

# Instructions for Installation and Operation

## Bodine 12 or 24VDC Type 34B/SR-WX Variable Speed Brushless DC INTEGRAmotor™

This apparatus is suitable for use in Class I, Division 2, Groups A, B, C, D, or unclassified locations.



### Specifications

Speed (RPM) .....	0.6-658
Torque (lb-in.) .....	.9-205
Gear Ratio Range .....	.3.8:1 to 312.4:1
Power (HP) .....	1/5 (12V) or 1/4 (24V)
Control Input	
Max. Continuous Amps .....	19.0 (12V) or 11.0 (24V)



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This manual contains the basic information needed to install and operate a Bodine INTEGRAmotor 34B4/SR-WX brushless DC gearmotor & control system that is certified for use in Class I Division 2 hazardous locations. This manual does not profess to cover all details or variations in equipment, nor to provide for every possible contingency associated with installation, operation, or maintenance. No warranty of fitness for purpose is expressed or implied. It is the responsibility of the user to determine whether the installation location is hazardous, and to what degree it is hazardous. Should further information be desired or should particular problems arise which are not covered sufficiently for the user's purpose, the matter should be referred to the Bodine Electric Company.

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## RoHS COMPLIANCE

This document certifies that the Bodine Electric type 34B4/SR-WX gearmotor is manufactured with materials and processes that comply with European Directive 2011/65/EU on the Restriction of Hazardous Substances (RoHS).

## IMPORTANT SAFETY PRECAUTIONS

The use of electric motors and gearmotors, like the use of all electronically powered equipment, is potentially hazardous. The degree of hazard can be greatly reduced by proper design, selection, installation, and use, but hazards cannot be completely eliminated. The reduction of hazard is the joint responsibility of the user, the manufacturer of the driven or driving equipment, and the manufacturer of the motor or generator.



The Bodine type 34B motor was evaluated by Underwriters Laboratories (UL) for compliance to UL standards 508C and 1004-1 and CSA standards C22.2 No. 14 and C22.2 No. 100. Motor construction recognition is documented in UL file E47177. The gearmotor is also a UL listed product, documented in UL file E474208 for hazardous locations. This product was also evaluated by Underwriters Laboratories for compliance to UL standard 1836, CSA standard C22.2 No. 213, and ISA standard 12.12.01. It is suitable for use in Class I, Division 2, Groups A, B, C, D hazardous locations and bears the mark shown above.

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Please read through this operations manual in detail and observe those paragraphs with the safety alert symbol.

### **WARNING**

This indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

### **CAUTION**

This indicates a potentially hazardous situation which, if not avoided, may result in property damage.

### **WARNING/AVERTISSEMENT**

Explosion hazard. Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations.

Risque d'explosion – avant de deconnecter l'équipement, couper le courant ou s'assurer que l'emplacement est designe non dangereux.

### **WARNING/AVERTISSEMENT**

Explosion hazard. Substitution of components may impair suitability for Class I, Division 2.

Risque d'explosion – La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Div. 2.

## QUICK REFERENCE

### IMPORTANT

Read this manual completely and carefully before making any connections. Pay special attention to all warnings, cautions, and safety rules. Failure to follow the instructions could produce safety hazards which could injure personnel or damage the control, gearmotor, or other equipment. If you have any doubts about how to connect the control or gearmotor, refer to the detailed sections of this manual.

This apparatus is suitable for use in Class I, Division 2, Groups A, B, C, D, or unclassified (non-hazardous) locations.

1. Mount the gearmotor using the threaded holes in the face of the gearbox and couple the load mechanism to the gearmotor drive shaft.
2. Remove the cover of control enclosure.
3. Attach conduit to control enclosure using a UL listed conduit fitting.
4. Run wire through the conduit and connect to control circuit board.
5. Reinstall cover on control enclosure.
6. Turn on power and adjust speed with the potentiometer on the control enclosure.

