

Kinetix VP Stainless-steel Servo Motor with 130 mm and 165 mm Frame Size

Catalog Numbers VPS-B1304D-PJ12DF, VPS-B1653D-PJ12DF

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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.

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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.

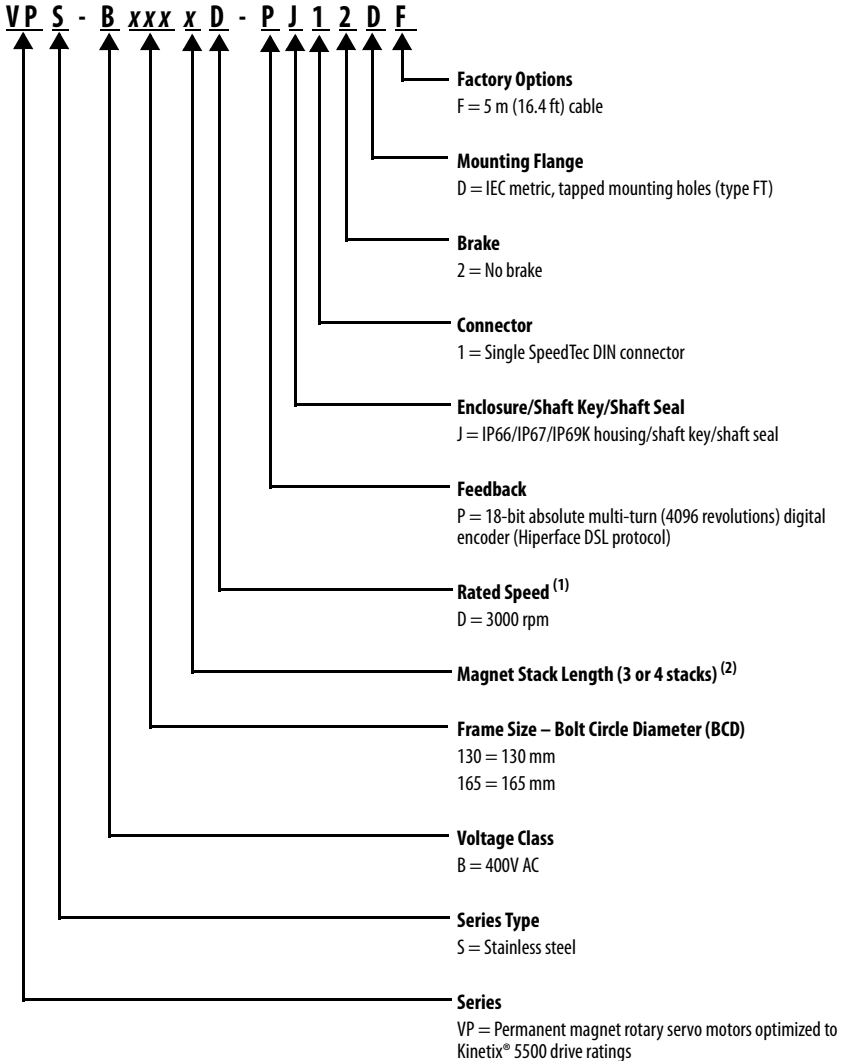


BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



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



(1) Rated speed hierarchy is for comparative purposes only. Use Motion Analyzer software to size and select motors for your application, and/or the torque/speed curves in the Kinetix 5500 Drive System Design Guide, publication [GMC-RM009](#).

(2) Refer to [Motor Dimensions on page 11](#) for dimensional changes that result from the number of magnet stacks.

About the Kinetix VP Stainless Steel Servo Motors

Kinetix® VP stainless steel motors (Bulletin VPS) feature a multi-turn high-resolution encoder. These compact, brushless servo motors meet the unique needs of hygienic manufacturing environments, such as food, beverage, brewing, dairy, health and beauty, and pharmaceutical products.

Before You Begin

You are responsible for inspecting the equipment before you accept the shipment from the freight company. Check the items you receive against your purchase order. Notify the carrier of shipping damage or missing items immediately. Store or operate your motor in a clean and dry location within the [Environmental Specifications on page 17](#).



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.

