

Orientalmotor

Brushless Motors

BLH Series

Improved DC Input drivers with more functionality and performance



Excellent performance just as-is.

The DC input type brushless motor **BLH** Series has been updated.

Performance has been increased, while the motor and driver remain the same size.

Using the support software with the digital setting type allows a variety of useful functions to be utilized.






The **BLH Series** has been updated with a variety of new Features.

- High torque at high speeds
- Speed range **80 to 3000 r/min***
- Deceleration stop according to the set time*
- Quieter: **13 dB quieter than before**
- Set operating data **from your computer***
- Monitor operating status **in real time***
- Torque adjustment*
- Max. **8 data setting points*** (conventional product: 2 points)

*When using the **MEXE02** support software and digital setting type driver.

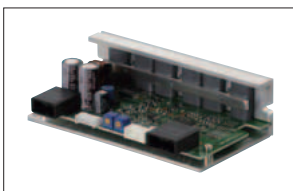
2 Driver Types to Choose From

<p>Common motor</p>  <ul style="list-style-type: none"> ● Output power 15 W / 30 W / 50 W ● Types: Parallel Shaft Gearhead / Hollow Shaft Flat Gearhead / Round Shaft 	+	<p>Analog Setting Type</p> <ul style="list-style-type: none"> ● Installation and functional compatibility with current products ● Increased performance (higher torque, reduced audible noise) ● Same price as current products* <p>*Including price of cable set (sold separately)</p> 	\$112~
		<p>Digital Setting Type</p> <ul style="list-style-type: none"> ● Installation compatibility with current products ● Increased performance (higher torque, improved quietness) ● Increased functionality with the support software MEXE02 <p>NEW</p> 	\$140~

Compact, Lightweight Drivers

Compact, lightweight drivers that are smaller than a business card.

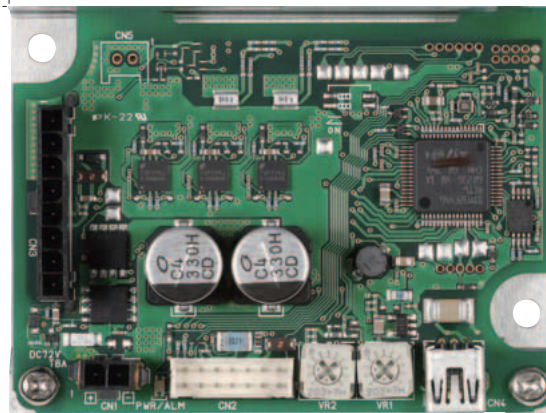
100 W



Actual Size

55 mm (2.17 in.)

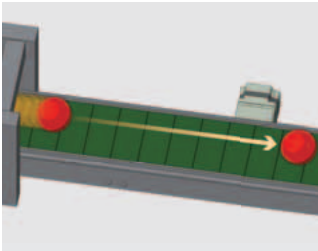
72 mm (2.83 in.)



Mass 46 g (0.10 lbs.)

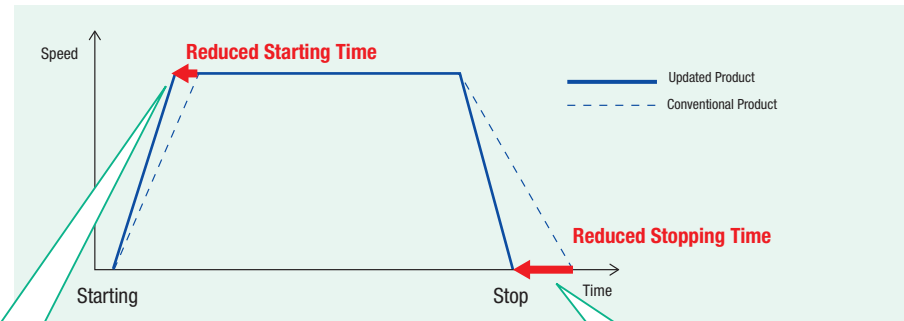
Increased performance and value with new drivers.

Reduction in Equipment Tact Time



- Faster starting time with increased torque
- Stop at the set time with deceleration stop (digital setting type)

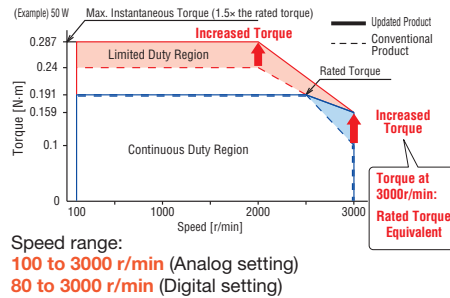
Reduction in tact time



► Increased Torque (30 W, 50 W)

Max. instantaneous torque: 1.5x the rated torque

A greater continuous duty region for higher speeds and a greater instantaneous region of 1.25 to 1.5x for improved tact times.



► Deceleration Stop (digital setting type)

The digital setting type driver is equipped with a deceleration stop function to stop at the set time. Equipment tact time can be reduced more than natural stopping by conventional type.

Suitable for Applications in Quiet Environments

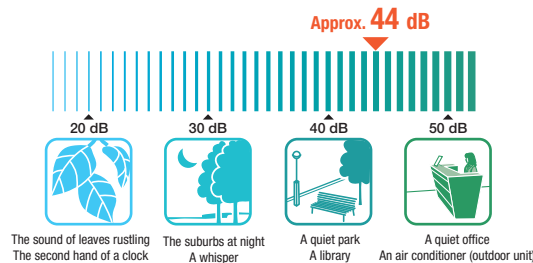
► Improved Quietness

Noise value approx. 44 dB (reduced by approx. 13 dB)

Noise sounds about half as loud as conventional products.

*30W with parallel shaft gearhead Gear ratio of 5

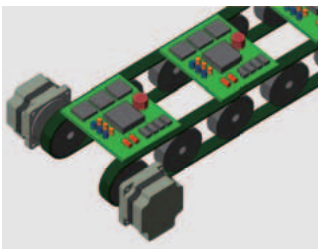
*Measurement of noise: OA value



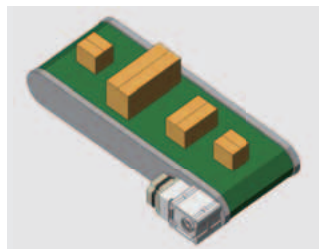
The **BLH** Series uses a sinusoidal drive method. With little torque ripple and smooth, stable rotation even at low speeds, the motor's drive sound is reduced.

Synchronized Operation and Operation with Little Speed Fluctuation

► Synchronized Operation ► Speed Stability



- Digital settings improve speed matching and allow for synchronized operation



- Speed remains stable even if the weight of the work changes (speed regulation $\pm 0.2\%$ max.)

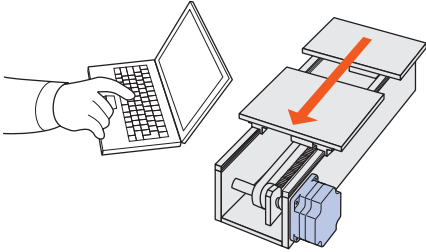
● Speed Regulation

Driver Type	Analog Setting Type	Digital Setting Type
Speed Setting Method		
Analog Setting	$\pm 0.5\%$ max.	
Digital Setting	—	$\pm 0.2\%$ max.
PWM Input Setting	—	$\pm 0.5\%$ max.

Startup and maintenance with digital settings + support software.

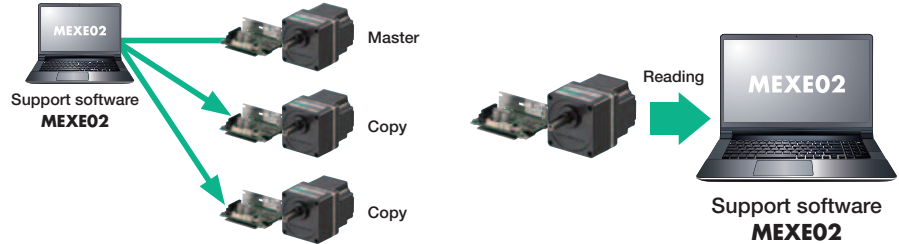
Equipment Startup Assistance

▶ Teaching and Remote Operation



Operating data can be set on the computer screen. It is possible to perform a test run without connecting to the host system, then record the operating data as-is.

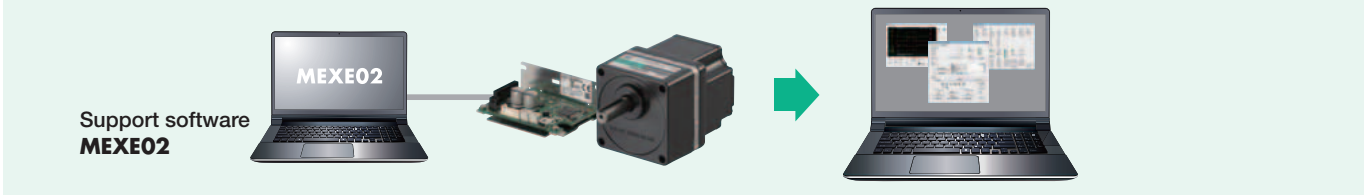
▶ Operating Data Copy Reading



Copy the operating data to the driver when using multiple units, and read out the data on the driver side. This contributes to reduced system startup time.

Predictive Maintenance with Visualization

What is predictive maintenance? By constantly monitoring the status of the motor and performing maintenance when signs of change are observed, trouble can be avoided.



▶ Status Monitoring



The load factor, driver temperature, and other such conditions can be constantly checked.

▶ Information Monitoring



By outputting an information signal with preset thresholds, this information can be used as reference for the maintenance period.

▶ Alarm Monitoring (when an abnormality occurs)

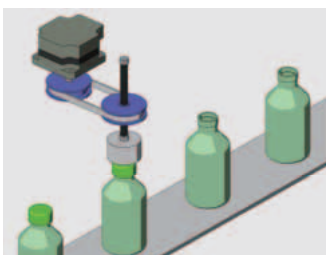


Alarm information can also be monitored. Besides being able to check for solutions to abnormalities, the cause of the alarm can be retained as a history.

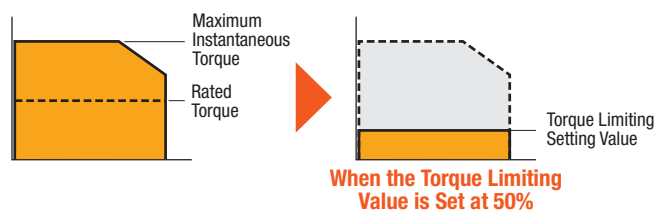
Torque Adjustment

▶ Torque Limiting Function

What is torque limiting? It is a limiting function that suppresses the motor's torque by limiting the current to the motor.



- Adjustment of tightening force, etc.
- Damage prevention (low thrust)
- Load factor monitoring is possible









Besides applications such as adjustment of tightening force, it can also be used as a safety measure for pinching detection and equipment damage prevention. The max. instantaneous torque range can be set between 0 and 200% by assuming the rated torque to be 100%.

Operating Data Setting

When using the digital setting type, operating data for up to 8 points can be set.

Setting Method

Setting Method		Digital Setting	External Analog Potentiometer		Internal Potentiometer (Driver)		PWM Input
Setting Item							
		 Support software MEXE02	 External speed potentiometer	 External DC Voltage 0~5 VDC 1 mA min.	 VR1	 VR2	 PWM signal
Speed	Analog setting type	—	●	●	●	—	—
	Digital setting type	●	●	●	●	●	●
Acceleration / Deceleration Time	Analog setting type	—	—	—	—	●	—
	Digital setting type	●	—	—	●	●	—
Torque Limiting	Analog setting type	—	—	—	—	—	—
	Digital setting type	●	●	●	●	●	●

Functions




Function	Analog Setting Type	Digital Setting Type
① Digital Speed Indicator	▲ *When the motor speed indicator SDM496 is used	● *When the support software MEXE02 is used
② Instantaneous Stop	●	●
③ Acceleration / Deceleration Time Setting	● 0.1 to 12.0 seconds	● 0.1 to 15.0 seconds (individual settings)
④ Multistep Speed-Change Operation	●	●
⑤ Parallel-Motor Operation	●	●
⑥ Protective Function	●	●
⑦ Torque Limiting	—	●
⑧ Speed Upper and Lower Limit Setting	—	●
⑨ Shock Alleviation Filter	—	●
⑩ I/O Signal Assignment	—	●
⑪ I/O Signal Operation Selection	—	●
⑫ Overload Alarm Detection Time Setting	— Fixed at 10.0 seconds	● 0.1 to 10.0 seconds
⑬ Prevention of Operation at Power-on Alarm	—	●
⑭ Various Information Detection	—	●

*For ⑦ to ⑭, when using the **MEXE02** support software and digital setting type driver.

Product Line

Motor, driver, connection cables (flexible connection cables), and cable sets (power supply cable, I/O signals cable) sold separately.

Motor



Type	Output/Frame Size	Gear Ratio
Parallel Shaft Gearhead GFS gear*1 	15 W/□42mm (1.65 in.) 30 W/□60 mm (2.36 in.) 50 W/□80 mm (3.15 in.) 100 W/□90 mm (3.54 in.)	5, 10, 15 20, 30, 50 100, 200
Hollow Shaft Flat Gearhead FR gear*2 		
Round Shaft 		

*1 The 15 W geared motor has an integrated motor and gearhead.





*2 Excluding 15 W

*3 Power cable and I/O signal cable are included with 100 W driver.

Driver

Type	Voltage/Output
Analog setting type 	24 VDC • 15 W 30 W 50 W 100 W
Digital setting type 	24 VDC • 15 W 30 W 50 W

Connection Cables / Cable Sets

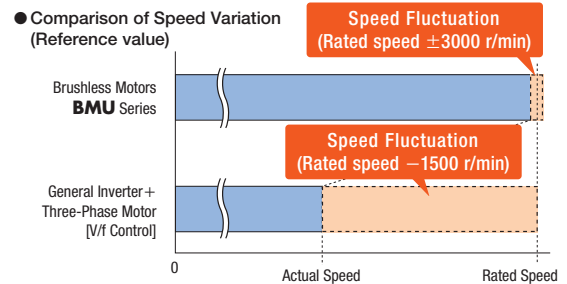
Type	Power Supply Cable Cable for I/O Signals
Connection Cable 1.5 m (4.9 ft.) 	Power Supply Cable*3 300 mm (11.8 in.) 
Flexible Connection Cable 1.5 m (4.9 ft.) 	Cable for I/O Signals*3 300 mm (11.8 in.) 

Features of Brushless Motors

Brushless motors have slim bodies and provide high output and high efficiency due to the built-in permanent magnets. The built-in sensor (hall IC) constantly monitors the motor's speed. No matter the load conditions, feedback control is carried out at all times so that the command speed and actual speed remain consistent.

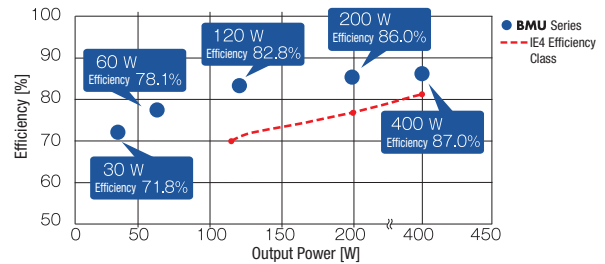
Speed Stability with Feedback Control

Brushless motors compare the setting speed with the speed feedback signals from the motor at all times and adjust the motor's applied voltage. Speed is kept stable over the entire speed range from low to high even when the load fluctuates.



IE4-Equivalent* High-Efficiency and Energy-Saving Motor

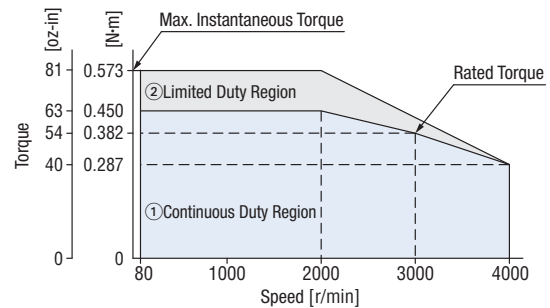
Brushless motors are higher efficiency than three-phase motors (induction motors). For example, with the **BMU Series** 200 W, motor and driver efficiency is increased by 86%, and the IE4 standard is increased 75.8%, thus giving consideration to energy-saving requirements.



*Induction motors 120 W and higher are subject to the efficiency classes under the international standard IEC 60034-30-1.
 *IE4 efficiency values are at 50 Hz and 1500 r/min, while brushless motor efficiency values are at rated speed.

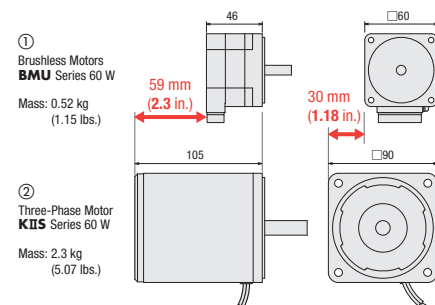
Broad Speed Control Range and Flat Torque

Rated torque is consistent over the entire speed range from low to high. Sufficient torque is obtained without limiting the used torque at low speeds, as is done with three-phase motors when driven with an inverter.