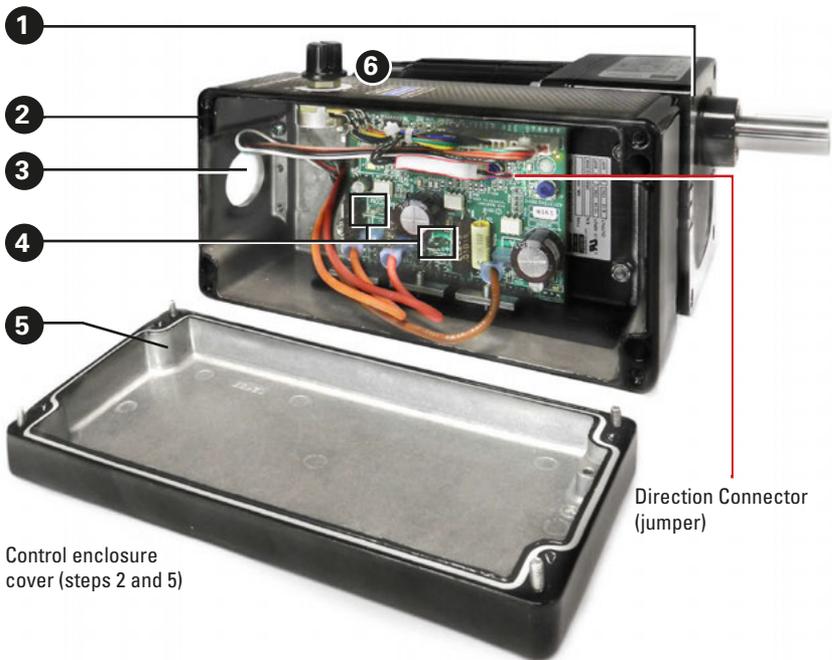


Figure 1 – Quick Reference for Installation and Operation

# PRODUCT SPECIFICATIONS

Parameter	Specification
Locations:	Hazardous locations Class I, Division 2, Groups A, B, C, D or (non-hazardous) unclassified locations.
Power Supply Voltage:	12-Volt models: 12 to 14 VDC 24-Volt models: 24 to 35 VDC
Ambient Temperature:	-20° to 40° C (operating)
Speed Regulation:	2% at 2500 RPM
Speed Range (at high speed shaft or rotor):	12.5:1 (200 to 2500 RPM) at rated load and rated supply voltage
Acceleration Time:	adjustable, 0.35 to 8.0 seconds

Tables 1 and 2 list the current models available, which are all parallel shaft gearmotors. Other configurations of Bodine's type 34B/SR gearmotor with different gear reducers are possible. Contact Bodine for details on those.

**TABLE 1 - 12 Volt Models**

Type	Wt. (lbs)	GEARMOTOR OUTPUT				CONTROL INPUT	
		Speed (rpm)	Torque (lb-in)	Gear Ratio	HP	Volts (VDC)	Max Cont. Amps
34B4BEBL/SR-WX4	11.6	0.6 to 8	205	312.4:1	1/5	12	19.0
34B4BEBL/SR-WX4	11.6	1.2 to 15	200	172.1:1	1/5	12	19.0
34B4BEBL/SR-WX4	11.6	2.0 to 26	185	97.5:1	1/5	12	19.0
34B4BEBL/SR-WX3	11.6	3.0 to 38	190	65.5:1	1/5	12	19.0
34B4BEBL/SR-WX3	11.6	3.6 to 46	185	54.7:1	1/5	12	19.0
34B4BEBL/SR-WX3	11.6	4.5 to 57	157	43.9:1	1/5	12	19.0
34B4BEBL/SR-WX3	11.6	6.7 to 99	106	29.7:1	1/5	12	19.0
34B4BEBL/SR-WX2	11.6	9.8 to 123	77	20.4:1	1/5	12	19.0
34B4BEBL/SR-WX2	11.6	14 to 181	46	13.8:1	1/5	12	19.0
34B4BEBL/SR-WX2	11.6	21 to 266	31	9.4:1	1/5	12	19.0
34B4BEBL/SR-WX2	11.6	36 to 455	18	5.5:1	1/5	12	19.0
34B4BEBL/SR-WX2	11.6	52 to 658	9	3.8:1	1/5	12	19.0

