Oriental motor

Brushless Motor and Controller Package

BMU Series

Easy Speed Control

30 W (1/25 HP) Full Size

Easy Speed Control

A motor and driver package designed for simplicity, performance and affordability.

The **BMU** Series introduces our latest technology in brushless motors and is combined with an easy to use, easy to set speed controller.

The **BMU** Series features a compact, high-power and high-efficiency brushless motor.

The entire motor structure has been innovated in pursuit of the optimal performance.

120 W (1/6 HP)

60 W (1/12 HP)

30 W (1/25 HP)

Brushless Motor and Controller Package

BMU Series

BMU Series

The speed controller features a front dial designed to easily set and control the motor speed. Simply plug the motor into the driver and turn on the switch.

① Easy speed control

② Easy wiring, easy set up

③ Expanded functions

④ New Brushless Motor

BMU Series
Operation Procedure

① Easy speed control

Turn the dial and set to the desired speed

The setting dial has tactile feedback allowing for easy control. Turning the dial clockwise increases the speed and turning it counter clockwise reduces the speed.

Turning the dial slowly changes the speed by 1 r/min

While observing the speed indicator, turning the dial slowly to the right will increase the speed by 1 r/min and slowly turning it to the left decreases the speed by 1 r/min.

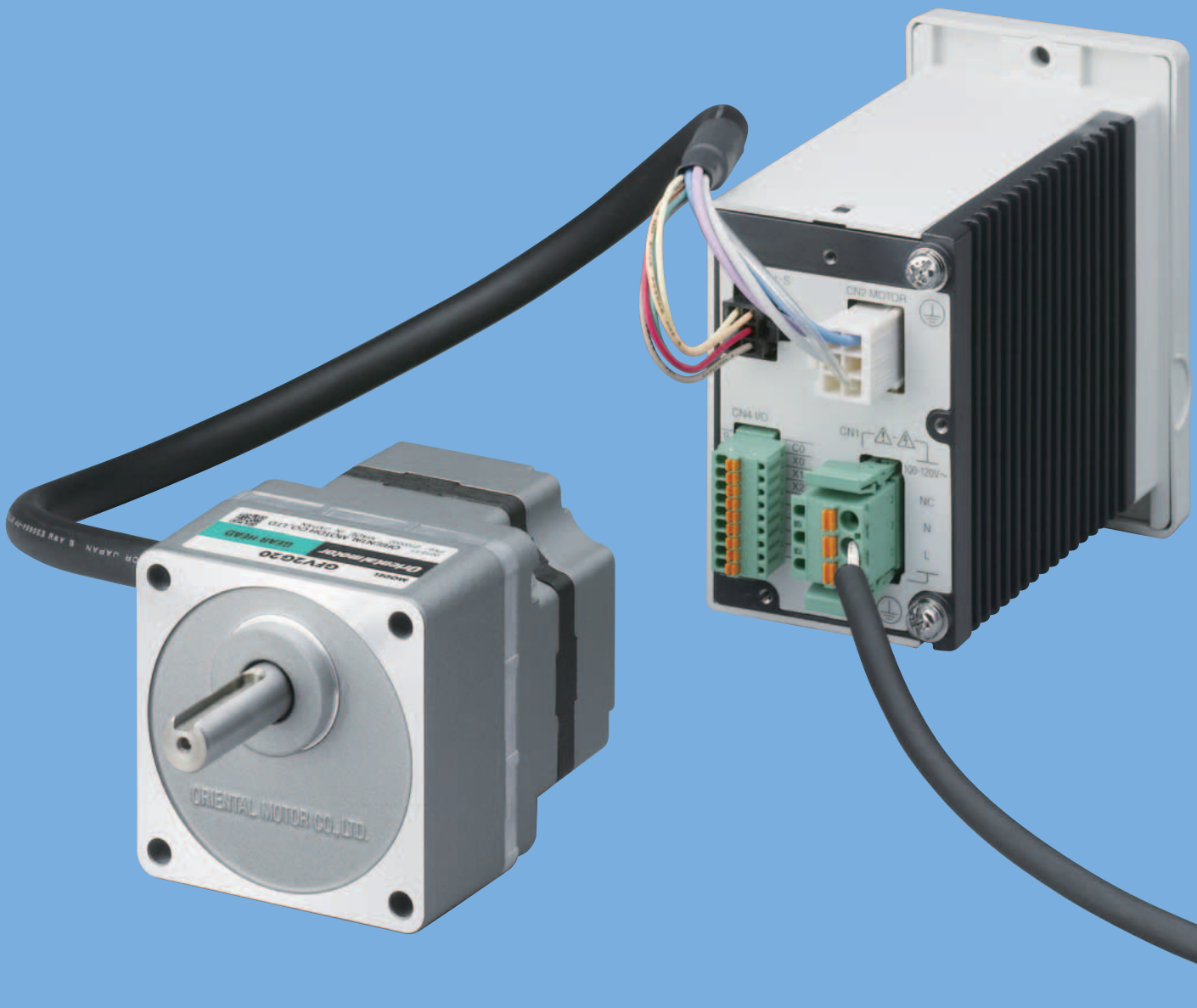
Pushing the dial sets the speed

Once the desired value for speed is reached, simply push the dial to set (store) the speed value. When power is re-supplied after setting the speed, the motor operates according to the set speed.

The dial operation can be locked

After the speed has been set, it can easily be changed by operating the dial. The dial can be locked to prevent changes in speed with the dial lock operation. (page 9)

BMU Series
Connection and Activation



② Easy wiring, easy set up

The motor and driver can be easily connected

To connect the motor, simply plug the motor connectors into the back of the speed controller.

The power and I/O connectors feature a screwless connector

There is no need for soldering or special crimp tools when connecting the power connector and the I/O connector. Just insert the lead wire while pushing the orange button.

The motor can be started immediately with only one switch

The motor starts when the switch is set to the “RUN” position. If set to the “STAND-BY” position, the motor decelerates to a stop. The motor can also be easily operated by an external signal, such as switches, relays etc. (page 25)

The rotation direction of the motor can be changed easily

Changing the rotation direction is possible with the rotation direction switch. It is possible to change the motor direction even when the motor is in operation.

BMU Series
Expanded Functions

③ Expanded functions

Various functions can be set on the driver

(Typical functions that can be set while the front panel is opened)

- Motor Start/Stop*
- Adjusting the operating speed*
- Setting the operating speed*
- Selecting the rotation direction*
- Changing the indication
- Indicating the operating speed when the speed reduction/speed increasing ratio is set
- Setting the acceleration/deceleration time
- Dial operation lock
- Speed setting for the 4-speed operation
- Speed limits setting
- Validating the external operating signals
- External input/output signal allocation
- Setting the overload alarm detection time, except during axial lock
- Load holding function for output shaft

*Setting is possible even if the front panel is attached.

MODE key
This changes the operating mode.

FUNCTION key
This changes the indication and functions for an operating mode.

Acceleration/deceleration time potentiometer

Load factor can be shown

With the rated torque of the motor at 100%, the load factor can be expressed as a percentage (40-200%). The load condition during start-up, as well as the load condition due to the aging deterioration of the equipment can be confirmed.

Indication at a load factor of 50%

Locks the dial operation

This prevents the undesired changes in the speed and the changes or deletion of data with the operation of the dial.

●Setting the Lock Function

At the main screen for each operating mode, press the “MODE” key for 5 seconds or more. When “Lk” appears, the lock function is activated.

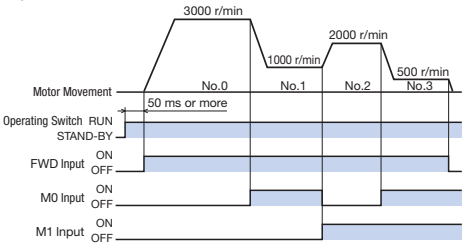
●Cancelling the Lock Function

Return to the main screen, and press the “MODE” key for 5 seconds or more. When “UnLk” is indicated, the lock function has been cancelled.

Upgraded Functions

4-Speed Settings

Operation is possible by setting the data to operating data No.0, No.1, No.2, or No.3, and switching the input of the M0 and M1 inputs.



Note

When operating in 4-speed settings, the rotation direction of the motor using external input signals cannot be changed.

Indicates the transport speed of the conveyor

The conveyor gear ratio is computed and set into the “gear ratio” parameters, and the conveyor transport speed can be indicated. As the conveyor transport speed can be checked directly, it is convenient for frequent changing of setup and other processes involved in the manufacturing process.

Sets the acceleration time and deceleration time

The acceleration time and deceleration time can be digitally set, in addition to adjusting them with an acceleration/deceleration time potentiometer.

●Setting Range: 0.0～15.0 sec (Initial value: 0.5 sec)

For the digital setting, the acceleration time and deceleration time are each set independently. Therefore, the time can be freely set according to the desired tact time of the equipment.

Additional Functions

Sets the upper and lower rotation speed limits

The upper and lower limits for the speed control range can be set. The speed limits can be set with the monitor mode or data mode.

Additional Functions

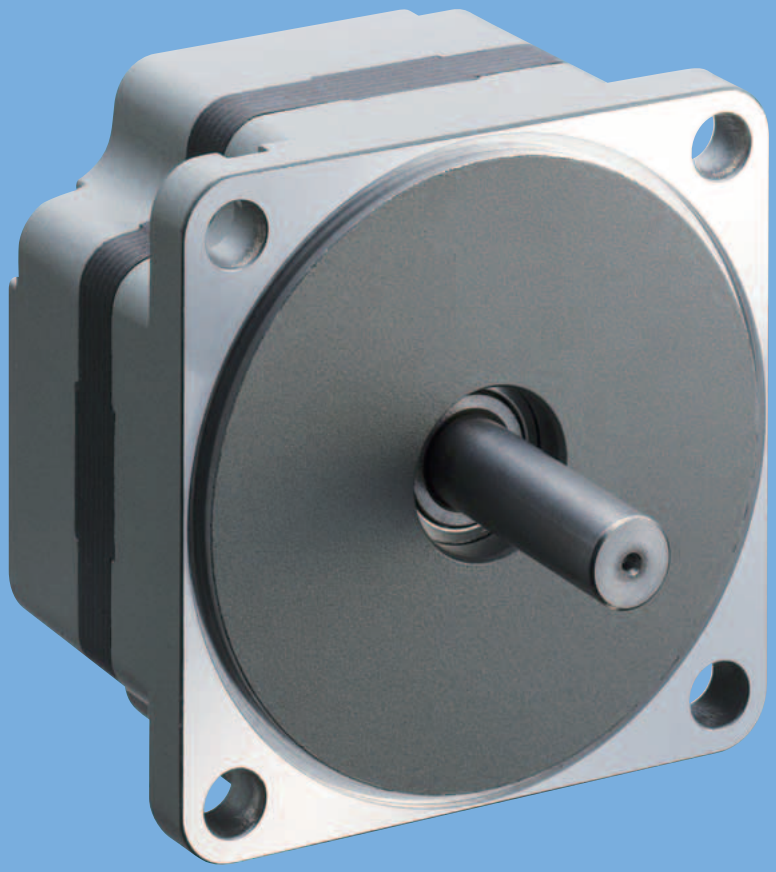
Load holding when stopped

When the motor is stopped, the load can be electrically held. (Holding force is up to 50% of the rated torque.)

Note

If the electrical power supply to the driver is turned OFF, the holding force dissipates. This cannot be used to prevent a fall during a power outage.