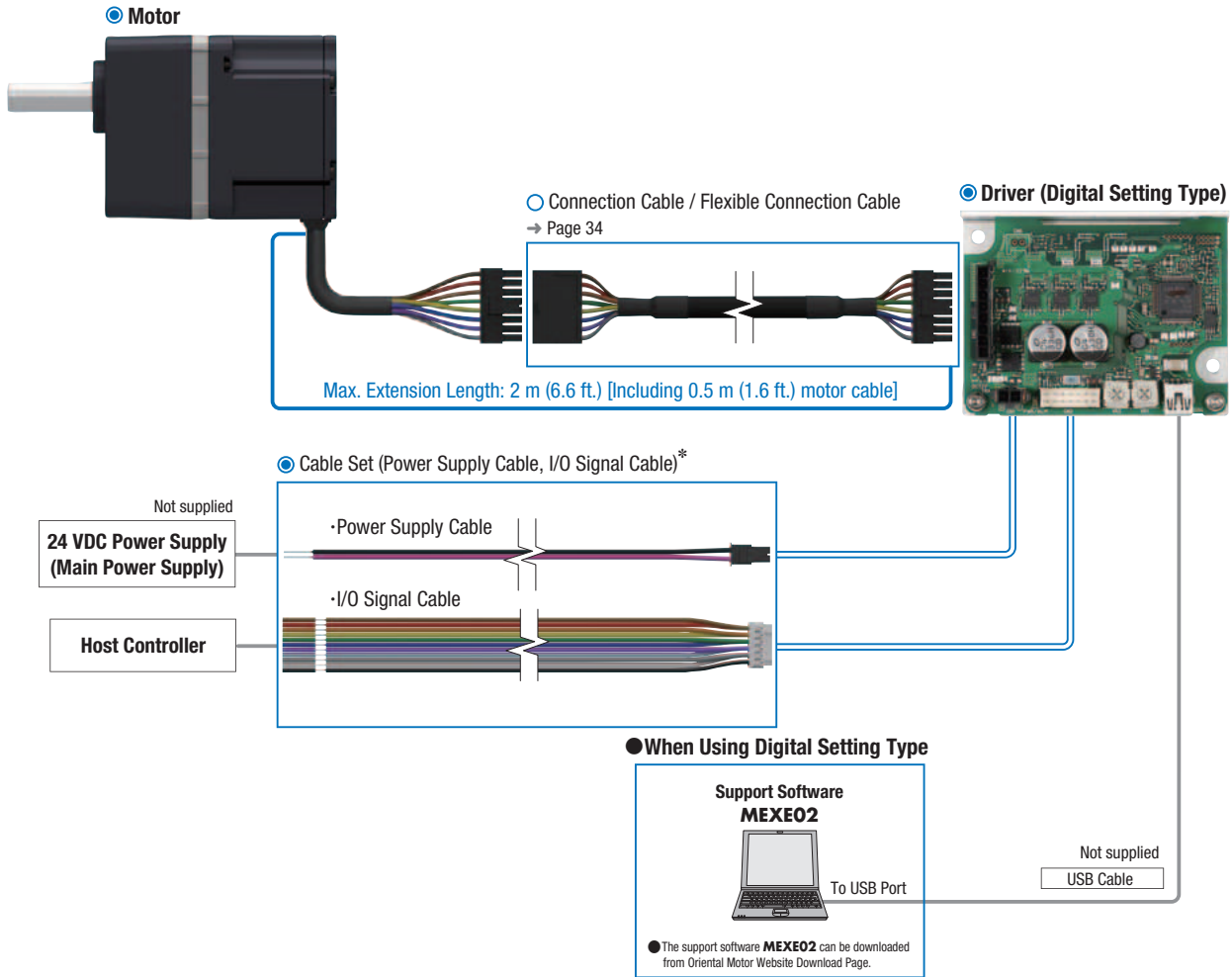
Compact, Lightweight, and High Power

Since these are brushless motors with built-in permanent magnets, they offer high output even though they are compact. Installation is easy, and both equipment weight and space can be reduced.




System Configuration


- Please be sure to purchase
- Please purchase as necessary



Motor Accessories




Motor / Gearhead Mounting Brackets
→ Page 35




Flexible Couplings
→ Page 35

Driver Accessories



External Speed Potentiometer
→ Page 35



DIN Rail Mounting Plates
→ Page 35

* A power supply cable and an I/O signal cable are included with the 100 W (1/8 HP) driver.

Example of System Configuration Pricing

Motor	Driver	Cables		+	Accessories		
		Connection Cable	Cable Set		Motor / Gearhead Mounting Bracket	Flexible Coupling	Din Rail Mounting Plate
BLHM230KC-5	BLH2D30-KD	CC02BLH	LHS003CD	+	SOL2M4	MCL301010	MADP01
\$293.00	\$140.00	\$55.00	\$10.00		\$27.00	\$60.00	\$15.00
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● The system configuration shown above is an example. Other combinations are also available.

Product Number

Motor

BLHM 4 50 K C - 5 FR

① ② ③ ④ ⑤ ⑥ ⑦

①	Motor Type	BLHM: Brushless Motor
②	Frame Size	0: 42 mm (1.65 in.) 2: 60 mm (2.36 in.) 4: 80 mm (3.15 in.) 5: 90 mm (3.54 in.)
③	Output Power	(Example) 50: 50 W (1/15 HP)
④	Power Supply Voltage	K: 24 VDC
⑤	C: Cable Type	
⑥	Gear Ratio/ Shaft Configuration	Number: Gear Ratio for Gearhead Gear Ratio for Geared Motor A: Round Shaft Type
⑦	Blank: Parallel Shaft Gearhead GFS Gear FR: Hollow Shaft Flat Gearhead FR Gear	

Driver

BLH2D 50 - K D

① ② ③ ④

①	Driver Type	BLH2D: BLH Series Driver [15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)] BLHD: BLH Series Driver [100 W (1/8 HP)]
②	Output Power	(Example) 50: 50 W (1/15 HP)
③	Power Supply Voltage	-K: 24 VDC [15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)] K: 24 VDC [100 W (1/8 HP)]
④	Blank: Analog Setting Type D: Digital Setting Type	

Connection Cable, Flexible Connection Cable

CC 02 BLH R

① ② ③ ④

①	Cable Type	CC: Connection Cable
②	Length	02: 1.5 m (4.9 ft.)
③	Applicable Model	BLH: Brushless Motor [15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)] AXH2, BLH2: Brushless Motor [100 W (1/8 HP)]
④	Blank: Connection Cable R: Flexible Connection Cable	

Power Supply Cable and I/O Signal Cable Set

LH S 003 C D

① ② ③ ④ ⑤

①	Cable Type	LH: Cable
②	S: Set	
③	Length	003: 0.3 m (0.98 ft.)
④	C: Cable	
⑤	Applicable Type	C: Analog Setting Type D: Digital Setting Type

Product Line

Motors, drivers, and connection cables are sold separately.

Motor

Parallel Shaft Gearhead GFS Gear

Output Power	Product Name	Gear Ratio	List Price
15 W (1/50 HP)	BLHM015K-□*	5, 10, 15, 20	\$239
		30, 50, 100	\$246
30 W (1/25 HP)	BLHM230KC-□	5, 10, 15, 20	\$293
		30, 50, 100	\$302
		200	\$311
50 W (1/15 HP)	BLHM450KC-□	5, 10, 15, 20	\$320
		30, 50, 100	\$328
		200	\$338
100 W (1/8 HP)	BLHM5100KC-□	5, 10, 15, 20	\$385
		30, 50, 100	\$396
		200	\$406

*The geared type has an integrated motor and gearhead.

The combination of motor and gearhead cannot be changed.

● A number indicating the gear ratio is specified where the box □ is located within the product name.



Driver

Analog Setting Type

Output Power	Product Name	List Price
15 W (1/50 HP)	BLH2D15-K	\$112
30 W (1/25 HP)	BLH2D30-K	\$112
50 W (1/15 HP)	BLH2D50-K	\$124
100 W (1/8 HP)	BLHD100K	\$156

Digital Setting Type

Output Power	Product Name	List Price
15 W (1/50 HP)	BLH2D15-KD	\$140
30 W (1/25 HP)	BLH2D30-KD	\$140
50 W (1/15 HP)	BLH2D50-KD	\$152



Connection Cable, Flexible Connection Cable

These cables are used when extending the wiring distance between the motor and the driver to 2 m (6.6 ft.).

For 15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)

Type	Length m (ft.)	Product Name	List Price
Connection Cable	1.5 (4.9)	CC02BLH	\$55.00
Flexible Connection Cable		CC02BLHR	\$98.00

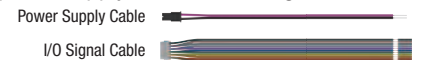
For 100 W (1/8 HP)

Type	Length m (ft.)	Product Name	List Price
Connection Cable	1.5 (4.9)	CC02AXH2	\$52.00
Flexible Connection Cable		CC02BLH2R	\$103.00

Power Supply Cable and I/O Signal Cable Set

[For 15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)]

Cables come as a set of power supply cable and I/O signal cable.



Setting Type	Length m (ft.)	Product Name	List Price
Analog Setting Type	0.3 (1)	LHS003CC	\$8.00
Digital Setting Type		LHS003CD	\$10.00

Hollow Shaft Flat Gearhead FR Gear

Output Power	Product Name	Gear Ratio	List Price
30 W (1/25 HP)	BLHM230KC-□FR	5, 10, 15, 20	\$351
		30, 50, 100	\$363
		200	\$375
50 W (1/15 HP)	BLHM450KC-□FR	5, 10, 15, 20	\$412
		30, 50, 100	\$424
		200	\$436
100 W (1/8 HP)	BLHM5100KC-□FR	5, 10, 15, 20	\$483
		30, 50, 100	\$494
		200	\$506

● A number indicating the gear ratio is specified where the box □ is located within the product name.

Round Shaft Type

Output Power	Product Name	List Price
15 W (1/50 HP)	BLHM015K-A	\$144
30 W (1/25 HP)	BLHM230KC-A	\$167
50 W (1/15 HP)	BLHM450KC-A	\$179
100 W (1/8 HP)	BLHM5100KC-A	\$215



Included

Motor

Geared Type	Parallel Key	Safety Cover	Installation Screws	Operating Manual
Geared Motor	—	—	—	1 Copy
Parallel Shaft Gearhead GFS Gear	1 pc.	—	1 Set	
Hollow Shaft Flat Gearhead FR Gear	1 pc.	1 Set	1 Set	
Round Shaft Type	—	—	—	

About the Gearheads

Parallel Shaft Gearhead GFS Gear

Hollow Shaft Flat Gearhead FR Gear

Motor and gearhead are delivered pre-assembled.

The combination of motors and gearheads can be changed.



Screw Fitting

The motor assembly position can be changed in 90° increments.

Driver

Output Power	Power Supply Cable	I/O Signal Cable	Operating Manual
15 W (1/50 HP) 30 W (1/25 HP) 50 W (1/15 HP)	—	—	1 Copy
100 W (1/8 HP)	1 pc.	1 pc.	1 Copy

Geared Motor

The geared motor has an integrated motor and gearhead.

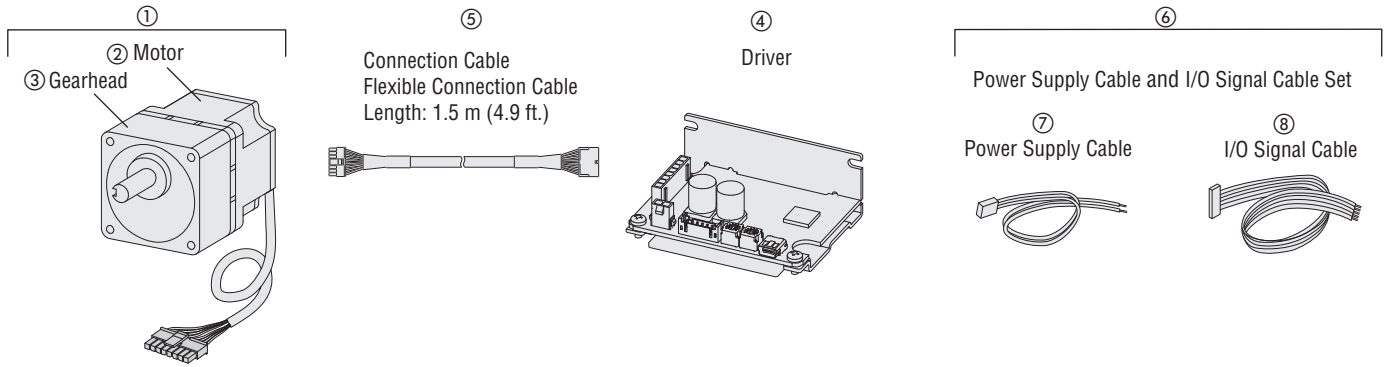
Motor and gearhead combinations cannot be changed.

Integrated Motor and Gearhead



■ Combination List

● 15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)



- The motor cable can also be connected directly to the driver without using a connection cable (or a flexible connection cable).
- The maximum extension length between the motor and driver is 2 m (6.6 ft.) [including 0.5 m (1.6 ft.) motor cable].

● Analog Setting Type

Output Power	Type	Brushless Motor			Driver	Connection Cable Flexible Connection Cable	Power Supply Cable and I/O Signal Cable Set			
		Product Name	Component Product Name				Product Name	Product Name	Product Name	Component Product Name
		①	②	③			④	⑤	⑥	⑦
15 W (1/50 HP)	G geared Type*	BLHM015K-□	—	—	BLH2D15-K	CC02BLH CC02BLHR	LHS003CC	LH003C1	LH003C3	
	Round Shaft Type	BLHM015K-A	—	—						
30 W (1/25 HP)	Parallel Shaft Gearhead GFS Gear	BLHM230KC-□	BLHM230KC-GFS	GFS2G□	BLH2D30-K	CC02BLH CC02BLHR	LHS003CC	LH003C1	LH003C3	
	Hollow Shaft Flat Gearhead FR Gear	BLHM230KC-□FR	BLHM230KC-GFS	GFS2G□FR						
	Round Shaft Type	BLHM230KC-A	—	—						
50 W (1/15 HP)	Parallel Shaft Gearhead GFS Gear	BLHM450KC-□	BLHM450KC-GFS	GFS4G□	BLH2D50-K	CC02BLH CC02BLHR	LHS003CC	LH003C1	LH003C3	
	Hollow Shaft Flat Gearhead FR Gear	BLHM450KC-□FR	BLHM450KC-GFS	GFS4G□FR						
	Round Shaft Type	BLHM450KC-A	—	—						

*The geared type has an integrated motor and gearhead. The combination of motor and gearhead cannot be changed.

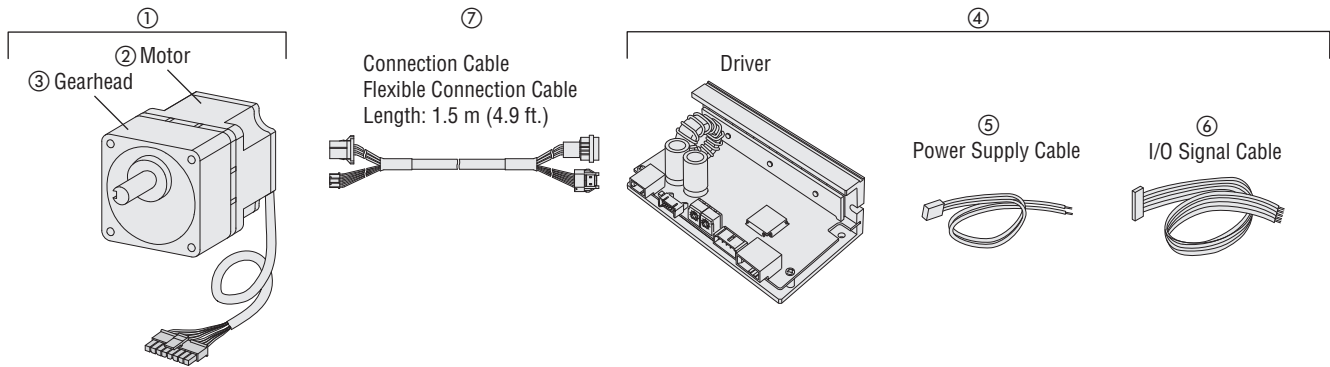
● Digital Setting type

Output Power	Type	Brushless Motor			Driver	Connection Cable Flexible Connection Cable	Power Supply Cable and I/O Signal Cable Set			
		Product Name	Component Product Name				Product Name	Product Name	Product Name	Component Product Name
		①	②	③			④	⑤	⑥	⑦
15 W (1/50 HP)	G geared Type*	BLHM015K-□	—	—	BLH2D15-KD	CC02BLH CC02BLHR	LHS003CD	LH003C1	LH003C4	
	Round Shaft Type	BLHM015K-A	—	—						
30 W (1/25 HP)	Parallel Shaft Gearhead GFS Gear	BLHM230KC-□	BLHM230KC-GFS	GFS2G□	BLH2D30-KD	CC02BLH CC02BLHR	LHS003CD	LH003C1	LH003C4	
	Hollow Shaft Flat Gearhead FR Gear	BLHM230KC-□FR	BLHM230KC-GFS	GFS2G□FR						
	Round Shaft Type	BLHM230KC-A	—	—						
50 W (1/15 HP)	Parallel Shaft Gearhead GFS Gear	BLHM450KC-□	BLHM450KC-GFS	GFS4G□	BLH2D50-KD	CC02BLH CC02BLHR	LHS003CD	LH003C1	LH003C4	
	Hollow Shaft Flat Gearhead FR Gear	BLHM450KC-□FR	BLHM450KC-GFS	GFS4G□FR						
	Round Shaft Type	BLHM450KC-A	—	—						

*The geared type has an integrated motor and gearhead. The combination of motor and gearhead cannot be changed.

- A number indicating the gear ratio is specified where the box □ is located within the product name.

● 100 W (1/8 HP)



- The motor cable can also be connected directly to the driver without using a connection cable (or a flexible connection cable).
- The maximum extension length between the motor and driver is 2 m (6.6 ft.) [including 0.5 m (1.6 ft.) motor cable].

