

MP-Series Stainless Steel Servo Motor with 100 mm to 165 mm Frame Size

Catalog Numbers MPS-A330, MPS-A4540, MPS-B330, MPS-B4540, MPS-B560

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Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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.



WARNING: 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.



ATTENTION: 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 consequence.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



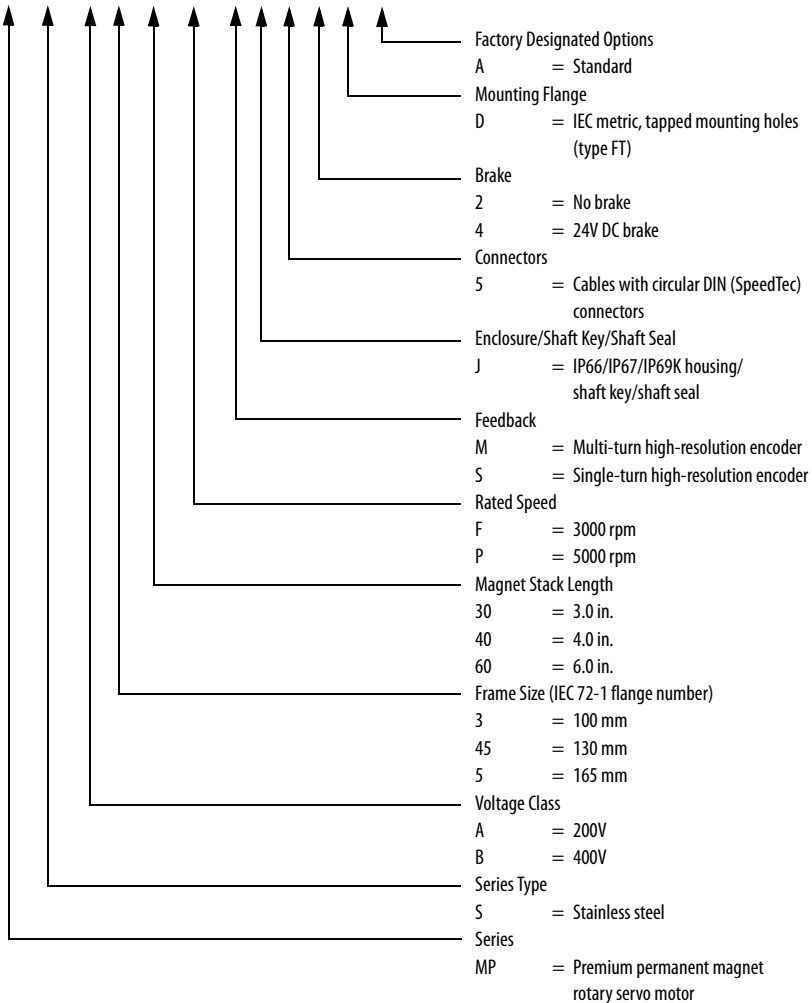
BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

Catalog Number Explanation

MP S - x x xx x - x J 5 x D A



About the MP-Series Stainless Steel Servo Motor

The MP-Series™ stainless steel (Bulletin MPS) motors are designed to meet the unique needs of hygienic manufacturing environments such as food, beverage, brewing, dairy, health and beauty, and pharmaceutical products.

Before You Begin

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



ATTENTION: To avoid personal injury and damage to the motor, do not lift or handle the motor by the motor shaft. The cap on the shaft can come loose and cause you to drop the motor.

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

Keep the original packing material in case you need to return the product for repair or transport it to another location. Use both the inner and outer packing cartons to provide adequate protection for a unit returned for service.



ATTENTION: Do not attempt to open and modify the motor. This manual describes modifications that you can perform in the field. Do not attempt other changes.

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

Store or operate your motor in a clean and dry location within the environmental conditions listed in [Motor Cables and Accessory Kits on page 23](#).

Removing the Shaft Cap

Use your hand to remove the protective cap that is installed on the motor shaft or pry off the cap with a screwdriver. Do not use a hammer or other tools as they can damage the motor shaft.

To Prolong Motor Life

Proper design and maintenance can increase the life of a servo motor. Follow these guidelines to maximize the life of a servo motor within your environment:

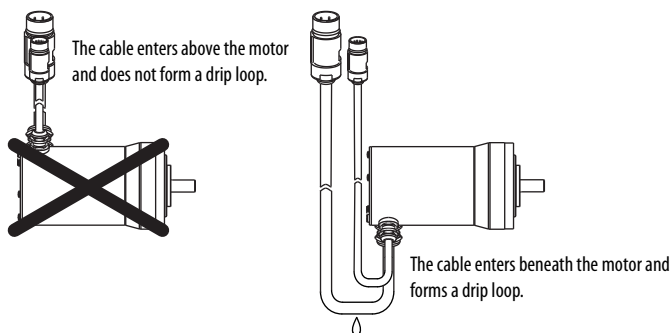


ATTENTION: Do not spray liquids under high pressure directly on the connectors, the motor, or enclosure joints.

Fluids under high pressure can be forced into the connectors, resulting in an electrical short circuit. Fluids also can be forced around worn seals, and contaminate the motor bearings. Bearing contamination significantly shortens the life of a servo motor.

