

RoHS RoHS-Compliant Brushless Motor Systems BLU Series

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

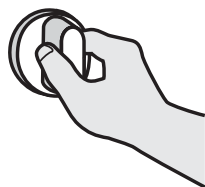
The **BLU** Series combines a brushless motor and a panel-installation type driver, enabling speed control via simple wiring and easy operation.

Choose a parallel gearhead, or a hollow shaft flat gearhead that saves installation space in 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 sink logic and source logic in accordance with the output type of your controller.

● Speed Control Range

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

● 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.

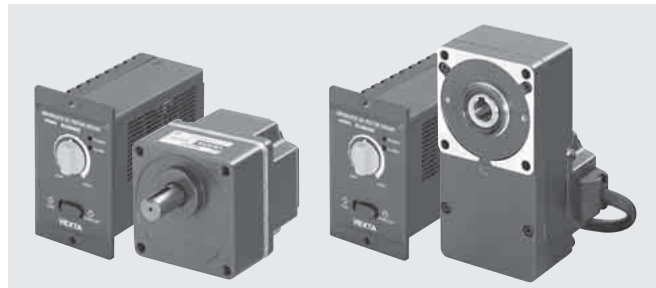
● RoHS RoHS-Compliant

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-38



- List of safety standard approved products (Model, Standards, File No., Certification Body) → Page G-11



● Long Life Gearhead Rating of 10000 Hours

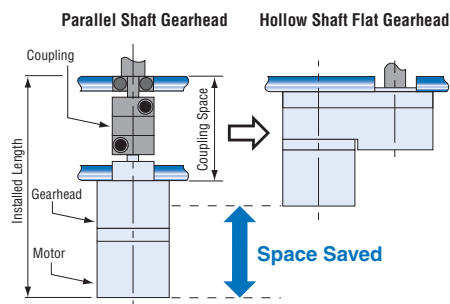
The rated life of the parallel shaft gearhead and hollow shaft flat gearhead is 10000 hours. The parallel shaft gearhead achieves a rated life of twice as long as that of a conventional gearhead.

- The 40 W (1/19 HP) and 90 W (1/8 HP) parallel shaft gearhead has a tapped hole at the shaft end.

● Features of Hollow Shaft Flat Gearhead

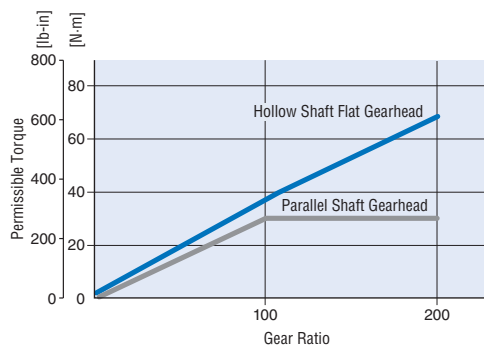
◇ Space-Saving and Low-Cost

The output shaft can be coupled directly to a driven shaft without using a coupling, which allows 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

