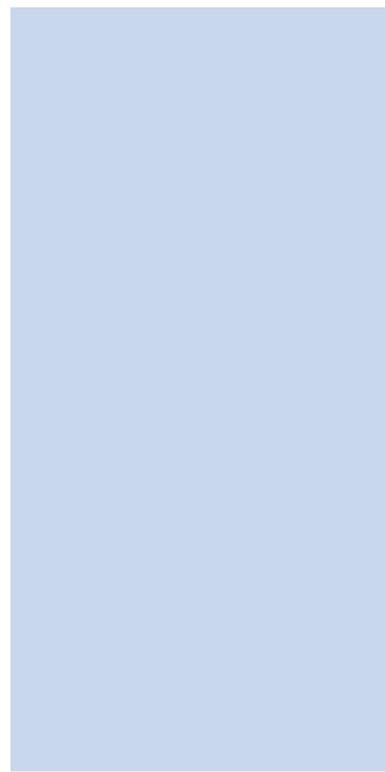


Brushless Motors/AC Speed Control Motors

AC Speed Control Motors

	Page
BHF Series	D-160
FE100/FE200	D-178
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US Series	D-222

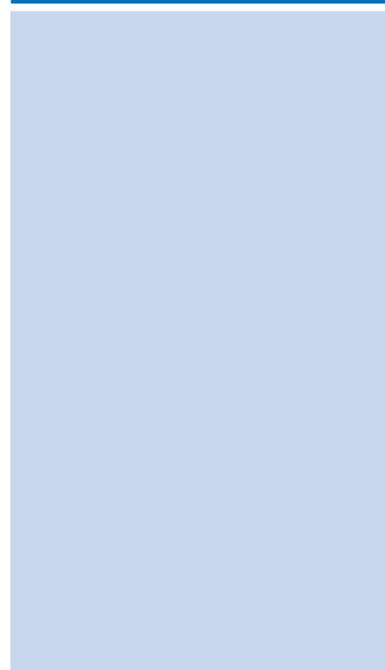


BHF Series

FE100/FE200

ES01/ES02

US Series



Introduction	
BX	Brushless Motors
BIF	
BLE	
BLU	
BLH	DC Input
BLV	
BHF	AC Speed Control Motors
FE100 / FE200	
ES01 / ES02	
US	
Accessories	
Installation	

Product Line of AC Speed Control Motors

The specifications and functions of each series are introduced with in the lists below.
Use these for your series selection.

		High-power and roll-down operation possible	Various motor combinations				
Series		BHF Series	FE100/FE200				
Page		▶ Page D-160	▶ Page D-178				
Features		<ul style="list-style-type: none"> • Smallest Frame Size among 200 W Output Power • Speed Regulation ±3% • Vertical Operation (gravitational operation) Possible 	<ul style="list-style-type: none"> • Panel-installation type Speed Controller • Digital Display of Setting Speed is Possible • Parameters Set in Accordance with Motor Output Combinations 				
Power Supply Input		Single-Phase 100-115 VAC Single-Phase 200-230 VAC Three-Phase 200-230 VAC	Single-Phase 100-120 VAC Single-Phase 200-240 VAC Three-Phase 200-240 VAC				
Motor Types		Induction Motors Electromagnetic Brake Motors	World K Series Induction Motors	V Series Induction Motors	FPW Series Induction Motors	BH Series Induction Motors	
Output Power	Frame Size 60 mm (2.36 in.)	—	6 W (1/125 HP)	—	—	—	
	Frame Size 70 mm (2.76 in.)	—	15 W (1/50 HP)	—	—	—	
	Frame Size 80 mm (3.15 in.)	—	25 W (1/30 HP)	25 W (1/30 HP)	25 W ^{*1} (1/30 HP)	—	
	Frame Size 90 mm (3.54 in.)	—	40 W (1/19 HP)	40 W (1/19 HP)	40 W ^{*2} (1/19 HP)	—	
	Frame Size 104 mm (4.09 in.)	200 W (1/4 HP)	—	—	90 W ^{*3} (1/8 HP)	200 W (1/4 HP)	
	Frame Size 104 mm (4.09 in.)	200 W (1/4 HP)	—	—	90 W ^{*3} (1/8 HP)	200 W (1/4 HP)	
Speed Control Range		100~2400 r/min	Speed Setting Range: 200~2400 r/min (6.6 to 80 Hz)				
Speed Ratio		24 : 1	12 : 1				
Speed Setting Methods	Potentiometer Control	Internal/External Speed Potentiometer	●				
	Digital Setting	—	—				
	External DC Voltage	●	●				
Functions	Digital Speed Indicator	● SDM496	●				
	Instantaneous Stop ^{*4}	●	●				
	Acceleration/Deceleration Operation	●	●				
	Multi-Speed Operation	2 Speeds (Internal/External switching)	—				
	Load Holding/Gravitational Operation	● Electromagnetic Brake Type	—				
	Multi-Motor Control	●	Multi-Axis Control				
	Protective Function	●	●				
	Sink/Source Select Input	—	●				
	Maximum Extension Distance	50 m (164 ft.)	20 m (65.6 ft.)				
Gearheads	Parallel Shaft Gearhead	●	●	●	●	●	
	Right-Angle Gearhead	●	●	—	—	●	
Safety Standards		c UL US CCC CE	c UL LISTED US CE				
RoHS Directive		(RoHS)	(RoHS)				

