

**RoHS** RoHS-Compliant

Brushless DC Motor and Driver Package

# BLU Series

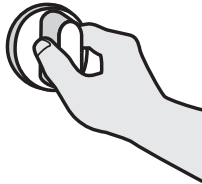
● Additional Information  
 Technical reference → Page F-1  
 Safety standards → Page G-2

The **BLU** Series combines a brushless DC motor and a panel-installation type driver, enabling speed control via simple wiring and easy operation. Choose a parallel gearhead, or a hollow shaft flat gearhead that saves installation space on your equipment.

## Features

### ● Easy Connection, Easy Operation

The motor can be connected simply by plugging the connector into the driver. There is no need for troublesome wiring. The motor speed can be set using the potentiometer on the front panel.



### ● External Control Possible

Start/stop, rotation direction switching and instantaneous stop can be controlled using external signals. You can also switch between the source logic and sink logic in accordance with the output type of your controller.

### ● Speed Control Range

100 to 2000 r/min (speed ratio 1:20)

### ● IP65 Motor Structure

The motor is protected against water intrusion, should water come into contact with the motor.

- The motor must not be washed with water, and is not suitable for use in an environment where it constantly comes into contact with water.

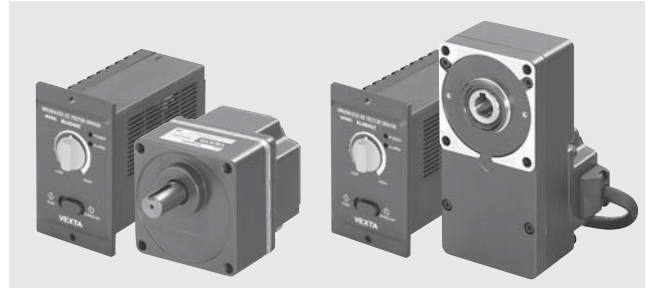
### ● **RoHS** RoHS-Compliant

The **BLU** Series conforms to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium.

- Details of RoHS Directive → Page G-23



- List of safety standard approved products (Model, Standards, File No., Certification Body) → Page G-10



### ● Long Life Gearhead Rating of 10000 Hours

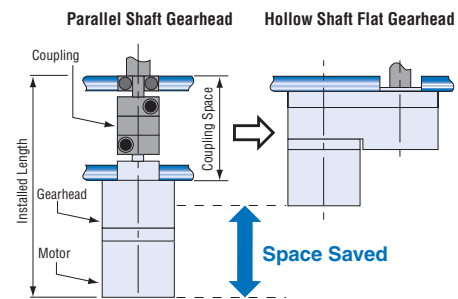
The rated life of the parallel shaft gearhead and hollow shaft flat gearhead is 10000 hours. The parallel shaft gearhead achieves a rated life of twice as long as that of a conventional gearhead.

- The 90 W parallel shaft gearhead has a tapped hole at the shaft tip.

### ● Features of Hollow Shaft Flat Gearhead

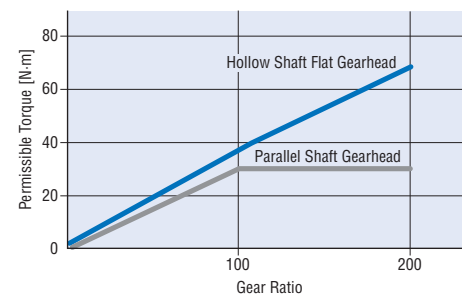
#### ◇ Space-Saving and Low-Cost

The output shaft can be coupled directly to a drive shaft without using a coupling. The flexible installation modes, such as installation on either the front or rear face or by using the center shaft, allow you to reduce the size and installation space of your equipment. Since no shaft-coupling parts are needed, the parts cost and labor will also decrease.



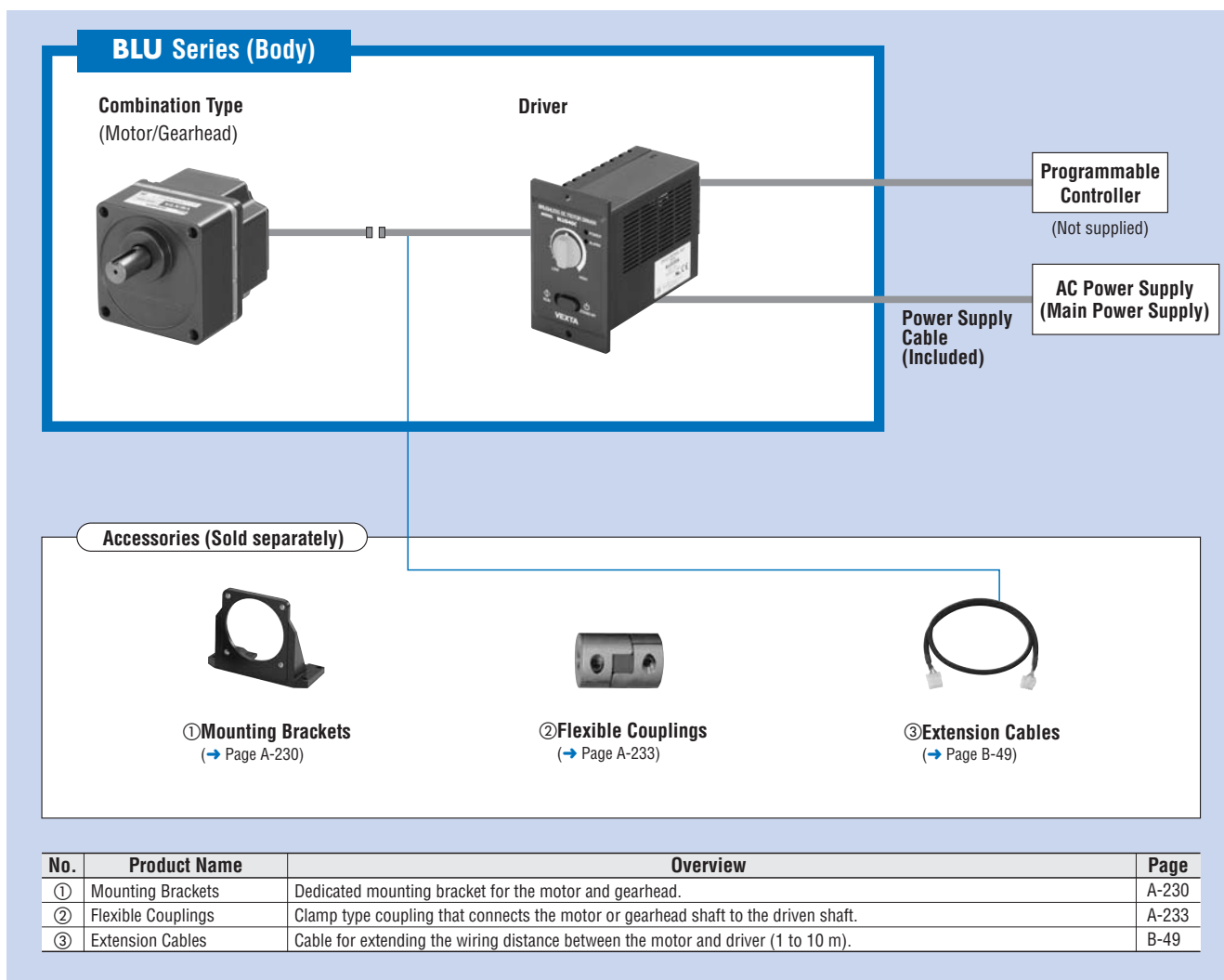
#### ◇ High Permissible Torque

While the permissible torque of the parallel shaft gearhead saturates at high gear ratios, the hollow shaft flat gearhead enables the motor torque to be fully utilized.