The motor has 3 m (9.8 ft) cables with nickel-plated connectors for motor power and feedback. These connectors are not designed to withstand high-pressure washdown or washdown with aggressive cleaning compounds. Position connectors away from direct exposure to cleaning processes, for example within washdown-rated conduit or junction boxes.

- Always provide a drip loop in each cable to carry liquids away from the connection to the motor.



- If possible, provide shields that protect the motor housing, shaft seals, and their junctions from product contamination, caustic agents, and high-pressure fluids.
- Shaft seals are subject to wear and require periodic inspection and replacement. Replacement is recommended every 3 months, not to exceed 12 months, depending on use. Refer to [Shaft Seal Kits on page 23](#) 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.
- You can seal the motor front flange to the driven equipment by applying a bead of food grade RTV around the periphery of the joint between the motor and the machine surfaces. Use of a gasket or RTV on the mating surfaces is not recommended, as this can cause misalignment of the shaft and result in damage to the motor and/or driven equipment.

- 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 rotational mechanical backlash that can cause damage to the system, increase brake wear, and reduce brake life.

IMPORTANT Holding brakes are not designed to stop rotation of the motor shaft, and they are not 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.

Follow these steps to prevent motor shaft rotation.

1. Command the servo drive to 0 rpm.
2. Verify the motor is at 0 rpm.
3. Engage the brake.
4. Disable the drive.

Disabling the drive removes the potential for brake wear caused by a badly-tuned servo system oscillating the shaft.

Using Shaft Seals

An additional seal is required on the motor shaft near the motor front bearing, if the shaft is exposed to fluids or significant amounts of fine dust. This includes lubricating oil from a gearbox. An IP66, IP67, or IP69K rating for the motor requires the use of a shaft seal and environmentally sealed connectors/cables. The additional seal is not recommended in applications where the motor shaft area is free of liquids or fine dust, and a lower rating is sufficient:

- Refer to [Specifications on page 25](#) for a brief description of the IP rating for these MP-Series motors.
- Refer to [Shaft Seal Kits on page 23](#) to find the catalog numbers of seal kits available for your motor.
- Refer to Kinetix® Motion Accessories Specifications, publication [GMC-TD004](#), to find environmentally sealed connectors and cables compatible with the MP-Series motors.

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 can cause system instability and damage the motor shaft. All connections between the system and the servo motor shaft must be rigid to achieve acceptable response from the system. Periodically inspect connections to verify their rigidity.

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



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

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

Preventing Electrical Noise

Electromagnetic interference (EMI), commonly called noise, can adversely impact motor performance by inducing stray signals.

Follow these guidelines to prevent the effects of EMI:

- Isolate the power transformers, or install line filters on all AC input power lines.
- 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 by 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 by improving the system level electromagnetic compatibility (EMC).

Build and Install the Cables

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

Follow these guidelines to build and install the cables:

- Keep the wire lengths as short as 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 EMI from other equipment.



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

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



ATTENTION: MP-Series motors produce leakage current in the protective earthing conductor that exceeds 3.5 mA AC and/or 10 mA DC.

Be sure to properly ground the motor cables per the drive installation instructions.

Power Cable Shielding

Power cables must be shielded, and the cable shield connects to ground.

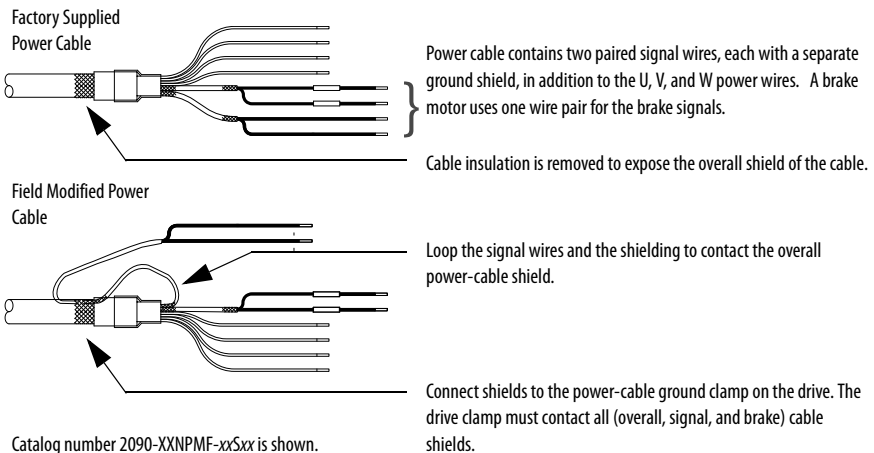


ATTENTION: High voltage can be present on the shields of a power cable, if the shields are not grounded.

Verify there is a connection to ground for all shields in the power cable.

Verify the separate signal-wire shield connect to the overall chassis ground by looping back each of the signal wire pairs as shown in [Shielding of Signal Wires within a Power Cable on page 9](#). Clamp all three shields together at the power cable (chassis) ground connection on the drive.

Shielding of Signal Wires within a Power Cable



The signal wire pairs within a power cable often carry a 24V DC brake signal, but can also carry logic signals. Grounding the shield that surrounds the signal wires dissipates an induced voltage and reduces the effects of EMI.