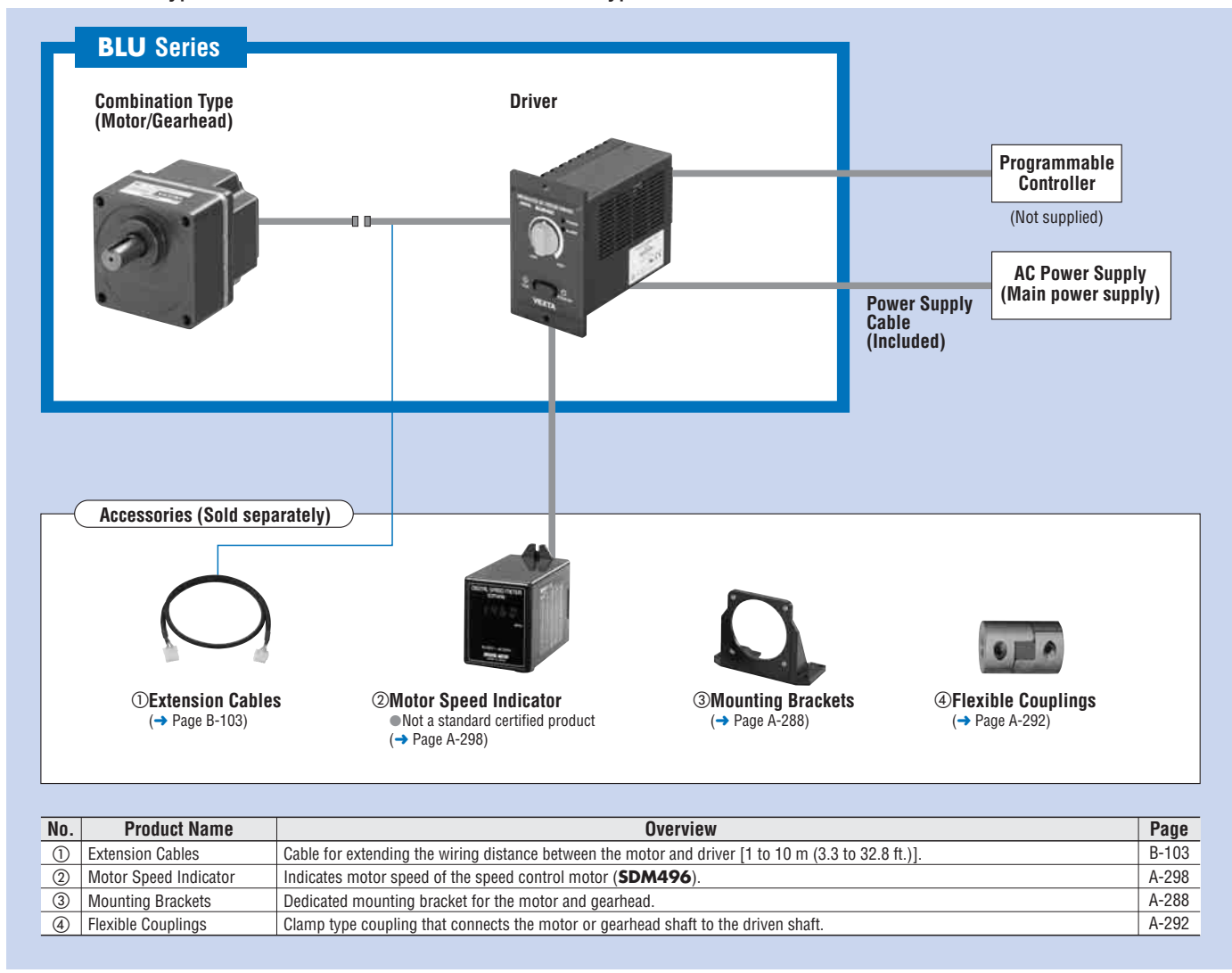
While the permissible torque of the parallel shaft gearhead saturates at high gear ratios, the hollow shaft flat gearhead enables the motor torque to be fully utilized.



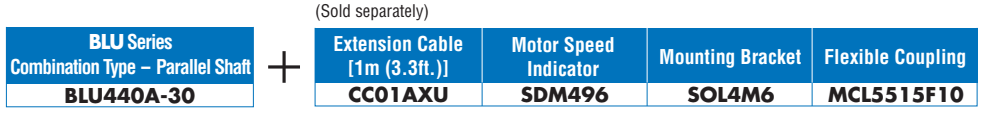
[Frame Size 90 mm (3.54 in.)]