**TABLE 2 - 24 Volt Models**

Type	Wt. (lbs)	GEARMOTOR OUTPUT				CONTROL INPUT	
		Speed (rpm)	Torque (lb-in)	Gear Ratio	HP	Volts (VDC)	Max Cont. Amps
34B4BEBL/SR-WX4	11.6	0.6 to 8	205	312.4:1	1/4	24	11.0
34B4BEBL/SR-WX4	11.6	1.2 to 15	200	172.1:1	1/4	24	11.0
34B4BEBL/SR-WX4	11.6	2.0 to 26	185	97.5:1	1/4	24	11.0
34B4BEBL/SR-WX3	11.6	3.0 to 38	190	65.5:1	1/4	24	11.0
34B4BEBL/SR-WX3	11.6	3.6 to 46	185	54.7:1	1/4	24	11.0
34B4BEBL/SR-WX3	11.6	4.5 to 57	157	43.9:1	1/4	24	11.0
34B4BEBL/SR-WX3	11.6	6.7 to 99	106	29.7:1	1/4	24	11.0
34B4BEBL/SR-WX2	11.6	9.8 to 123	77	20.4:1	1/4	24	11.0
34B4BEBL/SR-WX2	11.6	14 to 181	46	13.8:1	1/4	24	11.0
34B4BEBL/SR-WX2	11.6	21 to 266	31	9.4:1	1/4	24	11.0
34B4BEBL/SR-WX2	11.6	36 to 455	18	5.5:1	1/4	24	11.0
34B4BEBL/SR-WX2	11.6	52 to 658	9	3.8:1	1/4	24	11.0

## INSTALLATION

This product should only be installed by a qualified person familiar with its operation and associated hazards, and knowledgeable about the special requirements for installation in hazardous locations. The National Electrical Code (NEC), local electrical and safety codes, and when applicable, the Occupational Safety and Health Act (OSHA) should be observed to reduce hazards to personnel and property.

### **⚠ WARNING/AVERTISSEMENT**

Explosion hazard. Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations.

Risque d'explosion – avant de deconnecter l'équipement, couper le courant ou s'assurer que l'emplacement est designe non dangereux.

### **⚠ WARNING/AVERTISSEMENT**

Explosion hazard. Substitution of components may impair suitability for Class I, Division 2.

Risque d'explosion – La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.

### **Step 1: Mount the 34B4/SR-WX Gearmotor**

#### **CAUTION**

The PCB of this 34B4/SR-WX gearmotor is vulnerable to static electrical charges. This gearmotor is packaged in an anti-static bag and should be removed from the bag only in an area protected from electrostatic discharges (ESD).

This apparatus is suitable for use in Class I, Division 2, Groups A, B, C, D or unclassified locations.

Install this 34B4/SR-WX gearmotor onto a secure mounting surface by inserting screws into the four threaded holes in the face of the gearbox. See Figure 2 for size and location of the mounting holes. An optional L-bracket kit, Bodine model number 0970, is available for floor mounting.

**If this 34B4/SR-WX gearmotor is operated or used outdoors, it must be installed under a cover that protects it from direct exposure to rain or snow.**



## Step 2: Remove the Control Enclosure Cover

### **⚠ WARNING/AVERTISSEMENT**

Open circuit before removing cover. Keep cover tight while circuits are alive.

Coupez l'alimentation avant de retirer le couvercle. Ce couvercle doit être en place pendant que le circuit est sous tension.

The cover of the control enclosure is fastened with the four provided screws, one at each corner. Either a Philips or a flat screwdriver can be used to loosen the captive screws and remove the cover.



Figure 3 – Installed Conduit Hub.

## Step 3: Attach Conduit to the Control Enclosure

Figure 2 shows the location of a 1.125" / 1.063" diameter hole in the side of the control enclosure. The hole is for installation of a UL listed 3/4" NPT conduit hub. The conduit hub shown in the Figure 3 is McMaster part number 7864T42 and is one example. Follow the manufacturer's instructions for installing the hub onto the control enclosure and then attach the conduit.

## Step 4: Make Electrical Connections

### **CAUTION**

The printed circuit board (PCB) of the 34B4/SR-WX gearmotor is vulnerable to electrostatic discharges (ESD). Do not contact the PCB unless precautions are followed to prevent ESD.