Install the Motor

MP-Series motors include a mounting pilot for aligning the motor on the machine. Preferred fasteners are stainless 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.

Lockout and tag-out disassembled equipment (restrict electrical power).

Before applying power to the motor, remove the shaft key and other mechanical couplings that can be thrown from the shaft.



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.

Mount the Motor

Follow these steps to mount the motor.



ATTENTION: Damage can occur to the motor bearings and the feedback device if sharp impact to the shaft is applied during installation of couplings and pulleys.

Do not strike the shaft, couplings, or pulleys with tools during installation or removal.

1. Provide sufficient clearance, heatsink mass, and airflow for the motor so it 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 [Motor Cables and Accessory Kits](#) table.



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

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

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 with the cable connections beneath the motor.

Refer to [To Prolong Motor Life on page 5](#) for a visual reference of correct motor and cable positioning.

4. Properly mount and align the motor.

The index pulse occurs on a single-turn encoder when the shaft key is aligned with the connectors. Refer to [Product Dimensions on page 13](#) for a visual reference of this alignment.

Attach the Motor Cables

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



ATTENTION: Servo drive power must be turned off before connecting or disconnecting the cables to the motor, and if a cable is left disconnected at the motor end.

Arcing or unexpected motion can occur if the feedback, power, or brake cables are connected or disconnected while power is applied to the servo drive.

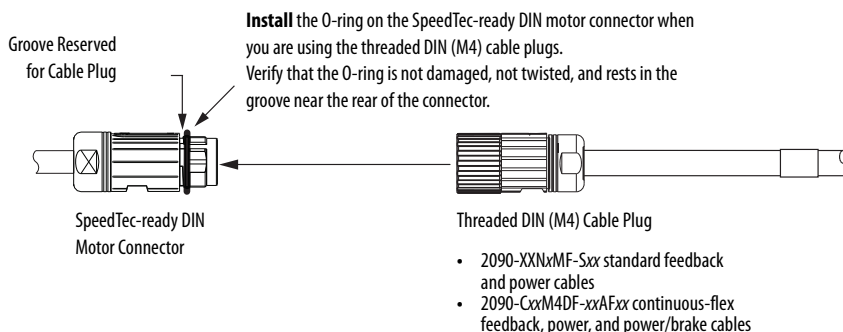


ATTENTION: Be sure that cables are installed and restrained to prevent uneven tension or flexing at the cable connectors. Provide support at 3 m (10 ft) intervals throughout the cable run.

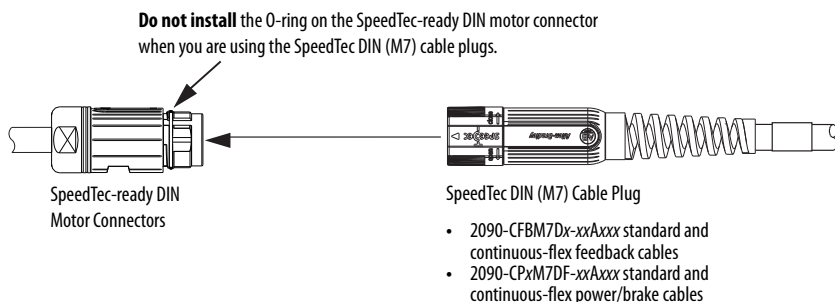
Excessive and uneven lateral force at the cable connectors can result in the connector's environmental seal opening and closing as the cable flexes, or wires separating at the cable gland.

1. If you are using the **Threaded DIN (M4) Cable Plugs**, install the O-rings.

An O-ring on the connector is necessary to achieve the maximum environmental rating.

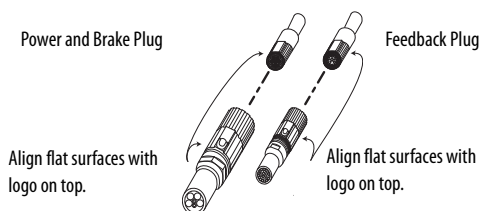


2. If you are using the **SpeedTec DIN (M7) Cable Plugs**, do not install the O-rings.



3. Form a drip loop in the cable (see [page 5](#)).

4. 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.



5. Hand tighten the collar on the plug to fully seat it on the connector:

- Threaded DIN (M4) cable plugs require five to six revolutions.
- SpeedTec DIN (M7) cable plugs require 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.