*1 Frame Size 83 mm (3.27 in.)

*2 Frame Size 91.5 mm (3.60 in.)

*3 Frame Size 106.5 mm (4.19 in.)

*4 Although the instantaneous stop function is not available, the deceleration time can be set to as short as 0.1 seconds.

SDM496 : Possible when a speed indicator (**SDM496**, accessory) is used.

Brushless Motors/AC Speed Control Motors

Introduction

BX

BLF

AC Input

BLE

Brushless Motors

BLU

BLH

DC Input

BLV

BHF

AC Speed Control Motors
FE100/
FE200

ES01/
ES02

US

Accessories

Installation

		Contact controller	Simple potentiometer settings
		ES01/ES02	US Series
Series			
Page		▶ Page D-192	▶ Page D-222
Features		<ul style="list-style-type: none"> ● Conforms to safety standards ● Simple Wiring ● Applicable Motors: World K Series, V Series 	<ul style="list-style-type: none"> ● Panel-installation type ● Simple Function ● Easy Wiring, Easy Operation ● Conforms to Safety Standards
Power Supply Input		Single-Phase 110/115 VAC Single-Phase 220/230 VAC	Single-Phase 110/115 VAC Single-Phase 220/230 VAC
Motor Types		Induction Motors Reversible Motors	Induction Motors
Output Power	Frame Size 60 mm (2.36 in.)	6 W (1/125 HP)	6 W (1/125 HP)
	Frame Size 70 mm (2.76 in.)	15 W (1/50 HP)	15 W (1/50 HP)
	Frame Size 80 mm (3.15 in.)	25 W (1/30 HP)	25 W (1/30 HP)
	Frame Size 90 mm (3.54 in.)	40 W (1/19 HP)	40 W (1/19 HP)
		60 W (1/12 HP)	60 W (1/12 HP)
Variable Speed Range	50 Hz	90~1400 r/min	90~1400 r/min
	60 Hz	90~1600 r/min	90~1600 r/min
	[r/min]		
	3000		
	0		
Speed Setting Methods	Potentiometer Control	Internal/External Speed Potentiometer	●
	Digital Setting	—	—
	External DC Voltage	—	—
Functions	Digital Speed Indicator	SDM496	SDM496
	Instantaneous Stop	●	—
	Acceleration/ Deceleration Operation	●	—
	Multi-Speed Operation	2 Speeds (Internal/External switching)	—
	Load Holding/ Gravitational Operation	—	—
	Multi-Motor Control	—	—
	Protective Function	—	—
	Maximum Extension Distance	10 m (32.8 ft.)	4.75 m (15.6 ft.)
Gearheads	Parallel Shaft Gearhead	●	●
	Right-Angle Gearhead	●	●
	Linear Heads	●	—
Safety Standards			
RoHS Directive			

SDM496 : Possible when a speed indicator (**SDM496**, accessory) is used.