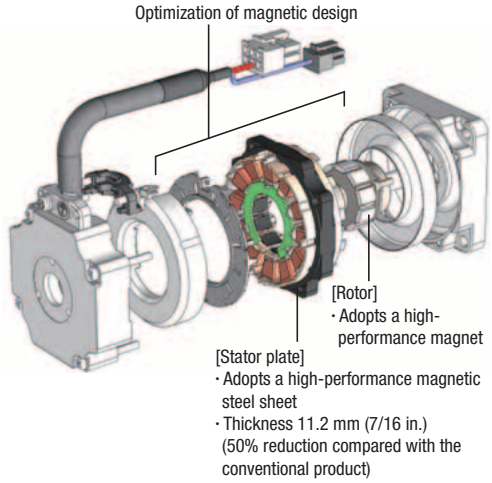
BMU Series
Motor Features



④ New Brushless Motor

The **BMU** Series is designed for compactness, high power and high efficiency

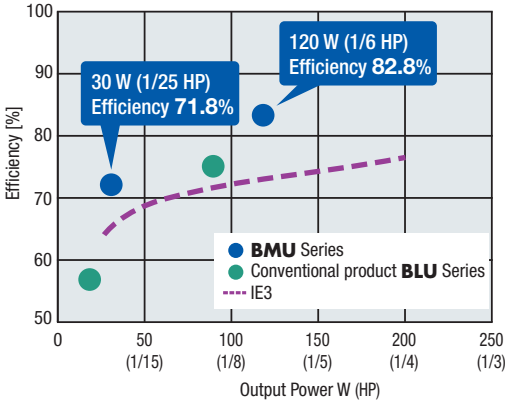
An optimal magnetic design and high-performance material enable the new brushless motor stator plate to have a thickness of just 11.2 mm (7/16 in.). This slimness achieves a highly efficient power unit that outputs 120 W (1/6 HP). Compared with the conventional brushless motor of the same output power, the stator plate thickness is only half of the conventional one [For motors with a frame size of 90 mm (3.54 in.)]. Moreover, the use of high-performance material reduces the amount of material used, therefore reducing costs.



Substantial improvement in the efficiency of the motor and driver package

- A maximum of 15% efficiency improvement of the package*1
- Exceeds global standards IE3*2

*1 **BMU** Series 30 W (1/25 HP) and **BLU** Series 20 W (1/38 HP) Comparison
*2 Established highest efficiency level for the International Standards IEC60034-30.

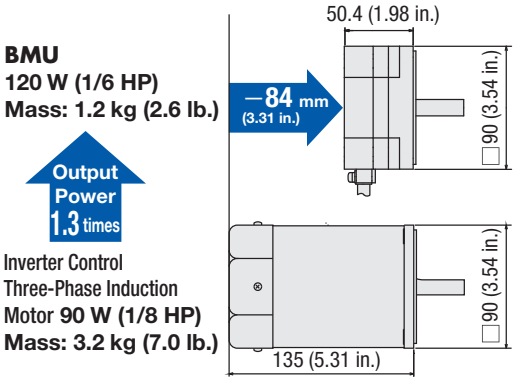


Advantages of the **BMU** Series compared to a three-phase motor / inverter

With a brushless motor, there is less motor weight and more output power. For example, compared with the three-phase induction motor of frame size 90 mm (3.54 in.):

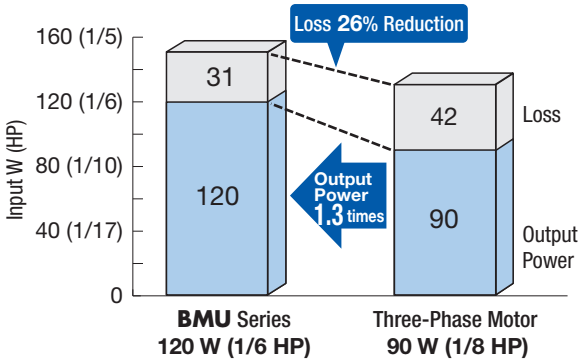
●Smaller Motor, More Output Power

With a motor mass of 2.0 kg (4.41 lbs) and an overall length of 84.6 mm (3.33 in.), the brushless motor represents approximately a 63% savings in mass and length. The motor output power increases by 1.3 times. A lightweight, slim, high-power motor saves space.



●Energy Savings

Motor output power is increased by 1.3 times, while motor loss is reduced by 26%. The new brushless motors are even more effective for energy savings.



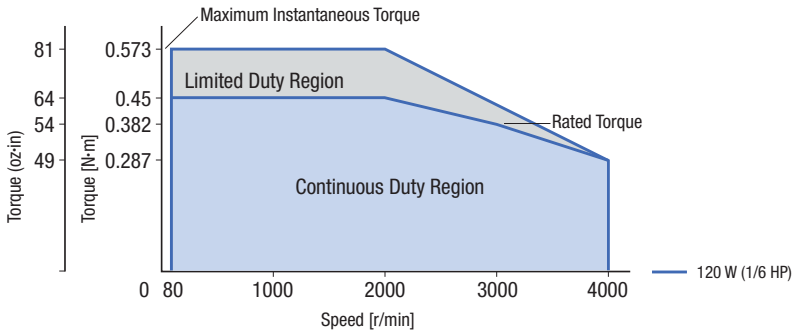
High performance speed control at an affordable price

High performance speed control

Maximum Speed of 4000 r/min Speed ratio 1:50 (2.5 times of the conventional ratio)

The **BMU** Series has a maximum speed of 4000 r/min. Speed ratio of 1:50 (80 to 4000 r/min) is achieved. Speed regulation has been greatly improved from ±0.5% to ±0.2%.

● **BMU** Series 120 W (1/6 HP)



User-friendly features and expanded functions at an affordable price

The list price for the **BMU** Series, 60 mm (2.36 in.), 30 W (1/25 HP) motor with a 5:1 ratio offers more value and performance then ever before. The **BMU** Series motor, driver and gearhead come together as one part number saving ordering time and ensuring a complete solution, guaranteed.

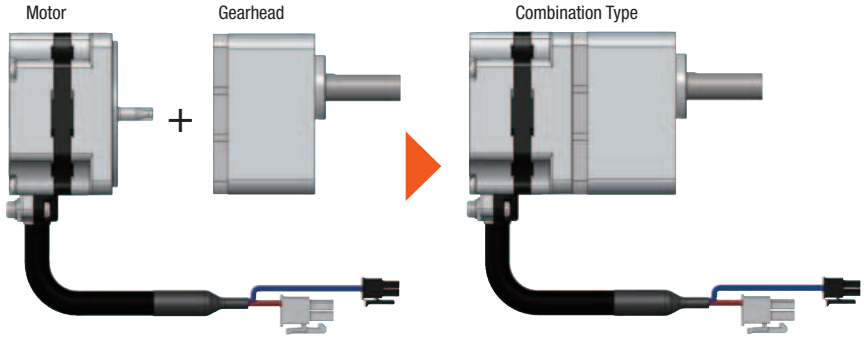
BMU Series
- Output power: 30 W (1/25 HP)
- Gearhead gear ratio: 5
- Permissible torque: 0.45 N·m (3.98 lb·in)
- Speed range: 16~800 r/min

$358.00

● For price and lead time please contact the nearest Oriental Motor office, or visit our website.

New gearhead (combination type)

With the gearhead's boss and machined mounting surface, the installation accuracy has been greatly improved. The new gearhead also has lower audible noise as compared to our previous type and comes pre-assembled (motor and gear) as a combination type.



Product Line

Package						
Motor	Frame Size	Output Power	Type	Driver	Power Supply Voltage	Connection Cable
 Combination Type  Round Shaft Type	60 mm (2.36 in.)	30 W (1/25 HP)	Standard (IP20) or IP65		Single-Phase 100-120 VAC Single-Phase 200-240 VAC Three-Phase 200-240 VAC	 3 m (9.8 ft.) included
	Combination Type 80 mm (3.15 in.) Round Shaft Type 60 mm (2.36 in.)	60 W (1/12 HP)				
	90 mm (3.54 in.)	120 W (1/6 HP)				

Brushless motors have the following advantages:

No Maintenance, Longer Life

In a brushless motor, there are no brushes and thus no physical contact that could lead to frictional energy losses.

While brush DC motors use a brush and commutator to rotate and require regular maintenance, brushless motors rotate by the ON/OFF operation of the drive circuit transistor, based on the signals detected by the hall effect IC (magnetic sensor).

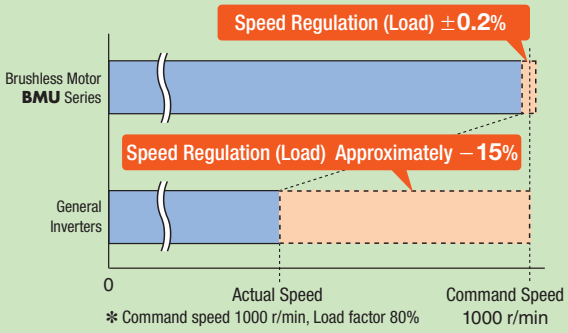
Brushless motors are more expensive to design and manufacture, however they are typically more efficient than brushed motors.

This leads to:
- No maintenance, longer life
- More power
- Longer runtime

Stable Speed 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. For this reason, even if the load changes, stable rotation is performed from low speed to high speed. Common inverter-controlled three-phase induction motors do not have this type of feedback control and when the load changes, the speed can be affected. Brushless motors are recommended for applications that require the speed to be maintained regardless of the load fluctuation.

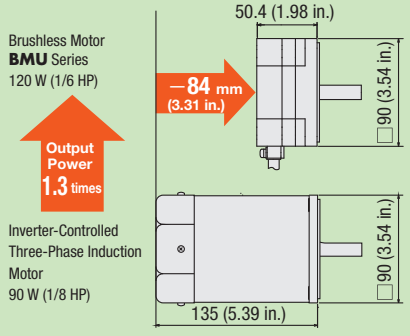
● **Speed change comparison at a load factor of 80% (Reference values)**✻



✻ Command speed 1000 r/min, Load factor 80%

Compact and Powerful

Brushless motors have a slim body and provide high power due to permanent magnets being used in the rotor. For example, the overall length is 84.6 mm (3.33 in.) shorter and the output power is 1.3 times higher than that of three-phase induction motors with a frame size of 90 mm (3.54 in.). Using brushless motors can contribute to downsizing and space saving.



Wide Speed Control Range

The brushless motor has a broader speed control range compared to three-phase inverter driven motors. Unlike three-phase inverter driven motors, the torque at low speed is not limited, so brushless motors are suited for applications that require a constant torque from low speed to high speed.

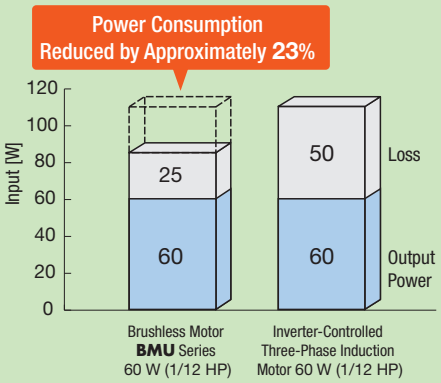
Product Group	Speed Control Range✻	Speed Ratio
Brushless Motor	80～4000 r/min	1:50
Inverter-Controlled Three-Phase Induction Motor	200～2400 r/min	1:12

✻ Typical speed control range, inverter-controlled three-phase induction motor.

Contributes to Energy Savings

Brushless motors, which incorporate permanent magnets in the rotor, generate little secondary loss from the rotor. This allows for power consumption to be reduced by approximately 23% compared with inverter-controlled three-phase induction motors.✻ This contributes to overall energy savings.