Before You Install the Motor

Perform these inspection steps 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, front output shaft, and mounting pilot for any defects.
 4. Notify the carrier of shipping damage immediately.
-



ATTENTION: Do not open and modify the motor.

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

Removing the Shaft Cap

Remove the protective cap installed on the motor shaft with your hand or by prying it off with a screwdriver. Do not use a hammer or other tools as they can damage the motor shaft.

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 operated within the [Environmental Specifications on page 17](#).



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

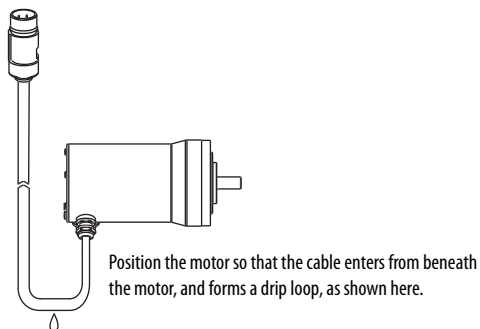
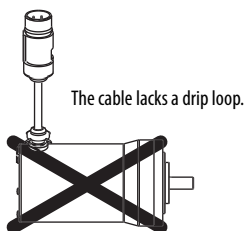
Fluids under high pressure can be forced into the connector, resulting in an electrical short circuit. Fluids also can be forced around worn seals, and contaminate the motor bearings. Bearing contamination significantly shortens the life of a servo motor.

The motor connector is not designed to withstand high-pressure washdown, or washdown with aggressive cleaning compounds. Position the connector away from direct exposure to cleaning processes, for example, within washdown-rated conduit or junction boxes.

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

- Do not install the motor with the shaft pointing upward, as this increases the risk of contaminant ingress.
- If design requirements permit, provide shields or junction boxes that protect the motor housing, shaft seals, connector, 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 [Slinger and Shaft Seal Removal and Installation on page 14](#) for more information on shaft seals.
- If desired, seal the motor front flange to the driven equipment with a bead of food-grade room temperature vulcanizing (RTV) silicone around the periphery of the motor to equipment joint. Use of a gasket, or non food-grade RTV silicone, on the mating surfaces can cause misalignment of the shaft and result in damage to the motor and driven equipment.
- Always provide a drip loop in the single motor cable to carry liquids away from the connection to the motor.

Create a Drip Loop



Using Shaft Seals

A seal is installed on the motor shaft to protect the front bearing from fluids or fine dust that can contaminate the motor bearing and reduce its lifetime. The IP66, IP67, or IP69K rating for the motor depends on the shaft seals and the environmental seal on the connector and cable:

- Refer to [Positive Air-pressure Accessory Kit on page 18](#) to find the catalog numbers of seal kits available for your motor.
- Refer to [Environmental Specifications on page 17](#) for brief descriptions of IP ratings.

Refer to Kinetix Motion Control Selection Guide, publication [GMC-SG001](#), to find environmentally sealed cables that are compatible with the Bulletin VPS 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 causes system instability and can damage the motor shaft. All connections between the machine and the motor shaft must be rigid to achieve acceptable system response. Periodically inspect connections to verify their rigidity.

When mounting couplings or pulleys to the motor shaft, verify that the connections are properly aligned and that axial and radial loads are within the specifications of the motor. If you attach a sealed gearbox to the motor shaft, remove the slinger (see [Remove the Slinger on page 14](#)).

Refer to [Motor Load Force Ratings on page 12](#) for guidelines on how to achieve 20,000 hours of motor bearing life.



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. Damage to the feedback device can 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 when attempting 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, but the key must be properly installed in the keyway. Refer to these sections for additional information:

- [Shaft, Pilot, and Keyway Dimensions, mm \(in.\) on page 10](#) for information about the key and shaft keyway dimensions
- [Remove and Install a Shaft Key on page 13](#) for recommendations on how to remove and install a shaft key

Preventing Electrical Noise

Electromagnetic interference (EMI), commonly called electrical noise, can reduce motor performance. Effective techniques to counter EMI include filtering the AC power, using shielded cables, shielding 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.
- Do not route the single motor cable over the vent openings on 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.