System Configuration

Combination Type – Parallel Shaft Gearhead/Round Shaft Type

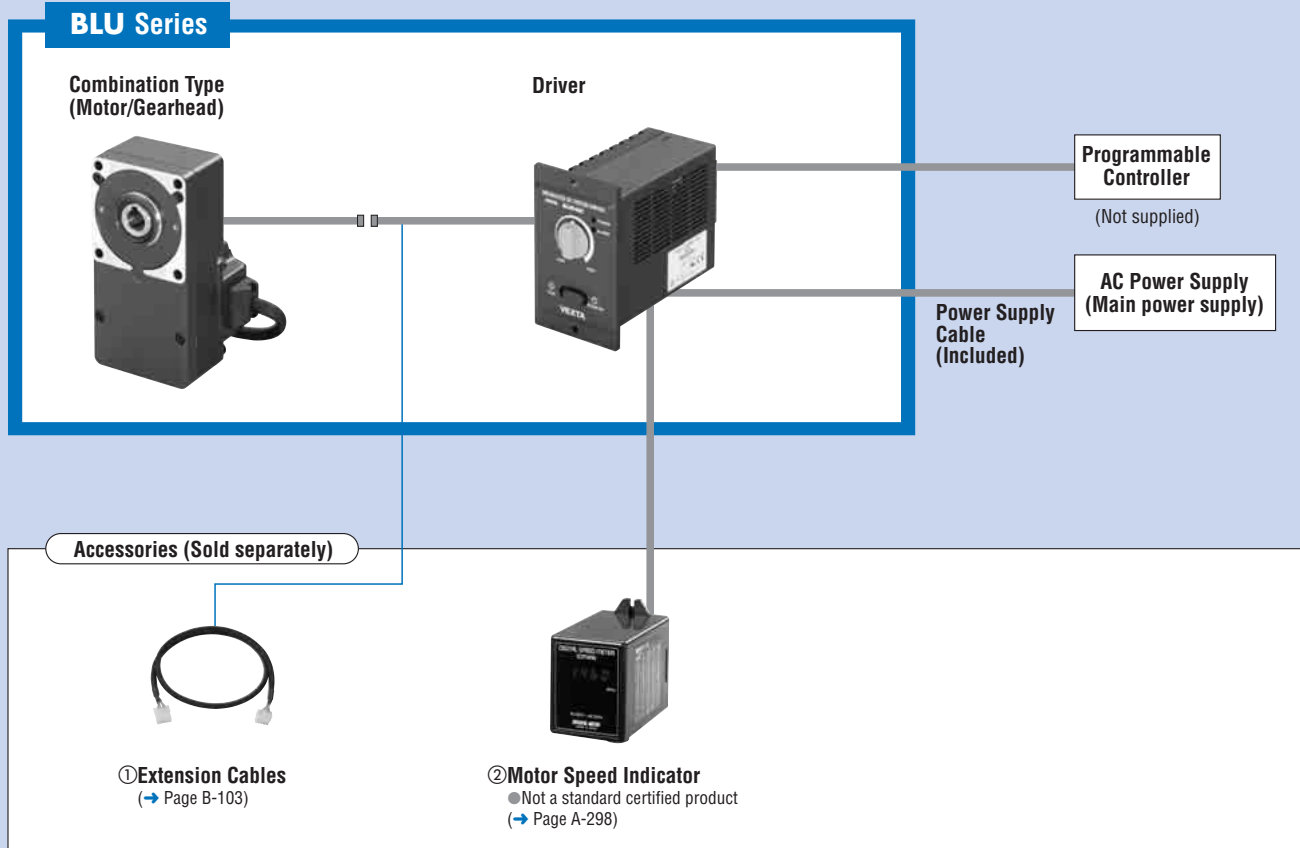


Example of System Configuration



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

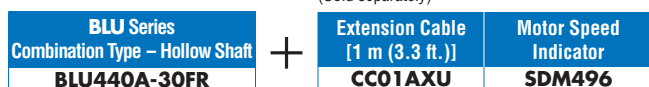
● Combination Type – Hollow Shaft Flat Gearhead



No.	Product Name	Overview	Page
①	Extension Cables	Cable for extending the wiring distance between the motor and driver [1 to 10 m (3.3 to 32.8 ft.)].	B-103
②	Motor Speed Indicator	Indicates motor speed of the speed control motor (SDM496).	A-298

● Example of System Configuration

(Sold separately)



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

■ Product Number Code

BLU 4 40 A - 5 FR

- ① ② ③ ④ ⑤ ⑥

①	Series	BLU: BLU Series
②	Motor Frame Size	2: 60 mm (2.36 in.) 4: 80 mm (3.15 in.) 5: 90 mm (3.54 in.)
③	Output Power (W)	(Example) 40: 40 W (1/19 HP)
④	Power Supply Voltage	A: Single-Phase 100–115 VAC C: Single-Phase 200–230 VAC S: Three-Phase 200–230 VAC
⑤	Gear Ratio/Shaft Type	Number: Gear ratio for combination types: 8 types from 5 to 200 A: Round Shaft Type GFS: GFS Type Pinion Shaft
⑥	Blank: Combination Type – Parallel Shaft Gearhead FR: 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
20 W (1/38 HP)	Single-Phase 100-115 VAC	BLU220A- <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200
	Single-Phase 200-230 VAC	BLU220C- <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200
	Three-Phase 200-230 VAC	BLU220S- <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200
40 W (1/19 HP)	Single-Phase 100-115 VAC	BLU440A- <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200
	Single-Phase 200-230 VAC	BLU440C- <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200
	Three-Phase 200-230 VAC	BLU440S- <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200
90 W (1/8 HP)	Single-Phase 100-115 VAC	BLU590A- <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200
	Single-Phase 200-230 VAC	BLU590C- <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200
	Three-Phase 200-230 VAC	BLU590S- <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200

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

—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

● Combination Type – Hollow Shaft Flat Gearhead

Output Power	Power Supply Voltage	Model	Gear Ratio
20 W (1/38 HP)	Single-Phase 100-115 VAC	BLU220A- <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200
	Single-Phase 200-230 VAC	BLU220C- <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200
	Three-Phase 200-230 VAC	BLU220S- <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200
40 W (1/19 HP)	Single-Phase 100-115 VAC	BLU440A- <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200
	Single-Phase 200-230 VAC	BLU440C- <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200
	Three-Phase 200-230 VAC	BLU440S- <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200
90 W (1/8 HP)	Single-Phase 100-115 VAC	BLU590A- <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200
	Single-Phase 200-230 VAC	BLU590C- <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200
	Three-Phase 200-230 VAC	BLU590S- <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200

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

—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

● Round Shaft Type

Output Power	Power Supply Voltage	Model
20 W (1/38 HP)	Single-Phase 100-115 VAC	BLU220A-A
	Single-Phase 200-230 VAC	BLU220C-A
	Three-Phase 200-230 VAC	BLU220S-A
40 W (1/19 HP)	Single-Phase 100-115 VAC	BLU440A-A
	Single-Phase 200-230 VAC	BLU440C-A
	Three-Phase 200-230 VAC	BLU440S-A
90 W (1/8 HP)	Single-Phase 100-115 VAC	BLU590A-A
	Single-Phase 200-230 VAC	BLU590C-A
	Three-Phase 200-230 VAC	BLU590S-A