## System Configuration

### Combination Type – Parallel Shaft Gearhead/Round Shaft Type



### Example of System Configuration

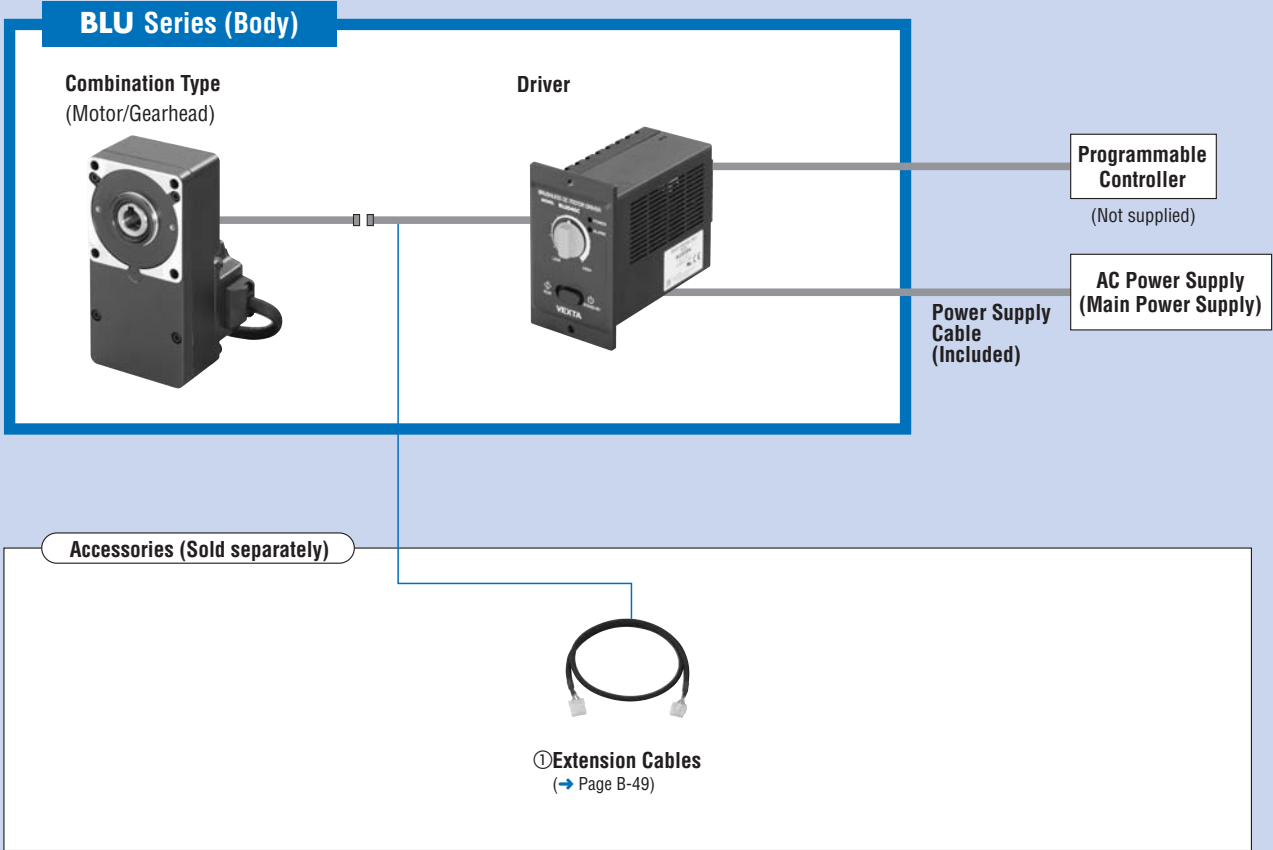
(Body)

(Sold separately)

<b>BLU Series</b> Combination Type – Parallel Shaft <b>BLU440C-30</b>	+	<b>Extension Cable (1 m)</b> <b>CC01AXU</b>	<b>Mounting Bracket</b> <b>SOL4M6</b>	<b>Flexible Coupling</b> <b>MCL551515</b>
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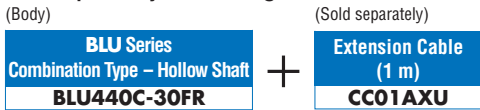
●The system configuration shown above is an example. Other combinations are available.

● Combination Type – Hollow Shaft Flat Gearhead



No.	Product Name	Overview	Page
①	Extension Cables	Cable for extending the wiring distance between the motor and driver (1 to 10 m).	B-49

● Example of System Configuration



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

■ Product Number Code

**BLU 4 40 C - 5 FR**

① ② ③ ④ ⑤ ⑥

①	Series	<b>BLU: BLU</b> Series
②	Motor Frame Size	<b>2:</b> 60 mm <b>4:</b> 80 mm <b>5:</b> 90 mm
③	Output Power (W)	(Example) <b>40:</b> 40 W
④	Power Supply Voltage	<b>A:</b> Single-Phase 100-115 VAC <b>C:</b> Single-Phase 200-230 VAC <b>S:</b> Three-Phase 200-230 VAC
⑤	Gear Ratio/Shaft Type	Number: Gear ratio for combination types: 8 types from <b>5</b> to <b>200</b> <b>A:</b> Round Shaft Type <b>GFS: GFS</b> Type Pinion Shaft
⑥		Blank: Combination Type – Parallel Shaft Gearhead <b>FR:</b> Combination Type – Hollow Shaft Flat Gearhead

## Product Line

**Combination Type** The combination type comes with the motor and its dedicated gearhead pre-assembled, which simplifies installation in equipment. Motors and gearheads are also available separately to facilitate changes or repairs.

### ● Combination Type – Parallel Shaft Gearhead

Output Power	Power Supply Voltage	Model	Gear Ratio	Page
20 W	Single-Phase 100-115 VAC	<b>BLU220A-□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*
	Single-Phase 200-230 VAC	<b>BLU220C-□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU220S-□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*
40 W	Single-Phase 100-115 VAC	<b>BLU440A-□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*
	Single-Phase 200-230 VAC	<b>BLU440C-□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU440S-□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*
90 W	Single-Phase 100-115 VAC	<b>BLU590A-□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*
	Single-Phase 200-230 VAC	<b>BLU590C-□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU590S-□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*

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

\* For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

The following items are included in each product.

Motor, Driver, Gearhead, Power Supply Cable, Mounting Screws for Driver, Short Circuit Bar, Mounting Screws, Parallel Key, Operating Manual

### ● Round Shaft Type

Output Power	Power Supply Voltage	Model	Page
20 W	Single-Phase 100-115 VAC	<b>BLU220A-A</b>	*
	Single-Phase 200-230 VAC	<b>BLU220C-A</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU220S-A</b>	*
40 W	Single-Phase 100-115 VAC	<b>BLU440A-A</b>	*
	Single-Phase 200-230 VAC	<b>BLU440C-A</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU440S-A</b>	*
90 W	Single-Phase 100-115 VAC	<b>BLU590A-A</b>	*
	Single-Phase 200-230 VAC	<b>BLU590C-A</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU590S-A</b>	*

\* For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

The following items are included in each product.

Motor, Driver, Power Supply Cable, Mounting Screws for Driver, Short Circuit Bar, Operating Manual

### ● Gearhead

#### ◇ Parallel Shaft Gearhead

Output Power of Applicable Motor (Pinion Shaft Type)	Gearhead Model	Gear Ratio
20 W	<b>GFS2G□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
40 W	<b>GFS4G□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
90 W	<b>GFS5G□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>

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

The following items are included in each product.

Gearhead, Screws for Connecting Motor and Gearhead, Mounting Screws, Parallel Key, Operating Manual

### ● Combination Type – Hollow Shaft Flat Gearhead

Output Power	Power Supply Voltage	Model	Gear Ratio	Page
20 W	Single-Phase 100-115 VAC	<b>BLU220A-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*
	Single-Phase 200-230 VAC	<b>BLU220C-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU220S-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*
40 W	Single-Phase 100-115 VAC	<b>BLU440A-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*
	Single-Phase 200-230 VAC	<b>BLU440C-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU440S-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*
90 W	Single-Phase 100-115 VAC	<b>BLU590A-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*
	Single-Phase 200-230 VAC	<b>BLU590C-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU590S-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>	*

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

\* For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

The following items are included in each product.