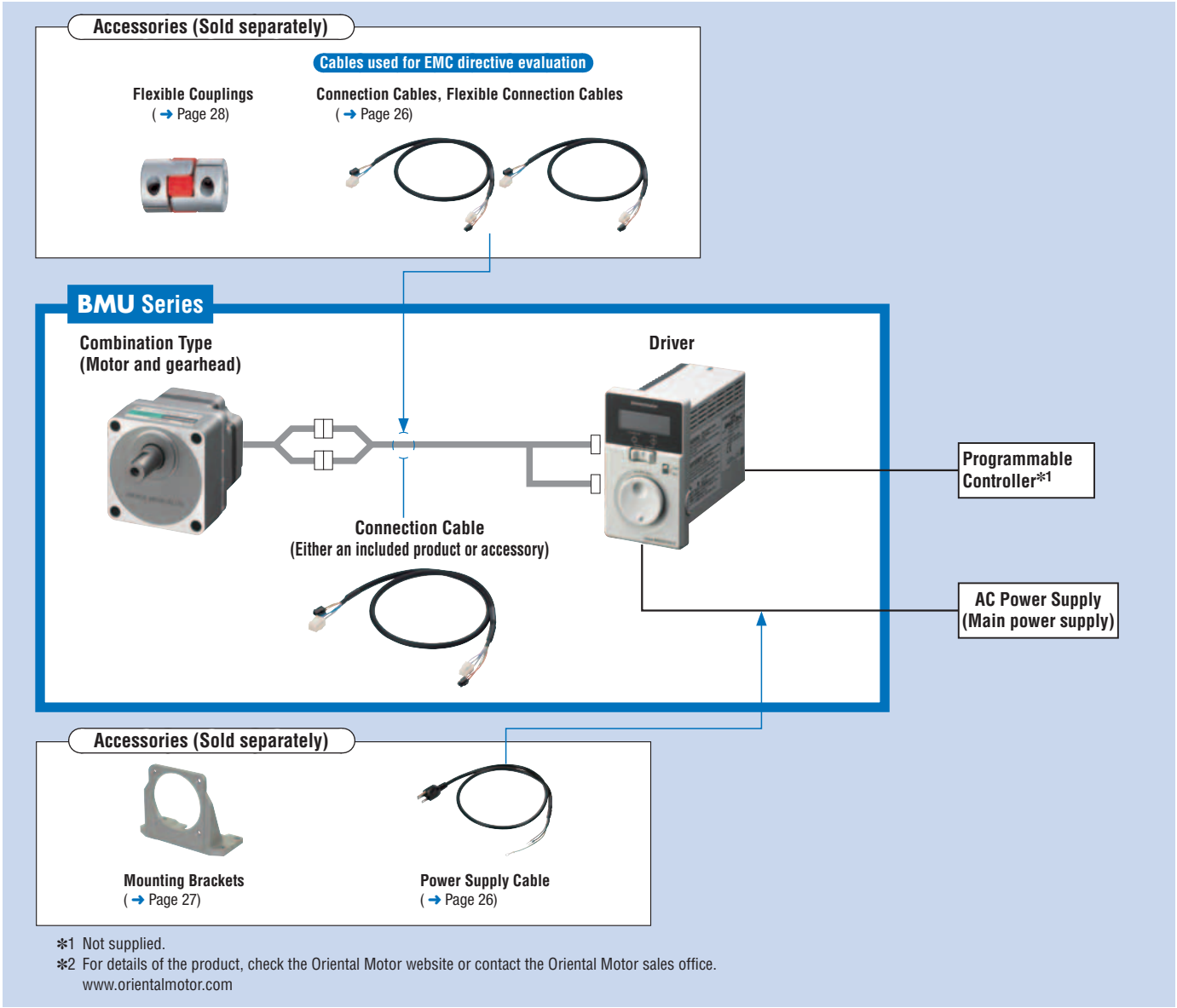
✻ When output power is 60 W (1/12 HP)



Protective Functions and Alarm Output

The **BMU** Series is equipped with various protective functions including the overload protective function and over voltage protective function. An alarm is output when a protective function activates.

System Configuration



*1 Not supplied.
*2 For details of the product, check the Oriental Motor website or contact the Oriental Motor sales office.
www.orientalmotor.com

●System Configuration

BMU Series Combination Type - Parallel Shaft		Sold Separately		
		Connection Cable (7 m)	Mounting Bracket	Flexible Coupling
BMU5120A-10A-3	+	CC07BLE	SOL5UBF	MCL5515F12
$508.00		$127.00	$29.00	$97.00

●The system configuration shown above is an example. Other combinations are available.

Product Number

BMU 5 120 A P -10 A - 3
① ② ③ ⑤ ⑥ ⑦ ⑧ ⑨

BMU 4 60 S A P -10 A - 3
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

①	Type	**BMU** Series
②	Frame Size	**2**: 60 mm (2.36 in.) **4**: 80 mm (3.15 in.) **5**: 90 mm (3.54 in.)
③	Output Power (W)	**30**: 30 W (1/25 HP) **60**: 60 W (1/12 HP) **120**: 120 W (1/6 HP)
④	Identification Number	**S**
⑤	Power Supply Voltage	**A**: Single-Phase 100-120 VAC **C**: Single-Phase, Three-Phase 200-240 VAC
⑥	Motor Degree of Protection	None: Standard Type (IP20 Specification) **P**: IP65 Specification
⑦	Gear Ratio/Shaft Configuration	Number: Gear Ratio for Combination Types **A**: Round Shaft Type
⑧	Gear Shaft	**A**: Inch None: Metric
⑨	Connection Cable Length (Included)	Number: Included Connection Cable Length **-3**: 3 m (9.8 ft.) None: Connection Cable Not Included

●Examples of product names that indicate connection cable availability and length
Includes a 3 m (9.8 ft.) connection cable ➜ **BMU5120A-10A-3**
No connection cable ➜ **BMU5120A-10A**

Product Line

Combination Type	The combination type comes with the motor and its dedicated gearhead pre-assembled. This simplifies installation. Motors and gearheads are also available separately to facilitate changes in motor and gearhead combinations and if spare gearheads are required.

●The **BMU** Series comes with a 3 m (9.8 ft.) cable. Products without cables are available.
For lead time please contact the nearest Oriental Motor office, or visit our website.

●Combination Type – Parallel Shaft Gearhead

◇Standard Type (IP20 specification)

Output Power	Power Supply Voltage	Product Name	Gear Ratio	Cable Included	Cable Not Included
30 W (1/25 HP)	Single-Phase 100-120 VAC	**BMU230A-□A-3**	**5**, **10**, **15**, **20**	$386.00	$358.00
			30, **50**, **100**	$394.00	$366.00
			200	$405.00	$377.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU230C-□A-3**	**5**, **10**, **15**, **20**	$386.00	$358.00
			30, **50**, **100**	$394.00	$366.00
			200	$405.00	$377.00
60 W (1/12 HP)	Single-Phase 100-120 VAC	**BMU460SA-□A-3**	**5**, **10**, **15**, **20**	$419.00	$391.00
			30, **50**, **100**	$427.00	$399.00
			200	$439.00	$411.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU460SC-□A-3**	**5**, **10**, **15**, **20**	$419.00	$391.00
			30, **50**, **100**	$427.00	$399.00
			200	$439.00	$411.00
120 W (1/6 HP)	Single-Phase 100-120 VAC	**BMU5120A-□A-3**	**5**, **10**, **15**, **20**	$508.00	$480.00
			30, **50**, **100**	$519.00	$491.00
			200	$529.00	$501.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU5120C-□A-3**	**5**, **10**, **15**, **20**	$508.00	$480.00
			30, **50**, **100**	$519.00	$491.00
			200	$529.00	$501.00

◇IP65 Specification

Output Power	Power Supply Voltage	Product Name	Gear Ratio	Cable Included	Cable Not Included
30 W (1/25 HP)	Single-Phase 100-120 VAC	**BMU230AP-□A-3**	**5**, **10**, **15**, **20**	$409.00	$381.00
			30, **50**, **100**	$417.00	$389.00
			200	$428.00	$400.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU230CP-□A-3**	**5**, **10**, **15**, **20**	$409.00	$381.00
			30, **50**, **100**	$417.00	$389.00
			200	$428.00	$400.00
60 W (1/12 HP)	Single-Phase 100-120 VAC	**BMU460SAP-□A-3**	**5**, **10**, **15**, **20**	$442.00	$414.00
			30, **50**, **100**	$450.00	$422.00
			200	$462.00	$434.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU460SCP-□A-3**	**5**, **10**, **15**, **20**	$442.00	$414.00
			30, **50**, **100**	$450.00	$422.00
			200	$462.00	$434.00
120 W (1/6 HP)	Single-Phase 100-120 VAC	**BMU5120AP-□A-3**	**5**, **10**, **15**, **20**	$531.00	$503.00
			30, **50**, **100**	$542.00	$514.00
			200	$552.00	$524.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU5120CP-□A-3**	**5**, **10**, **15**, **20**	$531.00	$503.00
			30, **50**, **100**	$542.00	$514.00
			200	$552.00	$524.00

The following items are included in each product.
Motor, driver, gearhead*1, connection cable*2, CN1 connector, CN4 connector, installation screws*1, machine key*1, operating manual
*1 Combination type only
*2 Only with types supplied with a connection cable

●Enter the gear ratio in the box (□) within the product name.

●Round Shaft Type

◇Standard Type (IP20 Specification)

Output Power	Power Supply Voltage	Product Name	Cable Included	Cable Not Included
30 W (1/25 HP)	Single-Phase 100-120 VAC	**BMU230A-A-3**	$305.00	$277.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU230C-A-3**	$305.00	$277.00
60 W (1/12 HP)	Single-Phase 100-120 VAC	**BMU260A-A-3**	$325.00	$297.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU260C-A-3**	$325.00	$297.00
120 W (1/6 HP)	Single-Phase 100-120 VAC	**BMU5120A-A-3**	$375.00	$347.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU5120C-A-3**	$375.00	$347.00

◇IP65 Specification

Output Power	Power Supply Voltage	Product Name	Cable Included	Cable Not Included
30 W (1/25 HP)	Single-Phase 100-120 VAC	**BMU230AP-A-3**	$328.00	$300.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU230CP-A-3**	$328.00	$300.00
60 W (1/12 HP)	Single-Phase 100-120 VAC	**BMU260AP-A-3**	$348.00	$320.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU260CP-A-3**	$348.00	$320.00
120 W (1/6 HP)	Single-Phase 100-120 VAC	**BMU5120AP-A-3**	$398.00	$370.00
	Single-Phase, Three-Phase 200-240 VAC	**BMU5120CP-A-3**	$398.00	$370.00

The following items are included in each product.

Motor, driver, gearhead*1, connection cable*2, CN1 connector, CN4 connector, installation screws*1, machine key*1, operating manual

*1 Combination type only

*2 Only with types supplied with a connection cable

■Motor and Driver Combinations

●Combination Type – Parallel Shaft Gearhead

Output Power	Power Supply Voltage	Product Name	Combination Motor Product Name*	Motor Product Name	Gearhead Product Name	Driver Product Name
30 W (1/25 HP)	Single-Phase 100-120 VAC	**BMU230A■-□A-3**	BLM230■-□A	BLM230■-GFV	GFV2G□A	BMUD30-A
	Single-Phase, Three-Phase 200-240 VAC	**BMU230C■-□A-3**				BMUD30-C
60 W (1/12 HP)	Single-Phase 100-120 VAC	**BMU460SA■-□A-3**	BLM460S■-□A	BLM460S■-GFV	GFV4G□A	BMUD60-A
	Single-Phase, Three-Phase 200-240 VAC	**BMU460SC■-□A-3**				BMUD60-C
120 W (1/6 HP)	Single-Phase 100-120 VAC	**BMU5120A■-□A-3**	BLM5120■-□A	BLM5120■-GFV	GFV5G□A	BMUD120-A
	Single-Phase, Three-Phase 200-240 VAC	**BMU5120C■-□A-3**				BMUD120-C

*For combination motors, the product name applies to the motor and gearhead combination.