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

Install the Motor

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

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



ATTENTION: Unmounted motors, disconnected mechanical couplings, loose shaft keys, and disconnected cables are dangerous if power is applied.

Verify that disassembled equipment is identified (tagged-out) and access to electrical power is restricted (locked-out).

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

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

Cable Shielding

The single motor cable contains power and digital encoder signals. It must be shielded, and the cable shield must connect to ground.

Knowledgeable cable routing improves system electromagnetic compatibility (EMC). To install the single motor cable, follow these steps.

1. Keep the cable length as short as possible.
2. Ground both ends of the cable shield and twist the signal wire pairs to prevent electromagnetic interference from other equipment.

SHOCK HAZARD: High voltage can be present on the shields of the single motor cable if the shields are not grounded.

Verify that there is a connection to ground for all shields in the single motor cable.

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



ATTENTION: The overall shield on the motor cable must be grounded to obtain an effective encoder signal.

The encoder data signal is transmitted through an impedance-matched twisted-wire pair that requires effective shielding for optimum performance.

Be sure there is an effective connection between the motor cable shield and the drive system ground.

Mount and Connect the Motor

To install a Bulletin VPS motor, follow these procedures and recommendations.



ATTENTION: Servo motors are not for direct connection to an AC power line.

Servo motors are designed for connection to a servo drive that controls the application of AC power.

Failure to observe these safety precautions could result in damage to the motor and equipment.



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

Damage can occur to the motor bearings and the feedback device if you apply a sharp impact to the shaft during installation of couplings and pulleys, or a shaft key.

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

1. Allow sufficient clearances in the area of the motor for it to stay within its specified operating temperature range.

Do not install the motor in an area with restricted airflow. Keep other heat producing devices away from the motor.

BURN HAZARD: Outer surfaces of the 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.

Obtain the specified motor thermal rating by mounting 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.

Refer to [Environmental Specifications on page 17](#) for the operating range.

2. Determine the radial and axial shaft load limitations of your motor by referring to [Motor Load Force Ratings on page 12](#).
3. Position the motor with the cable connections beneath the motor.
Refer to [Create a Drip Loop 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 the encoder when the shaft key is aligned with the connector. Refer to [Motor Dimensions on page 10](#) for a visual reference of this alignment.
5. Attach the single motor cable that transmits the power and digital encoder signals as described below.
 - a. Carefully align the cable connector with the motor cable connector.
 - b. Align the flat surface on the top of the motor cable connector with the flat surfaces on the cable connector.



ATTENTION: Verify proper alignment and then hand-tighten the keyed connector.

Do not use tools, or apply excessive force, when mating the cable to the motor connector. If the connectors do not go together with light hand force, realign and try again.

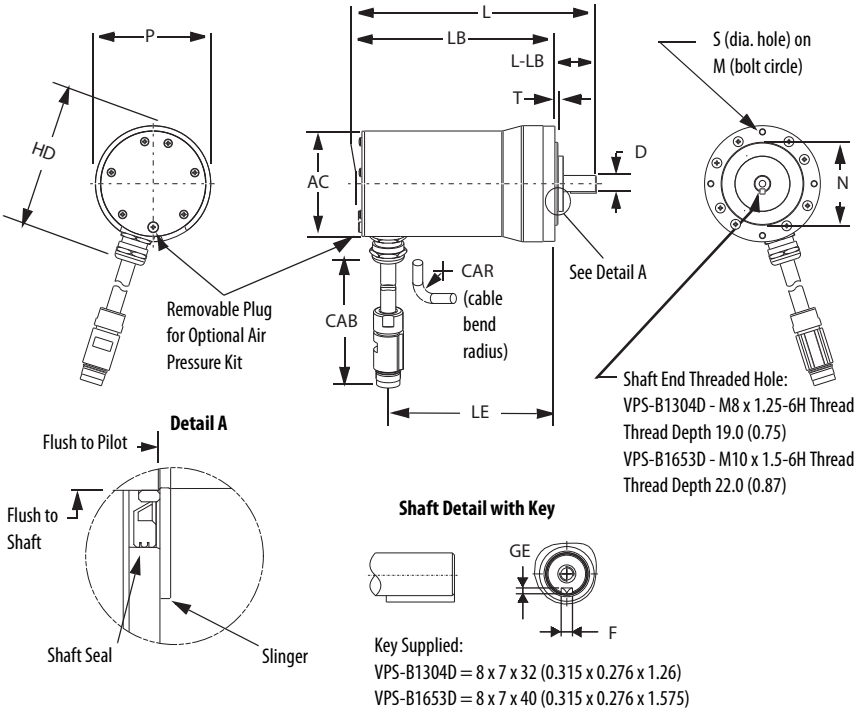
Failure to observe these safety procedures could result in damage to the motor and cable, and their components.