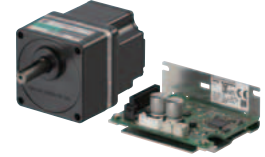
● Analog Setting Type

Output Power	Type	Brushless Motor			Driver			Connection Cable Flexible Connection Cable
		Product Name	Component Product Name		Product Name	Power Supply Cable (Included)	I/O Signal Cable (Included)	Product Name
		①	②	③	④	⑤	⑥	⑦
100 W (1/8 HP)	Parallel Shaft Gearhead GFS Gear	BLHM5100KC-□	BLHM5100KC-GFS	GFS5G□	BLHD100K	LH003C2	LH003C3	CC02AXH2 CC02BLH2R
	Hollow Shaft Flat Gearhead FR Gear	BLHM5100KC-□FR	BLHM5100KC-GFS	GFS5G□FR				
	Round Shaft Type	BLHM5100KC-A	—	—				

- A number indicating the gear ratio is specified where the box □ is located within the product name.

Parallel Shaft Gearhead GFS Gear

15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP),
100 W (1/8 HP)



Specifications



Product Name	Motor	BLHM015K-□	BLHM230KC-□	BLHM450KC-□	BLHM5100KC-□	
	Driver (Analog Setting Type)	BLH2D15-K	BLH2D30-K	BLH2D50-K	BLHD100K	
	Driver (Digital Setting Type)	BLH2D15-KD	BLH2D30-KD	BLH2D50-KD	—	
Rated Output Power (Continuous)	W (HP)	15 (1/50)	30 (1/25)	50 (1/15)	100 (1/8)	
Power Supply Input	Rated Voltage	DC24				
	Permissible Voltage Range	-10~+10%				
	Rated Input Current	A	0.93	1.9	2.9	6.0
	Maximum Input Current	A	2.3	4.1	5.4	9.8
Rated Speed	r/min	3000	2500			
Speed Control Range		100~3000 r/min (Speed Ratio 30:1) [80~3000 r/min (Speed Ratio 37.5:1)*]				
Speed Regulation	Load	±0.5% (±0.2%*) max. [0 to rated torque, at rated speed, at rated voltage, at normal temperature]				
	Voltage	±0.5% (±0.2%*) max. [Rated voltage ±10%, at rated speed, with no load, at normal temperature]				
	Temperature	±0.5% (±0.2%*) max. [Operating ambient temperature 0 to +50°C (+32 to +122°F), at rated speed, with no load, at rated voltage]				

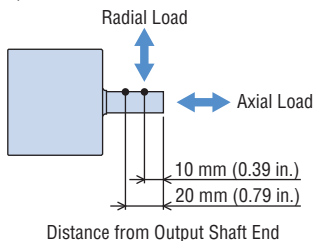
*Digital setting (when **MEXE02** is used).

● The values correspond to each specification and characteristics of a stand-alone motor.

Gear Ratio		5	10	15	20	30	50	100	200	
Rotation Direction	15 W (1/50 HP)	Same direction as the motor			Opposite direction to the motor		Same direction as the motor		—	
	30 W (1/25 HP) 50 W (1/15 HP) 100 W (1/8 HP)	Same direction as the motor				Opposite direction to the motor				Same direction as the motor
Output Shaft Speed [r/min]*	80 r/min	16	8	5.3	4	2.7	1.6	0.8	0.4	
	2500 r/min	500	250	167	125	83	50	25	12.5	
	3000 r/min	600	300	200	150	100	60	30	15	
Permissible Torque [N·m (lb·in)]	15 W (1/50 HP)	80~3000 r/min	0.22 (1.94)	0.43 (3.8)	0.65 (5.7)	0.83 (7.3)	1.2 (10.6)	1.9 (16.8)	2 (17.7)	—
	30 W (1/25 HP)	80~2500 r/min	0.52 (4.6)	1.0 (8.8)	1.6 (14.1)	2.1 (18.5)	3.0 (26)	4.9 (43)	6 (53)	6 (53)
		3000 r/min	0.43 (3.8)	0.86 (7.6)	1.3 (11.5)	1.7 (15.0)	2.5 (22)	4.1 (36)	6 (53)	6 (53)
	50 W (1/15 HP)	80~2500 r/min	0.86 (7.6)	1.7 (15.0)	2.6 (23)	3.4 (30)	4.9 (43)	8.2 (72)	16 (141)	16 (141)
		3000 r/min	0.72 (6.3)	1.4 (12.3)	2.1 (18.5)	2.9 (25)	4.1 (36)	6.8 (60)	13.7 (121)	16 (141)
	100 W (1/8 HP)	100~2500 r/min	1.8 (15.9)	3.6 (31)	5.4 (47)	7.2 (63)	10.3 (91)	17.2 (152)	30 (260)	30 (260)
3000 r/min		0.90 (7.9)	1.8 (15.9)	2.7 (23)	3.6 (31)	5.2 (46)	8.6 (76)	17.2 (152)	30 (260)	
Permissible Radial Load [N (lb.)]	10 mm (0.39 in.) from Output Shaft End	15 W (1/50 HP)	50 (11.2)						—	
		30 W (1/25 HP)	100 (22)			150 (33)			200 (45)	
		50 W (1/15 HP)	200 (45)			300 (67)			450 (101)	
		100 W (1/8 HP)	300 (67)			400 (90)			500 (112)	
	20 mm (0.79 in.) from Output Shaft End	30 W (1/25 HP)	150 (33)			200 (45)			300 (67)	
		50 W (1/15 HP)	250 (56)			350 (78)			550 (123)	
Permissible Axial Load [N (lb.)]	15 W (1/50 HP)	30 (6.7)						—		
	30 W (1/25 HP)	40 (9)						—		
	50 W (1/15 HP)	100 (22)						—		
	100 W (1/8 HP)	150 (33)						—		
Permissible Inertia J [$\times 10^{-4}$ kg·m ² (oz·in ²)]	15 W (1/50 HP)	3 (16)	14 (77)	30 (164)	50 (270)	120 (660)	300 (1640)	600 (3300)	—	
	30 W (1/25 HP)	12 (66)	50 (270)	110 (600)	200 (1090)	370 (2000)	920 (5000)	2500 (13700)	5000 (27000)	
	50 W (1/15 HP)	22 (120)	95 (520)	220 (1200)	350 (1910)	800 (4400)	2200 (12000)	6200 (34000)	12000 (66000)	
	100 W (1/8 HP)	45 (250)	190 (1040)	420 (2300)	700 (3800)	1600 (8800)	4500 (25000)	12000 (66000)	25000 (137000)	
	When Instantaneous Stop or Bi-Directional Operation is performed.	15 W (1/50 HP)	0.4 (2.2)	1.7 (9.3)	3.9 (21)	7.0 (38)	15.7 (86)	43.7 (240)		
		30 W (1/25 HP)	1.55 (8.5)	6.2 (34)	14.0 (77)	24.8 (136)	55.8 (310)	155 (850)		
50 W (1/15 HP)		5.5 (30)	22 (120)	49.5 (270)	88 (480)	198 (1080)	550 (3000)			
100 W (1/8 HP)		25 (137)	100 (550)	225 (1230)	400 (2200)	900 (4900)	2500 (13700)			

*The output shaft speed is calculated by dividing the speed by the gear ratio.

◇ Load Position



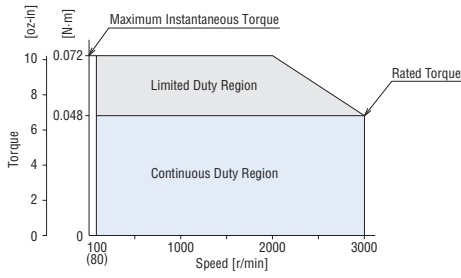
● A number indicating the gear ratio is specified where the box □ is located within the product name.

Speed – Torque Characteristics

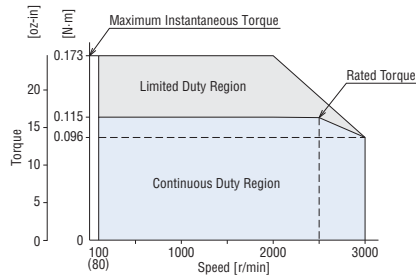
Continuous Duty Region: Continuous operation is possible in this region.

Limited Duty Region: This region is primarily used when accelerating.

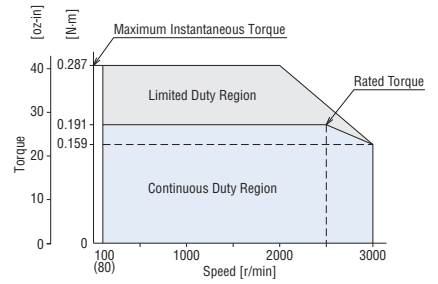
● 15 W (1/50 HP)



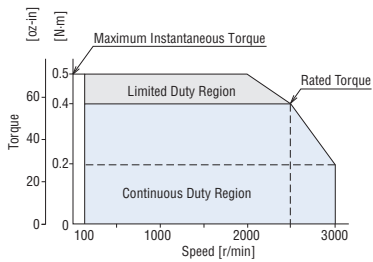
● 30 W (1/25 HP)



● 50 W (1/15 HP)



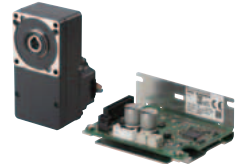
● 100 W (1/8 HP)



● The values correspond to each specification and characteristic of the stand-alone motor at 24 VDC with no extension cable.

Hollow Shaft Flat Gearhead FR Gear

30 W (1/25 HP), 50 W (1/15 HP), 100 W (1/8 HP)



Specifications

Product Name	Motor	BLHM230KC-□FR	BLHM450KC-□FR	BLHM5100KC-□FR
	Driver (Analog Setting Type)	BLH2D30-K	BLH2D50-K	BLHD100K
	Driver (Digital Setting Type)	BLH2D30-KD	BLH2D50-KD	—
Rated Output Power (Continuous)	W (HP)	30 (1/25)	50 (1/15)	100 (1/8)
Power Supply Input	Rated Voltage	V		
	Permissible Voltage Range	DC24		
	Rated Input Current	1.9	2.9	6.0
	Maximum Input Current	4.1	5.4	9.8
Rated Speed	r/min	2500		
Speed Control Range		100~3000 r/min (Speed Ratio 30:1) [80~3000 r/min (Speed Ratio 37.5:1)*]		
Speed Regulation	Load	±0.5% (±0.2%*) max. [0 to rated torque, at rated speed, at rated voltage, at normal temperature]		
	Voltage	±0.5% (±0.2%*) max. [Rated voltage ±10%, at rated speed, with no load, at normal temperature]		
	Temperature	±0.5% (±0.2%*) max. [Operating ambient temperature 0 to +50°C (+32 to +122°F), at rated speed, with no load, at rated voltage]		

*Digital setting (when MEXE02 is used).

● The values correspond to each specification and characteristics of a stand-alone motor.

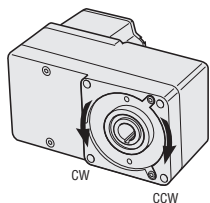
Gear Ratio	5 10 15 20 30 50 100 200									
	Output Shaft Speed [r/min]*1	80 r/min	16	8	5.3	4	2.7	1.6	0.8	0.4
	2500 r/min	500	250	167	125	83	50	25	12.5	
	3000 r/min	600	300	200	150	100	60	30	15	
Permissible Torque [N·m (lb·in)]	30 W (1/25 HP)	80~2500 r/min	0.46 (4.0)	0.98 (8.6)	1.5 (13.2)	2.0 (17.7)	2.9 (25)	4.9 (43)	9.8 (86)	17 (150)
		3000 r/min	0.38 (3.3)	0.82 (7.2)	1.2 (10.6)	1.6 (14.1)	2.4 (21)	4.1 (36)	8.2 (72)	16.3 (144)
	50 W (1/15 HP)	80~2500 r/min	0.81 (7.1)	1.6 (14.1)	2.4 (21)	3.2 (28)	4.9 (43)	8.1 (71)	16.2 (143)	32.5 (280)
		3000 r/min	0.68 (6.0)	1.4 (12.3)	2.0 (17.7)	2.7 (23)	4.1 (36)	6.8 (60)	13.5 (119)	27 (230)
	100 W (1/8 HP)	100~2500 r/min	1.7 (15)	3.4 (30)	5.1 (45)	6.8 (60)	10.2 (90)	17 (150)	34 (300)	68 (600)
		3000 r/min	0.85 (7.5)	1.7 (15)	2.6 (23)	3.4 (30)	5.1 (45)	8.5 (75)	17 (150)	34 (300)
Permissible Radial Load [N (lb.)]*2	10 mm (0.39 in.) from Output Shaft End	30 W (1/25 HP)	450 (101)			500 (112)				
		50 W (1/15 HP)	800 (180)			1200 (270)				
	20 mm (0.79 in.) from Output Shaft End	30 W (1/25 HP)	370 (83)			400 (90)				
		50 W (1/15 HP)	660 (148)			1000 (220)				
Permissible Axial Load [N (lb.)]	30 W (1/25 HP)				200 (45)					
	50 W (1/15 HP)				400 (90)					
	100 W (1/8 HP)				500 (112)					
Permissible Inertia J [$\times 10^{-4}$ kg·m ² (oz·in ²)]	When Instantaneous Stop or Bi-Directional Operation is performed.	30 W (1/25 HP)	12 (66)	50 (270)	110 (600)	200 (1090)	370 (2000)	920 (5000)	2500 (13700)	5000 (27000)
		50 W (1/15 HP)	22 (120)	95 (520)	220 (1200)	350 (1910)	800 (4400)	2200 (12000)	6200 (34000)	12000 (66000)
		100 W (1/8 HP)	45 (250)	190 (1040)	420 (2300)	700 (3800)	1600 (8800)	4500 (25000)	12000 (66000)	25000 (137000)
	When Instantaneous Stop or Bi-Directional Operation is performed.	30 W (1/25 HP)	1.55 (8.5)	6.2 (34)	14.0 (77)	24.8 (136)	55.8 (310)	155 (850)		
		50 W (1/15 HP)	5.5 (30)	22 (120)	49.5 (270)	88 (480)	198 (1080)	550 (3000)		
		100 W (1/8 HP)	25 (137)	100 (550)	225 (1230)	400 (2200)	900 (4900)	2500 (13700)		

*1 The output shaft speed is calculated by dividing the speed by the gear ratio.

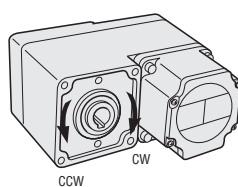
*2 The radial load at each distance can be calculated with a formula. → Page 33

◇ Rotation Direction

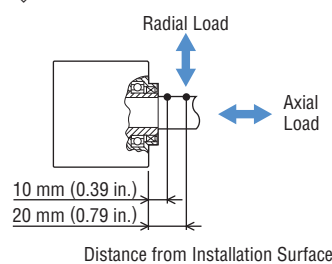
● Front View



● Rear View



◇ Load Position



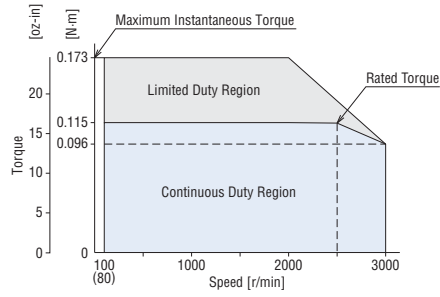
● A number indicating the gear ratio is specified where the box □ is located within the product name.

Speed – Torque Characteristics

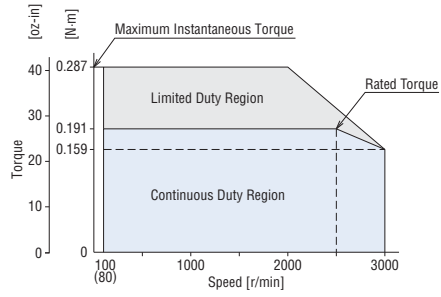
Continuous Duty Region: Continuous operation is possible in this region.

Limited Duty Region: This region is primarily used when accelerating.

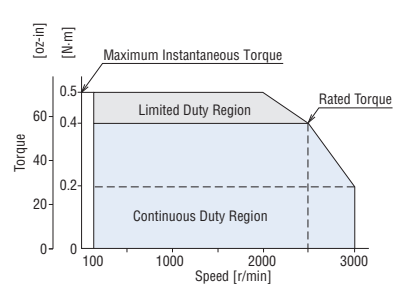
● 30 W (1/25 HP)



● 50 W (1/15 HP)

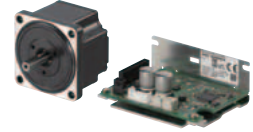


● 100 W (1/8 HP)



● The values correspond to each specification and characteristic of the stand-alone motor at 24 VDC with no extension cable.