—The following items are included in each product. —

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

● Pinion Shaft Type

Output Power	Power Supply Voltage	Model
20 W (1/38 HP)	Single-Phase 100-115 VAC	BLU220A-GFS
	Single-Phase 200-230 VAC	BLU220C-GFS
	Three-Phase 200-230 VAC	BLU220S-GFS
40 W (1/19 HP)	Single-Phase 100-115 VAC	BLU440A-GFS
	Single-Phase 200-230 VAC	BLU440C-GFS
	Three-Phase 200-230 VAC	BLU440S-GFS
90 W (1/8 HP)	Single-Phase 100-115 VAC	BLU590A-GFS
	Single-Phase 200-230 VAC	BLU590C-GFS
	Three-Phase 200-230 VAC	BLU590S-GFS

—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 (1/38 HP)	GFS2G <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200
40 W (1/19 HP)	GFS4G <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200
90 W (1/8 HP)	GFS5G <input type="checkbox"/>	5, 10, 15, 20, 30, 50, 100, 200

● 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

◇ Hollow Shaft Flat Gearhead

Output Power of Applicable Motor (Pinion shaft type)	Gearhead Model	Gear Ratio
20 W (1/38 HP)	GFS2G <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200
40 W (1/19 HP)	GFS4G <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200
90 W (1/8 HP)	GFS5G <input type="checkbox"/> FR	5, 10, 15, 20, 30, 50, 100, 200

● 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 (1/38 HP) (RoHS)



Model	Combination Type – Parallel Shaft Gearhead		BLU220A-□	BLU220C-□	BLU220S-□
	Combination Type – Hollow Shaft Flat Gearhead		BLU220A-□FR	BLU220C-□FR	BLU220S-□FR
	Round Shaft Type		BLU220A-A	BLU220C-A	BLU220S-A
Rated Output Power (Continuous)		W (HP)	20 (1/38)		
Power Source	Rated Voltage	VAC	Single-Phase 100-115	Single-Phase 200-230	Three-Phase 200-230
	Permissible Voltage Range		±10%		
	Rated Frequency	Hz	50/60		
	Permissible Frequency Range		±5%		
	Rated Input Current	A	0.95	0.55	0.35
	Maximum Input Current	A	1.55	0.9	0.55
Rated Torque	N-m (oz-in)	0.1 (14.2)			
Starting Torque*	N-m (oz-in)	0.12 (17.0)			
Rated Speed	r/min	2000			
Speed Control Range	r/min	100~2000			
Round Shaft Type	Permissible Load Inertia J	×10 ⁻⁴ kg·m ² (oz-in ²)	1.25 (6.8)		
Rotor Inertia J	×10 ⁻⁴ kg·m ² (oz-in ²)	0.086 (0.47)			
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 (+32~+104°F), at rated speed, with no load, at rated voltage]			

● 40 W (1/19 HP) (RoHS)



Model	Combination Type – Parallel Shaft Gearhead		BLU440A-□	BLU440C-□	BLU440S-□
	Combination Type – Hollow Shaft Flat Gearhead		BLU440A-□FR	BLU440C-□FR	BLU440S-□FR
	Round Shaft Type		BLU440A-A	BLU440C-A	BLU440S-A
Rated Output Power (Continuous)		W (HP)	40 (1/19)		
Power Source	Rated Voltage	VAC	Single-Phase 100-115	Single-Phase 200-230	Three-Phase 200-230
	Permissible Voltage Range		±10%		
	Rated Frequency	Hz	50/60		
	Permissible Frequency Range		±5%		
	Rated Input Current	A	1.45	0.85	0.5
	Maximum Input Current	A	2.5	1.4	0.9
Rated Torque	N-m (oz-in)	0.2 (28)			
Starting Torque*	N-m (oz-in)	0.24 (34)			
Rated Speed	r/min	2000			
Speed Control Range	r/min	100~2000			
Round Shaft Type	Permissible Load Inertia J	×10 ⁻⁴ kg·m ² (oz-in ²)	2.5 (13.7)		
Rotor Inertia J	×10 ⁻⁴ kg·m ² (oz-in ²)	0.234 (1.28)			
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 (+32~+104°F), at rated speed, with no load, at rated voltage]			

● 90 W (1/8 HP) (RoHS)



Model	Combination Type – Parallel Shaft Gearhead		BLU590A-□	BLU590C-□	BLU590S-□
	Combination Type – Hollow Shaft Flat Gearhead		BLU590A-□FR	BLU590C-□FR	BLU590S-□FR
	Round Shaft Type		BLU590A-A	BLU590C-A	BLU590S-A
Rated Output Power (Continuous)		W (HP)	90 (1/8)		
Power Source	Rated Voltage	VAC	Single-Phase 100-115	Single-Phase 200-230	Three-Phase 200-230
	Permissible Voltage Range		±10%		
	Rated Frequency	Hz	50/60		
	Permissible Frequency Range		±5%		
	Rated Input Current	A	2.55	1.45	0.85
	Maximum Input Current	A	3.9	2.4	1.5
Rated Torque	N-m (oz-in)	0.45 (63)			
Starting Torque*	N-m (oz-in)	0.54 (76)			
Rated Speed	r/min	2000			
Speed Control Range	r/min	100~2000			
Round Shaft Type	Permissible Load Inertia J	×10 ⁻⁴ kg·m ² (oz-in ²)	5.6 (31)		
Rotor Inertia J	×10 ⁻⁴ kg·m ² (oz-in ²)	0.611 (3.3)			
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 (+32~+104°F), 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.