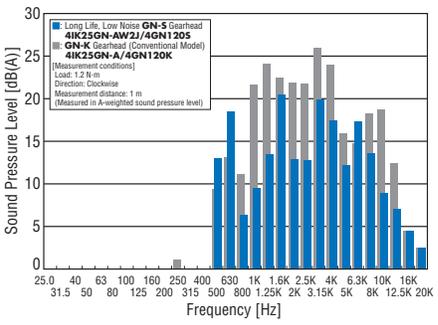
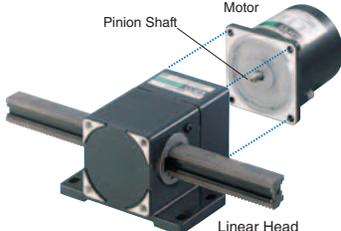
Types and Features of Gearheads and Linear Heads for AC Speed Control Motors

● Gearheads: Easy Reduction and Torque Increase

Combination with a gearhead allows the motor to reduce to a required speed or generate higher torque. Gearheads come in various types including the long life, low noise gearhead and right-angle gearhead.

● Linear Heads: Convert Motor Rotation to Linear Motion

Combination with a linear head allows the motor to convert rotation to linear motion with great ease. Linear heads are available with a square sectioned rack.

Types	Features	
<p>Parallel Shaft Gearhead Long Life, Low Noise GN-S Gearhead</p> 	<ul style="list-style-type: none"> ● Long Rated Life of 10000 Hours The GN-S gearhead achieves a long rated life of 10000 hours, twice the level of a conventional gearhead, by adopting a large, specially designed bearing and reinforced gears. ● Low Noise Design The GN-S gearhead generates less noise thanks to gears with a special shape and surface machining assembled with the use of advanced technology. ● Applicable Products 6 W (1/125 HP), 15 W (1/50 HP), 25 W (1/30 HP) or 40 W (1/19 HP) GN pinion motor 	 
<p>Parallel Shaft Gearhead Long Life GE-S Gearhead</p> 	<ul style="list-style-type: none"> ● Long Rated Life of 10000 Hours The GE-S gearhead achieves a long rated life of 10000 hours, twice the level of a conventional gearhead, by adopting a large, specially designed bearing and reinforced gears. ● The GE-S gearhead comes with a tapped hole at the tip of the shaft. 	<ul style="list-style-type: none"> ● Applicable Products 60 W (1/12 HP) or 90 W (1/8 HP) GE pinion motor (Applicable motors for FE100/FE200)
<p>Parallel Shaft Gearhead GU Gearhead</p>	<ul style="list-style-type: none"> ● Applicable Products 60 W (1/12 HP) or 90 W (1/8 HP) GU pinion motor (Applicable motors for ES01/ES02, US Series) 	
<p>Right-Angle Gearhead → Page C-227</p> 	<ul style="list-style-type: none"> ● Ideal Space-Saving Solution The gear shaft is positioned at right angles with the motor shaft, enabling space-saving. ● Hollow Shaft and Solid Shaft Types are Available Select an appropriate type that suits your specific application. ● Solid shaft type of GE pinion gearhead comes with a tapped hole at the tip of the shaft. 	<ul style="list-style-type: none"> ● Applicable Products 25 W (1/30 HP) or 40 W (1/19 HP) GN pinion motor 60 W (1/12 HP) or 90 W (1/8 HP) GE pinion motor 60 W (1/12 HP) or 90 W (1/8 HP) GU pinion motor (Applicable motors for FE100/FE200, ES01/ES02 and US Series)
<p>Rack-and-Pinion Mechanism LS Linear Heads → Page C-247</p> 	<ul style="list-style-type: none"> ● Easy to Achieve Linear Motion A rack-and-pinion mechanism is combined with a reduction mechanism, which allows the motor to convert rotation to linear motion with great ease. 	<ul style="list-style-type: none"> ● Applicable Products 6 W (1/125 HP), 25 W (1/30 HP) GN pinion motor (Applicable motors for ES01/ES02)