Round Shaft 15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP), 100 W (1/8 HP)



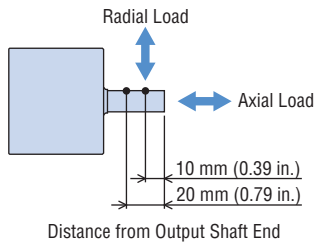
Specifications



Product Name	Motor	BLHM015K-A	BLHM230KC-A	BLHM450KC-A	BLHM5100KC-A
Driver (Analog Setting Type)	Driver (Analog Setting Type)	BLH2D15-K	BLH2D30-K	BLH2D50-K	BLHD100K
	Driver (Digital Setting Type)	BLH2D15-KD	BLH2D30-KD	BLH2D50-KD	—
Rated Output Power (Continuous)	W (HP)	15 (1/50)	30 (1/25)	50 (1/15)	100 (1/8)
Power Supply Input	Rated Voltage	DC24			
	Permissible Voltage Range	-10~+10%			
	Rated Input Current	0.93	1.9	2.9	6.0
	Maximum Input Current	2.3	4.1	5.4	9.8
Rated Speed	r/min	3000	2500		
Speed Control Range		100~3000 r/min (Speed Ratio 30:1) [80~3000 r/min (Speed Ratio 37.5:1)*]			
Rated Torque	N·m (oz·in)	0.048 (6.8)	0.115 (16.3)	0.191 (27)	0.4 (56)
Maximum Instantaneous Torque	N·m (oz·in)	0.072 (10.2)	0.173 (24)	0.287 (40)	0.5 (71)
Permissible Radial Load	10 mm (0.39 in.) from End of Output Shaft	50 (11.2)	70 (15.7)	120 (27)	160 (36)
	20 mm (0.79 in.) from End of Output Shaft	—	100 (22)	140 (31)	170 (38)
Permissible Axial Load		Half of the motor mass or less			
Rotor Inertia J	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.032 (0.175)	0.087 (0.48)	0.23 (1.26)	0.61 (3.3)
Permissible Inertia J	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.5 (2.7)	1.8 (9.8)	3.3 (18.1)	5.6 (31)
Speed Regulation	Load	$\pm 0.5\%$ ($\pm 0.2\%^*$) max. [0 to rated torque, at rated speed, at rated voltage, at normal temperature]			
	Voltage	$\pm 0.5\%$ ($\pm 0.2\%^*$) max. [Rated voltage $\pm 10\%$, at rated speed, with no load, at normal temperature]			
	Temperature	$\pm 0.5\%$ ($\pm 0.2\%^*$) max. [Operating ambient temperature 0 to +50°C (+32 to +122°F), at rated speed, with no load, at rated voltage]			

*Digital setting (when MEXE02 is used).

Load Position

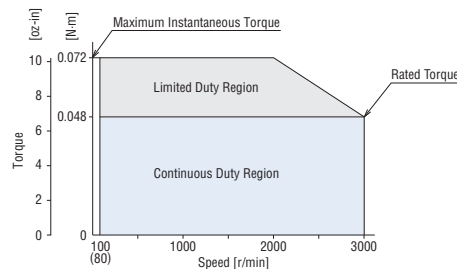


Speed – Torque Characteristics

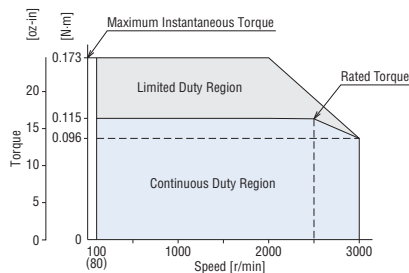
Continuous Duty Region: Continuous operation is possible in this region.

Limited Duty Region: This region is primarily used when accelerating.

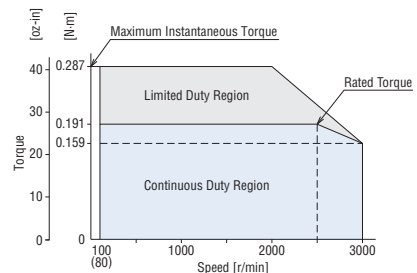
15 W (1/50 HP)



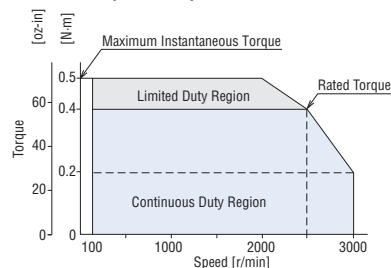
30 W (1/25 HP)



50 W (1/15 HP)



100 W (1/8 HP)



● The values correspond to each specification and characteristic at 24 VDC with no extension cable.

Common Specifications

Item		Specifications	
Driver Type		Analog Setting Type	Digital Setting Type
Operation Setting		2-speed operation is possible.	Operating data for up to 8 speeds can be set. *When the following settings are digital (i.e. using the MEXEO2 support software).
Speed	Setting Range	100 to 3000 r/min (Factory setting: 0 r/min)	80 to 3150 r/min (Factory setting: 80 r/min)
	Setting Method	· External speed potentiometer or external DC voltage: 0 to 5 VDC, 1 mA min.*1 · VR1	· Digital (MEXEO2 support software) · External analog setting device (external speed potentiometer or external DC voltage) or PWM input · VR1 · VR2
Acceleration/ Deceleration Time	Setting Range	15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP): 0.1 to 12.0 s (Factory setting: 0.1 s) 100 W (1/8 HP): 0.5 to 10 s (Factory setting: 0.5 s) Acceleration/deceleration time is a common setting	0.1 to 15.0 (Factory setting: 0.5 s)
	Setting Method	· VR2	· Digital (MEXEO2 support software) · VR1 · VR2
Torque Limiting*2	Setting Range	—	0 to 200% (Factory setting: 200%) · Digital (MEXEO2 support software)
	Setting Method	—	· External analog setting device (external speed potentiometer or external DC voltage) or PWM input · VR1 · VR2
Input Signals		C-MOS Negative Logic Input 15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP): START/STOP, RUN/BRAKE, FWD/REV, MO, ALM-RST 100 W (1/8 HP): START/STOP, RUN/BRAKE, CW/CCW, INT.VR/EX, ALARM-RESET	C-MOS Negative Logic Input Arbitrary signal assignment to DIN0 to DIN5 input (6 points) is possible. []: Default setting [START/STOP], [RUN/BRAKE], [FWD/REV], [M0], [M1], [ALM-REST], M2, TL, INFO-CLR, HMI, EXT-ERROR
Output Signals		Transistor and open-collector output 15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP): SPEED-OUT, ALM-B 100 W (1/8 HP): SPEED, ALARM	Transistor and open-collector output Arbitrary signal assignment to DOUT0, DOUT1, DOUT2, and DOUT3 (4 points) is possible. []: Default setting [SPEED-OUT], [ALM-B], [TLC], [DIR], ALM-A, MOVE, INFO, VA, individual output for information
Protective function*3		When the alarm sounds, the ALM-B output (ALARM output) shuts off. At the same time, the motor stops, and the PWR/ALM LED (POWER/ALARM LED) flashes red. The type of alarm can be confirmed by the number of times the LED flashes. 15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP): Overload (2 times), Sensor error, Initial sensor error (3 times), Overvoltage (4 times), Undervoltage (5 times), Overspeed (6 times), Overcurrent (7 times), EEPROM error (8 times), Main circuit overheat (9 times), CPU error (illuminated) 100 W (1/8 HP): Overload (2 times), Sensor error (3 times), Overvoltage (4 times), Undervoltage (5 times), Overspeed (6 times)	When the alarm sounds, the ALM-A output turns on (normally open), and the ALM-B output shuts off (normally closed). At the same time, the motor stops and the PWR/ALM LED flashes red. The type of alarm can be confirmed by the number of times the LED flashes and with the MEXEO2 support software. Overload (2 times), Sensor error, Initial sensor error (3 times), Overvoltage (4 times), Undervoltage (5 times), Overspeed (6 times), Overcurrent (7 times), EEPROM error (8 times), Main circuit overheat (9 times), External stop (10 times), Initial operation inhibition (11 times), CPU error (illuminated)
Information		—	The information monitor displays the settings for the MEXEO2 support software. When the information appears, the INFO output turns on and the PWR/ALM LED flashes orange. The motor continues to operate.
Maximum Extension Length		Motor and driver distance: 2 m [when a connection cable (sold separately) is used]	
Time Rating		Continuous	

*1 External DC current input impedance is approximately 47 kΩ.

*2 Torque limiting occurs when the difference between the set and generated values of torque is max. ±20% due to the setting speed, power supply voltage and motor cable extension length (at rated torque and rated speed).

*3 With the **BLH** Series, motor speed control cannot be performed in a gravitational operation or other applications where the motor shaft is turned by the load. When a load exceeding the permissible inertia is driven or a gravitational operation is performed, the protective function will be activated and the motor will coast to a stop.

General Specifications

Item	Motor	Driver	
Insulation Resistance	100 MΩ or more when 500 VDC megger is applied between the windings and the case after continuous operation under normal ambient temperature and humidity.	100 MΩ or more when 500 VDC megger is applied between the power supply input and the heat sink after continuous operation under normal ambient temperature and humidity.	
Dielectric Strength	Sufficient to withstand 0.5 kVAC at 50 Hz applied between the windings and the case for 1 minute after continuous operation under normal ambient temperature and humidity.	Sufficient to withstand 0.5 kVAC at 50 Hz applied between the power supply input and the heat sink for 1 minute after continuous operation under normal ambient temperature and humidity.	
Temperature Rise	The temperature rise of the windings is 50°C (90°F) or less and that of the case surface is 40°C (72°F) or less*1, measured by the thermocouple method after continuous operation under normal ambient temperature and humidity.	The temperature rise of the heat sink is 50°C (90°F) or less, measured by the thermocouple method after continuous operation under normal ambient temperature and humidity.	
Operating Environment	Ambient Temperature	0 to +50°C (+32 to +122°F) (Non-freezing)	
	Ambient Humidity	85% or less (Non-condensing)	
	Altitude	Up to 1000 m (3300 ft.) above sea level	
	Atmosphere	No corrosive gases or dust. Cannot be used in a radioactive area, magnetic field, vacuum, or other special environments.	
	Vibration	Must not be subjected to continuous vibration or excessive shock. Conforms to JIS C 60068-2-6, "Sine-Wave Vibration Test Method" Frequency Range: 10 to 55 Hz Half Amplitude: 0.15 mm (0.006 in.) Sweep Direction: 3 Directions (X, Y, and Z) Number of Sweeps: 20 Times	
Storage Conditions*2	Ambient Temperature	-25 to +70°C (-13 to +158°F) (Non-freezing)	
	Ambient Humidity	85% or less (Non-condensing)	
	Altitude	Up to 3000 m (10000 ft.) above sea level	
	Atmosphere	No corrosive gases or dust. Not exposed to water and oil. Cannot be used in a radioactive area, magnetic field, vacuum, or other special environments.	
Insulation Class	UL/CSA Standards: 105 (A), EN Standards: 120 (E)	—	
Degree of Protection	15 W (1/50 HP)	IP40	IP00
	30 W (1/25 HP)	IP65 (Excluding the installation surface of the round shaft type and connectors)	
	50 W (1/15 HP)		
	100 W (1/8 HP)		

*1 Install the round shaft type motor to a heat sink (material: aluminum) of one of the following sizes to maintain a motor case surface temperature of 90°C (194°F) or less. [15W (1/50 HP) type is excluded.]

30 W (1/25 HP) Type: 115×115 mm (4.53×4.53 in.), 5 mm (0.20 in.) thick

50 W (1/15 HP) Type: 135×135 mm (5.31×5.31 in.), 5 mm (0.20 in.) thick

100 W (1/8 HP) Type: 200×200 mm (7.87×7.87 in.), 5 mm (0.20 in.) thick

*2 The storage condition applies to short periods such as the period during transportation.

Note

- Do not measure the insulation resistance or perform a dielectric voltage withstand test while the motor and driver are connected.

Dimensions Unit: mm (in.)

- "Installation screws" are included with the parallel shaft gearhead. Installation screws → Page 25
- A number indicating the gear ratio is specified where the box □ is located within the product name.

Motor

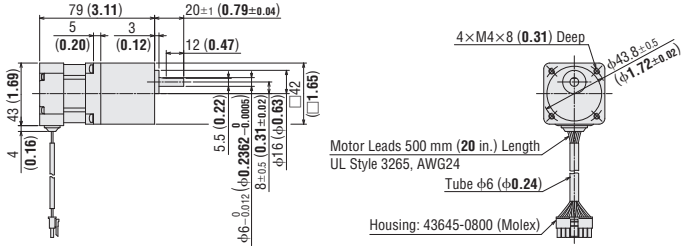
◇ Geared Type 15 W (1/50 HP)

BLHM015K-□

Mass: 0.5 kg (1.10 lb.)

2D CAD A428

3D CAD



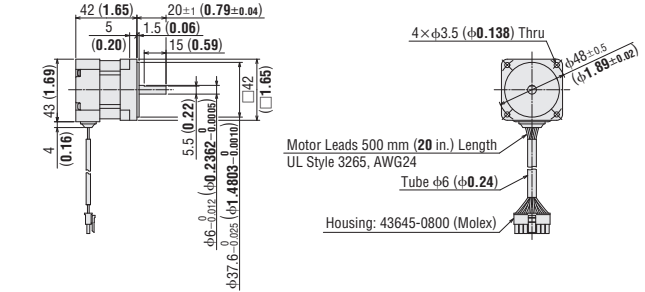
◇ Round Shaft Type 15 W (1/50 HP)

BLHM015K-A

Mass: 0.25 kg (0.55 lb.)

2D CAD A429

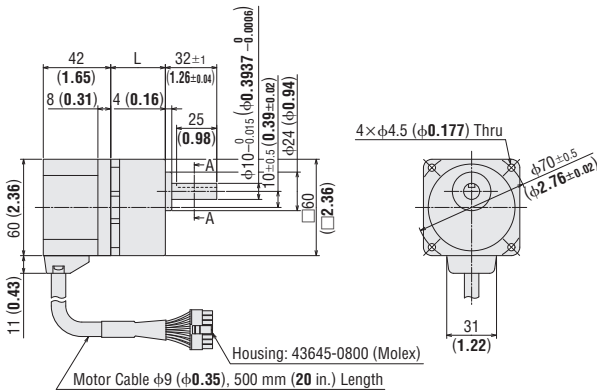
3D CAD



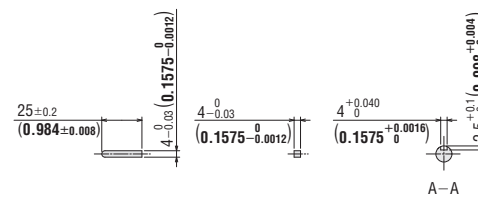
◇ Parallel Shaft Gearhead **GFS** Gear 30 W (1/25 HP)

2D & 3D CAD

Product Name	Motor Product Name	Gearhead Product Name	Gear Ratio	L	Mass kg (lb.)	2D CAD
BLHM230KC-□	BLHM230KC-GFS	GFS2G□	5~20	34 (1.34)	1.0 (2.2)	A430AU
			30~100	38 (1.50)		A430BU
			200	43 (1.69)		A430CU



◇ Key and Key Slot (Included)



◇ Hollow Shaft Flat Gearhead **FR** Gear 30 W (1/25 HP)

BLHM230KC-□FR

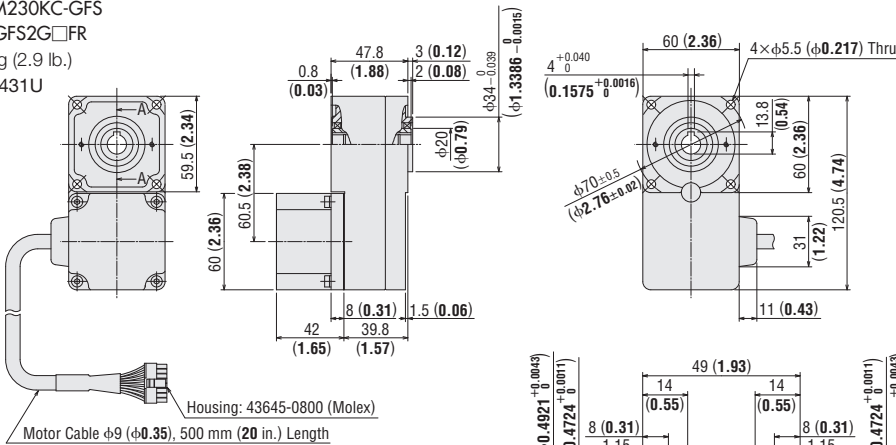
Motor: BLHM230KC-GFS

Gearhead: GFS2G□FR

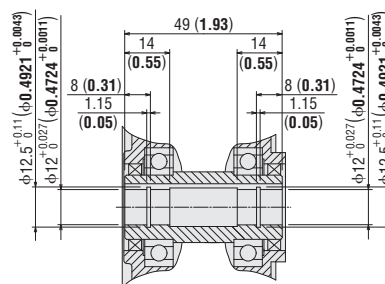
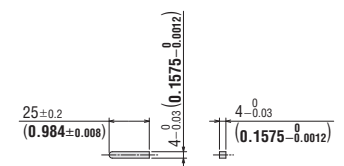
Mass: 1.3 kg (2.9 lb.)

2D CAD A431U

3D CAD



◇ Key (Included)



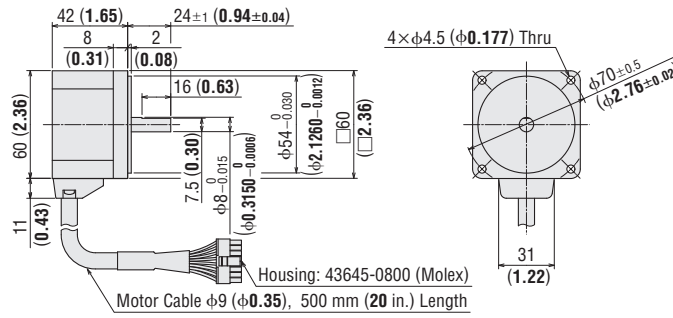
A-A

◇ Round Shaft Type 30 W (1/25 HP)

BLHM230KC-A

Mass: 0.5 kg (1.1 lb.)