- c. Hand-tighten the knurled collar one-quarter turn to fully seat the cable connector.
- d. Verify that the cable is properly shielded.
See [Cable Shielding on page 8](#).
- e. Form a drip loop in the cable to carry liquids away from the connector.
See [Create a Drip Loop on page 5](#).

Motor Dimensions

Refer to [Motor Dimensions on page 11](#) for Bulletin VPS motor dimensions.

Mounting Dimension References, mm (in.)



Bulletin VPS motors are designed to metric dimensions. Inch dimensions are mathematical conversions. Dimension CAB is the total length of the cable and the connector, but does not include the mounting hardware. Dimension LE measures to the center of the connector.

Shaft, Pilot, and Keyway Dimensions, mm (in.)	VPS-B1304D-PJ12DF	VPS-B1653D-PJ12DF
Flush to pilot	±0.83 (0.032)	
Flush to shaft	∅ 24.94 ±0.05 (0.982 ± 0.002)	∅ 29.92 ±0.05 (1.178 ± 0.002)
Keyway width (F)	7.96...8.00 (0.314...0.315)	
Keyway depth (GE)	4.00...4.20 (0.158...0.165)	

Motor Dimensions

Motor Cat. No.	D ⁽¹⁾	AC	HD	L	L-LB ⁽²⁾	LB	LE ⁽³⁾
	∅ mm (in.)	∅ mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)
VPS-B1304D-PJ12DF	24.0 (0.94)	127.1 (5.00)	164.0 (6.4)	266.0 (10.47)	50.0 (1.97)	216.0 (8.5)	185.0 (7.3)
VPS-B1653D-PJ12DF	28.0 (1.10)	168.3 (6.63)	198.0 (7.8)	396.4 (15.60)	60.0 (2.36)	336.4 (13.24)	302.0 (11.9)

(1) Tolerance for this dimension is: VPS-B1304D, ∅ 23.996...24.009 (0.9448...0.9451); VPS-B1653D, ∅ 27.996...28.009 (1.1022...1.1027).

(2) Tolerance for this dimension is ±0.7 mm (±0.03 in.).

(3) Measures to center of the connector.

Motor Dimensions (continued)

Motor Cat. No.	M	N ⁽¹⁾	P ⁽²⁾	S ⁽³⁾	T	CAB ⁽⁴⁾	CAR ⁽⁵⁾
	∅ mm (in.)	∅ mm (in.)	∅ mm (in.)	mm (in.)	mm (in.)	m (ft)	Bend radius
VPS-B1304D-PJ12DF	130.0 (5.118)	110.0 (4.33)	143.2 (5.64)	9.0 (0.35)	3.38 (0.133)	5.0 (16.4)	90°
VPS-B1653D-PJ12DF	165.0 (6.496)	130.0 (5.11)	181.0 (7.13)	11.0 (0.43)	3.38 (0.133)	5.0 (16.4)	90°

(1) Tolerance for this dimension is: VPS-B1304D, ∅ 109.991...110.013 (4.3303...4.3312); VPS-B1653D, ∅ 129.991...130.014 (5.1178...5.1187).

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

(3) VPS-B1304D, M8 x 1.25-6H thread, thread depth 9.0 (0.35); VPS-B1653D, M10 x 1.5-6H thread, thread depth 11.0 (0.43).

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

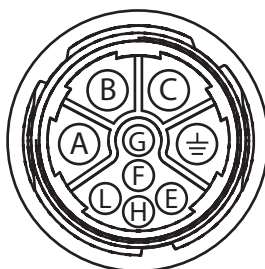
(5) Single motor cables do not have a continuous flex rating; the specified cable bend radius is a one-time bend.