This 34B4/SR-WX gearmotor is factory-wired so that the drive is enabled as soon as power is applied and speed is controlled using the potentiometer in the side of the control enclosure. If remote control of the gearmotor is desired, please contact our technical support staff at 773-478-3515 or via [info@bodine-electric.com](mailto:info@bodine-electric.com).

Power and ground connections are made using three wires routed through the conduit and into the 34B4/SR-WX gearmotor control enclosure. The power wires must be terminated with 1/4" quick disconnect receptacles.

Connect the (+) side of the power supply to the tab labeled “+VM” on the circuit board inside the control enclosure. Connect the (-) side of the power supply to the tab labeled “PCOM”. Use one of the two copper ground screws in the bottom of the control enclosure to attach the ground wire. See Figure 4 for location of the three connections.

### Select Direction of Drive Shaft Rotation

Bodine 34B4/SR-WX gearmotors can be configured so that the drive shaft rotates either clockwise or counterclockwise. The drive shafts of gearmotors with an even number of gearing stages (indicated by an even number at the end of the product type, as in 34B4BEBL/SR-WX<sub>2</sub>) are factory-set to rotate counterclockwise. Drive shafts of gearmotors with an odd number of gearing stages, such as 34B4BEBL/SR-WX<sub>3</sub> will rotate clockwise. If the application requires the drive shaft to rotate opposite the factory setting, simply remove the plug-in direction connector inside the control enclosure. See Figure 4 for location of the connector.

**Fusing:** The 34B4/SR-WX gearmotor must be protected by a user-supplied fuse. In a system with multiple INTEGRAMotors, each one must be protected separately. Make sure the fuse is connected in series with the (+) lead of the power supply. The power supply must be fused with a JDYX2 fuse with a maximum rating of 25 Amps. The fuse must be located outside the hazardous location area or installed in a suitable enclosure.

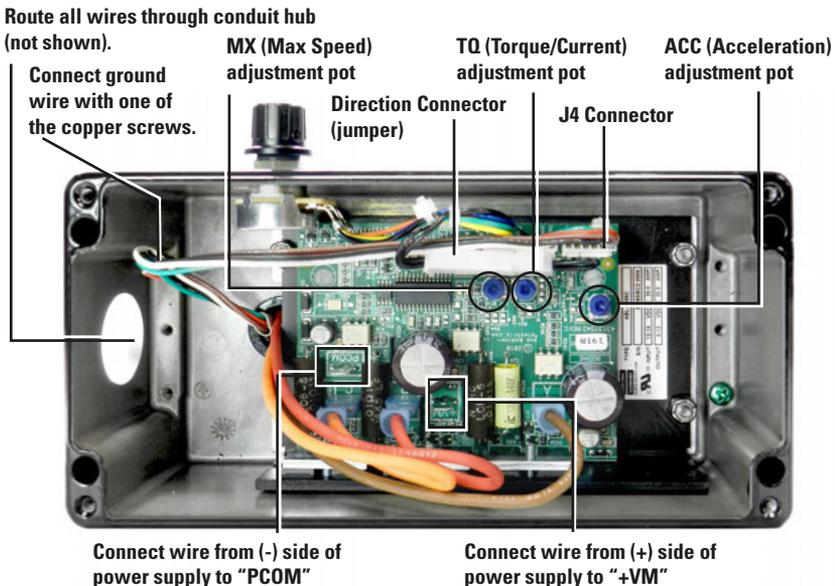


Figure 4 – Location of Control Components and Connections

## Step 5: Attach the Control Enclosure Cover

### **WARNING/AVERTISSEMENT**

Open circuit before removing or attaching the cover. Keep cover tight while circuits are alive.

Coupez l'alimentation avant de retirer le couvercle. Ce couvercle doit être en place pendant que le circuit est sous tension.

The cover of the control enclosure is fastened with the four provided M4 screws, one at each corner. Either a Phillips or a flat screwdriver can be used to tighten the captive screws to 14-18 lb-in. and attach the cover.

## Step 6: Operate the 34B4/SR-WX Gearmotor

### **WARNING**

- Recheck all connections.
- Do not remove the cover over the electronics when the power is ON to avoid personal injury caused by electrical shock.
- Do not attempt to install or remove the electrical connector when the power supply is turned on. Do not attempt to wire circuitry while power is on.