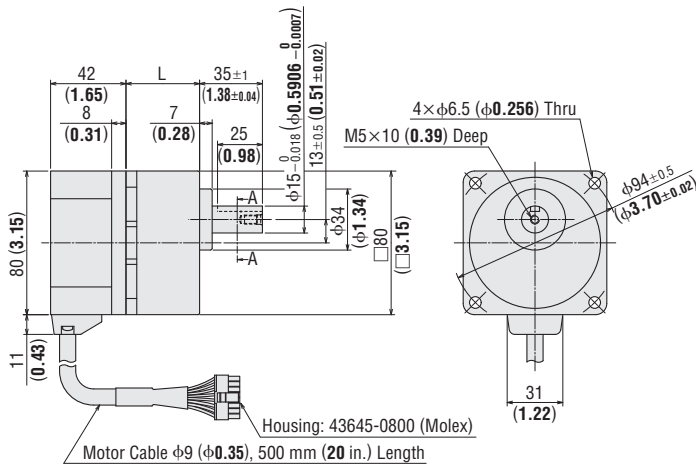
2D CAD A432U 3D CAD



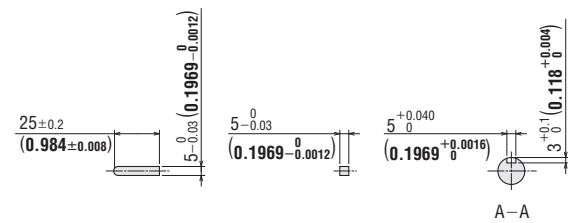
◇ Parallel Shaft Gearhead **GFS** Gear 50 W (1/15 HP)

2D & 3D CAD

Product Name	Motor Product Name	Gearhead Product Name	Gear Ratio	L	Mass kg (lb.)	2D CAD
BLHM450KC-□	BLHM450KC-GFS	GFS4G□	5~20	41 (1.61)	1.8 (4.0)	A433AU
			30~100	46 (1.81)		A433BU
			200	51 (2.01)	A433CU	



◇ Key and Key Slot (Included)



◇ Hollow Shaft Flat Gearhead **FR** Gear 50 W (1/15 HP)

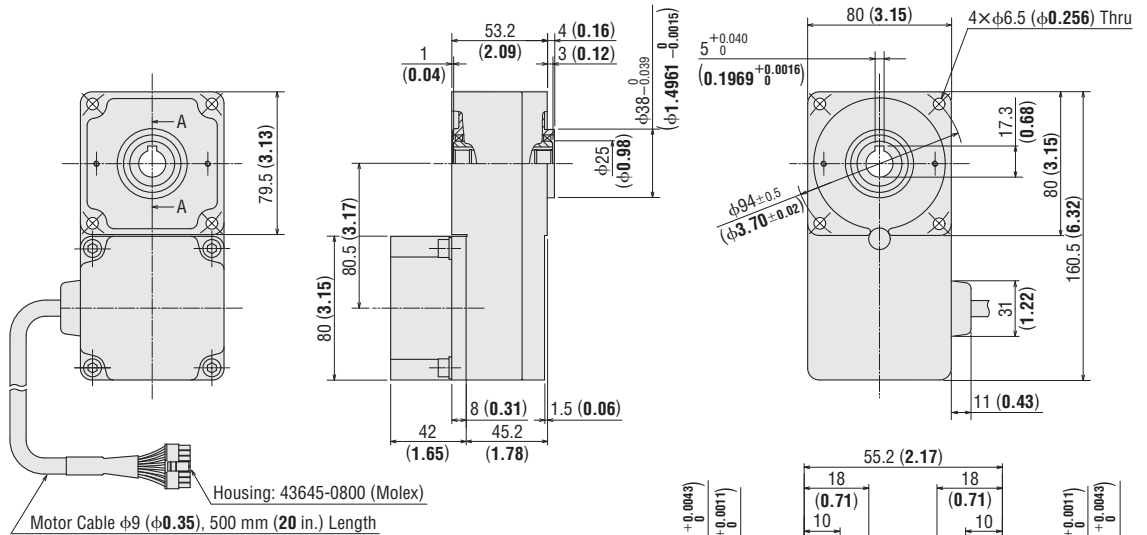
BLHM450KC-□FR

Motor: BLHM450KC-GFS

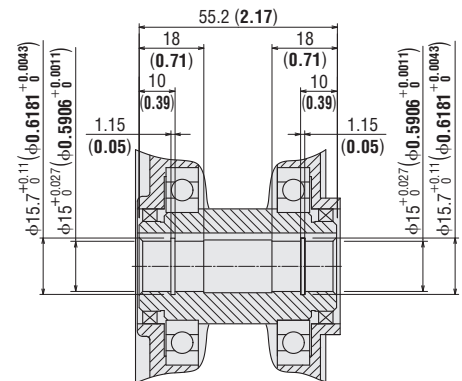
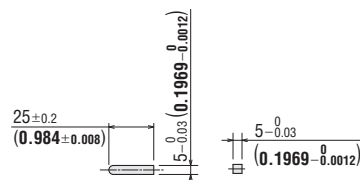
Gearhead: GFS4G□FR

Mass: 2.4 kg (5.3 lb.)

2D CAD A434U 3D CAD



◇ Key (Included)



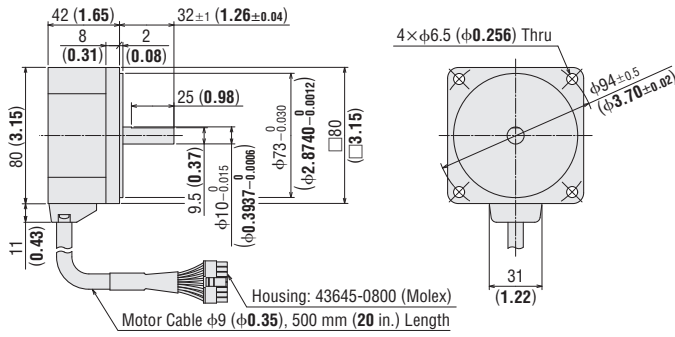
A-A

◇ Round Shaft Type 50 W (1/15 HP)

BLHM450KC-A

Mass: 0.8 kg (1.76 lb.)

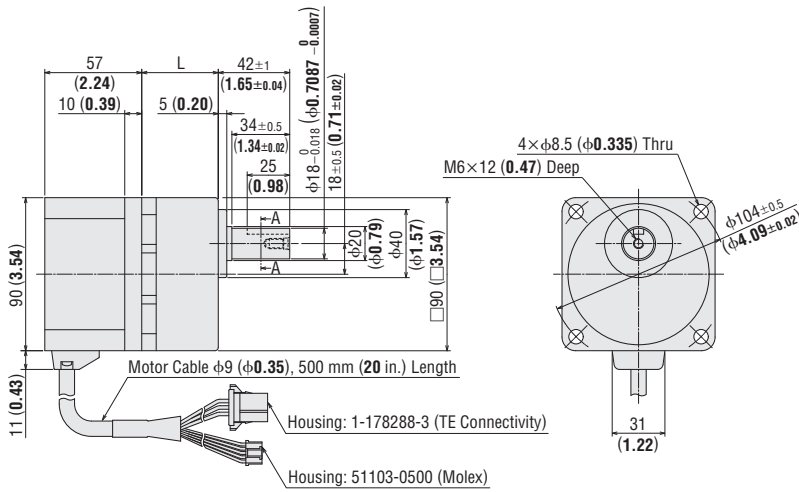
2D CAD A435U **3D CAD**



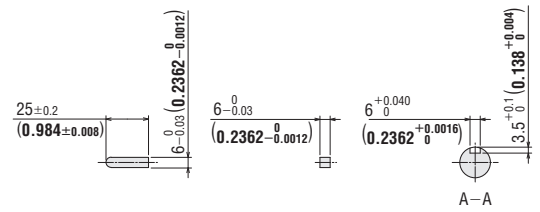
◇ Parallel Shaft Gearhead **GFS** Gear 100 W (1/8 HP)

2D & 3D CAD

Product Name	Motor Product Name	Gearhead Product Name	Gear Ratio	L	Mass kg (lb.)	2D CAD
BLHM5100KC-□	BLHM5100KC-GFS	GFS5G□	5~20	45 (1.77)	2.9 (6.4)	A436AU
			30~100	58 (2.28)		A436BU
			200	64 (2.52)		A436CU



◇ Key and Key Slot (Included)



◇ Hollow Shaft Flat Gearhead **FR** Gear 100 W (1/8 HP)

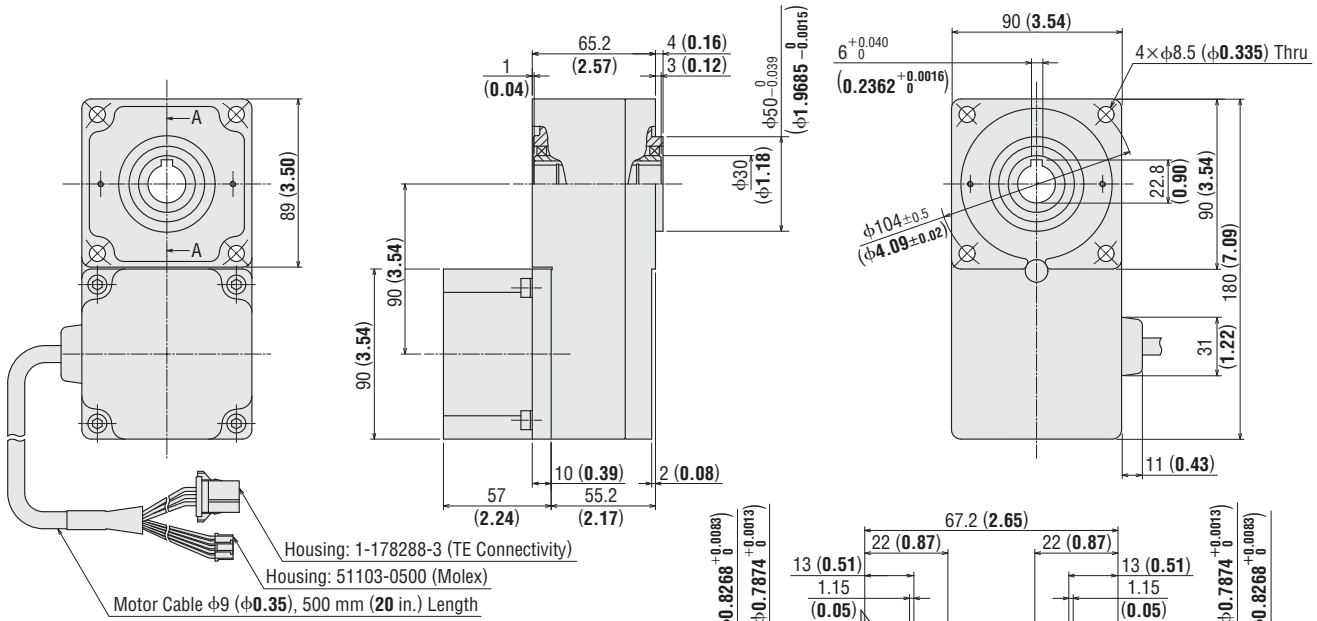
BLHM5100KC-□FR

Motor: BLHM5100KC-GFS

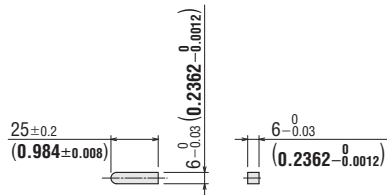
Gearhead: GFS5G□FR

Mass: 3.6 kg (7.9 lb.)

2D CAD A437U **3D CAD**



◇ Key (Included)

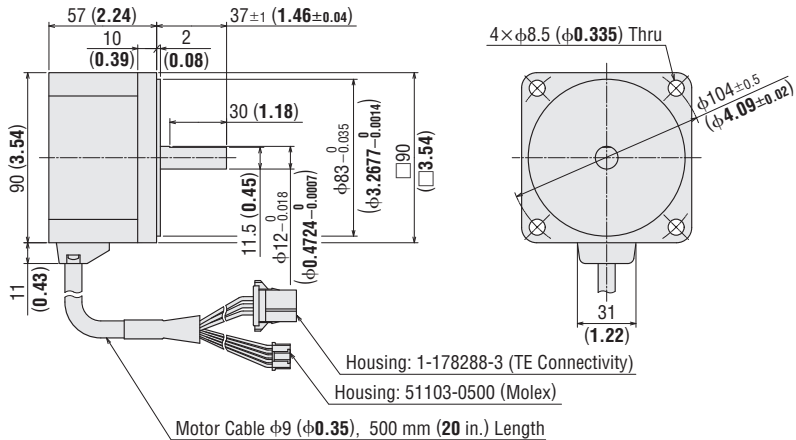


◇ Round Shaft Type 100 W (1/8 HP)

BLHM5100KC-A

Mass: 1.4 kg (3.1 lb.)

2D CAD A438U **3D CAD**



● Driver

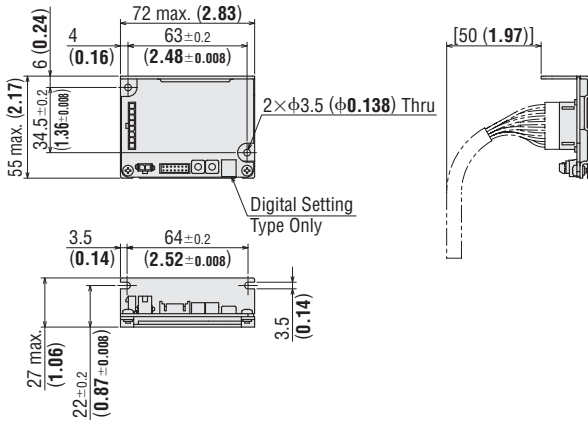
◇ 15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)

BLH2D15-K, BLH2D30-K, BLH2D50-K
BLH2D15-KD, BLH2D30-KD, BLH2D50-KD

Mass: 46 g (0.10 lb.)

Analog Setting Type: **2D CAD** A1678 **3D CAD**

Digital Setting Type: **2D CAD** A1679 **3D CAD**

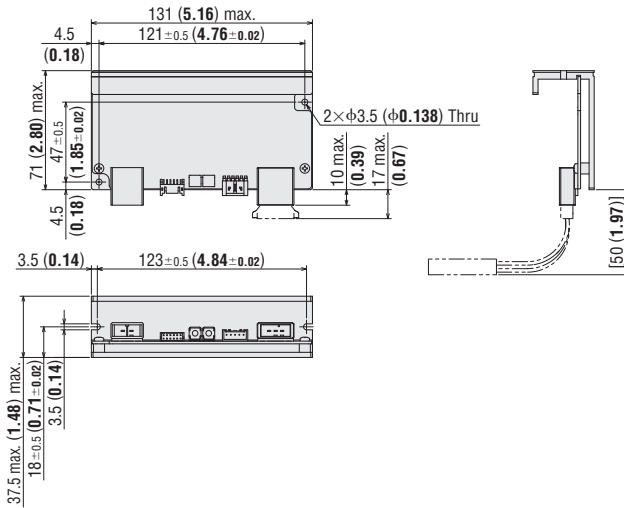


◇ 100 W (1/8 HP)

BLHD100K

Mass: 0.3 Kg (0.66 lb.)

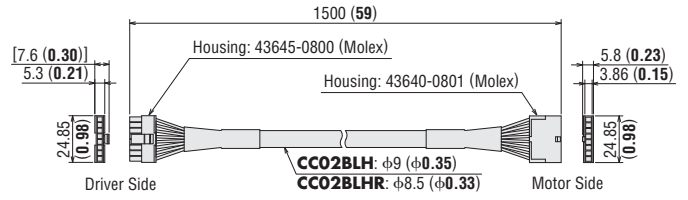
2D CAD A440 **3D CAD**



● Connection Cable, Flexible Connection Cable

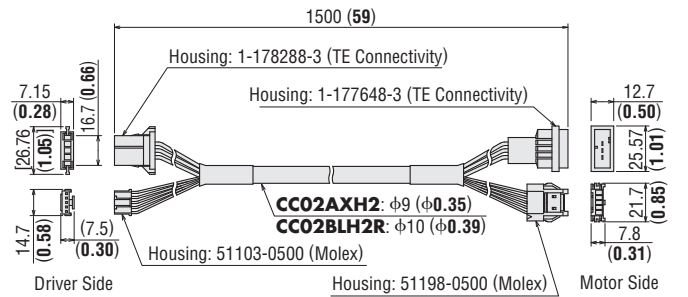
◇ 15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)

CC02BLH/CC02BLHR



◇ 100 W (1/8 HP)

CC02AXH2/CC02BLH2R



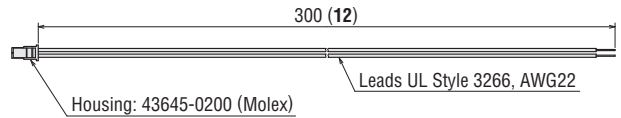
● Power Supply Cable and I/O Signal Cable Set

[For 15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)]

Driver Type	Product Name	Component Product Name	
		Power Supply Cable	I/O Signal Cable
Analog Setting Type	LH5003CC	LH003C1	LH003C3
Digital Setting Type	LH5003CD	LH003C1	LH003C4

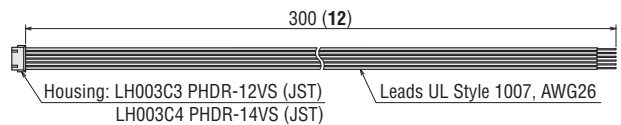
◇ Power Supply Cable

LH003C1



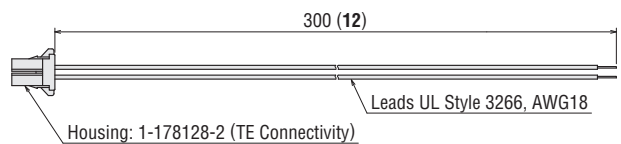
◇ I/O Signal Cable

LH003C3/LH003C4



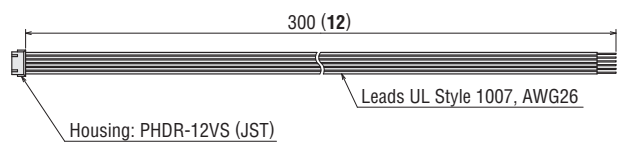
● Power Supply Cable [For 100 W (1/8 HP), Included]

LH003C2



● I/O Signal Cable [For 100 W (1/8 HP), Included]

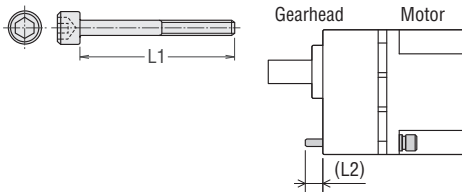
LH003C3



● **Dimensions for Installation Screws**

L2 is the dimension when a plain washer and a spring washer are mounted on the screw head side.

