of foreign substances and moisture.

The kit replaces the M23 feedback connector cap, provides a replacement O-ring, and includes installation instructions.

When designing a motion system, consider the following guidelines when installing a sealing air pressure kit:

- Plastic air tubing should be 4 mm (5/32 in.) OD Teflon FEP tubing.
- Air supplied to the motor should not exceed 0.1 bar (1.45 psi).
- The air fitting extends 26 mm (1.0 in.) from the M23 connector when installed.

ATTENTION

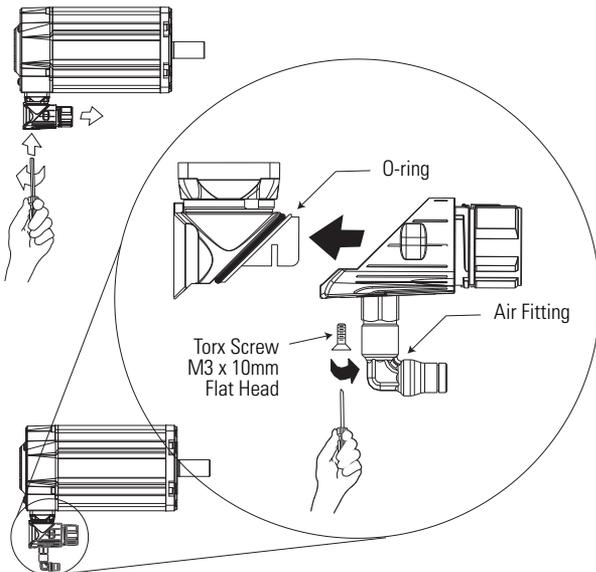


Excessive air pressure and improper filtering of air can result in damage to the motor.

Air supplied to the motor must be clean, dry, and of instrument quality. Maximum air pressure should be 0.1 bar (1.45 psi).

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

Air Kit Installation on the M23 Feedback Connector



Specifications

MP-Series Medium Inertia Servo Motors

Attribute	Value
Temperature, operating	0...40 °C (32...104 °F) ⁽³⁾
Temperature, storage	-30...70 °C (-22...158 °F)
Relative humidity, storage	5...95% noncondensing
Atmosphere, storage	noncorrosive
International Protection (IP) Rating ⁽¹⁾ Motor with optional shaft seal ⁽²⁾ installed	IP67 - dust tight, one meter immersion ⁽⁴⁾ IP65 - dust-tight, water jets
Motor without a shaft seal mounted in this direction: shaft down shaft horizontal shaft up	IP53 - dust protected, spraying water IP51 - dust protected, vertically falling water drops IP50 - dust protected, not protected from water

⁽¹⁾ The motors are dual rated with International Protection Codes (IP Ratings) for environmental protection. The motor rating excludes any reduction in the rating resulting from cables or their plugs with a lower rating.

⁽²⁾ An optional shaft seal kit is required to achieve the IP67 rating for the motor enclosure. Refer to Additional Resources for shaft seal installation instructions.

⁽³⁾ To obtain this thermal rating, mount the motor on a surface with heat dissipation equivalent to a 304.8 x 304.8 x 12.7 mm (12 x 12 x 0.5 in.) aluminum heatsink,

⁽⁴⁾ International Protection Code (IP 67) is roughly equivalent to a NEMA 4 (dust tight, water tight).

Additional Resources

These documents contain additional information concerning related Rockwell Automation products.

Resource	Description
Kinetix 2000 Multi-axis Servo Drive User Manual, publication 2093-UM001	Information on installing, configuring, startup, and troubleshooting a servo drive system with a Kinetix 2000 drive.
Kinetix 6000 Multi-axis Servo Drives User Manual, publication 2094-UM001	Information on installing, configuring, startup, and troubleshooting a servo drive system with a Kinetix 6000 drive.
Kinetix 6200 Modular Multi-axis Servo Drives User Manual, publication 2094-UM002	Information on installing, configuring, startup, and troubleshooting a servo drive system with a Kinetix 6200 drive.
Kinetix 7000 Multi-axis Servo Drives User Manual, publication 2099-UM001	Information on installing, configuring, startup, and troubleshooting a servo drive system with a Kinetix 7000 drive.
Shaft-seal Kits Installation Instructions, publication 2090-IN012	Information on selecting and installing a shaft seal on a servo motor.
Allen-Bradley Industrial Automation Glossary, publication AG-7.1	A glossary of industrial automation terms and abbreviations.
System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001	Information, examples, and techniques designed to minimize system failures caused by electrical noise.
Kinetix Motion Control Selection Guide, publication GMC-SG001	Specifications, motor/servo-drive system combinations, and accessories for Kinetix motion control products.

You can view or download publications at <http://literature.rockwellautomation.com>. To order paper copies of technical documentation, contact your local Rockwell Automation distributor or sales representative.

Notes:

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At <http://support.rockwellautomation.com>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://support.rockwellautomation.com>.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

United States	1.440.646.3434 Monday – Friday, 8 a.m. – 5 p.m. EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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