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 Signals	Photocoupler input (Reinforced insulation photocoupler) Input resistance 2.4 kΩ Internal power supply voltage 14 VDC Operated by internal power supply Common to CW input and CCW input Sink logic or source logic ... Switchable using a select switch Factory setting: sink logic
Output Signals	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 Functions*	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"> Overload protection: Activated when the motor load exceeds rated torque for a minimum of 5 seconds. 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. Motor sensor error: Activated when the sensor wire inside the motor cable is disconnected during motor operation. Undervoltage protection: Activated when the voltage applied to the driver falls below 100 VAC or 200 VAC by a minimum of approximately 30%. Overspeed protection: Activated when the motor speed exceeds 2500 r/min.
Maximum Cable Extension Distance	Motor/Driver Distance: 10.5 m (34.4 ft.) (when an accessory CC10AXU extension cable is used)
Time 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 (108°F) or less in the windings, and 50°C (90°F) 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 (+32~+104°F) (non-freezing) EN: 0~+50°C (+32~+122°F) (non-freezing)
	Ambient Humidity	85% or less (non-condensing)
	Altitude	Up to 1000 m (3300 ft.) above sea level
	Atmosphere	No corrosive gases or dust. Cannot be used in a radioactive area, magnetic field, vacuum or other special 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 (0.006 in.) Sweep direction: 3 directions (X, Y, Z) Number of sweeps: 20 times	
	Ambient Temperature	-25~+70°C (-13~+158°F) (non-freezing)
Storage Condition*2	Ambient Humidity	85% or less (non-condensing)
	Altitude	Up to 3000 m (10000 ft.) above sea level
	Insulation Class	UL, CSA: Class A [105°C (221°F)] EN: Class E [120°C (248°F)]
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 (194°F).

BLU220□-A: 135×135 mm (5.31×5.31 in.), 5mm (0.20 in.) thick

BLU440□-A: 165×165 mm (6.50×6.50 in.), 5mm (0.20 in.) thick

BLU590□-A: 200×200 mm (7.87×7.87 in.), 5mm (0.20 in.) thick

● Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name.

*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 (lb-in)

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
BLU220 <input type="checkbox"/> - <input type="checkbox"/>		0.45 (3.9)	0.90 (7.9)	1.4 (12.3)	1.8 (15.9)	2.6 (23)	4.3 (38)	6 (53)	6 (53)
BLU440 <input type="checkbox"/> - <input type="checkbox"/>		0.90 (7.9)	1.8 (15.9)	2.7 (23)	3.6 (31)	5.2 (46)	8.6 (76)	16 (141)	16 (141)
BLU590 <input type="checkbox"/> - <input type="checkbox"/>		2.0 (17.7)	4.1 (36)	6.1 (53)	8.1 (71)	11.6 (102)	19.4 (171)	30 (260)	30 (260)

- Enter the power supply voltage (**A**, **C** or **S**) in the box () within the model name.
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 (lb-in)

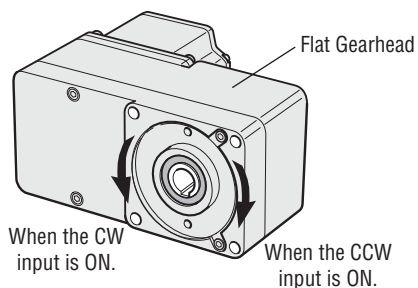
Model	Gear Ratio	5	10	15	20	30	50	100	200
	Speed Range r/min	20~400	10~200	6.7~133.3	5~100	3.3~66.7	2~40	1~20	0.5~10
BLU220 <input type="checkbox"/> - <input type="checkbox"/> FR		0.40 (3.5)	0.85 (7.5)	1.3 (11.5)	1.7 (15.0)	2.6 (23)	4.3 (38)	8.5 (75)	17 (150)
BLU440 <input type="checkbox"/> - <input type="checkbox"/> FR		0.85 (7.5)	1.7 (15.0)	2.6 (23)	3.4 (30)	5.1 (45)	8.5 (75)	17 (150)	34 (300)
BLU590 <input type="checkbox"/> - <input type="checkbox"/> FR		1.9 (16.8)	3.8 (33)	5.7 (50)	7.7 (68)	11.5 (101)	19.1 (169)	38.3 (330)	68 (600)

- Enter the power supply voltage (**A**, **C** or **S**) in the box () within the model name.
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.