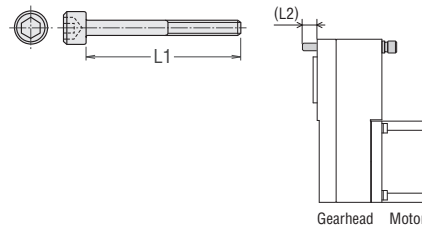
◇ **Parallel Shaft Gearhead**



Product Name	Gear Ratio	Mounting Screws		L2 [mm (in.)]
		Screw Size	L1 [mm (in.)]	
GFS2G□	5~20	M4	50 (1.97)	6 (0.24)
	30~100		55 (2.17)	7 (0.28)
	200		60 (2.36)	7 (0.28)
GFS4G□	5~20	M6	65 (2.56)	13 (0.51)
	30~100		70 (2.76)	13 (0.51)
	200		75 (2.95)	13 (0.51)
GFS5G□	5~20	M8	75 (2.95)	16.5 (0.65)
	30~100		90 (3.54)	18.5 (0.73)
	200		95 (3.74)	17.5 (0.69)

● Mounting Screws: 4 each pieces of flat washers, spring washers, and hexagonal nuts are included.

◇ **Hollow Shaft Flat Gearhead**

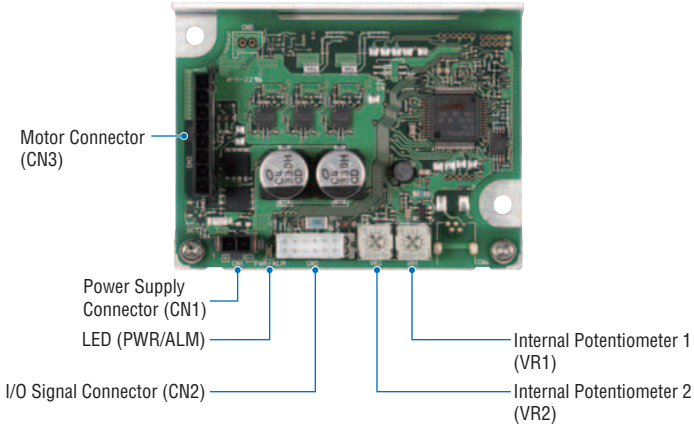


Product Name	Gear Ratio	Mounting Screws		L2 [mm (in.)]
		Screw Size	L1 [mm (in.)]	
GFS2G□FR	5~200	M5	65 (2.56)	15 (0.59)
GFS4G□FR	5~200	M6	70 (2.76)	14 (0.55)
GFS5G□FR	5~200	M8	90 (3.54)	21 (0.83)

● Mounting Screws: 4 each pieces of flat washers, spring washers, and hexagonal nuts are included.

■ Connection and Operation Analog Setting Type [15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)]

● Names and Functions of Driver Parts



Name	Indication	Description	
Power Supply Connector	CN1	Connects the power supply cable.	
I/O Signal Connector	CN2	Connects the I/O signal cable to connect with an external control device.	
Motor Connector	CN3	Connects the motor cable.	
LED	PWR/ALM	Green	Lit in green while the power is supplied.
		Red (LED Blinks)	If an alarm is generated, this LED will blink in red. The generated alarm content can be checked by counting the number of times the LED blinks.
Internal Potentiometer	VR1	Uses to set the speed (M0 input: ON)	
	VR2	Uses to set the acceleration time and deceleration time.	

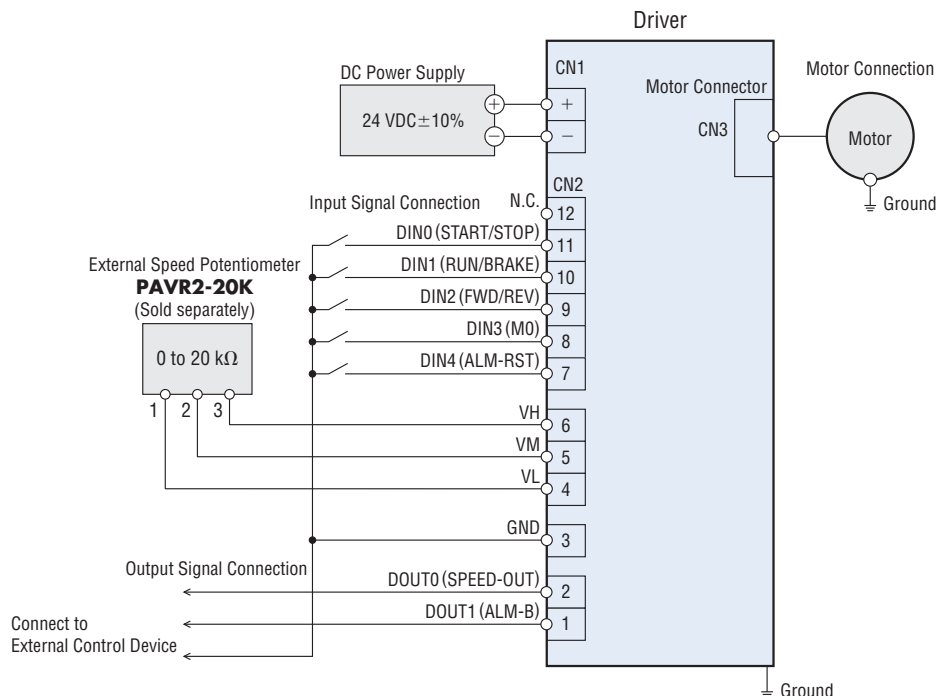
◇ I/O Signal Connector (CN2)

Pin No.	Color of Lead Wire	Terminal Name	Signal Name	Description
12	—	—	—	N.C. (No Connection.)
11	Black	DIN0	START/STOP	These signals are used to operate the motor. The motor rotates according to the acceleration time when both the START/STOP input and the RUN/BRAKE input are turned ON. If the START/STOP input is turned OFF, the motor stops according to the deceleration time. If the RUN/BRAKE input is turned OFF, the motor stops instantaneously.
10	White	DIN1	RUN/BRAKE	
9	Gray	DIN2	FWD/REV	This signal is used to change the motor rotation direction. The motor rotates in the CW direction when this signal is turned ON, and in the CCW direction when it is turned OFF. *
8	Light Blue	DIN3	M0	When the M0 input is ON, the setting speed of the internal potentiometer (VR1) is enabled. When it is OFF, the setting speed of the external analog setting device (external speed potentiometer or external DC voltage) is enabled.
7	Purple	DIN4	ALM-RST	This signal is used to reset the alarm. (The alarm will be reset at the OFF edge of the input.)
6	Blue	VH	External Analog Setting Device	These signals are used when the rotation speed is externally set using an external analog setting device (external speed potentiometer or external DC voltage).
5	Green	VM		
4	Yellow	VL		
3	Orange	GND		
2	Red	DOUT0	SPEED-OUT	30 pulses are output while the motor output shaft makes one revolution in synchronization with the motor rotation. The pulse width of output pulse signals is 0.3 ms. The motor rotation speed can be calculated using the SPEED-OUT output.
1	Brown	DOUT1	ALM-B	This is a signal to output an alarm status. It is turned OFF when an alarm is generated. (Normally closed) The generated alarm content can be checked by counting the number of times the LED blinks.

*The rotation direction depends on the gear ratio of the gearhead.

● Connection Diagrams

The figure shows a connection example when connecting an external speed potentiometer.



● Run/Stop

Operate the motor with the START/STOP and RUN/BRAKE inputs.

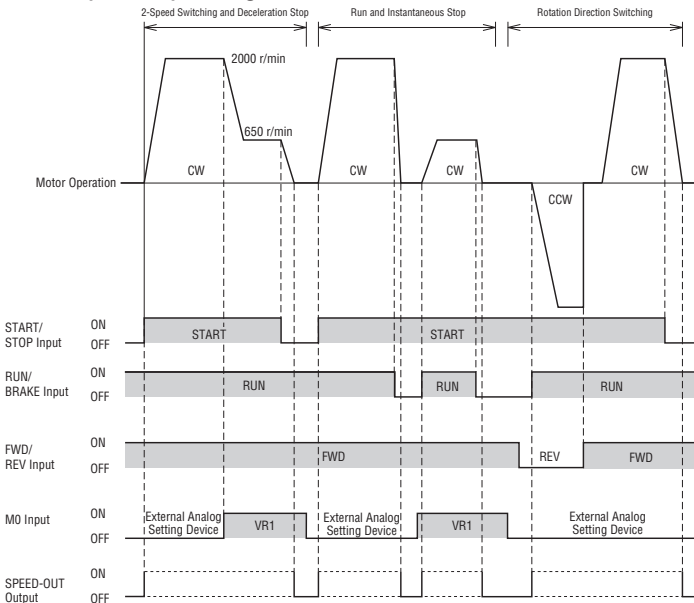
When the RUN/BRAKE Input is shut off during deceleration, the motor will stop instantaneously.

Decelerated Stop: Stopping in accordance with the set deceleration speed.

Instantaneous Stop: Stopping in a very short time window regardless of the deceleration speed.

	START/STOP Input	RUN/BRAKE Input	Motor Operation
Signal Level	ON	ON	Operation
	ON	OFF	Instantaneous Stop
	OFF	ON	Deceleration Stop

◇ Example of Operating Pattern



● START/STOP Input, RUN/BRAKE Input

When the START/STOP and RUN/BRAKE inputs are both turned on, the motor will run. When the START/STOP Input is shut off during operation, the motor will execute a decelerated stop in accordance with the settings on the internal potentiometer (VR2). When the RUN/BRAKE Input is shut off during operation, the motor will stop in the shortest window of time possible (instantaneous stop).

● FWD/REV Input

This signal is used to change the rotation direction of the motor. When on, the motor will turn CW; when off, the motor will turn CCW. (The rotation direction varies according to the gear ratio of the gearhead.)

● M0 Input

When the M0 input is turned on, the motor will rotate in accordance with the internal potentiometer (VR1). When it shut off, the motor will rotate in accordance with the external analog setting device.

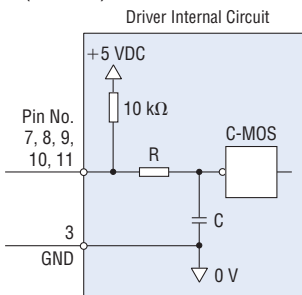
● Please ensure that the on and off durations for each output pulse signal are 10 ms min.

● I/O Signal Circuits

◇ Input Signal Circuit

The driver's signal input uses the C-MOS input method.

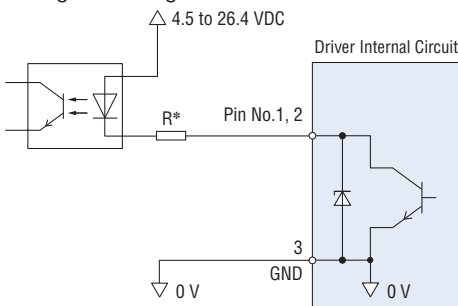
The signal status indicates "ON: 0 to 0.5 V (L Level)" or "OFF: 4 to 5 V (H Level)".



◇ Output Signal Circuit

The driver's signal output uses the transistor and open-collector output method.

The signal status indicates that the internal transistor is "ON: receiving power" or "OFF: not receiving power". It does not indicate the signal's voltage level.



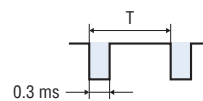
*Recommended resistance value when current limiting resistor R is connected
 24 VDC: 2.7 kΩ~4.7 kΩ (1 W)
 5 VDC: 560 Ω~820 Ω (0.25 W)

◇ SPEED-OUT

30 pulses are output every rotation of the motor output shaft in synchronization with the rotation of the motor. The pulse width for output pulse signals is 0.3 ms. The SPEED-OUT output can be used to calculate the motor speed.

$$\text{Frequency of SPEED-OUT [Hz]} = \frac{1}{T \text{ [s]}}$$

$$\text{Motor Speed [r/min]} = \frac{\text{Frequency of SPEED-OUT [Hz]} \times 60}{30}$$



◇ Alarm Deactivation

When the alarm sounds, the ALM-B output shuts off. At the same time, the motor stops, and the PWR/ALM LED flashes red.

After the alarm has been deactivated, the cause of the alarm must be dealt with before the device can be used again. The alarm cannot be deactivated while the operation input signal is on.

The methods for deactivating the alarm are as follows.

- Turn off the ALM-RST input. (Active at off edge)
- Restart the power.

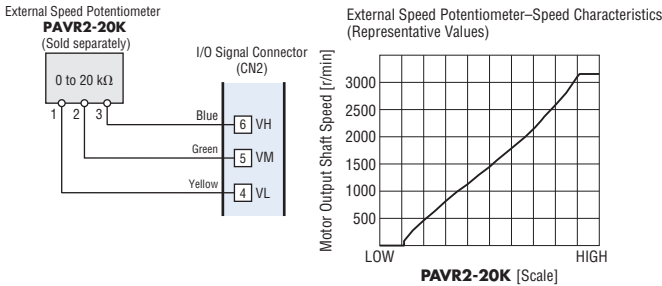
● Speed Setting Methods

The motor speed can be set using the external analog setting device (the external speed potentiometer or external DC voltage) or VR1. The external analog setting and VR1 can be switched between depending on whether the M0 input is on or off.

M0 Input	OFF	ON
Speed Setting	External Analog Setting Device	VR1

◇ Setting by the External Speed Potentiometer

Connect to pin No. 4 to 6 of CN2.

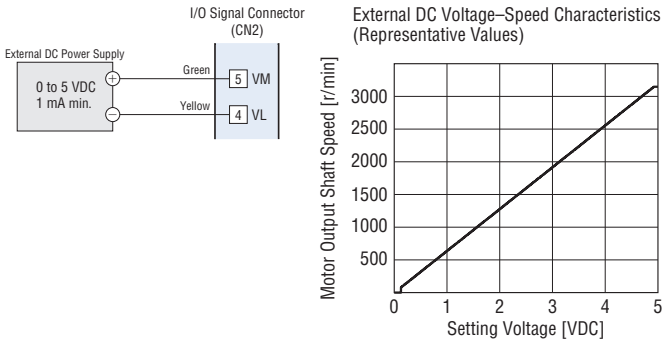


Note

- The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

◇ Setting by External DC Voltage

Connect to pin No. 4 and 5 of CN2.

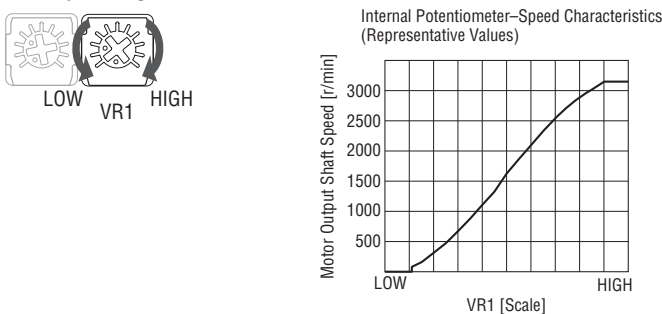


Note

- The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

◇ Setting by VR1

Factory setting: 0 r/min



Note

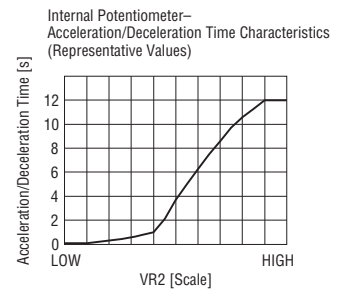
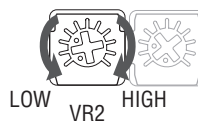
- The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

● Setting the Acceleration and Deceleration Times

For the acceleration time, set the time it takes the motor to move from a resting state to a rated speed. For the deceleration time, set the time it takes for the motor to move from a rated speed to rest. (Acceleration and deceleration have shared settings)

Factory setting: 0.1 s

◇ VR2 settings



● Multi-Motor Control

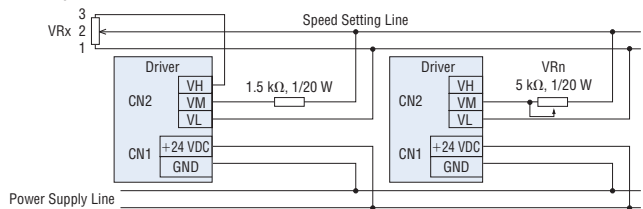
Two or more motors can be operated at the same speed using 1 external speed potentiometer or external DC voltage.

◇ When Using an External Speed Potentiometer

When using an external speed potentiometer (VRx), no more than ten motors should be operated simultaneously.

Resistance value when the number of drivers is n: $VRx (k\Omega) = 20 k\Omega/n$, acceptable loss $(W) = n/20$

Example: When two drivers are used, the resistance is 10 k Ω ,

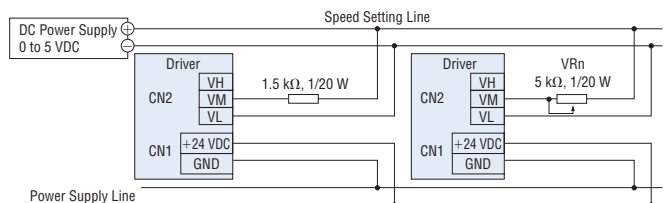


◇ When Using an External DC Voltage

The current capacity of the DC power supply is determined as follows.