Motor, Driver, Gearhead, Power Supply Cable, Mounting Screws for Driver, Short Circuit Bar, Mounting Screws, Parallel Key, Safety Cover (with screws), Operating Manual

### ● Pinion Shaft Type

Output Power	Power Supply Voltage	Model	Page
20 W	Single-Phase 100-115 VAC	<b>BLU220A-GFS</b>	*
	Single-Phase 200-230 VAC	<b>BLU220C-GFS</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU220S-GFS</b>	*
40 W	Single-Phase 100-115 VAC	<b>BLU440A-GFS</b>	*
	Single-Phase 200-230 VAC	<b>BLU440C-GFS</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU440S-GFS</b>	*
90 W	Single-Phase 100-115 VAC	<b>BLU590A-GFS</b>	*
	Single-Phase 200-230 VAC	<b>BLU590C-GFS</b>	B-38
	Three-Phase 200-230 VAC	<b>BLU590S-GFS</b>	*

\* For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

The following items are included in each product.

Motor, Driver, Power Supply Cable, Mounting Screws for Driver, Short Circuit Bar, Operating Manual

#### ◇ Hollow Shaft Flat Gearhead

Output Power of Applicable Motor (Pinion Shaft Type)	Gearhead Model	Gear Ratio
20 W	<b>GFS2G□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
40 W	<b>GFS4G□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
90 W	<b>GFS5G□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>

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

The following items are included in each product.

Gearhead, Screws for Connecting Motor and Gearhead, Mounting Screws, Parallel Key, Safety Cover (with screws), Operating Manual

## Specifications

● 20 W, 40 W, 90 W (RoHS)



Model	Combination Type – Parallel Shaft Gearhead		BLU220C-□	BLU440C-□	BLU590C-□
	Combination Type – Hollow Shaft Flat Gearhead		BLU220C-□FR	BLU440C-□FR	BLU590C-□FR
	Round Shaft Type		BLU220C-A	BLU440C-A	BLU590C-A
Rated Output Power (Continuous)	W		20	40	90
Power Source	Rated Voltage	VAC	Single-Phase 200-230		
	Permissible Voltage Range		±10%		
	Rated Frequency	Hz	50/60		
	Permissible Frequency Range		±5%		
	Rated Input Current	A	0.55	0.85	1.45
	Maximum Input Current	A	0.9	1.4	2.4
Rated Torque	N·m	0.1	0.2	0.45	
Starting Torque*	N·m	0.12	0.24	0.54	
Rated Speed	r/min	2000			
Speed Control Range	r/min	100~2000			
Round Shaft Type Permissible Load Inertia	J×10 <sup>-4</sup> kg·m <sup>2</sup>	1.25	2.5	5.6	
Rotor Inertia	J×10 <sup>-4</sup> kg·m <sup>2</sup>	0.086	0.234	0.611	
Speed Regulation	Load	±0.5% max. (0~Rated torque, at rated speed, at rated voltage, at normal ambient temperature)			
	Voltage	±0.5% max. (Rated voltage ±10%, at rated speed, with no load, at normal ambient temperature)			
	Temperature	±0.5% max. (0~+40°C, at rated speed, with no load, at rated voltage)			

\*The time during which the starting torque is effective is no more than 5 seconds and at 1500 r/min or below.

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

● The values for each specification apply to the motor only.

● In addition to the products shown above, the products for single-phase 100-115 VAC and three-phase 200-230 VAC are also available. Please contact the nearest Oriental Motor sales office.

## Common Specifications

Item	Specifications
Speed Setting Method	Speed potentiometer on front panel
Acceleration/Deceleration Time	0.5~10 sec. (at 2000 r/min with no load) (The actual speed may change by load condition.) A common value is set using the acceleration/deceleration time potentiometer provided at the back of the front panel.
Input Signal	Photocoupler input (Reinforced insulation photocoupler) Input resistance 2 kΩ Internal power supply voltage 14 V Operated by internal power supply Common to CW input and CCW input Source logic or sink logic ... Switchable using a select switch Factory setting: source logic
Output Signal	Open-collector output (Reinforced insulation photocoupler) Operated by external power supply Use condition 4.5~26.4 VDC, 0.5~10 mA Common to Alarm output and Speed output
Protective Function*	When the following are activated, the motor will coast to a stop and the ALARM output will be OFF. When the overload protective function is activated, the alarm LED on the driver will blink. The alarm LED will illuminate steadily in the event of actuation of any other protective function. <ul style="list-style-type: none"> <li>Overload protection: Activated when the motor load exceeds rated torque for a minimum of 5 seconds.</li> <li>Overvoltage protection: Activated when the voltage applied to the driver exceeds 115 VAC or 230 VAC by a minimum of approximately 20%, a gravitational operation is performed or a load exceeding the permissible load inertia is driven.</li> <li>Motor sensor error: Activated when the sensor wire inside the motor cable is disconnected during motor operation.</li> <li>Undervoltage protection: Activated when the voltage applied to the driver falls below 100 VAC or 200 VAC by a minimum of approximately 30%.</li> <li>Overspeed protection: Activated when the motor speed exceeds 2500 r/min.</li> </ul>
Maximum Extension Distance	Motor/Driver Distance: 10.5 m (when an accessory <b>CC10AXU</b> extension cable is used)
Timing Rating	Continuous

\*With the **BLU** Series, the motor speed cannot be controlled in a gravitational operation or other application where the motor shaft is turned by the load. When a load exceeding the permissible load inertia is driven or a gravitational operation is performed, the overvoltage 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 terminal and the protective earth terminal, and between the power supply terminal and the signal I/O 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.	Sufficient to withstand 1.8 kVAC at 50 Hz applied between the power supply terminal and the protective earth terminal for 1 minute, and 3 kVAC at 50 Hz applied between the power supply terminal and the signal I/O terminal for 1 minute after continuous operation under normal ambient temperature and humidity.
Temperature Rise	60°C or less in the windings, and 50°C or less in the case*1 as measured by the thermocouple method after continuous operation at normal temperature and humidity.	—
Operating Environment	Ambient Temperature	UL, CSA: 0~+40°C (non-freezing) EN: 0~+50°C (non-freezing)
	Ambient Humidity	85% or less (non-condensing)
	Altitude	Up to 1000 m above sea level
	Atmosphere	No corrosive gases or dust. Cannot be used in a radioactive area, magnetic field, vacuum or other special environment
	Vibration	Not subject to continuous vibration or excessive impact In conformance with JIS C 60068-2-6, "Sine-wave vibration test method" Frequency range: 10~55 Hz Pulsating amplitude: 0.15 mm Sweep direction: 3 directions (X, Y, Z) Number of sweeps: 20 times
Storage Condition*2	Ambient Temperature	-25~+70°C (non-freezing)
	Ambient Humidity	85% or less (non-condensing)
	Altitude	Up to 3000 m above sea level
Insulation Class	UL, CSA: class A (105°C) EN: class E (120°C)	—
Degree of Protection	IP65 (Excluding the mounting surface of the round shaft type and connectors)	IP10

\*1 For round shaft types, please attach to the heat radiation plate (material: aluminum) of the following sizes to maintain a maximum motor case temperature of 90°C.

**BLU220C-A:** 135×135 mm, 5 mm thick

**BLU440C-A:** 165×165 mm, 5 mm thick

**BLU590C-A:** 200×200 mm, 5 mm thick

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

### Note:

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

## Gearmotor – Torque Table of Combination Type

### Combination Type – Parallel Shaft Gearhead

Unit = N·m

Model	Gear Ratio	5	10	15	20	30	50	100	200
	Speed Range r/min	20~400	10~200	6.7~133.3	5~100	3.3~66.7	2~40	1~20	0.5~10
<b>BLU220C-□</b>		0.45	0.9	1.4	1.8	2.6	4.3	6	6
<b>BLU440C-□</b>		0.9	1.8	2.7	3.6	5.2	8.6	16	16
<b>BLU590C-□</b>		2	4.1	6.1	8.1	11.6	19.4	30	30

- Enter the gear ratio in the box (□) within the model name.

- A colored background (□) indicates gear shaft rotation in the same direction as the motor shaft, while the others rotate in the opposite direction.

### Combination Type – Hollow Shaft Flat Gearhead

Unit = N·m

Model	Gear Ratio	5	10	15	20	30	50	100	200
	Speed Range r/min	20~400	10~200	6.7~133.3	5~100	3.3~66.7	2~40	1~20	0.5~10
<b>BLU220C-□FR</b>		0.4	0.85	1.3	1.7	2.6	4.3	8.5	17
<b>BLU440C-□FR</b>		0.85	1.7	2.6	3.4	5.1	8.5	17	34
<b>BLU590C-□FR</b>		1.9	3.8	5.7	7.7	11.5	19.1	38.3	68

- Enter the gear ratio in the box (□) within the model name.