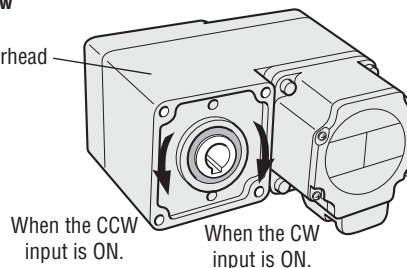
■ Rotation Direction of the Hollow Shaft Flat Gearhead

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



■ Permissible Overhung Load and Permissible Thrust Load

● Combination Type – Parallel Shaft Gearhead

Model	Gear Ratio	Permissible Overhung Load				Permissible Thrust Load	
		10 mm (0.39 in.) from shaft end		20 mm (0.79 in.) from shaft end		N	lb.
		N	lb.	N	lb.		
BLU220 <input type="checkbox"/> - <input type="checkbox"/>	5	100	22	150	33	40	9
	10, 15, 20	150	33	200	45		
	30, 50, 100, 200	200	45	300	67		
BLU440 <input type="checkbox"/> - <input type="checkbox"/>	5	200	45	250	56	100	22
	10, 15, 20	300	67	350	78		
	30, 50, 100, 200	450	101	550	123		
BLU590 <input type="checkbox"/> - <input type="checkbox"/>	5	300	67	400	90	150	33
	10, 15, 20	400	90	500	112		
	30, 50, 100, 200	500	112	650	146		

● Enter the power supply voltage (**A**, **C** or **S**) in the box () within the model name.
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	
		10 mm (0.39 in.) from mounting surface of gearhead		20 mm (0.79 in.) from mounting surface of gearhead		N	lb.
		N	lb.	N	lb.		
BLU220 <input type="checkbox"/> - <input type="checkbox"/> FR	5, 10	450	101	370	83	200	45
	15, 20, 30, 50, 100, 200	500	112	400	90		
BLU440 <input type="checkbox"/> - <input type="checkbox"/> FR	5, 10	800	180	660	148	400	90
	15, 20, 30, 50, 100, 200	1200	270	1000	220		
BLU590 <input type="checkbox"/> - <input type="checkbox"/> FR	5, 10	900	200	770	173	500	112
	15, 20	1300	290	1110	240		
	30, 50, 100, 200	1500	330	1280	280		

● Enter the power supply voltage (**A**, **C** or **S**) in the box () within the model name.
Enter the gear ratio in the box () within the model name.

● Round Shaft Type

Model	Permissible Overhung Load				Permissible Thrust Load
	10 mm (0.39 in.) from shaft end		20 mm (0.79 in.) from shaft end		
	N	lb.	N	lb.	
BLU220 <input type="checkbox"/> - A	70	15.7	100	22	The permissible thrust load shall be no greater than half the motor mass.
BLU440 <input type="checkbox"/> - A	120	27	140	31	
BLU590 <input type="checkbox"/> - A	160	36	170	38	

● Enter the power supply voltage (**A**, **C** or **S**) in the box () within the model name.

■ Permissible Load Inertia J of Combination Type

● Combination Type – Parallel Shaft Gearhead

Unit = $\times 10^{-4}$ kg-m² (oz-in²)

Model \ Gear Ratio	5	10	15	20	30	50	100	200
BLU220 <input type="checkbox"/> - <input type="checkbox"/>	1.55 (8.5)	6.2 (34)	14 (77)	24.8 (136)	55.8 (310)	155 (850)	155 (850)	155 (850)
BLU440 <input type="checkbox"/> - <input type="checkbox"/>	5.5 (30)	22 (120)	49.5 (270)	88 (480)	198 (1080)	550 (3000)	550 (3000)	550 (3000)
BLU590 <input type="checkbox"/> - <input type="checkbox"/>	25 (137)	100 (550)	225 (1230)	400 (2200)	900 (4900)	2500 (13700)	2500 (13700)	2500 (13700)

● Enter the power supply voltage (**A**, **C** or **S**) in the box () within the model name.
Enter the gear ratio in the box () within the model name.

● Combination Type – Hollow Shaft Flat Gearhead

Unit = $\times 10^{-4}$ kg-m² (oz-in²)

Model \ Gear Ratio	5	10	15	20	30	50	100	200
BLU220 <input type="checkbox"/> - <input type="checkbox"/> FR	1.55 (8.5)	6.2 (34)	14 (77)	24.8 (136)	55.8 (310)	155 (850)	155 (850)	155 (850)
BLU440 <input type="checkbox"/> - <input type="checkbox"/> FR	5.5 (30)	22 (120)	49.5 (270)	88 (480)	198 (1080)	550 (3000)	550 (3000)	550 (3000)
BLU590 <input type="checkbox"/> - <input type="checkbox"/> FR	25 (137)	100 (550)	225 (1230)	400 (2200)	900 (4900)	2500 (13700)	2500 (13700)	2500 (13700)