How to Read Specifications

How to Read Specifications

Specifications Table (Example) World K Series/Speed Controller

Motor Model			Applicable Speed Controller	Power Supply Input			Output Power W (HP)	Permissible Torque		Speed Setting Range Hz (r/min)
Lead Wire Type	Terminal Box Type	Conduit Box Type		Voltage VAC	Frequency Hz	Current A		Set Frequency Hz (Set Speed r/min)	Torque mN·m (oz·in)	
ZP	2IK6GN-SW2 (2IK6A-SW2)	-	FE100A	Single-Phase 100-120 ±10%	50/60 ±5%	0.68	6 (1/125)	6.6 (200)	42 (5.9)	6.6~80 (200~2400)
			FE100C	Single-Phase 200-240 ±10%		0.42				
			FE100S	Three-Phase 200-240 ±10%		0.23				
TP	3IK15GN-SW2 (3IK15A-SW2)	-	FE100A	Single-Phase 100-120 ±10%		1.1	15 (1/50)	6.6 (200)	60 (8.5)	
			FE100C	Single-Phase 200-240 ±10%		0.63				
			FE100S	Three-Phase 200-240 ±10%		0.33				
TP	4IK25GN-SW2 (4IK25A-SW2)	4IK25GN-SW2T (4IK25A-SW2T) 4IK25GN-SH (4IK25AA-SH)	FE100A	Single-Phase 100-120 ±10%		1.3	25 (1/30)	6.6 (200)	150 (21)	
			FE100C	Single-Phase 200-240 ±10%		0.77				
			FE100S	Three-Phase 200-240 ±10%		0.43				
TP	5IK40GN-SW2 (5IK40A-SW2)	5IK40GN-SW2T (5IK40A-SW2T) 5IK40GN-SH (5IK40AA-SH)	FE100A	Single-Phase 100-120 ±10%	1.7	40 (1/19)	6.6~50 (200~1500)	300 (42)		
			FE100C	Single-Phase 200-240 ±10%	0.96					
			FE100S	Three-Phase 200-240 ±10%	0.53					
TP	5IK60GE-SW2 (5IK60A-SW2)	5IK60GE-SW2T (5IK60A-SW2T) 5IK60GE-SH (5IK60A-SH)	FE100A	Single-Phase 100-120 ±10%	2.3	60 (1/12)	6.6 (200)	310 (44)		
			FE100C	Single-Phase 200-240 ±10%	1.3					
			FE100S	Three-Phase 200-240 ±10%	0.72					
TP	5IK90GE-SW2 (5IK90A-SW2)	5IK90GE-SW2T (5IK90A-SW2T) 5IK90GE-SH (5IK90A-SH)	FE100A	Single-Phase 100-120 ±10%	2.7	80 (1/9)	6.6 (200)	450 (63)		
			FE100C	Single-Phase 200-240 ±10%	1.6					
			FE100S	Three-Phase 200-240 ±10%	0.85					

- ① Current: This refers to, with the combination of motor and speed controller, the maximum current value sent into the speed controller.
- ② Output Power: This refers to, with the combination of motor and speed controller, the amount of work that can be performed in a given period of time. It also expresses the maximum output that can be generated within the permissible torque (continuous operation region) on the speed – torque characteristics diagram.
- ③ Permissible Torque: Maximum torque that can be used in a range of the specified frequency (or speed) with the applicable combination of motor and speed controller.
- ④ Speed Setting Range: Frequency (or speed) that can be set with the applicable combination of motor and speed controller. The actual speed varies depending on the load conditions.

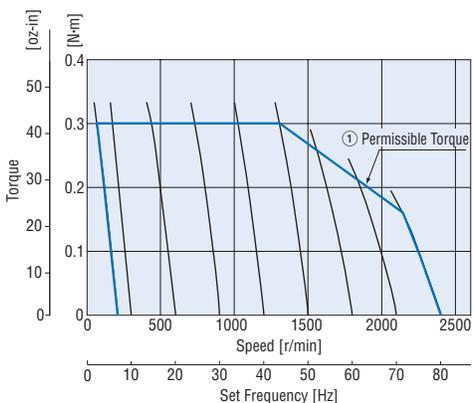
Permissible Overhung Load and Permissible Thrust Load of Motors

Similar to standard AC motors. Refer to "How to Read Motor Specifications" of constant speed motors.