- The flat gearhead rotates in the opposite direction to the motor when viewed from the front of the gearhead. It rotates in the same direction as the motor when viewed from the rear (motor mounting surface) of the gearhead.

Rotation direction of the hollow shaft flat gearhead → Page B-48

## ■ Permissible Overhung Load and Permissible Thrust Load

### ● Combination Type – Parallel Shaft Gearhead

Model	Gear Ratio	Permissible Overhung Load		Permissible Thrust Load N
		10 mm from Shaft End N	20 mm from Shaft End N	
<b>BLU220C-□</b>	<b>5</b>	100	150	40
	<b>10, 15, 20</b>	150	200	
	<b>30, 50, 100, 200</b>	200	300	
<b>BLU440C-□</b>	<b>5</b>	200	250	100
	<b>10, 15, 20</b>	300	350	
	<b>30, 50, 100, 200</b>	450	550	
<b>BLU590C-□</b>	<b>5</b>	300	400	150
	<b>10, 15, 20</b>	400	500	
	<b>30, 50, 100, 200</b>	500	650	

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

### ● Combination Type – Hollow Shaft Flat Gearhead

Model	Gear Ratio	Permissible Overhung Load		Permissible Thrust Load N
		10 mm from Mounting Surface of Gearhead N	20 mm from Mounting Surface of Gearhead N	
<b>BLU220C-□FR</b>	<b>5, 10</b>	450	370	200
	<b>15, 20, 30, 50, 100, 200</b>	500	400	
<b>BLU440C-□FR</b>	<b>5, 10</b>	800	660	400
	<b>15, 20, 30, 50, 100, 200</b>	1200	1000	
<b>BLU590C-□FR</b>	<b>5, 10</b>	900	770	500
	<b>15, 20</b>	1300	1110	
	<b>30, 50, 100, 200</b>	1500	1280	

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

### ● Round Shaft Type

Model	Permissible Overhung Load		Permissible Thrust Load
	10 mm from Shaft End N	20 mm from Shaft End N	
<b>BLU220C-A</b>	70	100	The permissible thrust load shall be no greater than half the motor mass.
<b>BLU440C-A</b>	120	140	
<b>BLU590C-A</b>	160	170	

## ■ Permissible Load Inertia of Combination Type: J

### ● Combination Type – Parallel Shaft Gearhead

Unit =  $\times 10^{-4}$  kg-m<sup>2</sup>

Model \ Gear Ratio	5	10	15	20	30	50	100	200
<b>BLU220C-□</b>	1.55	6.2	14	24.8	55.8	155	155	155
<b>BLU440C-□</b>	5.5	22	49.5	88	198	550	550	550
<b>BLU590C-□</b>	25	100	225	400	900	2500	2500	2500

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

### ● Combination Type – Hollow Shaft Flat Gearhead

Unit =  $\times 10^{-4}$  kg-m<sup>2</sup>

Model \ Gear Ratio	5	10	15	20	30	50	100	200
<b>BLU220C-□FR</b>	1.55	6.2	14	24.8	55.8	155	155	155
<b>BLU440C-□FR</b>	5.5	22	49.5	88	198	550	550	550
<b>BLU590C-□FR</b>	25	100	225	400	900	2500	2500	2500

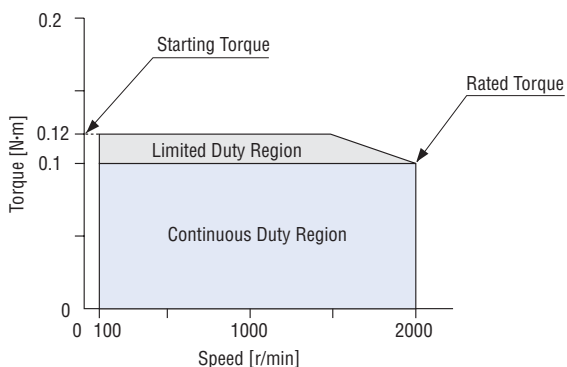
● Enter the gear ratio in the box (□) within the model name.

## Speed – Torque Characteristics

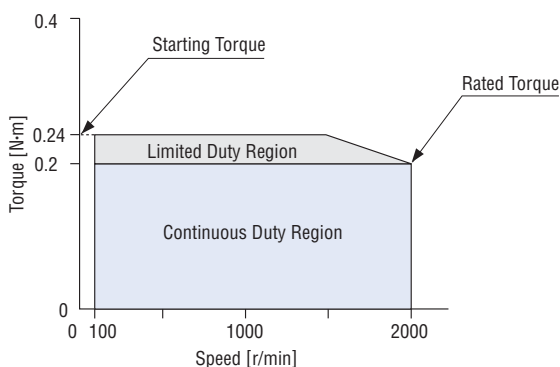
Continuous Duty Region: Continuous operation is possible in this region.

Limited Duty Region: This region is used primarily when accelerating. When a load that exceeds the rated torque is applied continuously for approximately five seconds, overload protection is activated and the motor coasts to a stop.

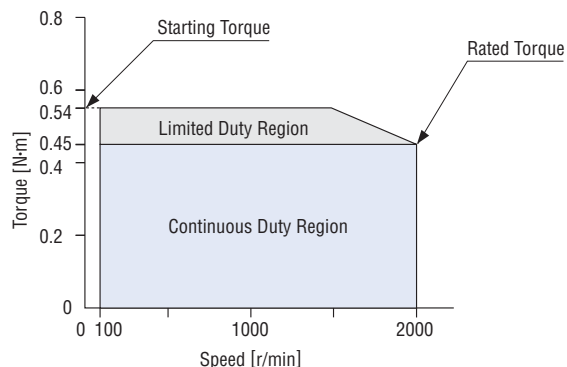
**BLU220C-□/BLU220C-□FR/BLU220C-A**



**BLU440C-□/BLU440C-□FR/BLU440C-A**



**BLU590C-□/BLU590C-□FR/BLU590C-A**



- The characteristics shown above are applicable for the motors only.
- Enter the gear ratio in the box (□) within the model name.



## Dimensions (Unit = mm)

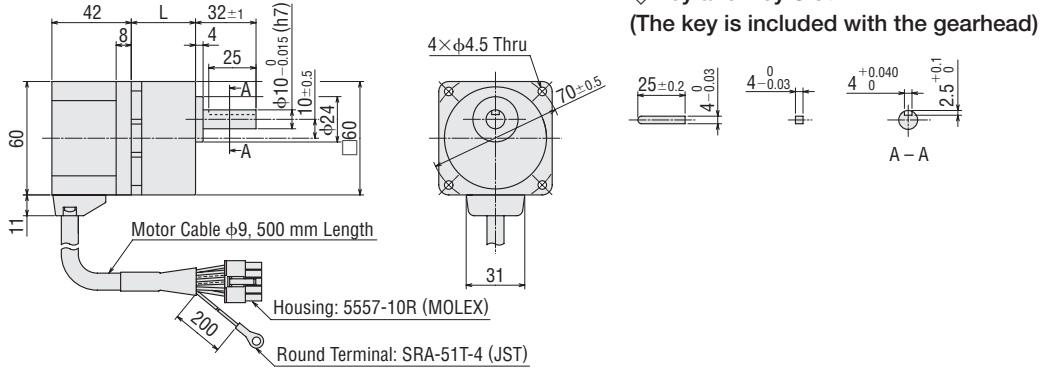
● Mounting screws are included with the combination type. Dimensions for mounting screws → Page B-72

● 20 W

### ◇ Motor/Parallel Shaft Gearhead

Model	Motor Model	Gearhead Model	Gear Ratio	L
BLU220C-□	BLUM220-GFS	GFS2G□	5~20	34
			30~100	38
			200	43

Mass: 1.0 kg (Including gearhead)