●Round Shaft Type

Output Power	Power Supply Voltage	Product Name	Motor Product Name	Driver Product Name
30 W (1/25 HP)	Single-Phase 100-120 VAC	**BMU230A■-A-3**	BLM230■-A	BMUD30-A
	Single-Phase, Three-Phase 200-240 VAC	**BMU230C■-A-3**		BMUD30-C
60 W (1/12 HP)	Single-Phase 100-120 VAC	**BMU260A■-A-3**	BLM260■-A	BMUD60-A
	Single-Phase, Three-Phase 200-240 VAC	**BMU260C■-A-3**		BMUD60-C
120 W (1/6 HP)	Single-Phase 100-120 VAC	**BMU5120A■-A-3**	BLM5120■-A	BMUD120-A
	Single-Phase, Three-Phase 200-240 VAC	**BMU5120C■-A-3**		BMUD120-C

●Enter the gear ratio in the box (□) within the product name.
For motors with a degree of protection of IP65 specification, **P** is specified where the box ■ appears in the product name.

Specifications

●30 W (1/25 HP) RoHS

Product Name	Combination Type – Parallel Shaft Gearhead	BMU230A□-□A-3	BMU230C□-□A-3
	Round Shaft Type	BMU230A□-A-3	BMU230C□-A-3
Rated Output Power (Continuous) W (HP)		30 (1/25)	
Rated Speed r/min		3000	
Rated Torque N·m (oz·in)		0.096 (13.6)	
Maximum Instantaneous Torque N·m (oz·in)		0.144 (20)	
Rotor Inertia J: $\times10^{-4}$kg·m^2 (oz·in^2)		0.042 (0.23)	
Round Shaft Type Permissible Inertia J: $\times10^{-4}$kg·m^2 (oz·in^2)		1.8 (9.8)	
Speed Control Range		80～4000 r/min (Speed ratio 1:50)	
Speed Regulation	Load	±0.2% or less: Conditions 0～rated torque, rated speed, rated voltage, normal temperature	
	Voltage	±0.2% or less: Conditions Rated voltage −15～+10%, rated speed, no load, normal temperature	
	Temperature	±0.2% or less: Conditions Operating ambient temperature from 0～+40℃ (+32～104°F), rated speed, no load, rated voltage	
Power Supply Input	Rated Voltage VAC	Single-Phase 100-120	Single-Phase 200-240/Three-Phase 200-240
	Permissible Voltage Range	−15～+10%	
	Frequency Hz	50/60	
	Permissible Frequency Range	±5%	
	Rated Input Current A	1.2	Single-Phase: 0.7/ Three-Phase: 0.38
	Maximum Input Current A	2.0	Single-Phase: 1.2/ Three-Phase: 0.75

●60 W (1/12 HP) RoHS

Product Name	Combination Type – Parallel Shaft Gearhead	BMU460SA□-□A-3	BMU460SC□-□A-3
	Round Shaft Type	BMU260A□-A-3	BMU260C□-A-3
Rated Output Power (Continuous) W (HP)		60 (1/12)	
Rated Speed r/min		3000	
Rated Torque N·m (oz·in)		0.191 (27)	
Maximum Instantaneous Torque N·m (oz·in)		0.287 (41)	
Rotor Inertia J: $\times10^{-4}$kg·m^2 (oz·in^2)		0.082 (0.45)	
Round Shaft Type Permissible Inertia J: $\times10^{-4}$kg·m^2 (oz·in^2)		3.75 (21)	
Speed Control Range		80～4000 r/min (Speed ratio 1:50)	
Speed Regulation	Load	±0.2% or less: Conditions 0～rated torque, rated speed, rated voltage, normal temperature	
	Voltage	±0.2% or less: Conditions Rated voltage −15～+10%, rated speed, no load, normal temperature	
	Temperature	±0.2% or less: Conditions Operating ambient temperature from 0～+40℃ (+32～104°F), rated speed, no load, rated voltage	
Power Supply Input	Rated Voltage VAC	Single-Phase 100-120	Single-Phase 200-240/Three-Phase 200-240
	Permissible Voltage Range	−15～+10%	
	Frequency Hz	50/60	
	Permissible Frequency Range	±5%	
	Rated Input Current A	1.7	Single-Phase: 1.0/ Three-Phase: 0.52
	Maximum Input Current A	3.3	Single-Phase: 1.9/ Three-Phase: 1.1

●120 W (1/6 HP) RoHS

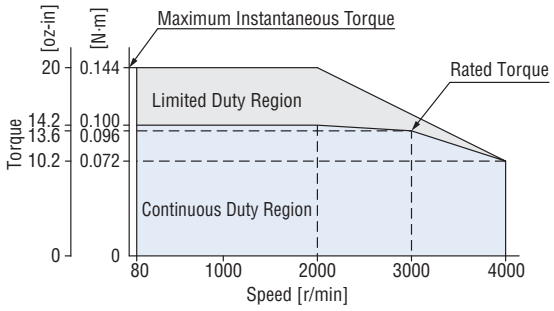
Product Name	Combination Type – Parallel Shaft Gearhead	BMU5120A□-□A-3	BMU5120C□-□A-3
	Round Shaft Type	BMU5120A□-A-3	BMU5120C□-A-3
Rated Output Power (Continuous) W (HP)		120 (1/6)	
Rated Speed r/min		3000	
Rated Torque N·m (oz·in)		0.382 (54)	
Maximum Instantaneous Torque N·m (oz·in)		0.573 (81)	
Rotor Inertia J: $\times10^{-4}$kg·m^2 (oz·in^2)		0.23 (1.26)	
Round Shaft Type Permissible Inertia J: $\times10^{-4}$kg·m^2 (oz·in^2)		5.6 (31)	
Speed Control Range		80～4000 r/min (Speed ratio 1:50)	
Speed Regulation	Load	±0.2% or less: Conditions 0～rated torque, rated speed, rated voltage, normal temperature	
	Voltage	±0.2% or less: Conditions Rated voltage −15～+10%, rated speed, no load, normal temperature	
	Temperature	±0.2% or less: Conditions Operating ambient temperature from 0～+40℃ (+32～104°F), rated speed, no load, rated voltage	
Power Supply Input	Rated Voltage VAC	Single-Phase 100-120	Single-Phase 200-240/Three-Phase 200-240
	Permissible Voltage Range	−15～+10%	
	Frequency Hz	50/60	
	Permissible Frequency Range	±5%	
	Rated Input Current A	3.3	Single-Phase: 2.0/ Three-Phase: 1.1
	Maximum Input Current A	6.8	Single-Phase: 4.1/ Three-Phase: 2.0

●The values correspond to each specification and characteristic of a stand-alone motor. The speed-torque characteristics show the values when rated voltage is applied.
●Enter the gear ratio in the box (□) within the product name.
If the degree of protection of the motor is IP65 specification, **P** is entered where the box □ is located within the product name.

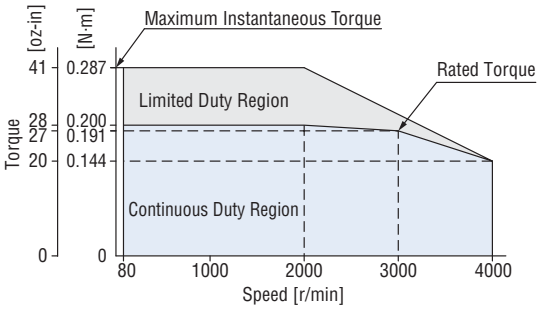
Speed – Torque Characteristics

Continuous Duty Region: Continuous operation is possible in this region.
Limited Duty Region : This region is used primarily when accelerating.

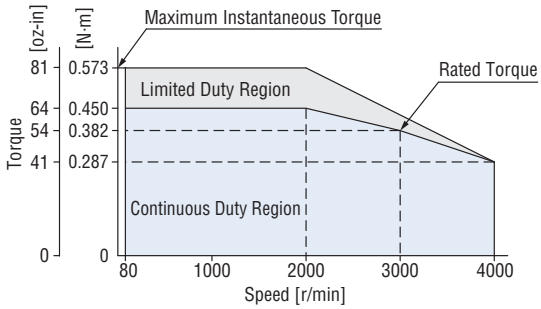
●30 W (1/25 HP)



●60 W (1/12 HP)



●120 W (1/6 HP)



●The values correspond to each specification and characteristic of a stand-alone motor. The speed-torque characteristics show the values when rated voltage is applied.

Common Specifications

Item	Specifications
Speed Setting Methods	Digital setting using the dial 4 speed settings possible
Acceleration/Deceleration Time	Analog setting: 0.1～15.0 s (Time setting from stopped state until reaching the rated speed) Common settings for acceleration/deceleration time with the use of acceleration/deceleration time potentiometer* Digital setting: 0.0～15.0 s (Time setting from current speed to the setting speed) Individual settings for acceleration time/deceleration time for each operating data* *Acceleration time/deceleration time varies with the load condition of the motor.
Input Signals	Photocoupler Input method Input Resistance: 5.7 kΩ Operation by internal power supply: 5 VDC Connectable External DC Power Supply: 24 VDC −15～+20% Current 100 mA or more Sink input/Source input Supplied through external wiring
	Arbitrary signal assignment to X0～X2 input (3 points) is possible [ ]: Initial Setting [FWD], [REV], [M0], M1, ALARM-RESET, EXT-ERROR, H-FREE
Output Signals	Photocoupler and Open-Collector Output External Power Supply: 4.5～30 VDC Current 100 mA or less Sink output/Source output Supplied through external wiring
	Arbitrary signal assignment to Y0, Y1 (2 points) is possible [ ]: Initial Setting [ALARM-OUT1], [SPEED-OUT], ALARM-OUT2, MOVE, VA, WNG
Protective Function	When the following protective functions are activated, ALARM-OUT1 output turns OFF and the motor will undergo a coasting stop. At the same time, the alarm code will be displayed. (Instantaneous stop for external stop only) Overcurrent, Main circuit overheating, Overvoltage, Undervoltage, Sensor error, Overload, Overspeed, EEPROM error, Initial sensor error, Initial operation inhibition, External stop
Maximum Extension Distance	Motor and Driver Distance: 10.5 m (34.4 ft.) (Accessory connection cable used)
Time Rating	Continuous

●Overload Alarm Detection Time

The overload alarm is generated if the operation goes beyond the continuous duty region.
The detection time for this overload alarm can be set from 0.1～60.0 seconds. (Initial setting: 30.0 seconds)
However, alarm will be generated within 5 seconds in the following cases:
- If an applied load goes beyond the limited duty region
- If the output shaft is locked