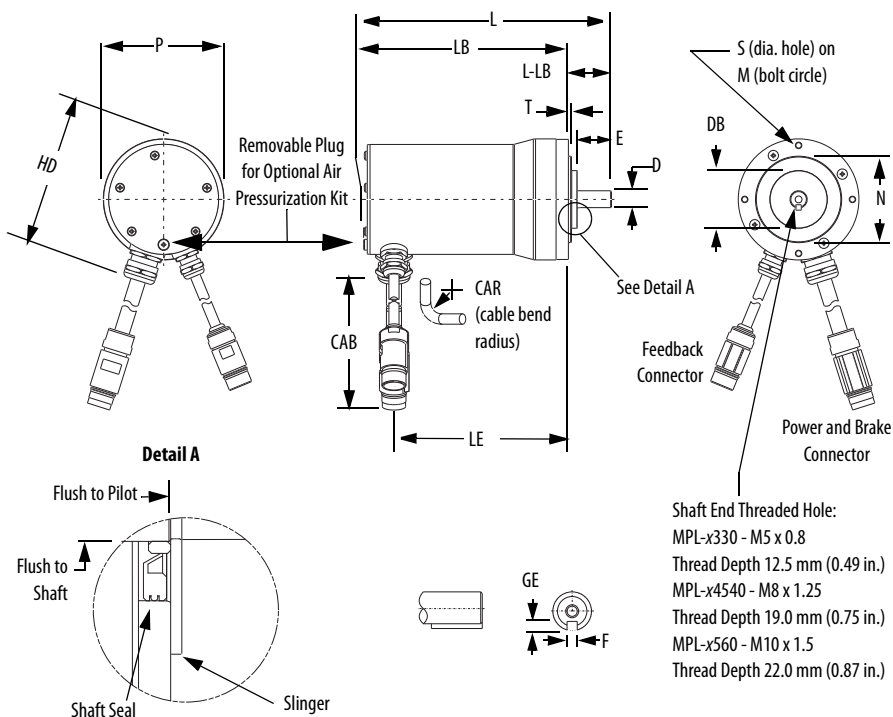


ATTENTION: Align the keyed connectors and hand-tighten the recommended number of turns.

If you cannot tighten the connectors by hand, verify that the keyed connectors are properly aligned. Do not use tools (for example, pliers and vise-grips) to tighten the connectors.

Product Dimensions

This section provides dimensions for the motors.



Catalog number MPS-x330x faceplate is shown above.

Catalog numbers MPS-x4540x and MPS-x560x have additional housing screws evenly distributed.

Bulletin MPS motors are designed to metric dimensions. Inch dimensions are mathematical conversions from millimeters.

Dimension CAB includes the total length of the cable and the connector, but does not include mounting hardware.

Dimension LE measures to the center of connectors.

These dimensions are for non-brake motors with a single-turn encoder. Footnotes provide the additional dimensions for the brake options, and the tolerances for common dimensions.

Dimensions

Motor Cat. No.	D ⁽¹⁾	DB	E	HD	L ^{(2), (3)}	L-LB ^{(2), (3)}	LB	LE ⁽⁴⁾	M
	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)
MPS-A/B330	16.0 (0.63)	50.8 (2.0)	32.13 (1.26)	135.0 (5.31)	230.0 (9.06)	40.0 (1.58)	190.0 (7.49)	162.0 (6.38)	100.0 (3.94)
MPS-A/B4540	24.0 (0.945)	63.5 (2.50)	41.4 (1.63)	164.0 (6.46)	266.0 (10.45)	50.0 (1.97)	216.0 (8.48)	185.0 (7.30)	130.0 (5.12)
MPS-A/B560	28.0 (1.1024)	82.6 (3.25)	56.62 (2.229)	198 (7.79)	396 (15.60)	60.0 (2.362)	336 (13.24)	302 (11.90)	165 (6.496)

(1) Tolerance for this dimension is: MPS-x330 +0.008, -0.003 (+0.0001, -0.0002); MPS-x4540 +0.009, -0.004 (+0.0001, -0.0002); and MPS-x560 +0.009, -0.004 (+0.0003, -0.0002).

(2) Tolerance for this dimension is ± 0.7 ($\pm .028$).

(3) If ordering an MPS-x330 motor with brake, add 35.0 mm (1.38 in.) to L and LB, and 34.0 mm (1.34 in.) to LE.
If ordering an MPS-x4540 motor with brake, add 48.5 mm (1.91 in.) to L, LB, and LE.
If ordering an MPS-x560 motor with brake, add 51.6 mm (2.03 in.) to dimensions L, LB, and LE.

(4) Measures to center of connectors.

Dimensions (continued)

Motor Cat. No.	N ⁽¹⁾	P ⁽²⁾	S ⁽³⁾	T	CAB ⁽⁴⁾	CAR ⁽⁵⁾ Pwr	CAR ⁽⁵⁾ Fdbk	F ⁽⁶⁾	GE ⁽⁷⁾
	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)
MPS-A/B330	80.0 (3.15)	112.0 (4.41)	M6 x 1.0 x 7 (0.28)	2.87 (0.113)	3000.0 (118.1)	148.0 (5.84)	96.52 (3.80)	5.0 (0.197)	3.0 (0.118)
MPS-A/B4540	110.0 (4.331)	143.2 (5.64)	M8 x 1.25 - 6H x 9.0 (0.35)	3.38 (0.133)	3000.0 (118.1)	148.0 (5.84)	96.52 (3.80)	8.0 (0.315)	4.0 (0.158)
MPS-A/B560	130 (5.118)	181 (7.13)	M10 x 1.5 - 6H x 11 (0.43)	3.38 (0.133)	3000.0 (118.1)	187.0 (7.37)	96.52 (3.80)	8.0 (0.315)	4.0 (0.158)

(1) Tolerance for this dimension is: MPS-x330 +0.012, -0.007 (+0.0001, -0.0007); MPS-x4540 +0.013, -0.009 (+0.0001, -0.0002); and MPS-x560 +0.014, -0.009 (+0.0007, -0.0002).