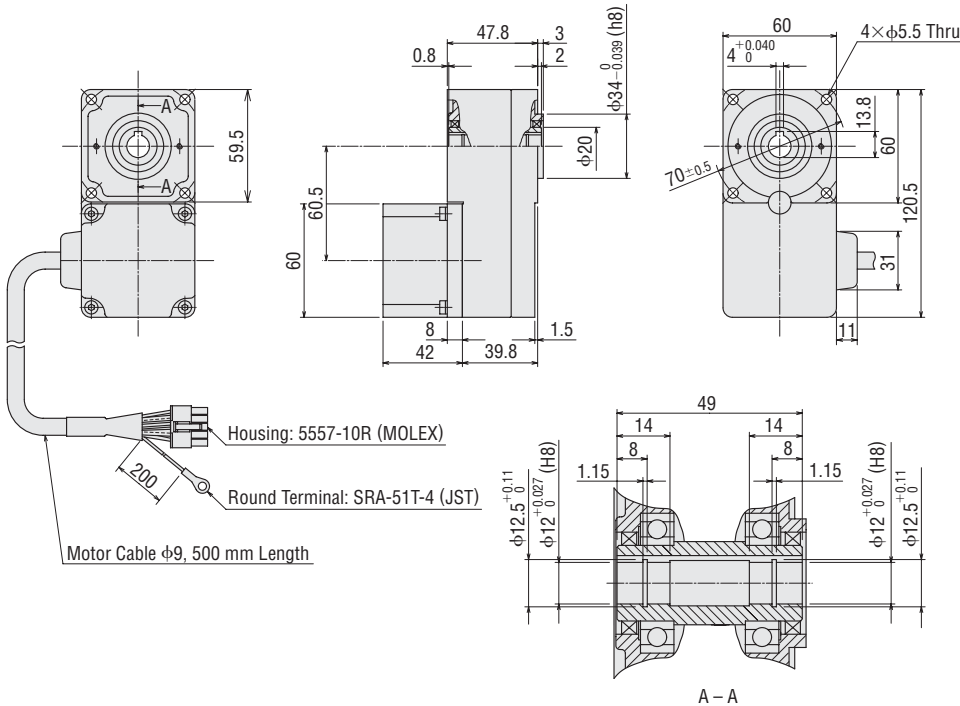
### ◇ Motor/Hollow Shaft Flat Gearhead

#### BLU220C-□FR

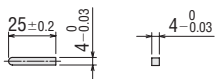
Motor: BLUM220-GFS

Gearhead: GFS2G□FR

Mass: 1.3 kg (Including gearhead)



### ◇ Key (Included)

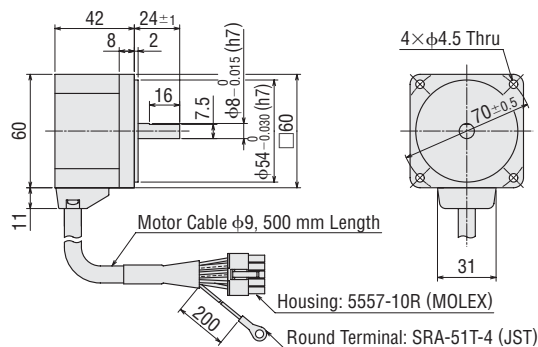


### ◇ Round Shaft Type

#### BLU220C-A

Motor: BLUM220-A

Mass: 0.5 kg



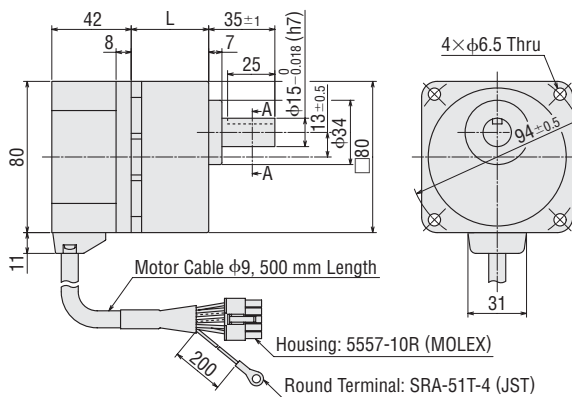
● Enter the gear ratio in the box (□) within the model name.

● 40 W

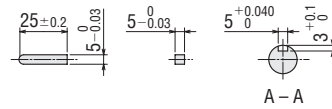
◇ Motor/Parallel Shaft Gearhead

Model	Motor Model	Gearhead Model	Gear Ratio	L
<b>BLU440C</b> -□	BLUM440-GFS	GFS4G□	<b>5~20</b>	41
			<b>30~100</b>	46
			<b>200</b>	51

Mass: 1.8 kg (Including gearhead)



◇ Key and Key Slot  
(The key is included with the gearhead)



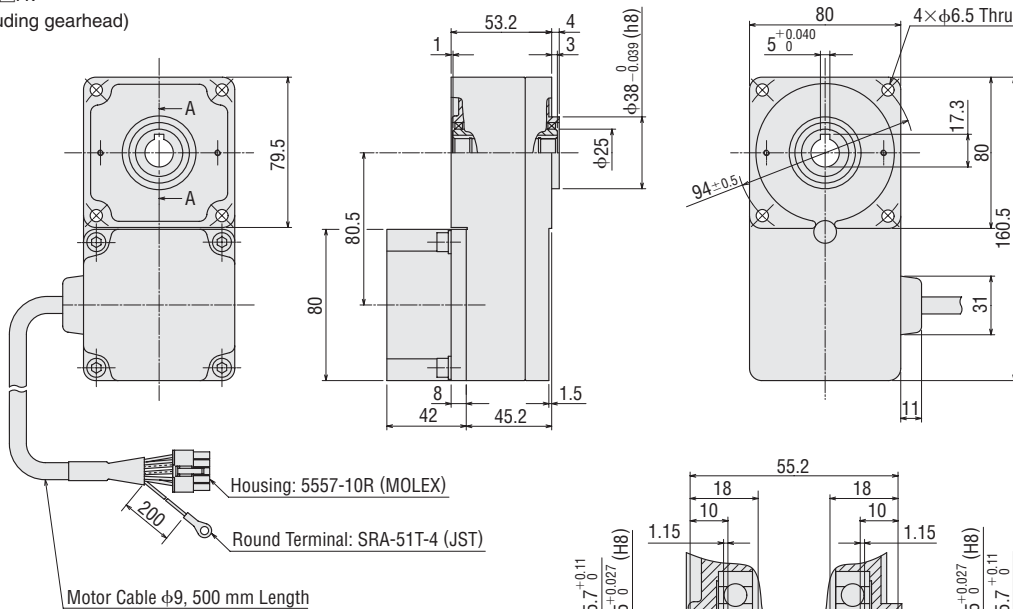
◇ Motor/Hollow Shaft Flat Gearhead

**BLU440C**-□FR

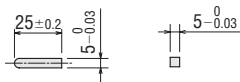
Motor: BLUM440-GFS

Gearhead: GFS4G□FR

Mass: 2.4 kg (Including gearhead)



◇ Key (Included)

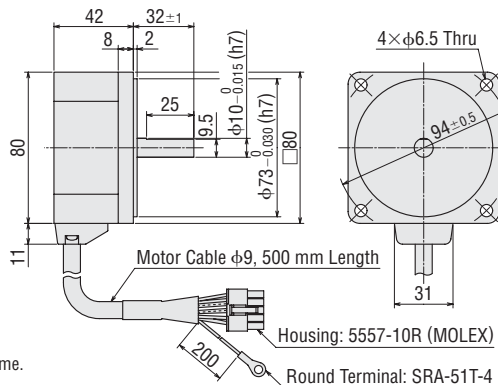


◇ Round Shaft Type

**BLU440C**-A

Motor: BLUM440-A

Mass: 0.8 kg



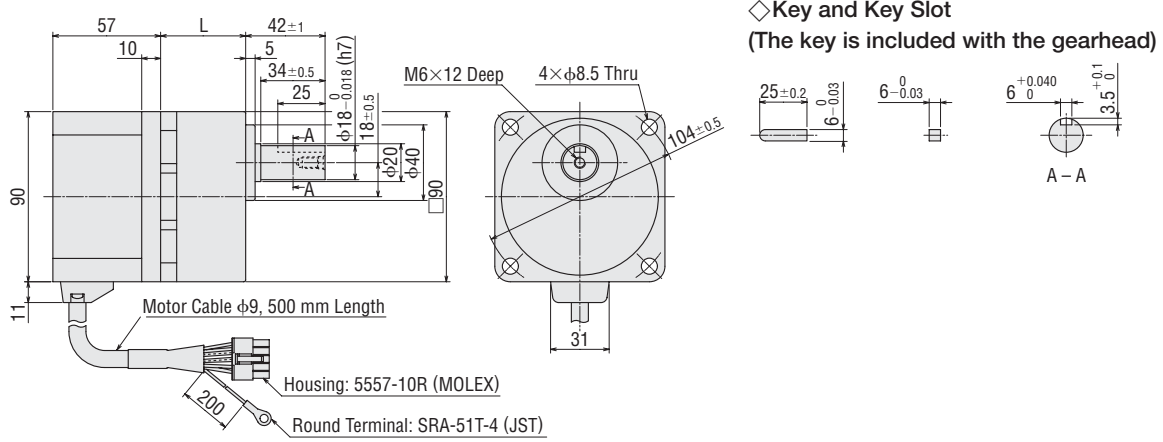
● Enter the gear ratio in the box (□) within the model name.