### **CAUTION**

- Check that gearmotor is securely mounted.
- Test 34B4/SR-WX gearmotor unloaded first.
- Check all rotating members. Be sure keys, pulleys, etc. are securely fastened and safety guards are in place.
- Check for proper mounting and alignment of products, and verify safe loading on shafts and gears.

### 1. Start the Gearmotor

- a. Turn the DC power supply on.
- b. The gearmotor should start running at the set speed if there is no remote switch to enable the drive. The factory setting is zero speed, so a new gearmotor should not turn at this point. But if the speed pot has already been moved by a previous user, the gearmotor will run at the speed set by that user.

### 2. Adjust Speed

- a. Turn speed potentiometer.

### 3. Stop the Gearmotor

- a. Turn the DC power supply off.



Figure 5 – 34B4/SR-WX gearmotor shown with cover attached to control enclosure and showing the location of the speed potentiometer.

### Step 7: Control Calibration (Optional)

#### **⚠ WARNING**

Do not remove the control box cover when the power is ON in a Class I, Div. 2 hazardous location. Always adjust the control outside the hazardous location area.

#### **⚠ WARNING**

Use a non-metallic or insulated adjustment tool for internal adjustments. Circuit components are not at ground potential and accidental short circuiting and shock hazard may occur with conducting tools. Adjustment should be made only by qualified service personnel.

#### **⚠ WARNING**

Never rely on logic circuitry as a means of disabling the gearmotor or control. To prevent unsuspected mechanical motion and potential injury, the AC power should always be disconnected from the control power supply whenever logic circuits or the driven equipment are serviced. When a battery is used, the DC supply to the control should be disconnected.

The factory settings of the control are satisfactory for most applications. However, there may be some cases where it is desirable to limit the maximum speed of the gearmotor, or to limit its stall torque, or to change how quickly it accelerates. These performance characteristics can be adjusted with potentiometers on the control board inside the terminal box. Because the control enclosure must be opened and the gearmotor must be running when these adjustments are made, this **must** be done **before** the gearmotor is installed in the hazardous location.

See Figure 4 for the location of the following adjustment potentiometers.

**Maximum Speed Potentiometer:** The gearmotor is calibrated to run at the speed listed on its nameplate when the external speed potentiometer is set to “100”. Turn the Max Speed (MX) potentiometer on the control board counterclockwise to reduce the maximum speed.

**Torque (Current) Limit Potentiometer:** The TQ potentiometer (Figure 4) has been calibrated so that the peak current limit of the 12 volt model is factory-set to 30 Amps and the peak current limit of the 24 volt model is factory-set to 27 Amps. In some cases, it may be desirable to reduce the peak current limit to a level less than the factory setting, in order to protect drive mechanisms, such as gearing, from damage due to overloads. Turn the TQ trim potentiometer counterclockwise to decrease the torque and clockwise to increase the torque.

**Acceleration Adjustment Potentiometer:** The ACC potentiometer (See Figure 4) can be used to adjust the gearmotor’s acceleration time. A counterclockwise adjustment decreases the acceleration time down to a minimum of approximately 0.35 seconds from zero to full speed. A clockwise adjustment increases the rate up to a maximum of approximately 8 seconds from zero to full speed.

## TROUBLESHOOTING

### WARNING

- Do not remove the cover over the electronics when the power is ON to avoid personal injury caused by electrical shock.
- Do not attempt to install or remove the electrical connector when the power supply is turned on. Do not attempt to wire circuitry while power is on.

If you encounter a problem, read all instructions and double-check the wiring. Even if the 34B4/SR-WX gearmotor itself is defective, it may be that another defective component in the system caused it to fail, in which case replacing the gearmotor alone and not tending to the root cause of the failure may result in another damaged product. Table 3 may assist in troubleshooting foreseeable problems which may occur during installation and operation.

If problems persist, contact your source of purchase or a Bodine Authorized Service Center and describe the problem in detail. Do not disassemble the product unless authorized by Bodine Electric Company. Performing unauthorized repairs will void the warranty and invalidate third-party certifications.