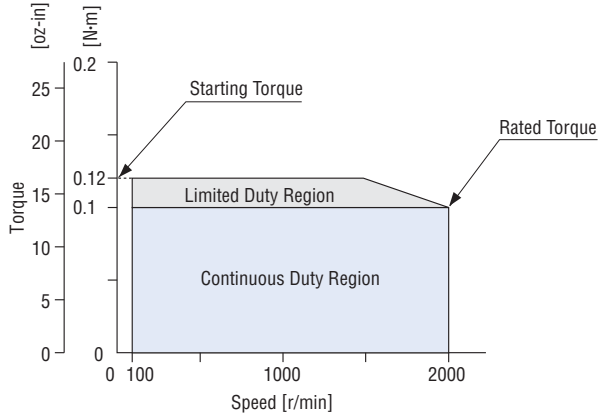
● Enter the power supply voltage (**A**, **C** or **S**) in the box () within the model name.
Enter the gear ratio in the box () within the model name.

Speed – Torque Characteristics

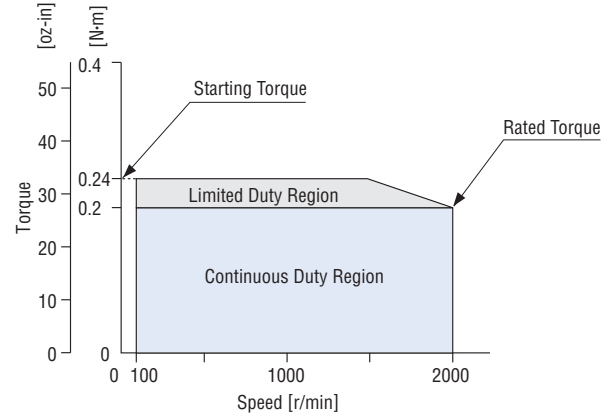
Continuous Duty Region: Continuous operation is possible in this region.

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.

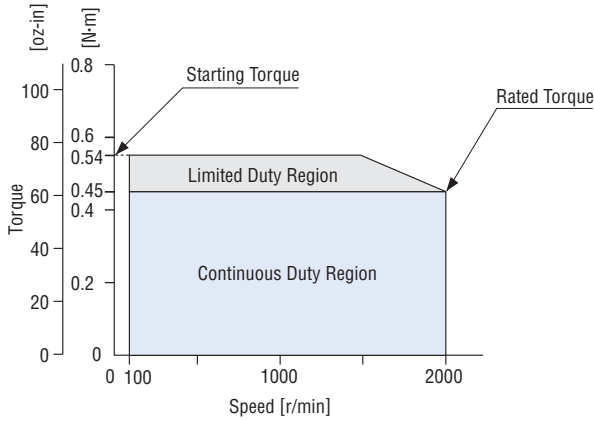
BLU220 / **BLU220** / **FR/BLU220** - **A**



BLU440 / **BLU440** / **FR/BLU440** - **A**



BLU590 / **BLU590** / **FR/BLU590** - **A**



- The characteristics shown above are applicable for the motors only.
- Enter the power supply voltage (**A**, **C** or **S**) in the box (■) within the model name.
Enter the gear ratio in the box (□) within the model name.

Dimensions Unit = mm (in.)

● Mounting screws are included with the combination type. Dimensions for mounting screws → Page B-222

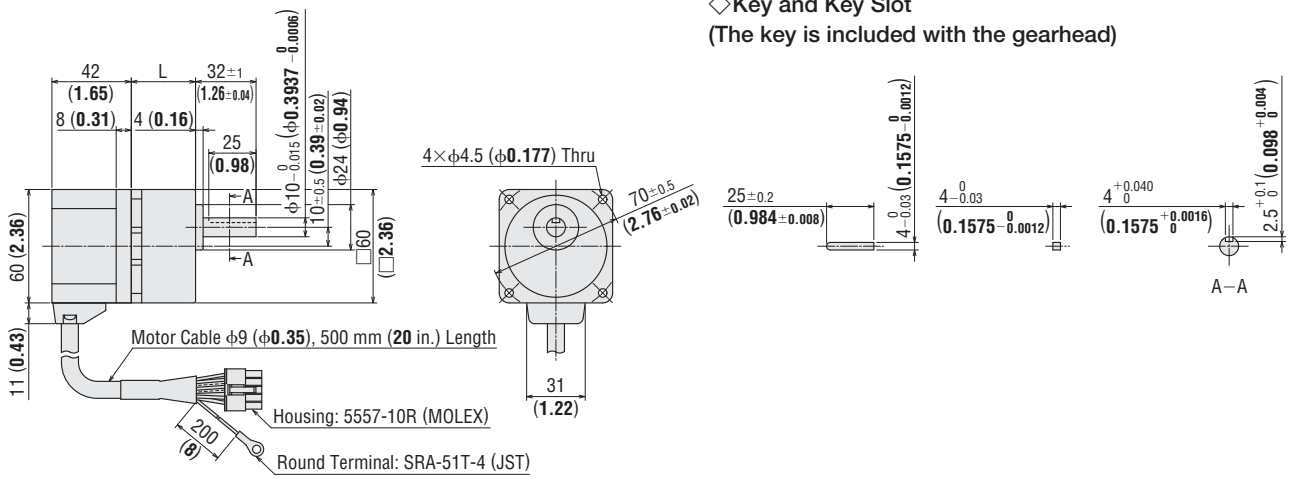
● 20 W (1/38 HP)