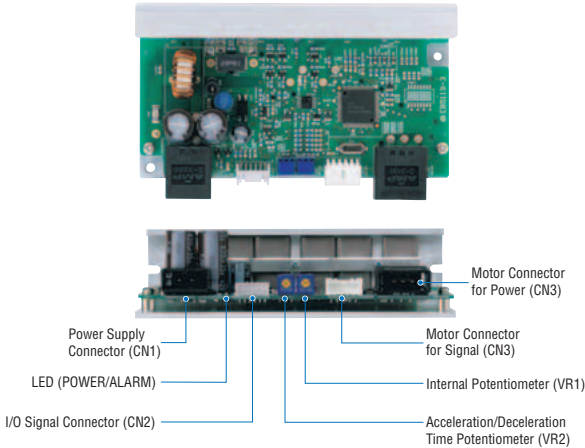
Current capacity (mA) when the number of drivers is n: $1 \text{ mA} \times n$

Example: When two drivers are used, the current capacity should be 2 mA min.



Connection and Operation Analog Setting Type [100 W (1/8 HP)]

Names and Functions of Driver Parts



Name	Indication	Description	
Power Supply Connector	CN1	Connects the power supply cable.	
I/O Signal Connector	CN2	Connects the I/O signal cable to connect with an external control device.	
Motor Connector for Signal	CN3	Connects the power supply cable.	
Motor Connector for Power	CN4		
LED	POWER/ALARM	Green	Lit in green while the power is supplied.
		Green (Blinks)	If an alarm is generated, this LED will blink in green. The generated alarm content can be checked by counting the number of times the LED blinks.
Internal Speed Potentiometer	VR1	Uses to set the speed (M0 input: ON)	
Acceleration/Deceleration Time Potentiometer	VR2	Uses to set the acceleration time and deceleration time.	

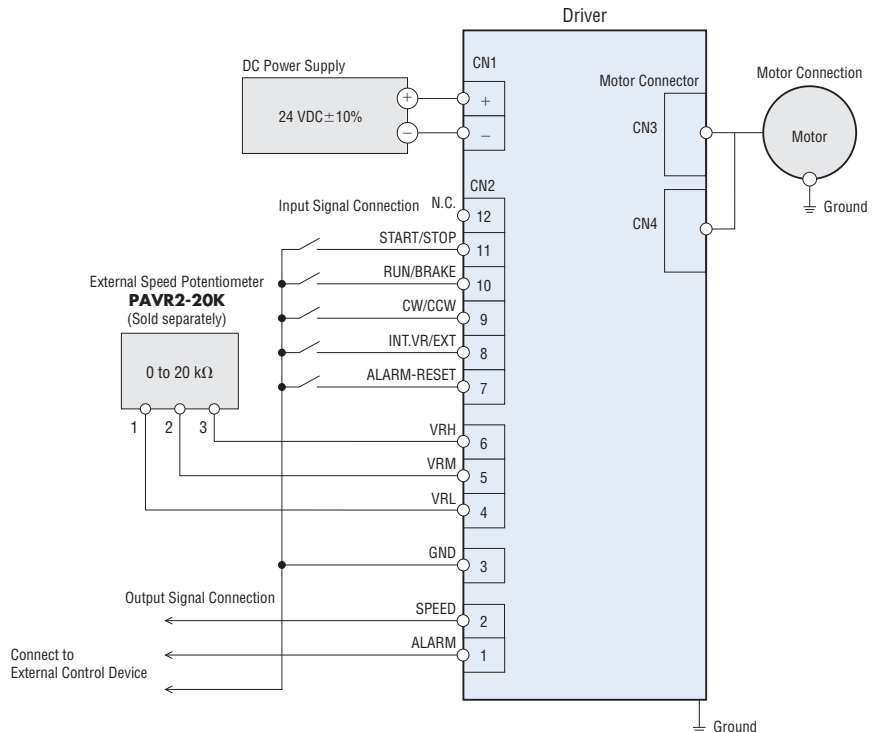
I/O Signal Connector (CN2)

Pin No.	Color of Lead Wire	Signal Name	Descriptions
12	—	—	N.C. (No Connection.)
11	Black	START/STOP	These signals are used to operate the motor. The motor rotates according to the acceleration time when both the START/STOP input and the RUN/BRAKE input are turned ON. If the START/STOP input is turned OFF, the motor stops according to the deceleration time. If the RUN/BRAKE input is turned OFF, the motor stops instantaneously.
10	White	RUN/BRAKE	
9	Gray	CW/CCW	This signal is used to change the motor rotation direction. When this signal is turned ON, the motor rotates in the CW direction, and when turned OFF, it rotates in the CCW direction.*
8	Light Blue	INT.VR/EXT	When the INT. VR/EXT input is ON, the setting speed of the internal speed potentiometer (VR1) is enabled. When OFF, the setting speed of the external speed potentiometer and the external DC voltage is enabled.
7	Purple	ALARM-RESET	This signal is used to reset the alarm. (The alarm will be reset at the OFF edge of the input.)
6	Blue	VRH	These signals are used to set the speed externally using the external speed potentiometer or external DC voltage.
5	Green	VRM	
4	Yellow	VRL	
3	Orange	GND	I/O signals common
2	Red	SPEED	30 pulses are output while the motor output shaft makes one revolution in synchronization with the motor rotation.
1	Brown	ALARM	This is a signal to output an alarm status. It is turned OFF when an alarm is generated, and the motor stops. The generated alarm content can be checked by counting the number of times the LED blinks.

*The rotation direction depends on the gear ratio of the gearhead.

Connection Diagrams

The figure shows a connection example when connecting an external speed potentiometer.



● Run/Stop

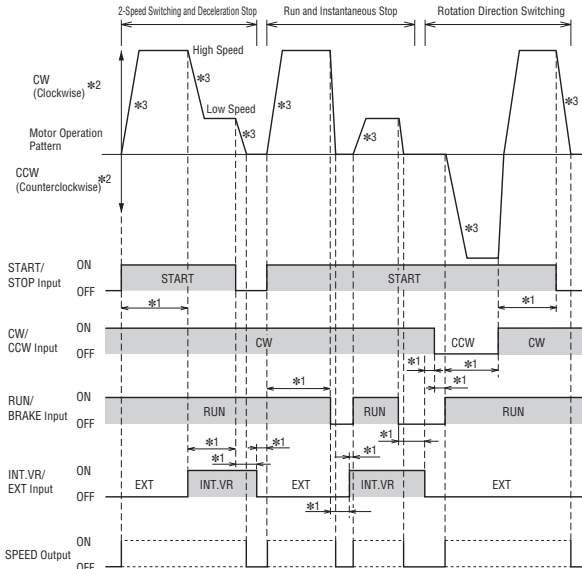
Operate the motor with the START/STOP and RUN/BRAKE inputs.

	START/STOP Input	RUN/BRAKE Input	Motor Operation
Signal Level	ON	ON	Operation*1
	ON	OFF	Instantaneous Stop
	OFF	ON	Stop*2

*1 The operating speed of the motor is set by either one of the internal speed potentiometer, external speed potentiometer, or external DC voltage. Acceleration is performed at the time set in the acceleration/deceleration time potentiometer.

*2 Deceleration is performed at the time set in the acceleration/deceleration time potentiometer.

◇ Example of operating pattern



*1 10 ms min.

*2 The direction of rotation applies to the motor only. It will vary depending on the gear ratio.

*3 The motor will start and stop at the time set by the acceleration and deceleration time potentiometer.

● START/STOP Input, RUN/BRAKE Input

When the START/STOP and RUN/BRAKE inputs are both turned on, the motor will run.

When the START/STOP Input is shut off during operation, the motor will execute a decelerated stop in accordance with the settings on the acceleration and deceleration potentiometer (VR2).

When the RUN/BRAKE Input is shut off during operation, the motor will stop in the shortest window of time possible (instantaneous stop).

● CW/CCW Input

This signal is used to change the rotation direction of the motor. When on, the motor will turn CW; when off, the motor will turn CCW. (The rotation direction varies according to the gear ratio of the gearhead.)

● INT. VR/EXT Input

When the INT.VR/EXT Input is turned on, the set speed for the internal potentiometer (VR1) is enabled. When it shut off, the set speed for the external speed potentiometer or the external DC voltage is enabled.

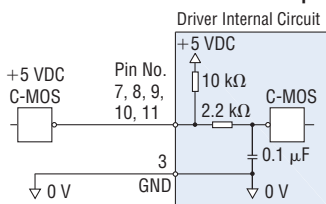
● Please ensure that the on and off durations for each output signal are 10 ms min.

◇ Input Signal Circuit

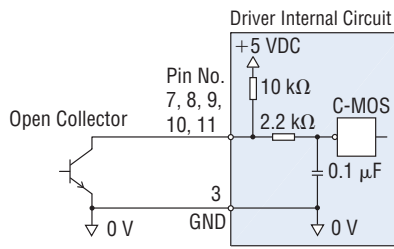
The driver's signal input uses the C-MOS input method.

The signal status indicates "ON: 0 to 0.5 V (L Level)" or "OFF: 4 to 5 V (H Level)."

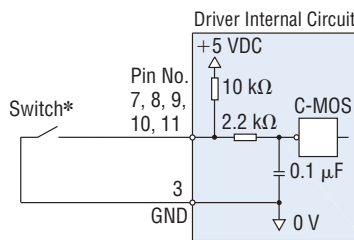
● External control device output: 5 VDC C-MOS



● External control device output: Open-collector output



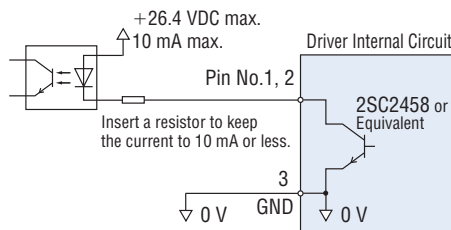
● Switch Connection



*Please use a switch capable of opening/closing the current flow at 5 VDC, 1 mA max.

◇ Output Signal Circuit

The driver's signal output uses the transistor and open-collector output method. The signal status indicates that the internal transistor is "ON: receiving power" or "OFF: not receiving power". It does not indicate the signal's voltage level.



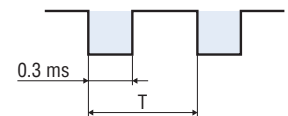
◇ SPEED Output

Pulse signals of 30 pulses (pulse width: 0.3 ms) are output every rotation of the motor output shaft in synchronization with the motor operation.

The SPEED output frequency can be measured and the approximate motor speed calculated.

$$\text{Motor Speed [r/min]} = \frac{\text{Frequency of SPEED-OUT [Hz]}}{30} \times 60$$

$$\text{Frequency of SPEED-OUT [Hz]} = \frac{1}{T [\text{s}]}$$



◇ ALARM-RESET Input

When the alarm sounds, the ALARM output shuts off. At the same time, the motor stops, and the POWER/ALARM LED flashes green. After the alarm has been deactivated, the cause of the alarm must be dealt with before the device can be used again. The alarm cannot be deactivated while the operation input signal is on.

The methods for deactivating the alarm are as follows.

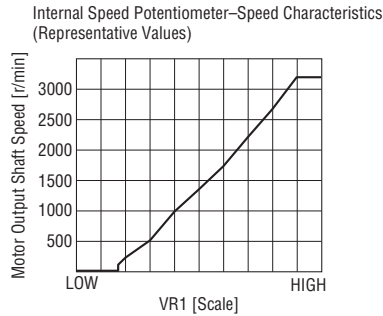
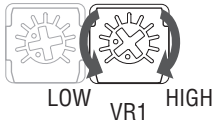
- Turn off the ALARM-RESET input. (Active at off edge)
- Restart the power.

● Speed Setting Method

The motor speed can be set using any of the following: the internal speed potentiometer, the external speed potentiometer or the external DC voltage. The speed potentiometer can be switched by turning the INT.VR/EXT input on or off.

◇ Setting by the Internal Speed Potentiometer

Factory setting: 0 r/min

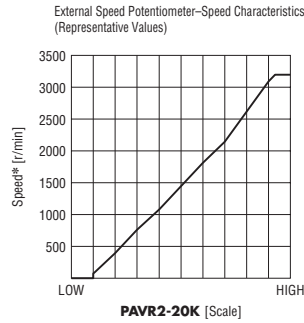
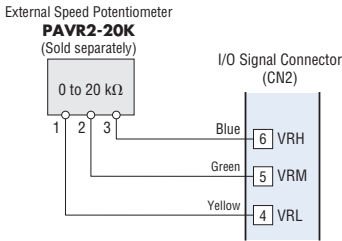


Note

● The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

◇ Setting by the External Speed Potentiometer

Connect to pin No. 4 to 6 of CN2.

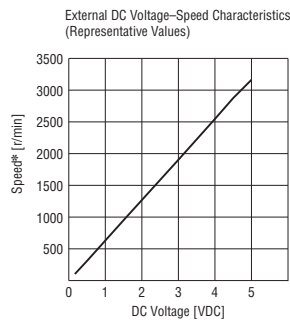
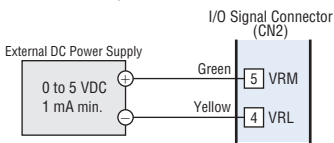


Note

● The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

◇ Setting by External DC Voltage

Connect to pin No. 4 and 5 of CN2.



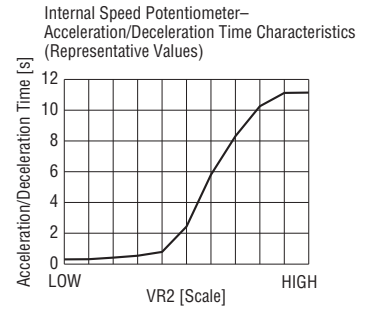
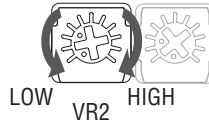
Note

● The speed in the graph represents the speed of the motor alone. The gear output shaft speed is calculated by dividing the gear ratio.

● Setting the Acceleration and Deceleration Times

For the acceleration time, set the time it takes the motor to move from a resting state to a rated speed. For the deceleration time, set the time it takes for the motor to move from a rated speed to rest. (Acceleration and deceleration times have shared settings)

Factory setting: 0.5 s



● Multi-Motor Control

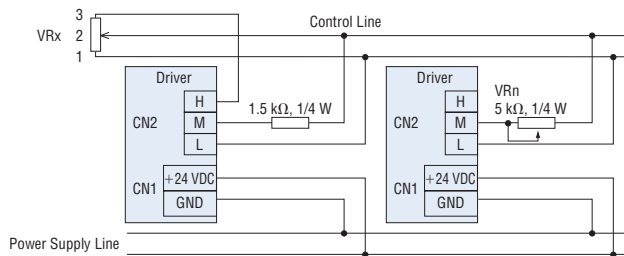
Two or more motors can be operated at the same speed using 1 external speed potentiometer or external DC voltage.

◇ When Using an External Speed Potentiometer

When using an external speed potentiometer (VRx), no more than five motors should be operated simultaneously.

Resistance value when the number of drivers is n: $VRx (k\Omega) = 20 k\Omega / n$, acceptable loss $(W) = n/4$

E.g. 10 k Ω , 1/2 W for 2 drivers.

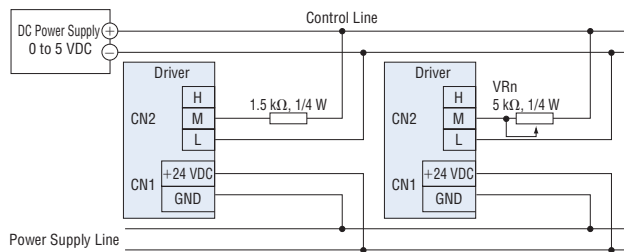


◇ When Using an External DC Voltage

The current capacity of the DC power supply is determined as follows.

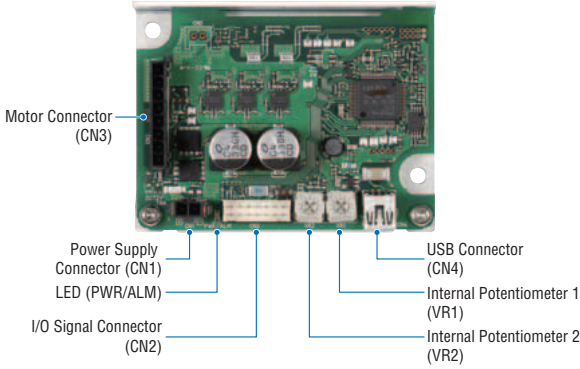
Current capacity (mA) when the number of drivers is n: $1 \text{ mA} \times n$

Example: When two drivers are used, the current capacity should be 2 mA min.



Connection and Operation Digital Setting Type

Names and Functions of Driver Parts



Name	Indication	Description	
Power Supply Connector	CN1	Connects the power supply cable.	
I/O Signal Connector	CN2	Connects the I/O signal cable to connect with an external control device.	
Motor Connector	CN3	Connects the motor cable.	
USB Connector	CN4	Connects a PC in which the MEXEO2 has been installed.	
LED	PWR/ ALM	Green	Lit in green while the power is supplied.
		Red (Blinks)	If an alarm is generated, this LED will blink in red.
		Orange (Blinks)	If information is generated, it will blink in orange.
Internal Potentiometer*	VR1	Uses to set the operation data. Factory setting: The rotation speed in the operation data No.1 can be set.	
	VR2	Uses to set the operation data. Factory Setting: The acceleration time and deceleration time in the operation data No.0 and No.1 can be set.	

*The function can be changed using the **MEXEO2**.

