Brushless Motors/AC Speed Control Motors

Brushless Motors

Product Line of Brushless Motors

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

Classification		AC Power Supply Input		
Series		Higher functionality and performance		
		High power, speed and position control **BX** Series		High power and digital potentiometer basic mounting **BLF** Series
		Standard Model	Standard Model＋Control Module	
				
Page		▶ Page D-18		▶ Page D-60
Features		● High speed stability, high performance, high functionality ● Vertical Operation (gravitational operation)	● Increased functionality from the basic model; capable of multistep speed-change operation, position control and torque limiting	● The mounted digital operator enables digital setting and display ● High-power motor lineup with a max. of 4000 r/min
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
Output Power	Frame Size 42 mm (1.65 in.)	–		–
	Frame Size 60 mm (2.36 in.)	30 W (1/25 HP)		30 W (1/25 HP)
	Frame Size 80 mm (3.15 in.)	60 W (1/12 HP)		60 W (1/12 HP)
	Frame Size 90 mm (3.54 .in)	120 W (1/6 HP)		120 W (1/6 HP)
	Frame Size 104 mm (4.09 in.)	200 W (1/4 HP)/400 W (1/2 HP)		200 W (1/4 HP)/400 W (1/2 HP)
Speed Control Range	[r/min] 4000 / 3000 / 2000 / 0	30～3000 r/min	3～3000 r/min	80～4000 r/min
Speed Ratio		100 : 1	1000 : 1	50 : 1
Speed Regulation (Load)		±0.05%	±0.05%	±0.2%
Speed Setting Method	Potentiometer	Internal/External Speed Potentiometer	Internal/External Speed Potentiometer	Internal/External Speed Potentiometer
	Digital Setting	–	●	●
	External DC Voltage	●	●	●
Functions	Digital Speed Indicator	–	●	●
	Instantaneous Stop	●	●	●
	Acceleration/Deceleration Operation	●	●	●
	Multi-Speed Operation	2 Speeds	8 Speeds	8 Speeds
	Load Holding/ Gravitational Operation	● Electromagnetic Brake Type	● Electromagnetic Brake Type	–
	Multi-Motor Control	●	●	●
	Protective Function	●	●	●
	Sink/Source Select Input	–	–	●
	Maximum Extension Distance	20.4 m (66.9 ft.)	20.4 m (66.9 ft.)	20.4 m (66.9 ft.)
	Others	–	Position Control Torque Limiting	–
Gearheads	Parallel Shaft Gearhead	●	●	●
	Hollow Shaft Flat Gearhead	●	●	●
Safety Standards		c UL us CE	c UL us CE	Motor: c UL us CE Driver: c UL LISTED us CE
RoHS Directive		RoHS	RoHS	RoHS

AC Power Supply Input			DC Power Supply Input		
Standard Model		Easier and simpler	24 VDC Input	24 VDC/48 VDC Input	
BLE Series		Analog speed setting with the potentiometer **BLU** Series	**BLH** Series	**BLV** Series	
Standard Model	Standard Model + Control Module			Standard Model	Standard Model + Control Module
					