Connector Data

This section identifies the power and data encoder pins on the motor connector.

M23 Motor Connector Pinouts

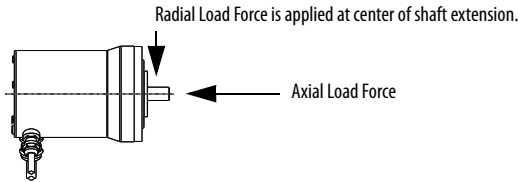
Pin	Signal Name
A	Phase U
B	Phase V
C	Phase W
⊕	Ground
E	Data+
F	Reserved
G	Reserved
H	Data-
L	Reserved



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 L10 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 kilograms; pounds are mathematical conversions.

Radial Load Force Ratings

Motor Cat. No.	500 rpm		1000 rpm		2000 rpm		3000 rpm	
	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)
VPS-B1304D-PJ12DF	140	(308)	111	(244)	89	(196)	77	(169)
VPS-B1653D-PJ12DF	—	—	154	(338)	122	(268)	106	(234)

Axial Load Force Ratings with Maximum Radial Load

Motor Cat. No.	500 rpm		1000 rpm		2000 rpm		3000 rpm	
	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)
VPS-B1304D-PJ12DF	49	(108)	36	(79)	27	(59)	22	(48)
VPS-B1653D-PJ12DF	—	—	52	(115)	39	(85)	32	(71)

Axial Load Force Ratings with Zero Radial Load

Motor Cat. No.	500 rpm		1000 rpm		2000 rpm		3000 rpm	
	kg	(lb)	kg	(lb)	kg	(lb)	kg	(lb)
VPS-B1304D-PJ12DF	69	(152)	51	(112)	38	(83)	31	(68)
VPS-B1653D-PJ12DF	—	—	68	(149)	50	(109)	42	(92)

Remove and Install a Shaft Key

Shaft keys for the Bulletin VPS motors are constructed of stainless steel - 300 series with a tolerance for interference fit (slightly larger than the opening) to provide a secure and rigid fit for the mating 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. Damage to the feedback device can 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 when attempting to remove any device from the motor shaft.

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

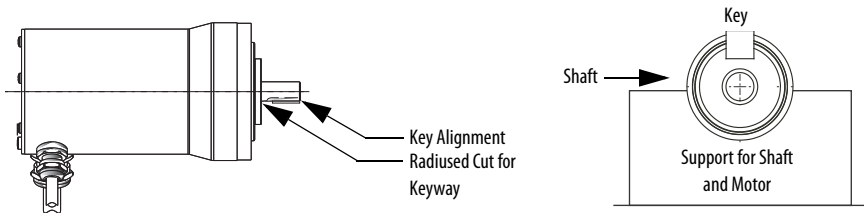
To remove a shaft key, perform one of these actions:

- Grasp the key with a plier or similar tool, and lift the key out of the key slot.
- Insert a screwdriver between the key and the bottom of the key slot, and use a levering action to lift the key out of the key slot.

To install a shaft key, follow these steps.

1. Verify that 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 curved end-of-cut at the motor end of the keyway from interfering with the 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 shaft seal provides environmental sealing for Bulletin VPS motors. Bulletin VPS motors are shipped with a Fluoroloy shaft seal installed.

Lubricate the shaft seals with a food-grade polyurea base grease, such as Chevron FM (NLGI 2). Lubricant is included in each shaft seal kit.



ATTENTION: Damage to the motor surface where the slinger and shaft seal make contact can cause excessive wear and early failure of the slinger and shaft seal. Do not scratch or damage the surface of the motor or the shaft.

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

Remove the 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 procedure below.

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 13](#).

Shaft Seal Kits

Shaft seal kit (with slinger) for Polytetrafluoroethylene (PTFE) shaft seals are shown below.

Motor Cat. No.	Shaft Seal Cat. No. ⁽¹⁾
VPS-B1304D-PJ12DF	MPS-SST-A45B45
VPS-B1653D-PJ12DF	MPS-SST-F165

(1) 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.