(2) This dimension is the largest diameter on the motor housing.

(3) Metric (M) threading dimensions include major diameter (mm) X thread pitch - tolerance class X thread depth in mm and (in.).

(4) This dimension includes the total length of the cable and the connector, but does not include mounting hardware.

(5) Factory cables do not have a continuous flex rating, the specified cable bend radius is a one-time bend.

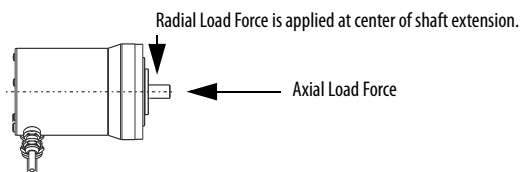
(6) Tolerance for this dimension is: MPS-x330 -0.03 (-0.001); MPS-x4540 -0.04 (-0.001); and MPS-x560 -0.04 (-0.001).

(7) Tolerance for this dimension is: MPS-x330 +0.1 (+0.004); MPS-x4540 +0.2 (+0.007); and MPS-x560 +0.2 (+0.007).

Motor Load Force Ratings

Motors can operate with a sustained shaft load. The figure shows radial and axial load force locations, and the tables provide maximum values for each force.

Load Forces on Motor Shaft



The tables represent 20,000 hour L_{10} bearing fatigue life at various loads and speeds. The 20,000 hour life does not account for possible application-specific life reduction that can occur due to bearing grease contamination from external sources.

Loads are measured in pounds; kilograms are mathematical conversions.

Radial Load Force Ratings

Motor Cat. No.	500 rpm		1000 rpm		2000 rpm		3000 rpm		3500 rpm		4000 rpm		5000 rpm	
	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)
MPS-A/B330	—	—	74	(163)	59	(130)	—	—	49	(108)	—	—	43	(95)
MPS-A/B4540	140	(309)	111	(245)	89	(195)	77	(170)	—	—	—	—	—	—
MPS-A/B560	—	—	154	(338)	122	(268)	106	(234)	—	—	—	—	—	—

Axial Load Force Ratings (maximum radial load)

Motor Cat. No.	500 rpm		1000 rpm		2000 rpm		3000 rpm		3500 rpm		4000 rpm		5000 rpm	
	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)
MPS-A/B330	—	—	27	(59)	20	(44)	—	—	16	(35)	—	—	13	(29)
MPS-A/B4540	49	(107)	36	(80)	27	(59)	22	(49)	—	—	—	—	—	—
MPS-A/B560	—	—	52	(115)	39	(85)	32	(71)	—	—	—	—	—	—

Axial Load Force Ratings (zero radial load)

Motor Cat. No.	500 rpm		1000 rpm		2000 rpm		3000 rpm		3500 rpm		4000 rpm		5000 rpm	
	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)
MPS-A/B330	—	—	36	(79)	27	(59)	—	—	21	(46)	—	—	18	(40)
MPS-A/B4540	69	(152)	51	(112)	38	(83)	31	(69)	—	—	—	—	—	—
MPS-A/B560	—	—	68	(149)	50	(109)	42	(92)	—	—	—	—	—	—

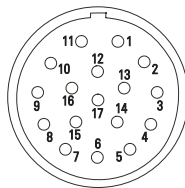
Connector Data

This table provides the signal descriptions for the feedback, power, and brake pinouts on the connectors.

M23 Feedback and Power/Brake Pin Descriptions

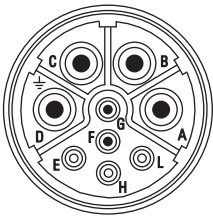
Pin	High-resolution Encoder for 230V Motors (MPS-Axxx)	High-resolution Encoder for 460V Motors (MPS-Bxxx)
1	Sin+	Sin+
2	Sin-	Sin-
3	Cos+	Cos+
4	Cos-	Cos-
5	Data+	Data+
6	Data-	Data-
7	Reserved	Reserved
8		
9	EPWR 5V	
10	ECOM	
11	Reserved	EPWR 9V
12		ECOM
13	TS+	TS+
14	TS-	TS-
15	Reserved	Reserved
16		
17		

M23 Feedback Connector



Pin	MPS-Axxx and MPS-Bxxx
A	Phase U ⁽¹⁾
B	Phase V ⁽¹⁾
C	Phase W ⁽¹⁾
D	Ground
E	Reserved
F	MBRK+
G	MBRK-
H	Reserved
L	