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 terminal and the protective earth terminal, and between the power supply terminal and the I/O signal terminal after continuous operation under normal ambient temperature and humidity.
Dielectric Strength		Sufficient to withstand 1.5 kVAC at 50 Hz applied between the windings and the case for 1 minute after continuous operation under normal ambient temperature and humidity.	No abnormality is judged even with application of 1.5 kVAC at 50 Hz between the power supply terminal and the protective earth terminal, and with application of 1.5 kVAC at 50 Hz between the power supply terminal and the I/O signal terminal, for 1 minute after continuous operation under normal ambient temperature and humidity.
Temperature Rise		The maximum temperature rise of the windings is 50°C (90°F) and that of the case is 40°C (72°F)*1 when measured by the thermocouple method after rated continuous operation under normal ambient temperature and humidity.	Temperature rise of the heat sink is 50°C (90°F) or less measured by the thermocouple method after rated continuous operation under normal ambient temperature and humidity.
Operating Environment	Ambient Temperature	0～+40°C (Non-freezing) (+32～104°F)	
	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	Not exposed to continuous vibration or excessive shock Conforms to JIS C 60068-2-6 "Sine-wave vibration test method" Frequency range: 10～55 Hz Pulsating amplitude: 0.15 mm (0.006 in.) Sweep direction: 3 directions (X, Y, Z) Number of sweeps: 20 times	
Storage Conditions*2	Ambient Temperature	−20～+70°C (−4～+158°F) (non-freezing)	−25～+70°C (−13～+158°F) (non-freezing)
	Ambient Humidity	85% or less (non-condensing)	
	Altitude	Up to 3000 m (10000 ft) above sea level	
Insulation Class		UL/CSA Standard: 105(A) EN standard: 120 (E)	–
Degree of Protection		Standard type: IP20 IP65 Specification: IP65 (Excluding the mounting surface of the round shaft type and connectors)	IP20

*1 For round shaft types, attach to a heat sink (material: aluminum) of one of the following sizes to keep the motor case surface temperature from exceeding 90°C (194°F).
30 W (1/25 HP) Type: 115×115 mm (4.53×4.53 in.) Thickness 5 mm (0.20 in.), 60 W (1/12 HP) Type: 135×135 mm (5.31×5.31 in.) Thickness 5 mm (0.20 in.),
120 W (1/12 HP) Type: 165×165 mm (5.31×5.31 in.) Thickness: 5 mm (0.20 in.)

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

Note

●Do not measure insulation resistance or perform a dielectric strength test while the motor and driver are connected.

Permissible Torque of Combination Type

●Combination Type – Parallel Shaft Gearhead

Unit: N•m (lb-in)

Product Name	Gear Ratio			5	10	15	20	30	50	100	200
	Motor Speed [r/min]	80 r/min		16	8	5.3	4	2.7	1.6	0.8	0.4
		2000 r/min		400	200	133	100	66.7	40	20	10
		3000 r/min		600	300	200	150	100	60	30	15
		4000 r/min		800	400	267	200	133	80	40	20
BMU230	At 80～2000 r/min		N•m	0.45	0.9	1.4	1.8	2.6	4.3	6	6
			lb-in	3.9	7.9	12.3	15.9	23	38	53	53
	At 3000 r/min		N•m	0.43	0.86	1.3	1.7	2.5	4.1	6	6
			lb-in	3.8	7.6	11.5	15.0	22	36	53	53
	At 4000 r/min		N•m	0.32	0.65	0.97	1.3	1.9	3.1	5.4	5.4
			lb-in	2.8	5.7	8.5	11.5	16.8	27	47	47
BMU460S	At 80～2000 r/min		N•m	0.9	1.8	2.7	3.6	5.2	8.6	16	16
			lb-in	7.9	15.9	23	31	46	76	141	141
	At 3000 r/min		N•m	0.86	1.7	2.6	3.4	4.9	8.2	16	16
			lb-in	7.6	15.0	23	30	43	72	141	141
	At 4000 r/min		N•m	0.65	1.3	1.9	2.6	3.7	6.2	12.4	14
			lb-in	5.7	11.5	16.8	23	32	54	109	123
BMU5120	At 80～2000 r/min		N•m	2	4.1	6.1	8.1	11.6	19.4	30	30
			lb-in	17.7	36	53	71	102	171	260	260
	At 3000 r/min		N•m	1.7	3.4	5.2	6.9	9.9	16.4	30	30
			lb-in	15.0	30	46	61	87	145	260	260
	At 4000 r/min		N•m	1.3	2.6	3.9	5.2	7.4	12.3	24.7	27
			lb-in	11.5	23	34	46	65	108	210	230

●A colored background ▭ indicates gear shaft rotation in the same direction as the motor shaft. Others rotate in the opposite direction.

Permissible Radial Load/Permissible Axial Load

Combination Type – Parallel Shaft Gearhead

Product Name	Gear Ratio		Permissible Overhung Load				Permissible Axial Load	
			10 mm (0.39 in.) from shaft end		20 mm (0.79 in.) from shaft end			
			N	lb.	N	lb.	N	lb.
BMU230	**5**	At 80～3000 r/min	100	22	150	33	40	9
		At 4000 r/min	90	20	110	24		
	10, **15**, **20**	At 80～3000 r/min	150	33	200	45		
		At 4000 r/min	130	29	170	38		
	30, **50**, **100**, **200**	At 80～3000 r/min	200	45	300	67		
		At 4000 r/min	180	40	230	51		
BMU460S	**5**	At 80～3000 r/min	200	45	250	56	100	22
		At 4000 r/min	180	40	220	49		
	10, **15**, **20**	At 80～3000 r/min	300	67	350	78		
		At 4000 r/min	270	60	330	74		
	30, **50**, **100**, **200**	At 80～3000 r/min	450	101	550	123		
		At 4000 r/min	420	94	500	112		
BMU5120	**5**	At 80～3000 r/min	300	67	400	90	150	33
		At 4000 r/min	230	51	300	67		
	10, **15**, **20**	At 80～3000 r/min	400	90	500	112		
		At 4000 r/min	370	83	430	96		
	30, **50**, **100**, **200**	At 80～3000 r/min	500	112	650	146		
		At 4000 r/min	450	101	550	123		

Round Shaft Type

Product Name	Permissible Radial Load				Permissible Axial Load
	10 mm (0.39 in.) from shaft end		20 mm (0.79 in.) from shaft end		
	N	lb.	N	lb.	
BMU230	80	18	100	22	Half of motor mass or less
BMU260	80	18	100	22	
BMU5120	150	33	170	38	

Permissible Load Inertia J of Combination Types

Combination Type – Parallel Shaft Gearhead

Unit = $\times 10^{-4}$ kg·m^2 (oz-in^2)

Product Name \ Gear Ratio		**5**	**10**	**15**	**20**	**30**	**50**	**100**	**200**
BMU230		12 (66)	50 (270)	110 (600)	200 (1090)	370 (2000)	920 (5000)	2500 (13700)	5000 (27000)
	When instantaneous stop or instantaneous bi-directional operation is performed*	1.55 (8.5)	6.2 (34)	14 (77)	24.8 (136)	55.8 (310)	155 (850)	155 (850)	155 (850)
BMU460S		22 (120)	95 (520)	220 (1200)	350 (1910)	800 (4400)	2200 (12000)	6200 (34000)	12000 (66000)
	When instantaneous stop or instantaneous bi-directional operation is performed*	5.5 (30)	22 (120)	49.5 (270)	88 (480)	198 (1080)	550 (3000)	550 (3000)	550 (3000)
BMU5120		45 (250)	190 (1040)	420 (2300)	700 (3800)	1600 (8800)	4500 (25000)	12000 (66000)	25000 (137000)
	When instantaneous stop or instantaneous bi-directional operation is performed*	25 (137)	100 (550)	225 (1230)	400 (2200)	900 (4900)	2500 (13700)	2500 (13700)	2500 (13700)

*It is also applicable when digitally setting the deceleration time to below 0.1 second.

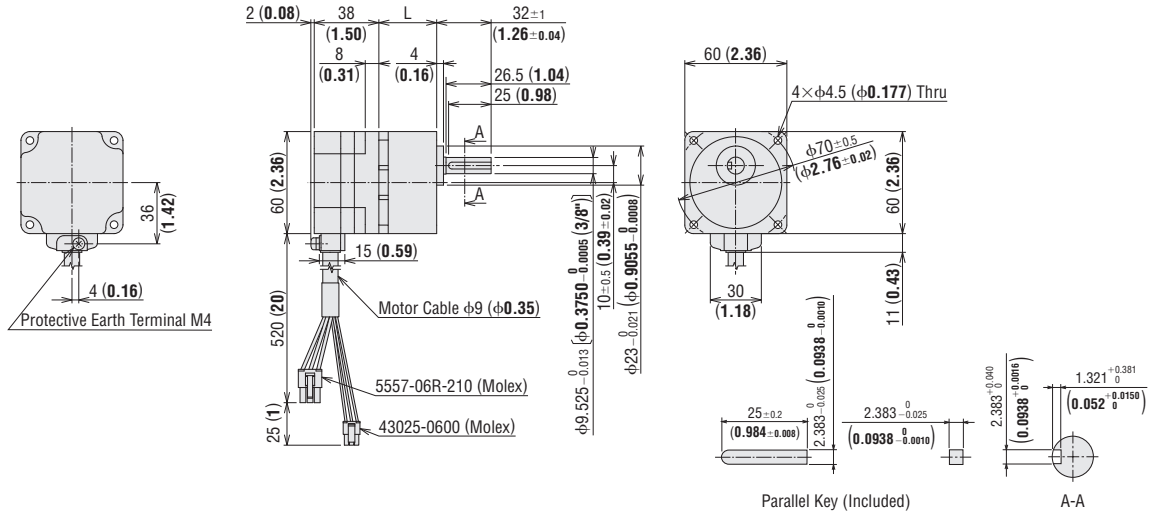
Dimensions Unit mm (in.)

●Enter the gear ratio in the box (□) within the product name.
For motors with a degree of protection of IP65 specification, **P** is specified where the box ■ appears in the product name.

●30 W (1/25 HP)

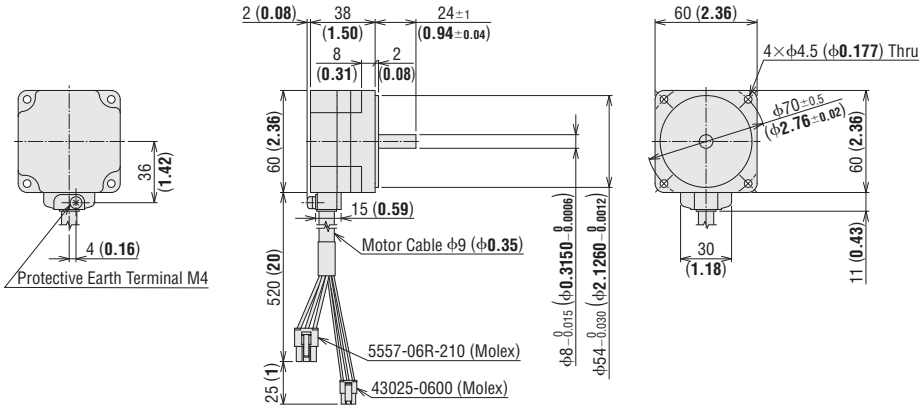
◇Motor/Parallel Shaft Gearhead

Product Name	Motor Product Name	Gearhead Product	Gear Ratio	L	Mass kg
BMU230A■-□A-3 **BMU230C■-□A-3**	BLM230■-GFV	GFV2G□A	**5～20**	34 (1.34)	0.92 (2.01 lb.)
			30～100	38 (1.50)	
			200	43 (1.69)	