**General Evaluation** – Knowing the circumstances under which the problem occurred can help to identify the root cause of the problem. The following are two questions you should ask yourself before disassembling the system:

**Has the system ever operated properly?** If the system was just installed and hasn't worked right from the beginning, then it is possible that something wasn't done correctly in the installation. Review all wiring or incorrect programming of remote devices. If the system has been working for an extended period of time and just recently stopped working, then this would indicate that the system was initially installed properly but has somehow changed. Focus instead on failed components or deteriorated wiring.

**Is the problem continuous or intermittent?** If the problem always occurs and never goes away, then it would indicate something inherently wrong in the connections or a defective component. On the other hand, if the system operates properly most of the time and only occasionally does something wrong, then this might indicate loose connections or electrical noise interference.

**TABLE 4 - General problem evaluation method**

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Does not operate	Incorrect power supply wiring	Check that power source is switched on.
		Check connections. Look for shorts and repair as required.
	Incorrectly sized power supply	Replace power supply with unit having sufficient voltage and current capacity to provide rated voltage under full load
	Blown fuse	Replace fuse.
	No speed signal	Check if speed potentiometer is working properly.
		Check wiring for speed potentiometer
	Gearmotor is overloaded	Reduce load Replace gearmotor with stronger model
Gearmotor is damaged	Contact Bodine or an Authorized Service Center for assistance.	
Operates, but speed can't be adjusted	Defective speed potentiometer	Contact Bodine or an Authorized Service Center for assistance.
Operates, but won't come up to speed	Gearmotor is overloaded	Reduce load Replace gearmotor with stronger model
	Incorrectly sized power supply	Replace power supply with unit having sufficient voltage and current capacity to provide rated voltage under full load
Operates, but with abnormal speed variations	Speed setting too low	Increase speed
		Replace gearmotor with model having higher gear ratio
Operates, but won't stop with zero speed signal	Defective speed potentiometer	Contact Bodine or an Authorized Service Center for assistance.
Operates, but won't maintain speed under load	Incorrectly sized power supply	Replace power supply with unit having sufficient voltage and current capacity to provide rated voltage under full load
	Gearmotor is overloaded	Reduce load Replace gearmotor with stronger model

## **BODINE LIMITED WARRANTY**

The Bodine Electric Company warrants all products it manufactures to be free of defects in workmanship and materials when used under Normal Operating Conditions and when applied in accordance with nameplate specifications.

When Bodine motors and gearmotors have been purchased with and used only with appropriately applied Bodine controls, this warranty shall be in effect for a period of twenty-four months from date of purchase or thirty months from date of manufacture, whichever comes first. Bodine motors and gearmotors used with non-Bodine controls and Bodine controls used with non-Bodine motors and gearmotors are covered by a standard twelve-month warranty period.

The Bodine Electric Company will repair, replace, or refund at its option, any of its products, which has been found to be defective and is within the warranty period, provided that the product is shipped freight prepaid, with previous authorization, to Bodine Electric, or to the nearest Bodine Authorized Service Center. At its option, all return shipments are F.O.B. Bodine's plant or Authorized Service Center. Bodine is not responsible for removal, installation, or any other incidental expenses incurred in shipping the products to or from Bodine.

This warranty is in lieu of any other expressed or implied warranty - including (but not limited to) any implied warranties of merchantability and/or fitness for a particular use or purpose.

Bodine's liability under this warranty shall be solely limited to repair or replacement of the Bodine product within the warranty period and Bodine shall not be liable, under any circumstances, for any consequential, incidental or indirect damages or expenses associated with the warranted products. Commutator and/or brush wear and its associated effects are normal occurrence and are not covered by this warranty unless otherwise agreed to by Bodine in writing.

Proof of purchase of motor or gearmotor and matching control as a system must be provided with any claim.

**Product Type:** \_\_\_\_\_ **Serial No.** \_\_\_\_\_

**Date of Purchase:** \_\_\_\_\_ **Place of Purchase:** \_\_\_\_\_

# Bodine offers over 1,200 standard gearmotors, motors and system-matched speed controls.



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Bodine offers the widest selection of variable-speed AC, permanent magnet DC and brushless DC fractional horsepower gearmotors and motors in the industry. For complete specifications, 3D CAD drawings, or to order online, visit [bodine-electric.com](http://bodine-electric.com).



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