M23 Power/Brake Connector



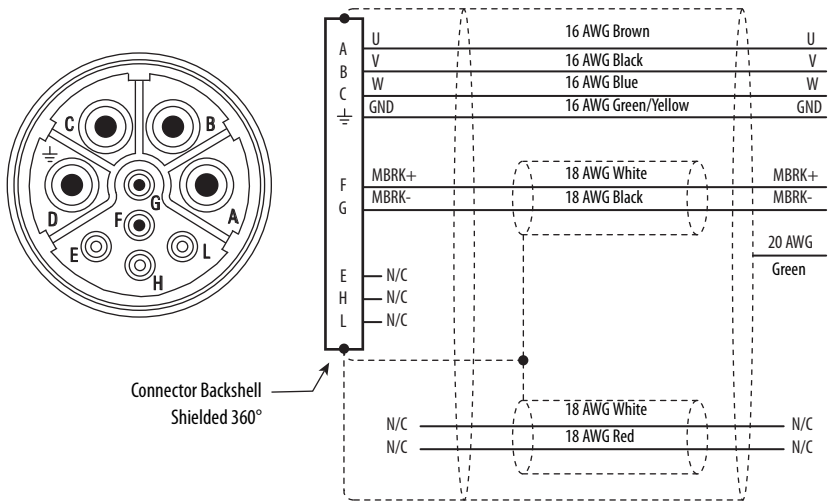
(1) The U, V, and W power phases can also be labeled as R, S, and T respectively.

Motor Cables

Use these figures to identify the cable wiring for 230V motors (catalog number MPS-Axxx) or 460V motors (catalog number MPS-Bxxx).

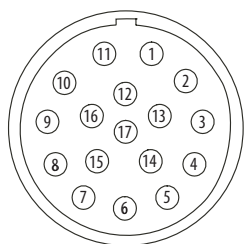
This figure depicts the wiring of a power and brake cable for a 230V or 460V motor.

Power/Brake Cable Schematic

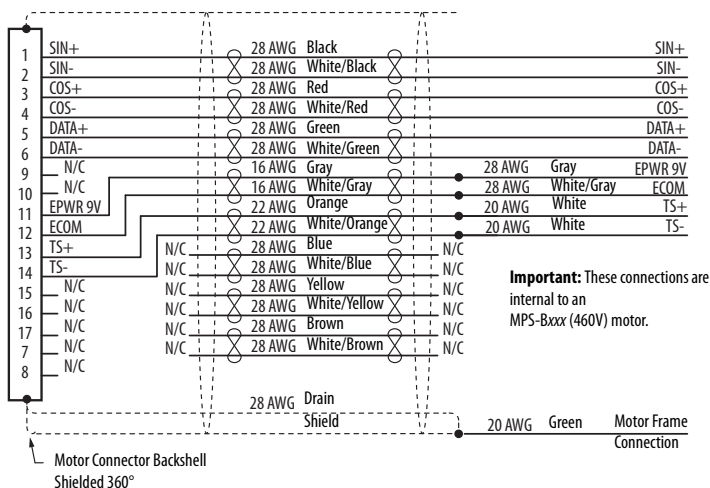


(heat shrink insulates wire-to-wire splices)

Important: Connections to the right are internal to an MPS-Axxx or MPS-Bxxx motor.



- ⌘ Twisted Pairing of Wires
- ⌘ Shield Wire
- Wire Splice or Connection
(heat shrink insulates wire-to-wire splices)



Remove and Install a Shaft Key

Shaft keys for the Bulletin MPS motors are constructed of stainless steel - 300 series. The specified tolerance provides an interference fit (slightly larger than the opening) for a secure and rigid connection.



ATTENTION: Do not strike the motor's shaft, couplings, or pulleys with tools during installation or removal of the shaft key.

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

Apply a constant pressure, with a wheel puller, to the user end of the shaft to remove a friction fit or stuck device.

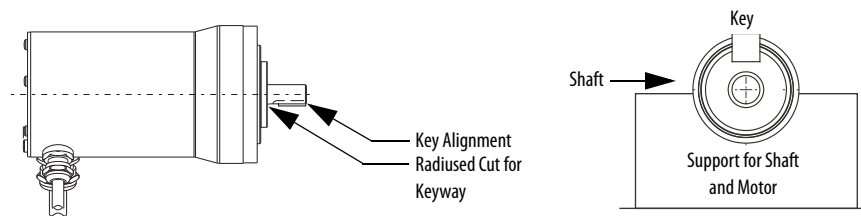
To remove a shaft key, perform one of these actions:

- Lift the key by grasping it with a pliers or similar tool.
- Lever the key with a screwdriver inserted between the key and the slot.

To install a shaft key, follow these steps.

1. Verify the replacement key matches the keyway in the shaft and the mating mechanical connection (for example, a coupling or pulley) before proceeding.
2. Align the front of the key with the front of the motor shaft.
This prevents the radiused end-of-cut at the motor end of the keyway from interfering with correct seating of the key.
3. Support the underside of the shaft diameter with a fixture, and use a controlled press device to apply a constant force across the top surface to press the key into the shaft.

Key Alignment and Shaft Support



Slinger and Shaft Seal Removal and Installation

The slinger and a shaft seal provide environmental sealing for Bulletin MPS motors. The slinger shields the shaft seal from contact with the full force of high-pressure cleaning fluids, while the shaft seal provides a secondary barrier to moisture and particle intrusion that helps protect the motor bearings. Bulletin MPS motors are shipped with a plastic slinger and polytetrafluoroethylene (PTFE) shaft seal installed.

Lubricate the shaft seals with a food-grade polyurea base grease.



ATTENTION: Damage to the motor surface where the slinger and shaft seals make contact can cause excessive wear and early failure of the slinger and shaft seal. Use care to prevent scratching or damaging the surface of the motor or the shaft.