I/O Signal Connector (CN2)

Pin No.	Color of Lead Wire	Terminal Name	Initial Assignment Signal*1	Description
14	Yellow/Black	DIN0	[START/STOP]	These signals are used to operate the motor. The motor rotates according to the acceleration time when both the START/STOP input and the RUN/BRAKE input are turned ON.
13	Orange/White	DIN1	[RUN/BRAKE]	If the START/STOP input is turned OFF, the motor stops according to the deceleration time. If the RUN/BRAKE input is turned OFF, the motor stops instantaneously.
12	Red/White	DIN2	[FWD/REV]	This signal is used to change the motor rotation direction. The motor rotates in the forward direction when the signal is turned ON.*2
11	Brown/White	DIN3	[M0]	The operation data number can be selected based on a combination of ON-OFF status of the M0 and M1 inputs.
10	Black	DIN4	[M1]	
9	White	DIN5	[ALM-RST]	This signal is used to reset the alarm. (The alarm will be reset at the ON edge of the input.)
8	Gray	VH	External Analog Setting Device*3	These terminals are used when the rotation speed or torque limiting value is externally set using an external analog setting device (external speed potentiometer or external DC voltage).
7	Purple	VM		
6	Blue	VL		
5	Green	GND	GND	I/O signals common
4	Yellow	DOUT0	[SPEED-OUT]	30 pulses are output while the motor output shaft makes one revolution.
3	Orange	DOUT1	[ALM-B]	This is a signal to output an alarm status. It is turned OFF when an alarm is generated. (Normally closed)
2	Red	DOUT2	[TLC]	This is a signal to output when the motor output torque is limited.*4
1	Brown	DOUT3	[DIR]	This is a signal to output information of the motor rotation direction. (It is turned ON when the motor rotates in the forward direction.)

*1 Described in brackets [] are signal assigned at the time of shipment. Functions for the pin No.1 to No.4 and No.9 to No.14 can be changed using the **MEXEO2**.

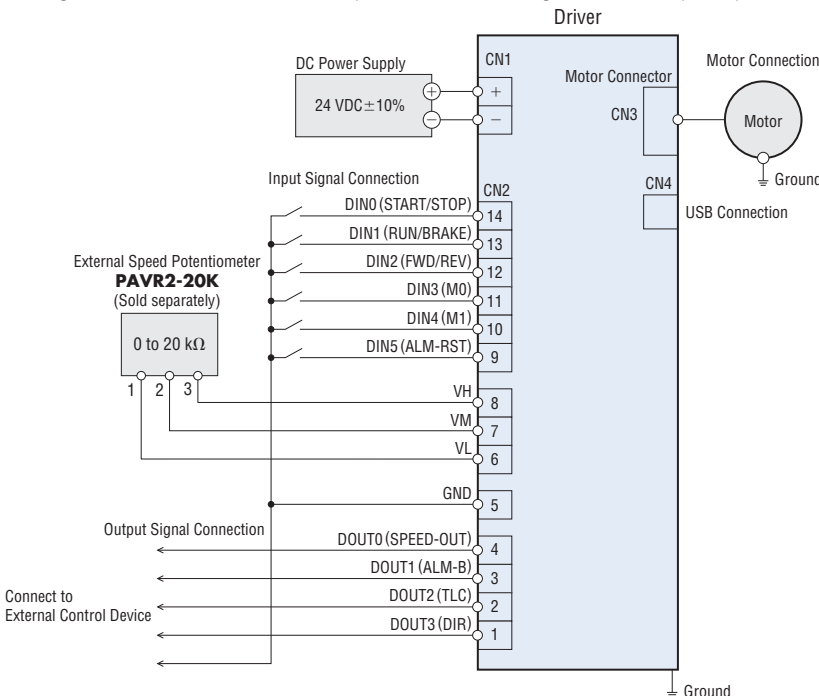
*2 The rotation direction of the output shaft varies depending on the gear ratio of the gearhead.

*3 If the "External setting method" parameter is changed, the speed and torque limiting value can be set with the PWM signal input.

*4 The torque limiting value is set to 200% at the time of shipment and can be changed using the **MEXEO2**.

Connection Diagrams

The figure shows a connection example when connecting an external speed potentiometer.



For detailed information and handling precautions of this product, see the operating manual. The operating manual is available for download from the Oriental Motor website.

USB Cable (CN4)

USB Cable Specifications

Specifications	USB2.0 (Full Speed)
Cable	Length: 3 m (9.8 ft.) max. Shape: A to mini-B

■ Installing a Load to the Hollow Shaft

● How to Install a Load Shaft

- Install the load shaft to the hollow output shaft by aligning the center of the hollow shaft with that of the load shaft.
- The hollow output shaft has a key slot. Machine a matching key slot on the load shaft and use the supplied key to affix the two shafts across the slots.
- The recommended tolerance of the load shaft is h7.
- If the motor is intended to receive large impacts due to frequent instantaneous stops or carry a large radial load, use a stepped load shaft.
- The load shaft can be installed from both the front and rear faces of the hollow shaft flat gearheads.

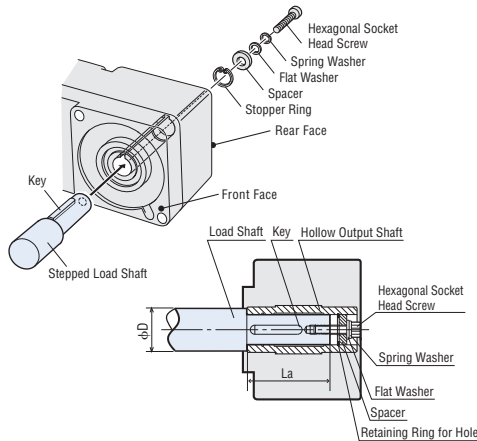
Note

- When installing the load shaft to the hollow output shaft, be careful not to damage the hollow output shaft or bearing.
- To prevent seizure, apply a coat of molybdenum disulfide grease on the exterior surface of the load shaft and interior surface of the hollow output shaft.
- Do not attempt to modify or machine the hollow output shaft. Doing so may damage the bearing and cause the hollow shaft flat gearhead to break.

◇ Stepped Load Shaft

Install a hexagonal socket head screw over a stopper ring, spacer, flat washer and spring washer and tighten the screw to affix the load shaft.

Example of Front Face Installation

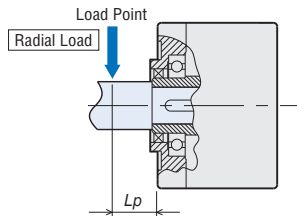


● Permissible Radial Load Calculation of the Hollow Shaft Type

The formula for permissible radial load varies depending on the mechanism.

◇ When End of Shaft being Driven is Not Supported by a Bearing

This mechanism experiences the highest amount of radial load. The stepped type is recommended for the load shaft.



F_0 [N (lb.)]: Permissible Radial Load at the Flange-Mounting Surface

L_p [mm (in.)]: Distance from Flange-Mounting Surface to Radial Load Point

B [mm (in.)]: Distance from Flange-Mounting Surface to Bearing Unit

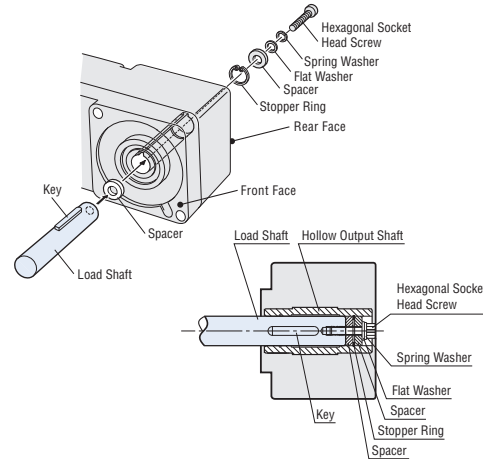
Product Name	Permissible Radial Load W [N (lb.)]
GFS2G□FR	W [N (lb.)] = $\frac{36 \text{ mm (8.1 in.)}}{36 \text{ mm (8.1 in.)} + L_p} \times F_0$ [N (lb.)]
GFS4G□FR	W [N (lb.)] = $\frac{40 \text{ mm (9 in.)}}{40 \text{ mm (9 in.)} + L_p} \times F_0$ [N (lb.)]
GFS5G□FR	W [N (lb.)] = $\frac{50 \text{ mm (11.2 in.)}}{50 \text{ mm (11.2 in.)} + L_p} \times F_0$ [N (lb.)]

● A number indicating the gear ratio is specified where the box □ is located within the product name.

◇ Straight Load Shaft

Install a hexagonal socket head screw over a stopper ring, spacer, flat washer and spring washer, with a spacer also inserted underneath the load shaft, and tighten the screw to affix the load shaft.

Example of Front Face Installation



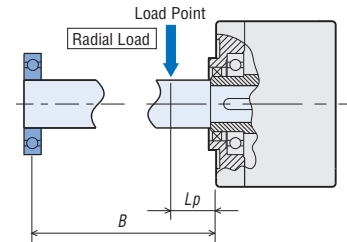
◇ Recommended Load Shaft Installation Dimensions Unit: mm (in.)

Product Name	GFS2G□FR	GFS4G□FR	GFS5G□FR
Inner Diameter of Hollow Shaft (H8)	$\phi 12^{+0.027}_{-0}$ ($\phi 0.4724^{+0.0011}$)	$\phi 15^{+0.027}_{-0}$ ($\phi 0.5906^{+0.0011}$)	$\phi 20^{+0.033}_{-0}$ ($\phi 0.7874^{+0.0013}$)
Shaft Diameter of Load Shaft (h7)	$\phi 12^{-0.018}_{-0}$ ($\phi 0.4724^{-0.0007}$)	$\phi 15^{-0.018}_{-0}$ ($\phi 0.5906^{-0.0007}$)	$\phi 20^{-0.021}_{-0}$ ($\phi 0.7874^{-0.0008}$)
Screw Size	M4	M5	M6
Spacer Thickness*	3 (0.12)	4 (0.16)	5 (0.20)
Nominal Hole Diameter of Retaining Ring	$\phi 12$ ($\phi 0.47$), C-Shaped	$\phi 15$ ($\phi 0.59$), C-Shaped	$\phi 20$ ($\phi 0.79$), C-Shaped
Outer Diameter of Stepped Shaft ϕD	20 (0.79)	25 (0.98)	30 (1.18)
Stepped Shaft L_a Length	39 (1.54)	43 (1.69)	52 (2.05)

* Determine the spacer thickness in conformance with the table. If the spacer is thicker than the specified dimension, the screw head may project outside of the gear case and the safety cover may not be installed.

● Retaining rings for holes, spacers, screws and other parts used to install the load shaft are not included. The customer must supply these.

◇ When End of Shaft being Driven is Supported by a Bearing

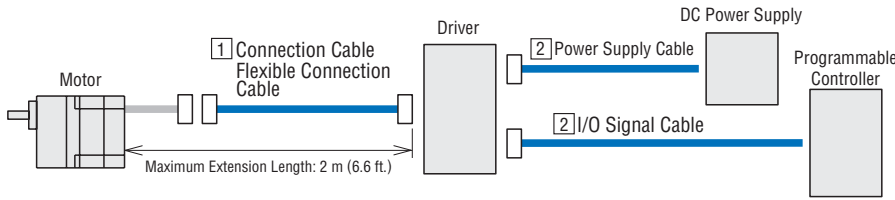


Product Name	Permissible Radial Load W [N (lb.)]
GFS2G□FR GFS4G□FR GFS5G□FR	W [N (lb.)] = $\frac{B}{B - L_p} \times F_0$ [N (lb.)]

Product Name	Gear Ratio	F_0 [N (lb.)]
GFS2G□FR	5, 10	570 (128)
	15~200	630 (141)
GFS4G□FR	5, 10	1000 (220)
	15~200	1500 (330)
GFS5G□FR	5, 10	1080 (240)
	15, 20	1550 (340)
	30~200	1800 (400)

Cables and Accessories (Sold Separately)

● Cable System Configuration



1 Connection Cables, Flexible Connection Cables

These cables are used to connect the motor and the driver. When using after extending the cables included with the product, the overall length of the cables should not exceed 2 m (6.6 ft.). Use the flexible connection cable in applications where the cable is bent and flexed.

● Product Line

◇ Connection Cables



Output Power	Product Name	Length m (ft.)	List Price
15 W (1/50 HP)	CC02BLH	1.5 (4.9)	\$55.00
30 W (1/25 HP)			
50 W (1/15 HP)			
100 W (1/8 HP)	CC02AXH2		\$52.00

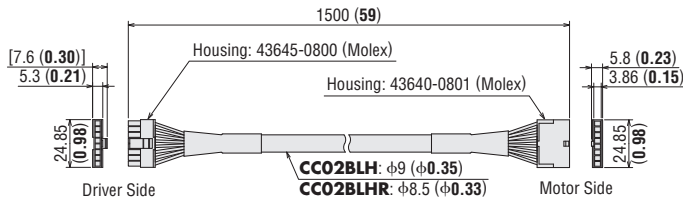
◇ Flexible Connection Cables



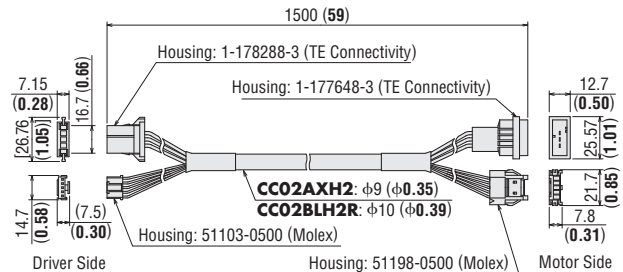
Output Power	Product Name	Length m (ft.)	List Price
15 W (1/50 HP)	CC02BLHR	1.5 (4.9)	\$98.00
30 W (1/25 HP)			
50 W (1/15 HP)			
100 W (1/8 HP)	CC02BLH2R		\$103.00

● Dimensions Unit: mm (in.)

◇ CC02BLH/CC02BLHR



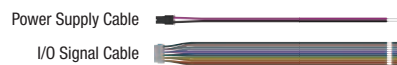
◇ CC02AXH2/CC02BLH2R



2 Power Supply Cable and I/O Signal Cable Set [For 15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)]

Power supply cable is used to connect the driver and the power supply. I/O signal cable is used to connect the driver and programmable controller. Cables come as a set of power supply cable and I/O signal cable.

● Product Line

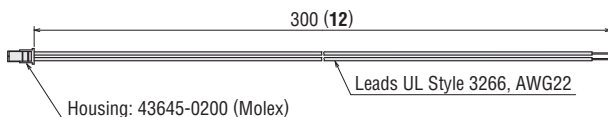


Driver Type	Product Name	List Price	Component Product Name	
			Power Supply Cable	I/O Signal Cable
Analog Setting Type	LHS003CC	\$8.00	LH003C1	LH003C3
Digital Setting Type	LHS003CD	\$10.00	LH003C1	LH003C4

● Dimensions Unit: mm (in.)

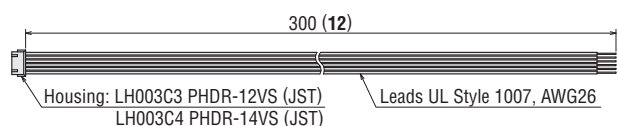
◇ Power Supply Cable

LH003C1



◇ I/O Signal Cable

LH003C3/LH003C4



Flexible Couplings

These products are clamp type couplings to connect a motor or gearhead shaft to the shaft of the equipment.



Once the motor or gearhead is determined, the proper coupling can be selected.

- Couplings can also be used with round shaft types.
Select a coupling with the same inner diameter size as the motor shaft diameter.

MCL Couplings

Applicable Product	Load Type	Coupling Type	List Price
BLHM015	Uniform Load	MCL20 Type	\$36.00
	Impact Load		
BLHM230	Uniform Load	MCL30 Type	\$60.00
	Impact Load		
BLHM450	Uniform Load	MCL40 Type	\$88.00
	Impact Load	MCL55 Type	\$113.00
BLHM5100	Uniform Load	MCL55 Type	\$113.00
	Impact Load		

Motor / Gearhead Mounting Brackets

Dedicated mounting brackets for attaching and securing a motor and gearhead.



Product Name	List Price	Applicable Product
SOLOB	\$23.00	BLHM015K-□
SOL2M4	\$27.00	BLHM230KC-□, BLHM230KC-A
SOL4M6	\$32.00	BLHM450KC-□, BLHM450KC-A
SOL5M8	\$34.00	BLHM5100KC-□, BLHM5100KC-A

- A number indicating the gear ratio is specified where the box □ is located within the product name.

External Speed Potentiometer



Features

- Potentiometer which allows the adjustment of rotation speed and torque.
- Easy installation
Simply insert the potentiometer into the mounting hole. No tools are required. It can be removed.
- Easy wiring
A terminal block is employed. Lead wire connection or soldering is not required. The efficiency of wiring is improved.



Front Face



Rear Face

Product Line

Product Name	List Price
PAVR2-20K	\$23.00

The following items are included with the product.
External Speed Potentiometer, Operating Manual

Note

- When connecting the potentiometer with an I/O signal cable, attach crimp terminals to the I/O signal cable.

Specifications

Resistance: 0 to 20 kΩ
Rated Power: 0.05 W
Resistance Variation Characteristics: B curve

Applicable Lead Wire Size

AWG22 to 16 (0.3 to 1.25 mm²)

DIN Rail Mounting Plates

Use these mounting plates to mount the driver to a DIN rail.



Product Line

Product Name	List Price	Applicable Product
MADP01	\$15.00	BLH2D15-K, BLH2D15-KD, BLH2D30-K, BLH2D30-KD, BLH2D50-K, BLH2D50-KD
MADP02	\$29.00	BLHD100K

For details, check the Oriental Motor website or contact the Oriental Motor sales office.

www.orientalmotor.com

■ Related Products

Brushless Motors DC Power Supply Input BLV Series

DC input brushless motors which can operate on battery and can be controlled remotely via communication

- High output power 200 W/400 W
- Electromagnetic brake motors are also available
- Supports operation on battery power
- Built-in communication functions



For details, check the Oriental Motor website or contact the Oriental Motor sales office.

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