◇Round Shaft Type

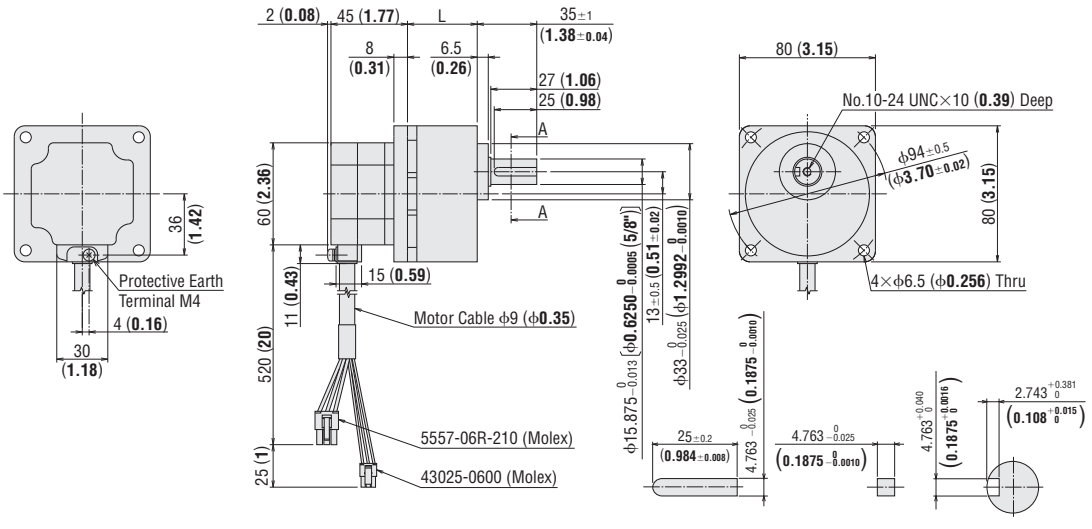
BMU230A■-A-3, **BMU230C■-A-3**
Motor: BLM230■-A
Mass: 0.42 kg (0.92 lb.)



●60 W (1/12 HP)

◇Motor/Parallel Shaft Gearhead

Product Name	Motor Product Name	Gearhead Product Name	Gear Ratio	L	Mass kg
BMU460SA■-□A-3 **BMU460SC■-□A-3**	BLM460S■-GFV	GFV4G□A	**5～20**	41 (1.61)	1.6 (3.5 lb.)
			30～100	46 (1.81)	
			200	51 (2.01)	

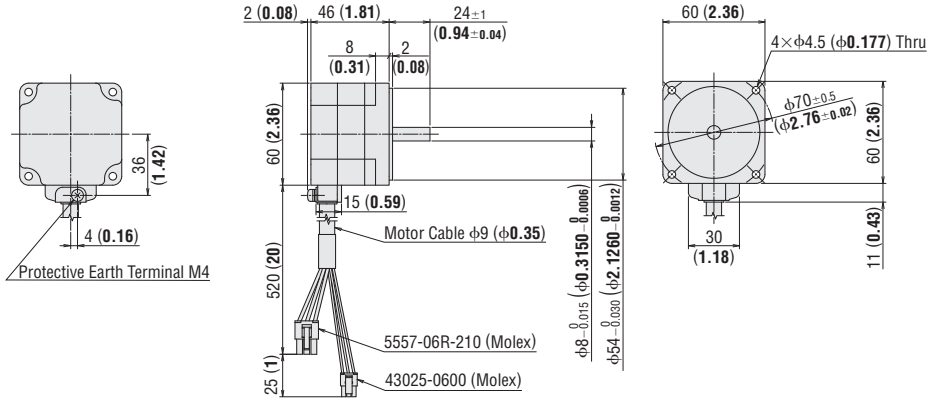


◇Round Shaft Type

BMU260A■-A-3, **BMU260C■-A-3**

Motor: BLM260■-A

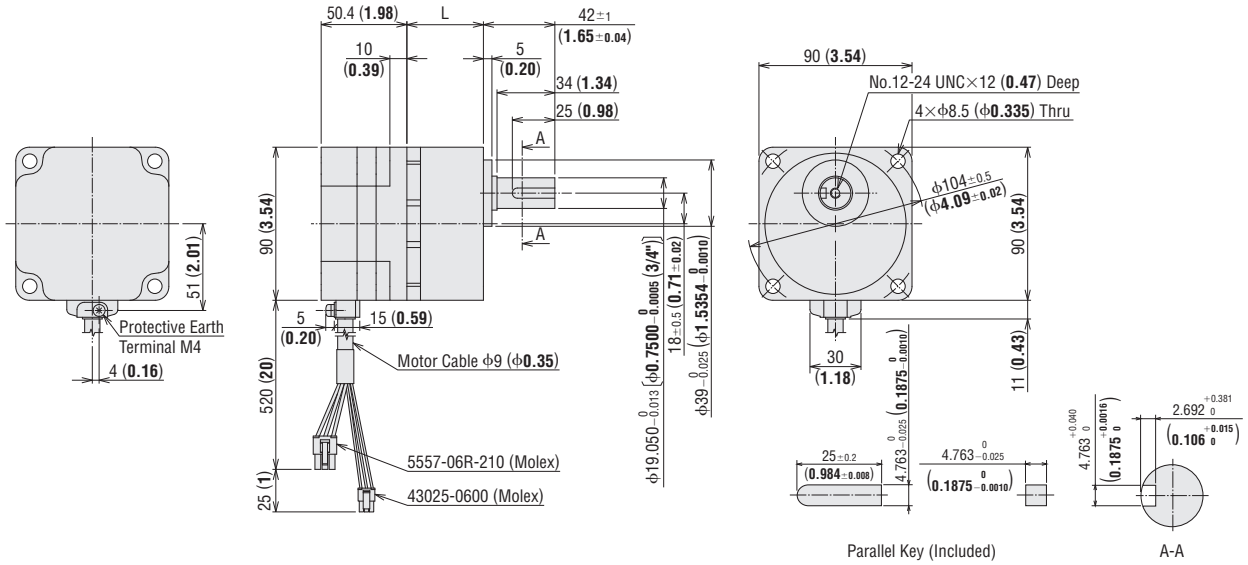
Mass: 0.55 kg (1.21 lb.)



●120 W (1/6 HP)

◇Motor/Parallel Shaft Gearhead

Product Name	Motor Product Name	Gearhead Product Name	Gear Ratio	L	Mass kg
BMU5120A■-□A-3 **BMU5120C■-□A-3**	BLM5120■-GFV	GFV5G□A	**5**～**20**	45 (1.77)	2.7 (5.9 in.)
			30～**100**	58 (2.28)	
			200	64 (2.54)	

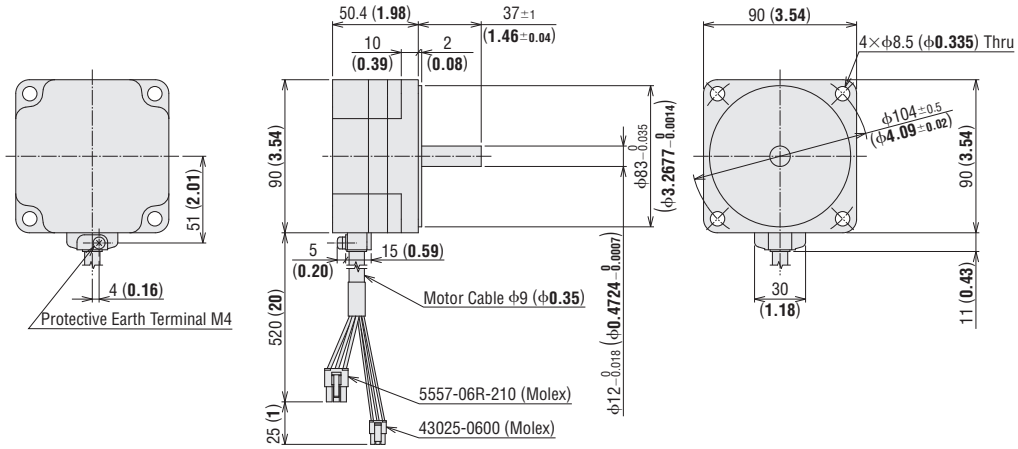


◇Round Shaft Type

BMU5120A■-A-3, **BMU5120C■-A-3**

Motor: BLM5120■-A

Mass: 1.2 kg (2.6 lb.)

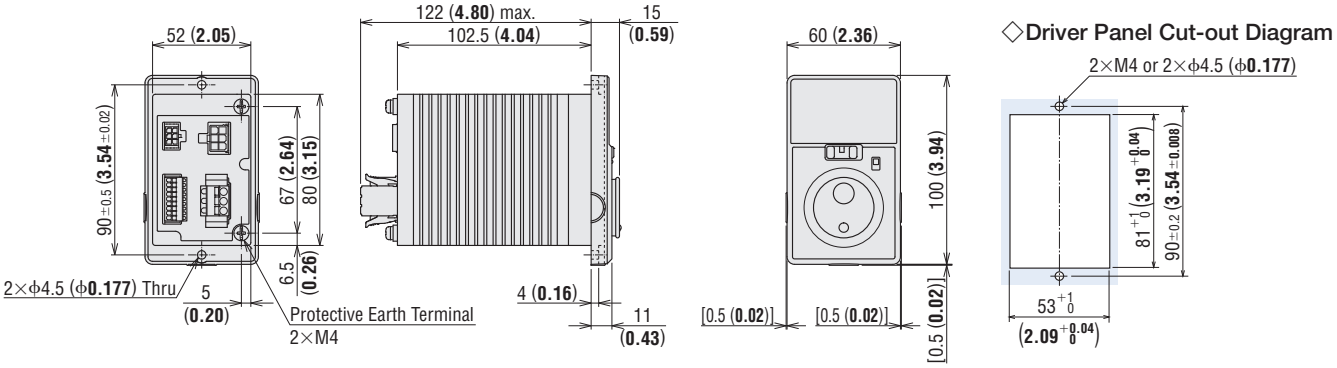


●Driver

BMUD30-A, BMUD30-C, BMUD60-A, BMUD60-C, BMUD120-A, BMUD120-C

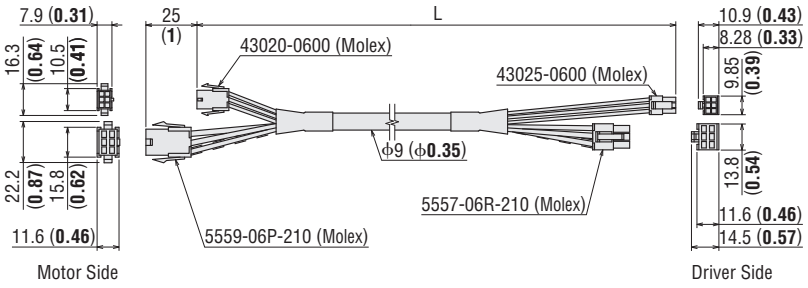
Mass: 0.4 kg (0.88 lb.)

CAD A1207



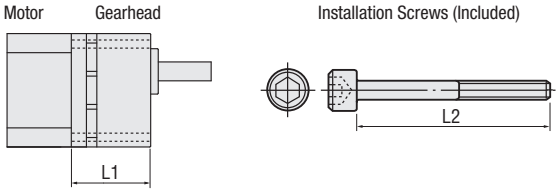
●Connection Cable (Included)

Length L (m)
3 (9.8 ft.)