● 90 W

◇ Motor/Parallel Shaft Gearhead

Model	Motor Model	Gearhead Model	Gear Ratio	L
<b>BLU590C</b> -□	BLUM590-GFS	GFS5G□	<b>5~20</b>	45
			<b>30~100</b>	58
			<b>200</b>	64

Mass: 2.9 kg (Including gearhead)



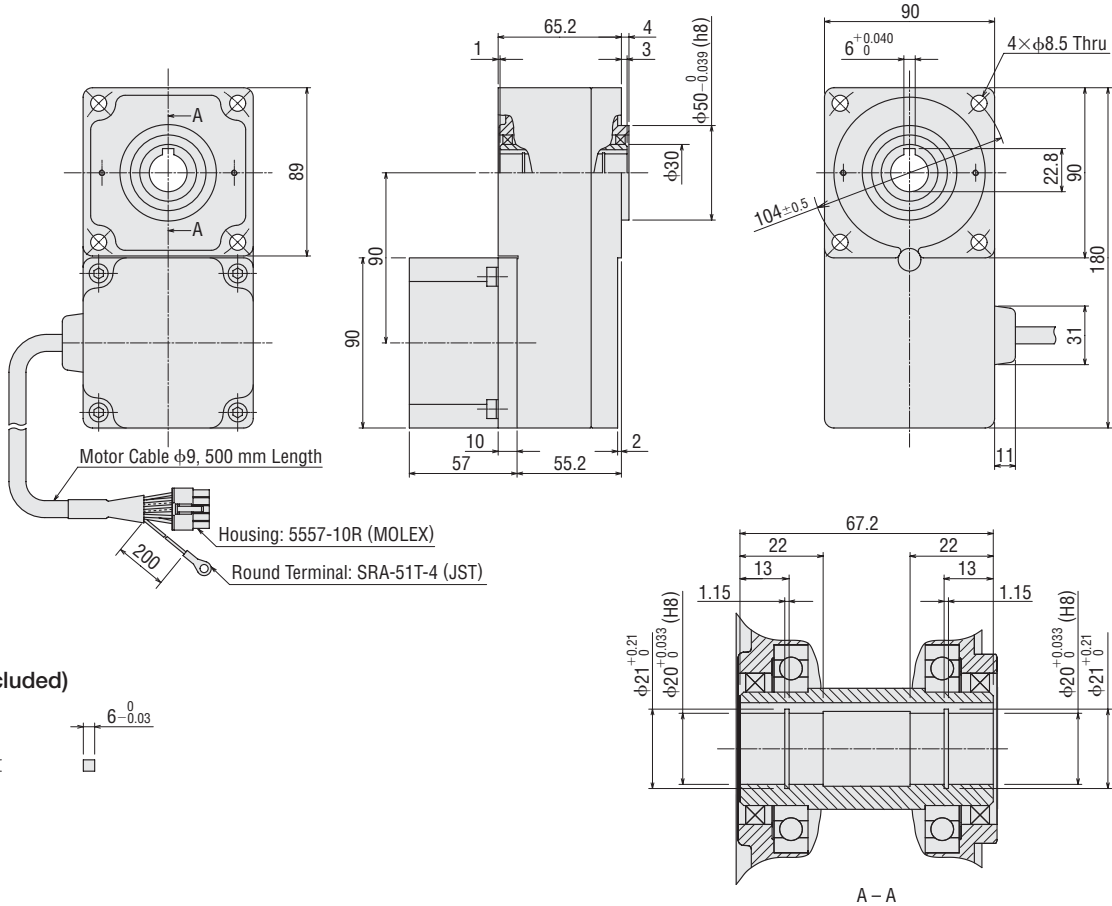
◇ Motor/Hollow Shaft Flat Gearhead

**BLU590C**-□FR

Motor: BLUM590-GFS

Gearhead: GFS5G□FR

Mass: 3.6 kg (Including gearhead)



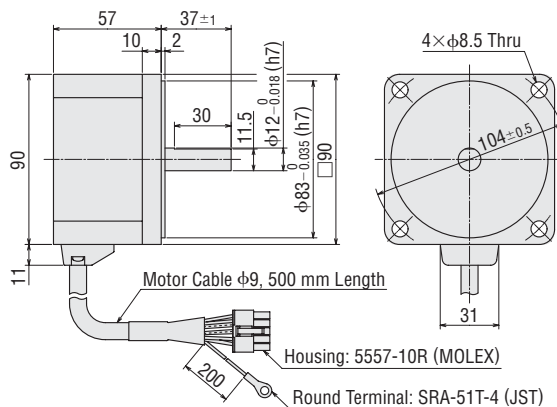
● Enter the gear ratio in the box (□) within the model name.

◇ Round Shaft Type

**BLU590C-A**

Motor: BLUM590-A

Mass: 1.4 kg



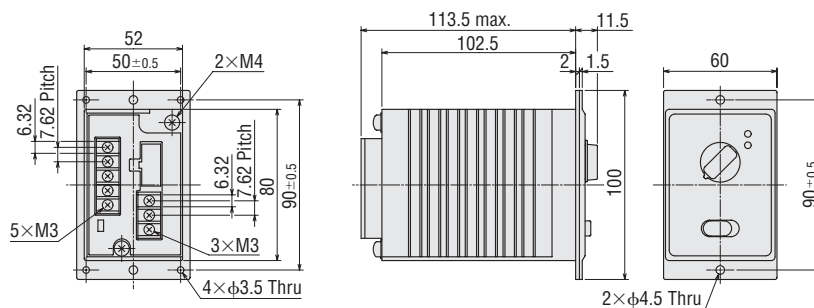
◇ Driver (Common to all models)

BLUD20C

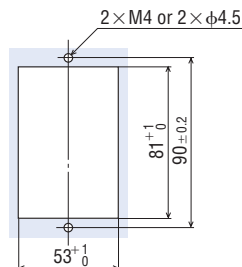
BLUD40C

BLUD90C

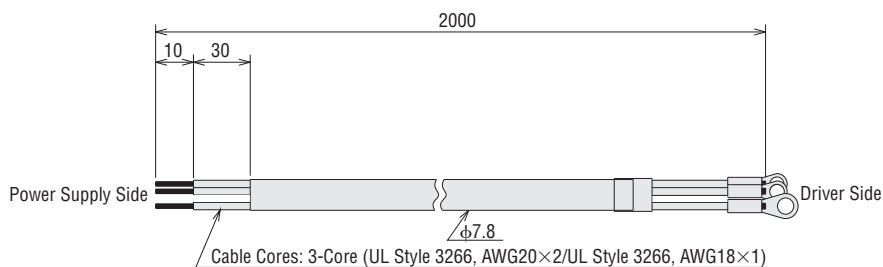
Mass: 0.4 kg



◇ Driver Panel Cut-Out



◇ Driver Power Supply Cable (Included, common to all models)



## Connection and Operation

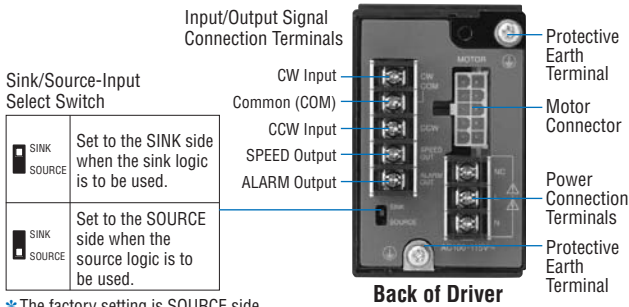
### Names and Functions of Driver Parts

**Speed Potentiometer**  
Turning the potentiometer clockwise causes the speed to increase. Speed setting range is 100~2000 r/min. The factory setting is 0 r/min.