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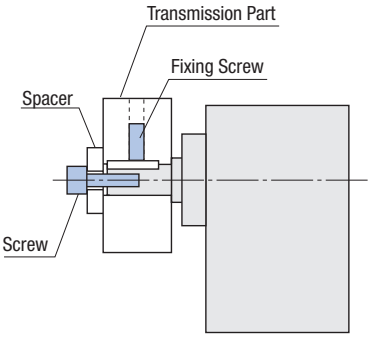
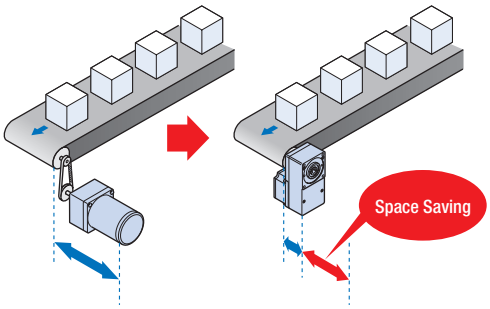
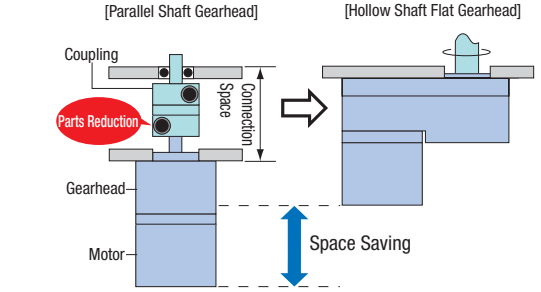
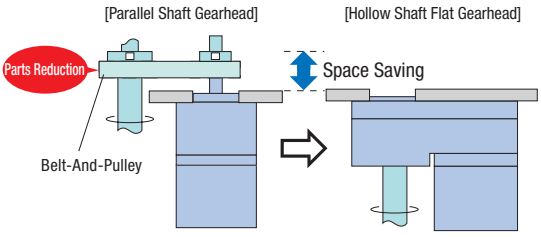
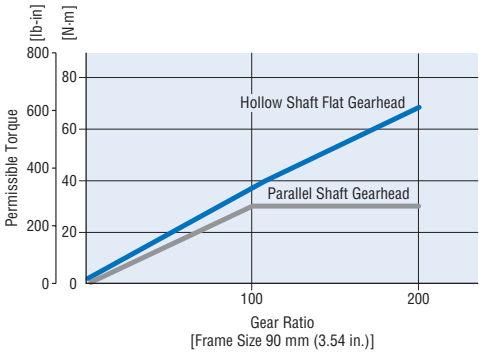
● The standard unit has a max. of 4000 r/min ● Wide Variation ● CC-Link-Compatible Lineup	● Increased functionality from the basic model; capable of multistep speed-change operation and torque limiting	● Adjust speed with potentiometer on front panel ● Panel Mounted Driver ● Easy Setting, Easy Operation	● Small Board Driver ● 24 VDC Input	● High Power ● Network Compatible (RS-485 Communication)	
Single-Phase 100-120 VAC Single-Phase 200-240 VAC Three-Phase 200-240 VAC		Single-Phase 100-115 VAC Single-Phase 200-230 VAC Three-Phase 200-230 VAC	24 VDC	24 VDC/48 VDC	
–		–	15 W (1/50 HP)	–	
30 W (1/25 HP)		20 W (1/38 HP)	30 W (1/25 HP)	–	
60 W (1/12 HP)		40 W (1/19 HP)	50 W (1/15 HP)	–	
120 W (1/6 HP)		90 W (1/8 HP)	100 W (1/8 HP)	–	
–		–	–	200 W (1/4 HP)/400 W (1/2 HP)	
100～4000 r/min	80～4000 r/min	100～2000 r/min	100～3000 r/min	100～4000 r/min	80～4000 r/min
					
40 : 1	50 : 1	20 : 1	30 : 1	40 : 1	50 : 1
±0.5%	±0.2%	±0.5%	±0.5%	±0.5%	±0.2%
Internal/External Speed Potentiometer	Internal/External Speed Potentiometer	●	Internal/External Speed Potentiometer	Internal/External Speed Potentiometer	
–	●	–	–	–	●
●	●	–	●	●	●
SDM496	●	SDM496	SDM496	SDM496	●
●	●	●	●	●	●
●	●	●	●	●	●
2 Speeds	8 Speeds	–	2 Speeds (Internal/External switching)	2 Speeds	8 Speeds
● Electromagnetic Brake Type	● Electromagnetic Brake Type	–	–	● Electromagnetic Brake Type	● Electromagnetic Brake Type
●	●	–	●	●	●
●	●	●	●	●	●
●	●	●	–	●	●
20.4 m (66.9 ft.)	20.4 m (66.9 ft.)	10.5 m (34.4 ft.)	2 m (6.6 ft.)	3.5 m (11.5 ft.)	3.5 m (11.5 ft.)
–	Torque Limiting	–	–	Torque Limiting	Torque Limiting
●	●	●	●	●	●
●	●	●	● [Except for 15 W (1/50 HP)]	●	●
c UL us CE	c UL us CE	c UL us CE	c UL us CE	CE	
RoHS	RoHS	RoHS	RoHS	RoHS	

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

Types and Features of Gearheads

These are high-strength gearheads that are compatible with the high speed and high power of brushless motors.
The two types include parallel shaft gearheads and hollow shaft flat gearheads.
Both types are available as a combination type pre-assembled with a motor.