■Dimensions of Installation Screw

●Combination Type – Parallel Shaft Gearhead



L1		L2	
Gearhead Product Name	Length mm (in.)	Length in.	Screw Size
GFV2G5～20A	42 (1.65)	2	No. 8-32 UNC
GFV2G30～100A	46 (1.81)	2 1/4	
GFV2G200A	51 (2.01)	2 1/2	
GFV4G5～20A	49 (1.93)	2 1/2	1/4-20 UNC
GFV4G30～100A	54 (2.13)	2 3/4	
GFV4G200A	59 (2.32)	3	
GFV5G5～20A	55 (2.17)	2 3/4	5/16-18 UNC
GFV5G30～100A	68 (2.68)	3 1/4	
GFV5G200A	74 (2.9)	3 1/2	

●Installation screw: Includes 4 plain washers and 4 spring washers each

Connection and Operation

Names and Functions of Driver Parts

Indication
Displays the monitor contents, alarm, etc.

Dial
Changes the speed and parameters.
The value is set when the dial is pressed after changes are made.

Operating Switch
The motor is started by setting it to the "RUN" position.
Setting it to the "STAND-BY" position stops the motor.

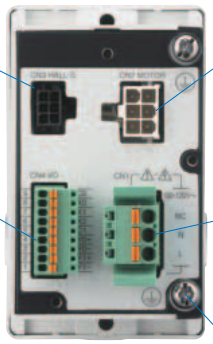
Rotation Direction Switch
Changes the rotation direction of the motor.

Front Panel

<Front side of the driver>

Sensor Connector (CN3)
Connects to the signal connector of the motor.

I/O Signal Connector (CN4)
Connects with the I/O signals.



Motor Connector (CN2)
Connects to the power connector of the motor.

Main Power Connector (CN1)
Connects to the main power supply.

Protective Earth Terminals (2 locations)
Ground either one of the protective earth terminals.

<Back side of the driver>

◇When Front Panel is Removed

MODE Key
Changes the operating mode.

FUNCTION Key
Changes the indication and functions for the operating mode.

Acceleration/deceleration Time Potentiometer
Sets the acceleration time for starting the motor and deceleration time for motor standstill.
Setting range: 0.1 s~15.0 s

Installation Holes (2 locations)

Extended Functions

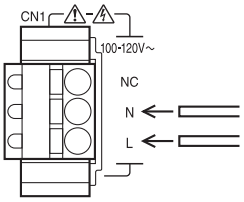
Remove the front panel to be able to perform various settings by operating the keys.

Operating Mode	Details
Monitoring	Speed, load factor, operating data number, alarm, warning, I/O monitor
Data	Data No. 0, No. 1, No. 2, No. 3 (4 points) Operating speed, acceleration time, deceleration time, reset
Parameters	Gear ratio, speed increasing ratio, initial panel indication, initial operation inhibition alarm, analog acceleration/deceleration, external operating signal input, input function selection, output function selection, overload alarm detection time except during axial lock, overload warning level, speed attainment width, parameter mode reset

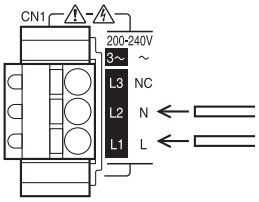
◇Main Power Connector (CN1)

Connects to the main power supply. Connect a power supply that matches with the power supply voltage to be used.

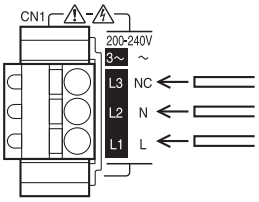
• Single-Phase 100-120 VAC



• Single-Phase 200-240 VAC



• Three-Phase 200-240 VAC



•Applicable Lead Wire Size
AWG18~14 (0.75~2.0 mm^2)

•Applicable Crimp Terminals
Use the following terminals for connection using crimp terminals.
Please note that the applicable crimp terminal varies depending on the size of the lead wire.

Manufacturer	Phoenix Contact	
Product No.	AI 0.75-10	[AWG18 (0.65~0.82 mm^2)]
	AI 1-10	[AWG18 (0.82~1.2 mm^2)]
	AI 1.5-10	[AWG16 (1.25~1.8 mm^2)]
	AI 2.5-10	[AWG14 (2.0~3.0 mm^2)]

Operation with the Driver Only

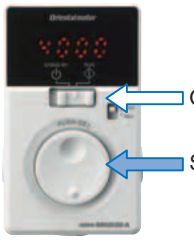
◇Run/Stop

When the operating switch is set to the "RUN" position, the motor will start.
When it is returned to the "STAND-BY" position, the motor decelerates to a stop.

◇Speed Setting Method

Set the motor speed by using the dial.
Setting range: 80~4000 r/min

Turning the dial slowly to the right increases the speed by 1 r/min increments, while turning it to the left reduces the speed by 1 r/min increments.
Turning the dial fast produces a great variation in speed.
Pressing the dial sets the speed.



Operation with the operating switch

Setting the speed with the dial

•Operating Switch

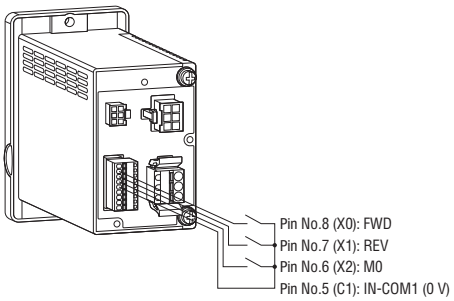
"STAND-BY" position

"RUN" position

●Operation by External Signals

◇Operating Method

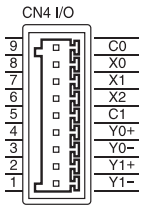
- Using the built-in power supply in the driver, the motor is operated through signals from external sources (switches, relays, etc.). Connect Pins No. 5～8 of the I/O signal connector (CN4) as in the figure to the right.
- When operating using external signals, change the parameter setting in the "External Operating Signal Input" to "on: Activated", and set the operating switch to the "RUN" position.



●I/O Signals Connector (CN4)

Pin No.	Terminal Name	Signal Name	Description
9	C0	IN-COM0	Input signal common
8	X0	FWD*	The motor rotates in the FWD direction.
7	X1	REV*	The motor rotates in the REV direction.
6	X2	M0*	Select the operating data.
5	C1	IN-COM1	Input signal common (0 V)
4	Y0+	SPEED-OUT*	For every rotation of the motor, 30 pulses are output.
3	Y0−		
2	Y1+	ALARM-OUT1*	It turns OFF when an alarm is generated. (Normally closed)
1	Y1−		

*These are initial settings. The allocation of values can be changed with the parameters.



●Applicable Lead Wire Size

AWG26～20 (0.14～0.5 mm²)

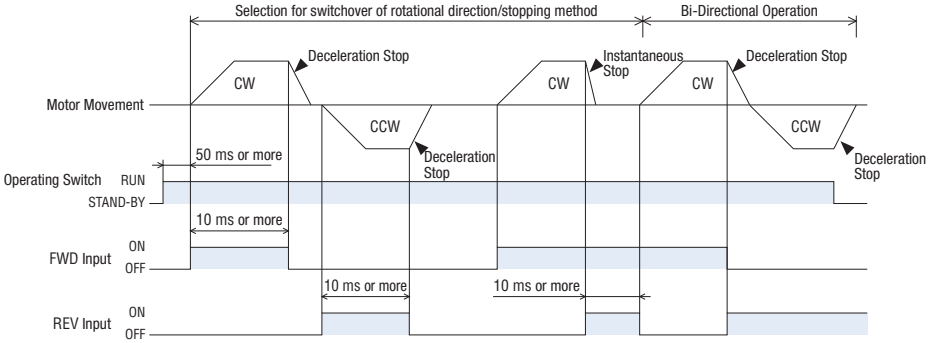
●Applicable Crimp Terminals

Use the following terminals for connection using crimp terminals.
Please note that the applicable crimp terminal varies depending on the size of the lead wire.

Manufacturer	Phoenix Contact	
Product No.	A 0.25-7	[AWG24 (0.14～0.34 mm²)]
	A 0.34-7	[AWG22 (0.14～0.34 mm²)]
	A 0.5-8	[AWG20 (0.40～0.65 mm²)]

◇Timing Chart

This is a timing chart when operated via external signals.
When the rotation direction switch is set to "FWD".



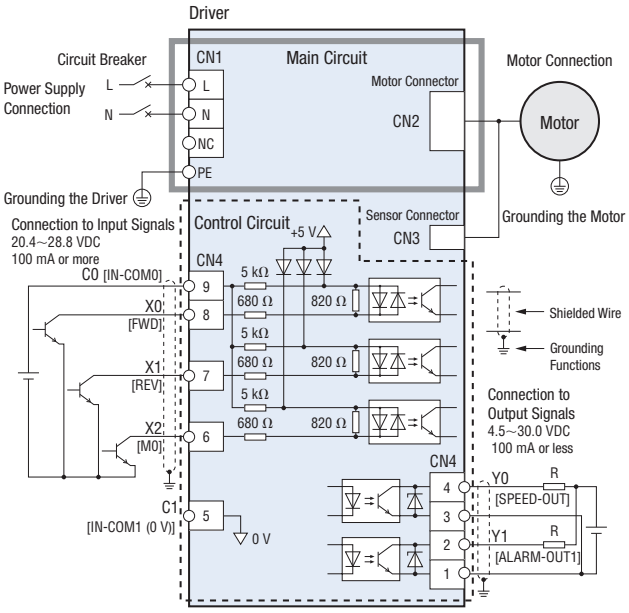
- Switching the FWD input to ON will cause the motor to turn clockwise as viewed from the motor shaft side, while switching the REV input to ON will cause the motor to turn counterclockwise. Turning it OFF decelerates the motor to a stop. If both the FWD input and REV input are turned ON simultaneously, the motor will stop instantaneously.

- With the combination type, the rotation direction varies according to the gear ratio of the gearhead.

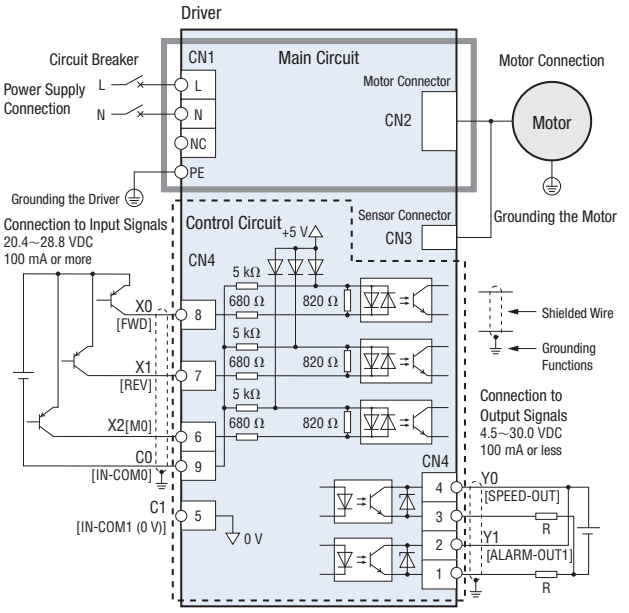
◇Connection Diagram

The figure shows an example for a motor operated with sequence connection by a single-phase 100-120 VAC input-type transistor.

●Sink Logic



●Source Logic



- Connect a limiting resistor R that corresponds to the power supply used, so that the current that flows with the output signals does not exceed 100 mA.

Accessories (Sold separately) RoHS

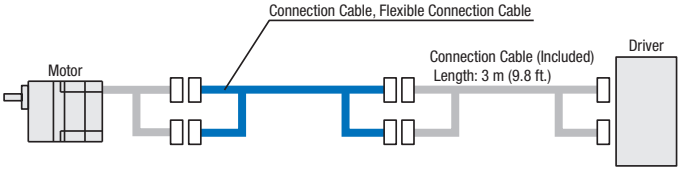
Power Supply Cable, Flexible Connection Cable

These cables are used to connect the motor and driver. The maximum extension length of the connectable cable is 10.5 m (34.4 ft.).
Use a flexible connection cable in applications where the cable is bent and flexed.