Remove the slinger and shaft seal by performing the following procedures. If a sealed gearbox is to be attached to the motor shaft, perform only the [Remove the Slinger on page 20](#) procedure.

TIP Remove the shaft key, if the motor is so equipped, before performing the following steps. Refer to [Remove and Install a Shaft Key on page 19](#).

Refer to [Shaft Seal Kits on page 23](#) for a list of kits. A slinger is included in each shaft seal kit.

Remove the Slinger

1. Use two screwdrivers to carefully lever the slinger away from the faceplate of the motor. You must create sufficient clearance to attach a wheel-puller, or a similar device underneath the slinger.

IMPORTANT Do not scratch or damage the motor shaft or mounting surface.

2. Center the wheel-puller on the motor shaft and position its arms under the slinger.
3. Slowly adjust the wheel-puller to lift the slinger off the motor shaft.
4. Dispose of the used slinger.

IMPORTANT Do not contaminate other surfaces or objects with foreign material from the slinger.

Remove the Shaft Seal

The shaft seal can be safely removed by partially inserting an appropriately sized screw or bolt into the face of the shaft seal. The head of the screw or bolt provides a convenient point to grasp and remove the shaft seal.

Before installing the screw, create a pilot hole appropriate for the screw being used. Use masking tape or a depth sleeve to establish a drilling depth limit of 4 mm (0.16 in.) from the tip of the drill bit.



ATTENTION: Do not drill into the shaft seal deeper than 4 mm (0.16 in.).

Drilling and inserting a screw completely through the shaft seal can damage the motor bearings, and require factory service to repair the motor.

1. Drill a pilot hole in the face of the shaft seal less than the depth limit specified above.
Be sure the drill does not come in contact with the shaft seal bore.
2. Thread the screw or bolt into the pilot hole.
3. Lift the shaft seal from the motor by grasping the screw head and slightly rotating the seal while pulling.
4. Inspect and clean the shaft and sealing surfaces as necessary.

Replace the Shaft Seal

No tools are required to install the replacement shaft seal.

1. Apply the provided grease to the inner ring of the shaft seal and motor shaft.
2. Center the shaft seal on the mounting surface of the motor with the seal oriented in the same manner as the removed seal.
3. Press the shaft seal into the seal recess by applying pressure with your fingertips in a circular fashion to slowly seat the shaft seal in place.
4. Verify the outer and inner circumference of the shaft seal is fully seated into position.

TIP You can verify the proper seating of the shaft seal by running a fingertip around the seal-to-motor joint to feel for irregularities in the shaft seal or an uneven alignment where the shaft seal contacts the motor.

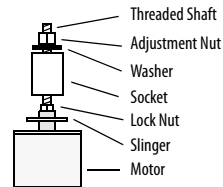
Install the Replacement Slinger

1. Install a threaded rod and nut in the shaft alignment hole.

The following table lists the diameter and threading of alignment holes, and a recommended rod length for each motor.

Hex Nut and Threaded Rod Sizing

Motor Cat No.	Threaded Rod Size with Recommended Length mm (in.)
MPS-x330	M5 x 0.8 thread size x 175 (6.9)
MPS-x4540	M8 x 1.25 thread size x 200 (7.9)
MPS-x560	M10 x 1.5 thread size x 225 (8.9)



2. Tighten the nut on the threaded rod against the end of the motor shaft.

This prevents the threaded rod from backing out of the motor shaft during this removal/installation procedure.

3. Position the slinger squarely on the end of the motor shaft.
4. Place a deep well socket, a larger washer, and a nut on the threaded rod.

Use a socket larger than the shaft diameter to provide sufficient clearance between the inside surface of the socket and the motor shaft. The following table lists shaft diameters for various motor sizes.

Motor Shaft and Slinger Diameters

Motor Cat No.	Motor Shaft Diameter mm (in.)	Slinger Outside Diameter mm (in.)
MPS-x330	16.0 (0.63)	50.8 (2.0)
MPS-x4540	24.0 (0.945)	63.5 (2.50)
MPS-x560	28.0 (1.1024)	82.6 (3.25)

5. Tighten the nut to force the washer, socket, and slinger down the shaft.

IMPORTANT Grasp the slinger tightly by hand to prevent shaft and slinger rotation in the next steps.

If additional travel is required to seat the slinger, add a section of hollow pipe or a similar item behind the socket.

6. Stop moving the slinger down the shaft approximately 3 mm (0.125 in.) before the slinger contacts the mounting surface of the motor.

Adjust the Clearance between the Slinger and Motor Face

1. Position two 0.5 mm (0.02 in.) feeler gauges between the motor face and slinger: one feeler gauge on each side of the shaft.
2. Slowly tighten or back-off the nut to adjust the slinger on the shaft.

Adjustment is complete when the slinger lightly and evenly contacts both feeler gauges.

TIP Replace the shaft key, if the motor is so equipped, after removing all tools.
Refer to [Remove and Install a Shaft Key on page 19](#).

Motor Cables and Accessory Kits

This section describes accessories that are available for MP-Series stainless steel motors.

Motor Cables

Factory manufactured feedback and power cables are available in standard cable lengths. They provide the sealing needed to achieve environmental ratings and shield termination.