Types	Features
Parallel Shaft Gearhead	**●High-Strength Gearhead** High strength is achieved through improving the strength of gears through heat treatment and through larger bearing diameters. The high permissible torque is 2 to 3 times that of a gearhead for an AC motor with the same frame size, and this contributes to reducing the size of equipment. **●Long-Life** The **GFS** gearhead is a long life gearhead that uses a special bearing as well as grease for high-speed rotation. The rated life is twice that of a conventional model at 10000 hours. **●Tapped Hole at the Shaft End** The 80 mm (3.15 in.), 90 mm (3.54 in.), and 104 mm (4.09 in.) gearheads come with a tapped hole at the shaft end. This can be used as an aid for preventing transmission parts from coming off.  Example of Using the Output Shaft End Tapped Hole
Hollow Shaft Flat Gearhead	**●Space Saving** Direct connection to the drive shaft is possible without using a connecting part which enables equipment space saving.  **●Low Cost** By eliminating parts such as a coupling or belt-and-pulley, the parts cost and labor will also decrease.  	**●High Permissible Torque, Long Life** High permissible torque and long life are achieved through improved gear case rigidity and larger diameters for gears and bearings. A rated life of 10000 hours is achieved.  **●Permissible Torque without Saturation** The hollow shaft flat gearhead enables permissible torque without saturation even at high gear ratios. The motor torque can be fully utilized. 

How to Read Specifications

How to Read Specifications

Specifications Table (Example) **BLF** Series

Model	Combination Type – Parallel Shaft Gearhead		**BLF460A-□**	**BLF460C-□**	**BLF460S-□**
	Combination Type – Hollow Shaft Flat Gearhead		**BLF460A-□FR**	**BLF460C-□FR**	**BLF460S-□FR**
	Round Shaft Type		**BLF460A-A**	**BLF460C-A**	**BLF460S-A**
① Rated Output Power (Continuous)		W (HP)	60 (1/12)		
Power Source	Rated Voltage	VAC	Single-Phase 100-120	Single-Phase 200-240	Three-Phase 200-240
	Permissible Voltage Range		±10%		
	Rated Frequency	Hz	50/60		
	Permissible Frequency Range		±5%		
	Rated Input Current	A	2.0	1.2	0.7
②	Maximum Input Current	A	4.5	3.0	1.5
③ Rated Torque		N·m (oz-in)	0.2 (28)		
④ Starting Torque		N·m (oz-in)	0.4 (56)		
⑤ Rated Speed		r/min	3000		
⑥ Speed Control Range		r/min	80～4000		
⑦ Round Shaft Type Permissible Load Inertia J		$\times10^{-4}$ kg·m^2 (oz-in^2)	3.75 (21)		
Rotor Inertia J		$\times10^{-4}$ kg·m^2 (oz-in^2)	0.24 (1.31)		
⑧ Speed Regulation (When digital operator is used)	Load		±0.2% max. (0～Rated torque, at rated speed, at rated voltage, at normal ambient temperature)		
	Voltage		±0.2% max. (Rated voltage ±10%, at rated speed, with no load, at normal ambient temperature)		
	Temperature		±0.2% max. [0～+50°C (+32～+122°F), at rated speed, with no load, at rated voltage]		

① Rated Output Power: This refers to, with the combination of motor and driver, 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 continuously.
② Maximum Input Current: This refers to, with the combination of motor and driver, the maximum current sent into the driver.
③ Rated Torque: This refers to, with the combination of motor and driver, the maximum torque created when they are in continuous operation.
④ Starting Torque: This refers to, with the combination of motor and driver, the limit of torque that can be generated instantaneously.
⑤ Rated Speed: This refers to, with the combination of motor and driver, the speed at rated output.
⑥ Speed Control Range: This refers to, with the combination of motor and driver, the range of variable speed.
⑦ Round Shaft Type Permissible Load Inertia J: This refers to, with the combination of motor and driver, the maximum load inertia that can be driven. The permissible load specified here is applicable only to round shaft type.
⑧ Speed Regulation: This shows how much the speed is affected by the change in load, voltage and temperature.

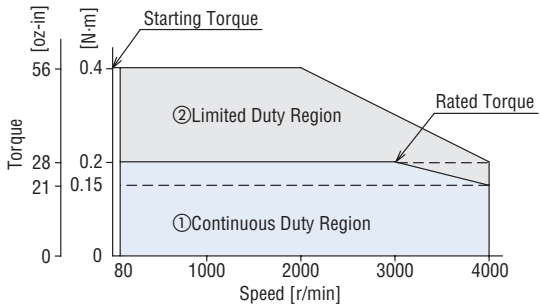
Permissible Overhung Load and Permissible Thrust Load of Motors

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) **BLF460A-A**



① Continuous Duty Region: This refers to the region where a motor can be operated continuously. The area is also used for the frictional load torque at the sliding portion of equipment.
② Limited Duty Region: This refers to the region which can be used for a short period of time. If operated for more than about five seconds in the limited duty region, the driver's overload protective function engages and the motor is automatically stopped. This area is also used as the acceleration torque which accelerates an inertial load up to the set speed at motor start-up.

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