Power Supply Cable
(Plug included)

Connection Cable
Flexible Connection Cable

Cable System Configuration



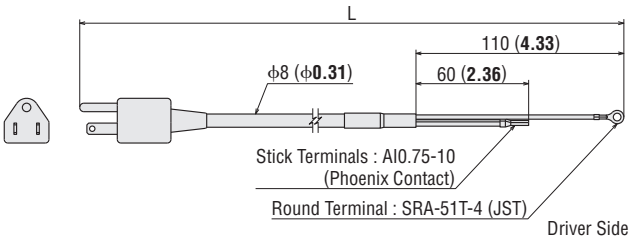
Product Line

◇Power Supply Cable

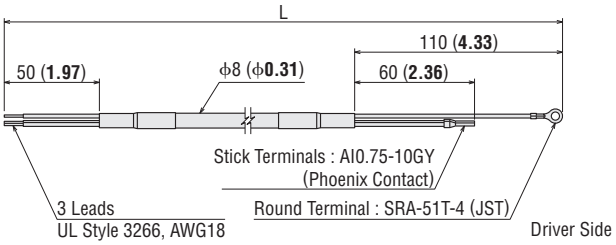
Product Name	Product Line	Power Supply Voltage	Length L m (ft.)	List Price
CC01AC03P	Plug included	Single-Phase 100-120 VAC	1 (3.3)	$18.00
CC02AC03P			2 (6.6)	$24.00
CC03AC03P			3 (9.8)	$30.00
CC01AC03N	Plug not included	Single-Phase 100-120 VAC Single-Phase 200-240 VAC	1 (3.3)	$12.00
CC02AC03N			2 (6.6)	$18.00
CC03AC03N			3 (9.8)	$24.00
CC01AC04N		Three-Phase 200-240 VAC	1 (3.3)	$12.00
CC02AC04N			2 (6.6)	$18.00
CC03AC04N			3 (9.8)	$24.00

Dimensions Unit mm (in.)

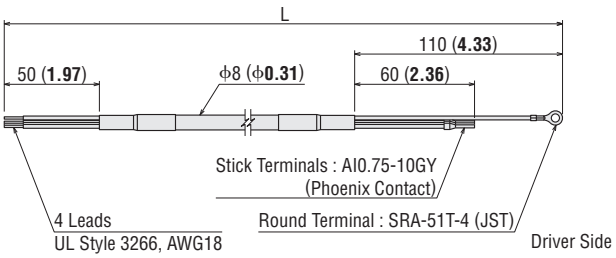
•CC01AC03P, CC02AC03P, CC03AC03P



•CC01AC03N, CC02AC03N, CC03AC03N



•CC01AC04N, CC02AC04N, CC03AC04N



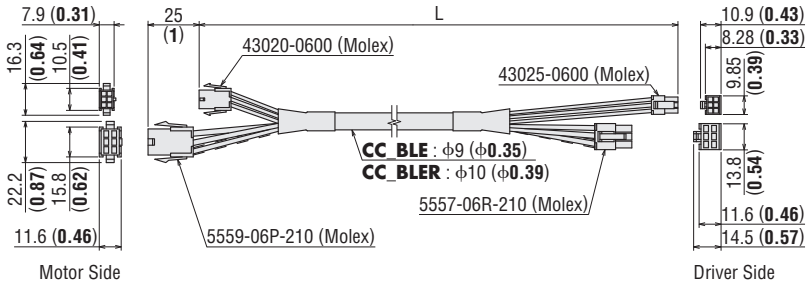
◇Connection Cable

Product Name	Length L m (ft.)	List Price
CC01BLE	1 (3.3)	$37.00
CC02BLE	2 (6.6)	$52.00
CC03BLE	3 (9.8)	$67.00
CC05BLE	5 (16.4)	$97.00
CC07BLE	7 (23.0)	$127.00
CC10BLE	10 (32.8)	$172.00

◇Flexible Connection Cables

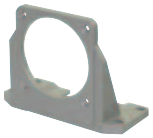
Product Name	Length L m (ft.)	List Price
CC01BLER	1(3.3)	$75.00
CC02BLER	2 (6.6)	$105.00
CC03BLER	3 (9.8)	$135.00
CC05BLER	5 (16.4)	$194.00
CC07BLER	7 (23.0)	$254.00
CC10BLER	10 (32.8)	$344.00

◇Connection Cable, Flexible Connection Cables



Motor and Gearhead Mounting Bracket

These dedicated mounting brackets are for mounting motors and gearheads.



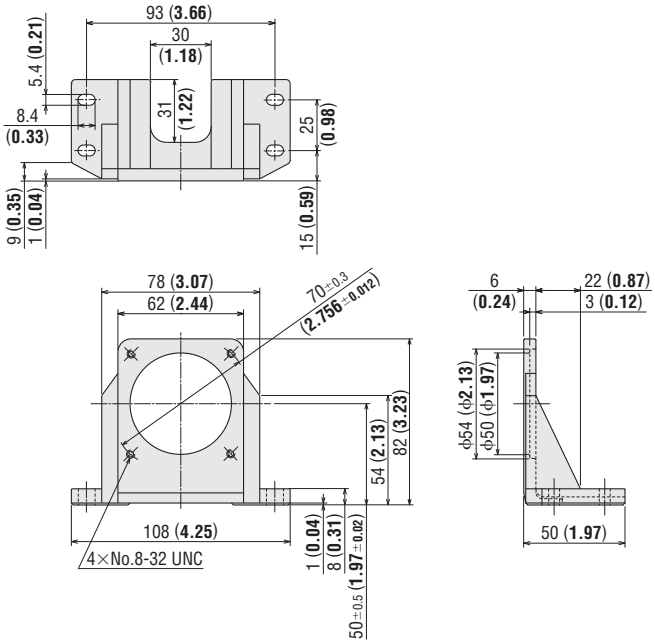
Product Line

Product Name	Applicable Product	List Price
SOL2U08F	**BMU230, BMU260**	$22.00
SOL4UAF	**BMU460S**	$27.00
SOL5UBF	**BMU5120**	$29.00

Dimensions Unit mm (in.)

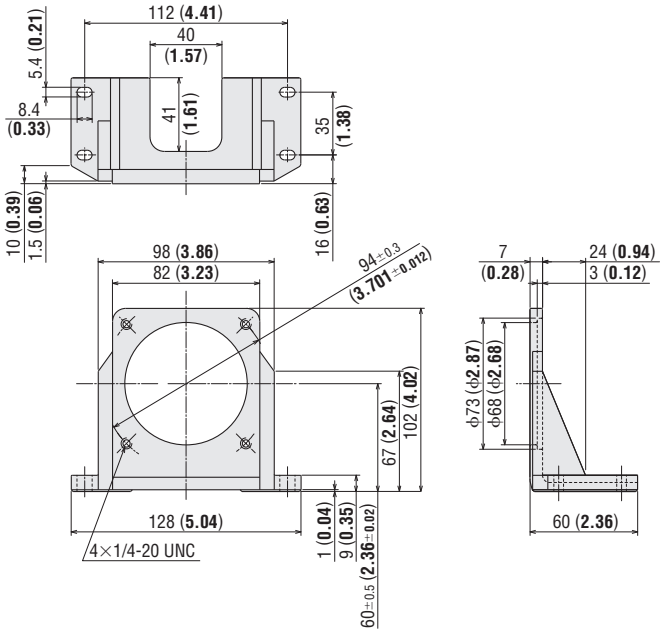
SOL2U08F

Mass: 140 g (4.9 oz)



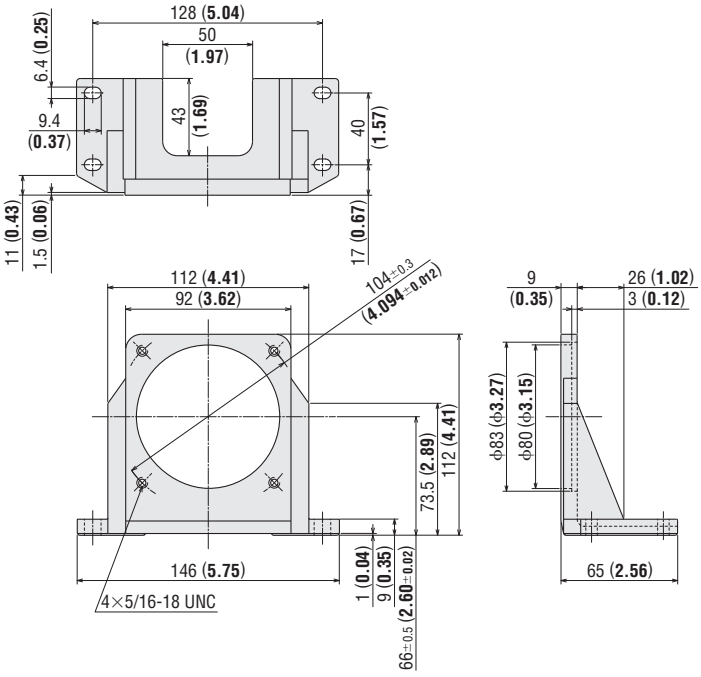
SOL4UAF

Mass: 210 g (7.4 oz)



SOL5UBF

Mass: 280 g (9.9 oz)



Flexible Couplings

These are clamp type couplings for connecting the motor/gearhead shaft with the driven shaft.

Product Line

Product Name	Applicable Product	List Price
MCL30 Type	**BMU230** Combination Type	$51.00
MCL40 Type	**BMU460S** Combination Type	$76.00
MCL55 Type	**BMU5120** Combination Type	$97.00

For details, check the Oriental Motors website or contact the Oriental Motor sales office.
www.orientalmotor.com

Safety Precautions

- To ensure correct operation, carefully read the Operating Manual before using it.
- The products listed in this catalog are for industrial use and for built-in components. Do not use for any other applications.

- The content listed in this catalog such as performance and specifications of the products are subject to change without notice for improvements.
- For details of the products, please contact the nearest dealer, sales office or Customer Service Center.
- ***Orientalmotor*** is registered trademark or trademark of Oriental Motor in Japan and other countries.

Specifications are subject to change without notice. This catalog was published in March, 2014.

ORIENTAL MOTOR U.S.A. CORP.

Western Sales and Customer Service Center
Tel: (310) 715-3301 Fax: (310) 225-2594

Los Angeles
Tel: (310) 715-3301

San Jose
Tel: (408) 392-9735

Midwest Sales and Customer Service Center
Tel: (847) 871-5900 Fax: (847) 472-2623

Chicago
Tel: (847) 871-5900

Dallas
Tel: (214) 432-3386

Toronto
Tel: (905) 502-5333

Eastern Sales and Customer Service Center
Tel: (781) 848-2426 Fax: (781) 848-2617

Boston
Tel: (781) 848-2426

Charlotte
Tel: (704) 766-1335

New York
Tel: (973) 359-1100

Technical Support
Tel: (800) 468-3982 / 8:30 A.M. to 5:00 P.M., P.S.T. (M–F)
7:30 A.M. to 5:00 P.M., C.S.T. (M–F)
E-mail: techsupport@orientalmotor.com

Obtain Specifications, Online Training and Purchase Products at:
www.orientalmotor.com

Printed in USA 14P 4.77 C #443