Remove the Slinger

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

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, under the slinger.
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.

IMPORTANT This shaft seal requires a lubricant to reduce wear. The lubricant is supplied in the kit.

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.
The surface of the seal must be 0.6 mm (0.02 in.) below the pilot surface.
4. Verify that the outer and inner circumference of the shaft seal is fully seated into position.

TIP To verify that the shaft seal is fully seated into position, run your fingertip around the seal-to-motor joint and feel for irregularities in the shaft seal, or an uneven alignment where the shaft seal contacts the motor.

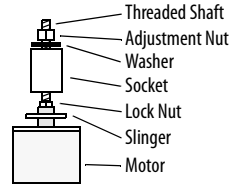
Install the Replacement Slinger

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

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

Hex Nut and Threaded Rod Sizing

Motor	Threaded Rod Size with Recommended Length in mm (in.)
VPS-B1304D-PJ12DF	M8 x 1.25 thread size x 203 (8.0)
VPS-B1653D-PJ12DF	M10 x 1.5 thread size x 216 (8.5)



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 table below lists shaft diameters for various motor sizes.

Motor Shaft and Slinger Diameters

Motor	Motor Shaft Diameter mm (in.)	Slinger Outside Diameter mm (in.)
VPS-B1304D-PJ12DF	24.0 (0.94)	70.0 (2.75)
VPS-B1653D-PJ12DF	28.0 (1.10)	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 loosen 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 13](#).

Specifications

The exterior surfaces of the Bulletin VPS stainless steel servo motors are made from the materials in the table. Always store a motor in a clean and dry location within the environmental conditions.

Exterior Surface Materials

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

Environmental Specifications

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

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

IP66	Dust tight, powerful water jets, room temperature water ⁽¹⁾
IP67	Dust tight, temporary immersion, room temperature water ⁽¹⁾
IP69K	Dust tight, water/steam jets up to 100 bar (1200 psi) with nozzle pressure at approximately 80 °C (176 °F) ⁽¹⁾

The connector is IP66 and IP67 rated. ⁽¹⁾

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

Motor Cables and Accessory Kits

Accessories available from the factory include these items.

Single Motor Cables

Factory-manufactured single motor 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 single motor cables, contact your nearest Rockwell Automation sales office, or refer to the Kinetix Motion Accessories Specifications Technical Data, publication [GMC-TD004](#).

Positive Air-pressure Accessory Kit

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

The kit provides a quick-release female air fitting. Positive air pressure 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:

- Plastic air tubing must be 4 mm (5/32 in.) OD Teflon FEP tubing.
- Air supplied to the motor must not exceed 0.1 bar (1.45 psi).



ATTENTION: Excessive air pressure or 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 is 0.1 bar (1.45 psi).

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

Positive Air-pressure Accessory Kit Installation

1. Remove the 5 mm (0.20 in.) sealing plug with a Phillips screwdriver.
Refer to the diagram [Mounting Dimension References, mm \(in.\) on page 10](#) 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 (9.7...10.6 lb•in).
4. Visually inspect the circumference of the connection for proper seating.

Additional Resources

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

Resource	Description
Kinetix 5500 Servo Drives User Manual, publication 2198-UM001	Information on installing, configuring, starting up, and troubleshooting a servo drive system with a servo motor.
Kinetix 5500 Feedback Connector Kit Installation Instructions, publication 2198-IN002	Information on installing the feedback connector kit.
Shaft-seal Kits Installation Instructions, publication 2090-IN012	Information on the installation of a shaft seal on this and other servo motors.
Kinetix Rotary Motion Specifications Technical Data, publication GMC-TD001	Product specifications for Allen-Bradley® rotary motors, with performance, environmental, certifications, load force, and dimension drawings.
Kinetix Motion Accessories Specifications, publication GMC-TD004	Product specifications and dimensions for Allen-Bradley servo drive accessories.
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	For declarations of conformity (DoC) currently available from Rockwell Automation.

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

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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Publication VPS-IN002B-EN-P - December 2014

Supersedes Publication VPS-IN002A-EN-P - April 2013

PN-280133

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