**RUN/STAND-BY Switch**



Front of Driver



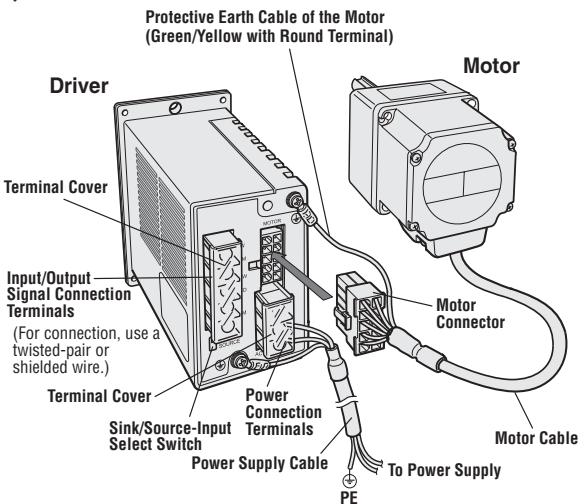
\*The factory setting is SOURCE side.

#### Notes:

- The RUN/STAND-BY switch is not a power ON/OFF switch.
- When you want to stop the motor for an extended period, turn off the driver power.

### Connection Diagrams

#### Motor and Driver Connection



#### Motor Connection

Insert the motor cable connector into the motor connector (MOTOR) on the driver. To extend the distance between the motor and driver, use an accessory dedicated extension cable. The connection can be extended to a maximum of 10.5 m.

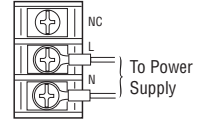
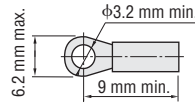
Connect the motor's protective earth cable (green/yellow) to the driver, as shown in the figure. If you are using an extension cable or the motor can be accessed directly by hands, connect the protective earth cable from the motor directly to ground. If the protective earth cable is not long enough, connect a lead wire of AWG18 (0.75 mm<sup>2</sup>) or thicker to the protective earth cable of the motor cable and connect it to ground over the shortest distance. The lead wire must be provided by the user. The accessory dedicated extension cable does not come with a protective earth cable. If you are using the accessory dedicated extension cable, provide grounding at a relay point or extend the cable to an appropriate grounding point.

#### Power Connection

Connect the included power supply cable to the power connection terminals of the driver. Connect the red and black lead wires to the power connection terminals, and green/yellow lead wire to the protective earth terminal. When the included power supply cable is not used, use a cable of AWG22 (0.3 mm<sup>2</sup>) or thicker. For the protective earth cable, use a cable of AWG18 (0.75 mm<sup>2</sup>) or thicker.

Recommended Crimp Terminals  
Round Terminal with Insulation (M3)

Single-Phase 200-230 VAC

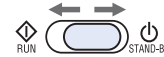


#### Operation

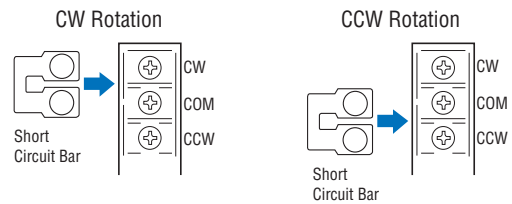
The direction of motor rotation is as viewed from the output shaft end of the motor. "CW" indicates clockwise direction, while "CCW" indicates counterclockwise direction.

#### Stand Alone Operation

When the RUN/STAND-BY switch is set to the "RUN" position, the motor will run. When it is set to the "STAND-BY" position, the motor will stop.

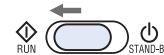


The direction of rotation depends on how the short circuit bar at the back of driver is connected. Connect the short circuit bar between the CW and COM or CCW and COM. Do not use the short circuit bar for any other purpose.



#### Operation Using External Signals

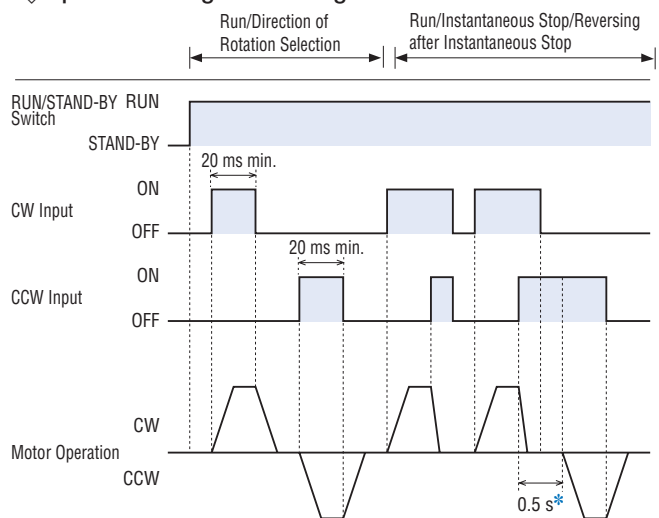
Set the RUN/STAND-BY switch to the "RUN" position.



- Refer to "Input circuit connection example" shown on the page B-47 for connection.

#### Timing Chart

##### Operation Using External Signals



\* Motor does not run for 0.5 s after instantaneous stop, if a reversing run signal is input.

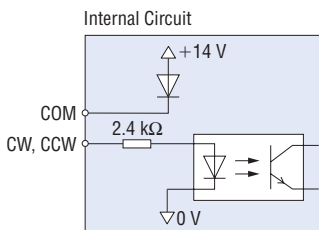
#### Note:

- The CW and CCW input signals must be ON for at least 20 ms.
- When both the CW and CCW inputs are turned on, the motor stops instantaneously.

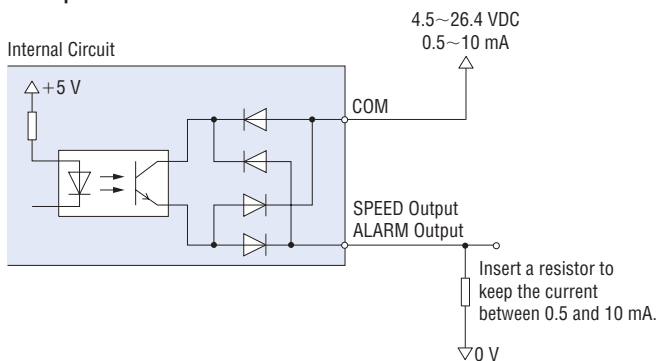
**I/O Signal Circuits**

The factory setting is the source logic. Select the sink logic or source logic according to the external control device you will be using.

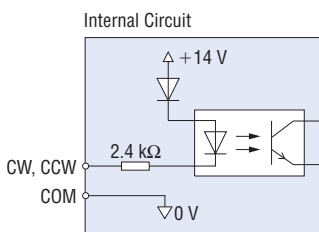
**Source Logic**  
**Input Circuit**



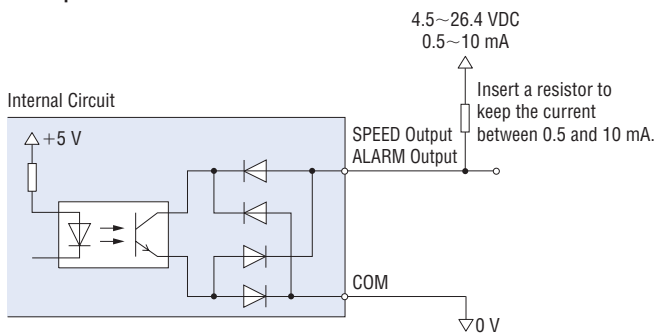
**Output Circuit**



**Sink Logic**  
**Input Circuit**

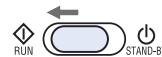


**Output Circuit**

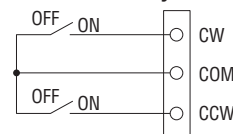


**Input Circuit Connection Example**

Set the RUN/STAND-BY switch to the "RUN" position.