- How to read motor specifications of constant speed motors → Page C-12

How to Read Speed – Torque Characteristics

Speed – Torque Characteristics (Example) FE100□/5IK40GN-SW2



- ① Permissible Torque: Torque at which continuous operation can be performed without exceeding motor's permissible maximum temperature and speed controller's rated output current.

How to Read Gearhead Specifications

Similar to standard AC motors. Refer to "How to Read Gearhead Specifications" of constant speed motors.

- How to read gearhead specifications of constant speed motors → Page C-13

How to Read Specifications

Specifications Table (Example) **ES01/ES02/World K Series Speed Control Motors**

Model		Max. Output Power W (HP)	Voltage VAC	Frequency Hz	Variable Speed Range r/min	Permissible Torque		Starting Torque mN·m (oz-in)	Current A	Power Consumption W	Capacitor μF
						1200 r/min mN·m (oz-in)	90 r/min mN·m (oz-in)				
Pinion Shaft Type	Round Shaft Type										
TP 4IK25RGN-AW2U	4IK25RA-AW2U	25 (1/30)	Single-Phase 110 Single-Phase 115	60	90~1600	185 (26)	50 (7.1)	120 (17.0)	0.75	58 69	6.5

- ① Maximum Output Power: This refers to, with the combination of motor and speed controller, the amount of work that can be performed by a motor in a given period of time. It also expresses the maximum output that can be generated within the safe-operation line on the speed – torque characteristics diagram.
- ② Variable Speed Range: This refers to, with the combination of motor and speed controller, the range of variable speed. For speed control motors, the variable speed range varies with the load torque. Refer to page G-62 for details.
- ③ Permissible Torque: This refers to, at the typical set speed at 1200 r/min and 90 r/min, the maximum torque that can be generated below the safe-operation line or the permissible torque when gearhead is attached.
- ④ Starting Torque: This refers to, with the combination of motor and speed controller, the torque generated the instant the motor starts.
- ⑤ Current: This refers to the current sent into the speed controller at the maximum output.

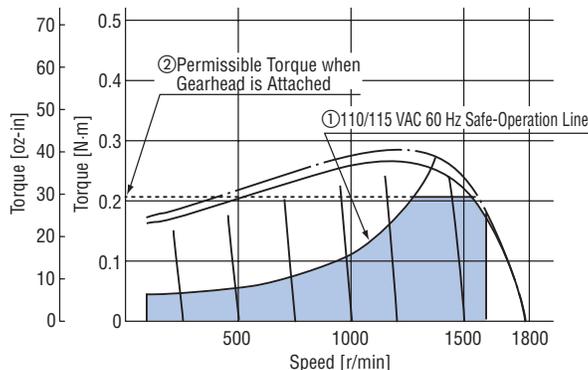
Permissible Overhung Load and Permissible Thrust Load of Motors

Similar to standard AC motors. Refer to "How to Read Motor Specifications" of constant speed motors.

● How to read motor specifications of constant speed motors → Page C-12

How to Read Speed – Torque Characteristics

Speed – Torque Characteristics (Example) **ES01/4IK25RGN-AW2U**



- ① Safe-Operation Line: The safe-operation line, measured by motor's temperature, indicates its limit for continuous operation (30 minutes operation for a reversible motor) with the temperature level below the permissible maximum. Whether the motor can be operated continuously or not, is judged by measuring the temperature of the motor case. When the temperature of the case is 90°C (194°F) or less, the motor is capable of continuous operation.
- ② Permissible Torque When Gearhead is Attached: When using a gearhead attached to motor, be aware that it is necessary to operate below the maximum permissible torque. If the actual torque required should exceed the maximum permissible torque, it may cause damage to the gearhead and/or may reduce its life.

How to Read Gearhead Specifications

Similar to standard AC motors. Refer to "How to Read Gearhead Specifications" of constant speed motors.

● How to read gearhead specifications of constant speed motors → Page C-13

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