For a complete listing of available cables, contact your nearest Rockwell Automation sales office or refer to the Kinetix Motion Accessories Specifications Technical Data, publication [GMC-TD004](#).

Shaft Seal Kits

IMPORTANT Shaft seals must be lubricated with a food-grade grease. Lubricant is supplied with the shaft seal kits.

Third-party shaft seals are not approved for use with these motors. The use of third-party shaft seals voids any implied or expressed warranties.

A shaft seal is a barrier that can prevent moisture and particles from entering the motor bearings.

Shaft seals are subject to wear and require periodic inspection and replacement. Replacement is recommended every 3 months, not to exceed 12 months, depending on use.

Catalog numbers for the motors and corresponding replacement shaft seal kits are listed in the table. Both a slinger and a shaft seal are included in Bulletin MPS shaft seal kits.

Motor Cat. No.	Shaft Seal Kit Cat. No.
MPS-A330, MPS-B330	MPS-SST-A3B3
MPS-A4540, MPS-B4540	MPS-SST-A45B45
MPS-B560	MPS-SST-F165

For instructions on how to install a shaft seal, refer to the Shaft Seal Kit Installation Instructions, publication [2090-IN012](#).

Positive Air-pressure Accessory Kit

A positive-air pressure kit (catalog number MPS-AIR-PURGE) is available for field installation on Bulletin MPS motors.

The kit provides a quick-release female air fitting. Positive air pressure that is applied to the motor provides an additional level of protection against the ingress of foreign substances and moisture.

Positive Air-pressure Accessory Kit Guidelines

You must supply these items, with the sealing plug:

- Use plastic air tubing that is 4 mm (5/32 in.) OD Teflon FEP.
- Do not exceed 0.1 bar (1.45 psi) air pressure.



ATTENTION: Excessive air pressure or improper filtering of air can result in damage to the motor.

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

Positive Air-pressure Accessory Kit Installation

1. Remove the 5 mm (0.20 in.) sealing plug with a Phillips screwdriver.
Refer to the [Product Dimensions on page 13](#) for the location of the sealing plug.
2. Inspect the air fitting and motor opening to verify that the surface area is undamaged, and the contact area is clean.
3. Torque the air fitting to 1.1...1.2 N•m (10...12 lb•in).
4. Visually inspect the circumference of the connection for proper seating.

Specifications

The exterior surfaces of the MP-Series stainless steel servo motors are made from the materials in the table. Store the motor in a clean and dry location within the environmental conditions.

123 Exterior Surface Materials

Surface	Material
Shaft	Stainless steel - grade 303
Shaft key	Stainless steel - 300 series
Housing	Stainless steel - grade 304
Connector	Nickel-plated zinc casting

Attribute	Value
Temperature, operating	0...40 °C (32...104 °F) ⁽¹⁾
Temperature, storage	-30...70 °C (-2...158 °F)
Relative humidity, storage	5...95% noncondensing
Atmosphere, storage	Noncorrosive

Motor housings are rated with multiple International Protection Codes (IP ratings) for environmental protection

IP66	Dust tight, powerful water jets, room temperature water ⁽²⁾
IP67	Dust tight, temporary immersion, room temperature water ⁽²⁾
IP69K	Dust tight, water/steam jets up to 100 bar (1200 psi) with nozzle pressure at approximately 80 °C (176 °F) ⁽²⁾

Connectors are IP66 and IP67 rated ⁽²⁾

(1) 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.

(2) IP rating descriptions are only for reference. Refer to the international standards for more complete rating descriptions.

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Kinetix 5500 Servo Drives User Manual, publication 2198-UM001	Provides information on installing, configuring, startup, troubleshooting, and applications for your Kinetix servo drive system.
Kinetix 6200 and Kinetix 6500 Modular Servo Drives User Manual, publication 2094-UM002	
Kinetix 6000 Multi-axis Servo Drive User Manual, publication 2094-UM001	
Kinetix 300 EtherNet/IP Indexing Servo Drives User Manual, publication 2097-UM001	
Kinetix 350 Single-axis EtherNet/IP Servo Drives User Manual, publication 2097-UM002	
Kinetix Motion Control Selection Guide, publication GMC-SG001	Specifications, motor/servo-drive system combinations, and accessories for Kinetix motion control products.
Kinetix Rotary Motion Specifications Technical Data, publication GMC-TD001	Provides product specifications for MP-Series (Bulletin MPL, MPM, MPF, MPS) rotary motors.
Kinetix Motion Accessories Specifications, publication GMC-TD004	Provides product specifications for Bulletin 2090 motor and interface cables, low-profile connector kits, drive power components, and other servo drive accessory items.
Shaft-seal Kit Installation Instructions, publication 2090-IN012	Information on the installation of a shaft seal on this and other servo motors.
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	How to minimize and control system-level noise.
Rockwell Automation Product Certification website http://www.rockwellautomation.com/products/certification/	Declarations of Conformity (DoC) for Rockwell Automation products.

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

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At <http://www.rockwellautomation.com/support> you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at <https://rockwellautomation.custhelp.com/> for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/services/online-phone>.

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 or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/rockwellautomation/support/overview.page , or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to help 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.

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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