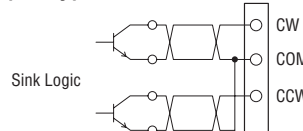


**Small-Capacity Switch and Relay**



Use a small-capacity contact type relay capable of opening and closing 14 VDC, 10 mA.

**Transistor Output Type Controller**



**Rotation Direction of Motor**

- CW (clockwise) directional operation**  
When CW input is turned on, the motor runs in a clockwise direction. When CW input is turned off, the motor stops.
  - CCW (counterclockwise) directional operation**  
When CCW input is turned on, the motor runs in a counterclockwise direction. When CCW input is turned off, the motor stops.
- When both the CW and CCW inputs are turned on simultaneously, the motor stops instantly. Instantaneous reversing operation is not possible.

**Note:**

- When in the source logic, do not connect the CW input and CCW input to transistor output type controller.

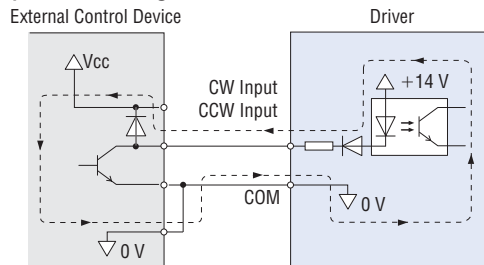
**When an External Control Device with a Built-In Clamp Diode is Used**

When you want to use the external control device with a built-in clamp diode, pay attention to the sequence of turning on or off the power.

- Power ON: External control device ON → Driver ON
- Power OFF: Driver OFF → External control device OFF

If the driver power is turned on first when connected as shown below, or the external control device power is turned off with the driver power turned on, current will be applied, as indicated by the arrows in the diagram. This may cause the motor to run. When the power is turned on or off simultaneously, the motor may run temporarily due to differences in power capacity. The external control device power must be turned on first, and driver power must be turned off first.

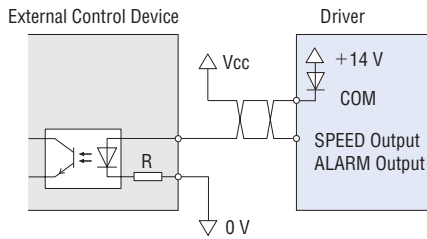
**Example of Sink Logic**



◇ Output Circuit Connection Example

The signal output is open-collector output. Use the power supply of 4.5 to 26.4 VDC to connect the limit resistor (R) to keep output current between 0.5 mA and 10 mA.

● Signal Output (Source Logic) Connection Example



Note:

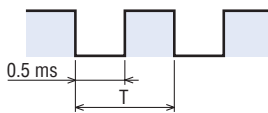
- The ON voltage of the output circuit is approximately 15 V. Remember this specification when driving other element using the output circuit.

◇ SPEED Output

The speed output signal is synchronized with the motor speed. The system outputs pulses (with a width of approximately 0.5 ms) at a rate of 30 pulses per rotation of the motor output shaft. You can measure the speed output frequency and calculate motor speed.

$$\text{Motor speed (r/min)} = \frac{\text{SPEED output frequency [Hz]}}{30} \times 60$$

$$\text{SPEED output frequency (Hz)} = \frac{1}{T}$$



Notes:

- When you want to extend the input/output signal cable, the length must not exceed 2 m. The cable should be as short as possible in order to minimize noise.
- The input/output signal cable should be kept away from power supply cables or motor cables.

◇ ALARM Output

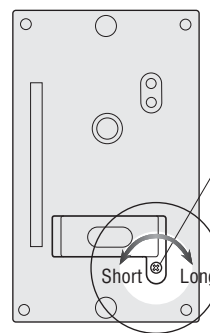
In the following conditions, the driver's protective function will actuate. The ALARM output will turn OFF and the motor will stop. In this case, the protective function that actuated can be checked based on whether the LED is blinking or illuminating steadily.

- The LED will blink upon actuation of the following protective function:
  - Overload protective function
- The LED will illuminate steadily upon actuation of the following protective functions:
  - Overvoltage protective function, motor sensor error, undervoltage protective function, overspeed protective function

● Setting the Acceleration/Deceleration Time

The motor starts over the specified acceleration time and stops over the specified deceleration time. This acceleration/ deceleration time can be set within the range from 0.5 to 10 sec (2000 r/min without load). The time can be set using the acceleration/deceleration potentiometer. Remove the front panel of the driver to access the potentiometer.

- The figure shows the driver with the front panel removed.



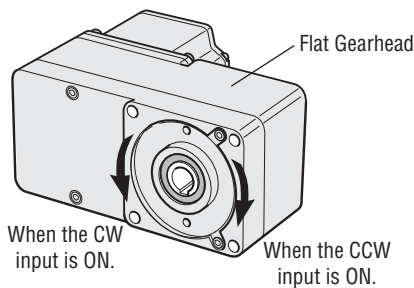
Acceleration/Deceleration Time Potentiometer

Time is increased by turning the switch clockwise. Use an insulated Phillips Screwdriver for this operation. The shortest time is selected at the time of shipment.

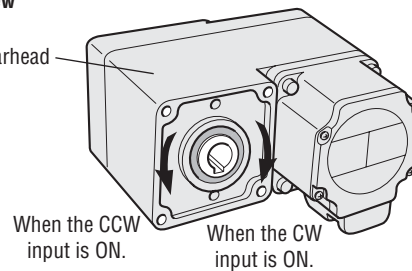
■ Rotation Direction of the Hollow Shaft Flat Gearhead

The hollow shaft flat gearhead of the combination type rotates in the direction as shown below, with respect to the direction input from the driver.

Front View



Rear View



## List of Motor and Driver Combinations

### Combination Type – Parallel Shaft Gearhead

The combination type comes with the motor and parallel shaft gearhead pre-assembled.

Output Power	Model	Motor Model	Gearhead Model	Driver Model
20 W	<b>BLU220C</b> -□	BLUM220-GFS	GFS2G□	BLUD20C
40 W	<b>BLU440C</b> -□	BLUM440-GFS	GFS4G□	BLUD40C
90 W	<b>BLU590C</b> -□	BLUM590-GFS	GFS5G□	BLUD90C

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

### Combination Type – Hollow Shaft Flat Gearhead

The combination type comes with the motor and hollow shaft flat gearhead pre-assembled.

Output Power	Model	Motor Model	Gearhead Model	Driver Model
20 W	<b>BLU220C</b> -□FR	BLUM220-GFS	GFS2G□FR	BLUD20C
40 W	<b>BLU440C</b> -□FR	BLUM440-GFS	GFS4G□FR	BLUD40C
90 W	<b>BLU590C</b> -□FR	BLUM590-GFS	GFS5G□FR	BLUD90C

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

### Round Shaft Type

Output Power	Model	Motor Model	Driver Model
20 W	<b>BLU220C-A</b>	BLUM220-A	BLUD20C
40 W	<b>BLU440C-A</b>	BLUM440-A	BLUD40C
90 W	<b>BLU590C-A</b>	BLUM590-A	BLUD90C

### Pinion Shaft Type

Output Power	Model	Motor Model	Driver Model
20 W	<b>BLU220C-GFS</b>	BLUM220-GFS	BLUD20C
40 W	<b>BLU440C-GFS</b>	BLUM440-GFS	BLUD40C
90 W	<b>BLU590C-GFS</b>	BLUM590-GFS	BLUD90C

## Accessories (Sold separately)

### Extension Cables (RoHS)

These cables are used to extend the wiring distance between the motor and driver. The maximum extension length is 10.5 m.

Model	Length: L (m)
<b>CC01AXU</b>	1
<b>CC02AXU</b>	2
<b>CC03AXU</b>	3
<b>CC05AXU</b>	5
<b>CC10AXU</b>	10