◇ Motor/Parallel Shaft Gearhead

Model	Motor Model	Gearhead Model	Gear Ratio	L	DXF
BLU220A-□	BLUM220-GFS	GFS2G□	5~20	34 (1.34)	A419A
BLU220C-□			30~100	38 (1.50)	A419B
BLU220S-□			200	43 (1.69)	A419C

Mass: 1.0 kg (2.2 lb.) (Including gearhead)

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



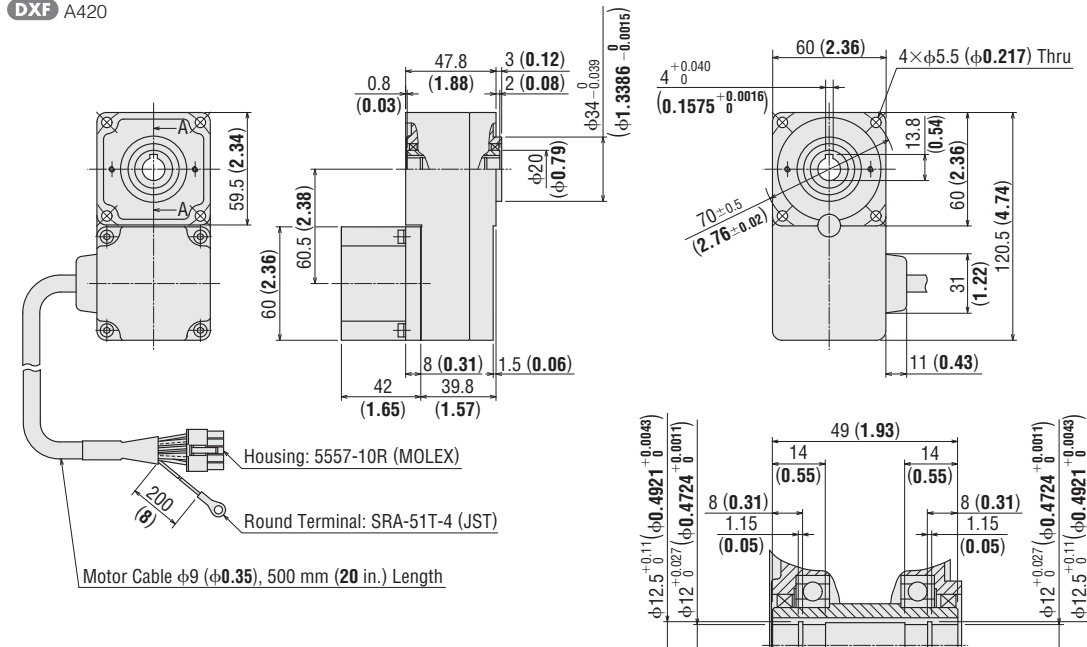
◇ Motor/Hollow Shaft Flat Gearhead

BLU220A-□FR, BLU220C-□FR, BLU220S-□FR

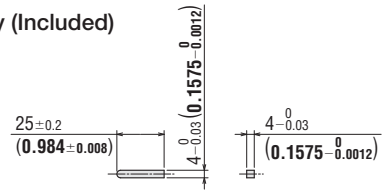
Motor: BLUM220-GFS
Gearhead: GFS2G□FR

Mass: 1.3 kg (2.9 lb.) (Including gearhead)

DXF A420



◇ Key (Included)



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

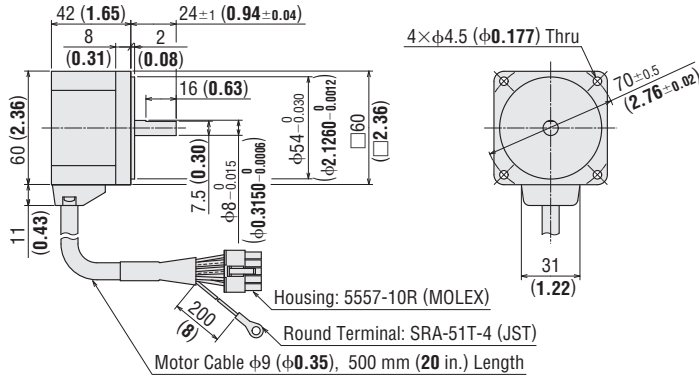
◇ Round Shaft Type

BLU220A-A, BLU220C-A, BLU220S-A

Motor: BLUM220-A

Mass: 0.5 kg (1.1 lb.)

DXF A421

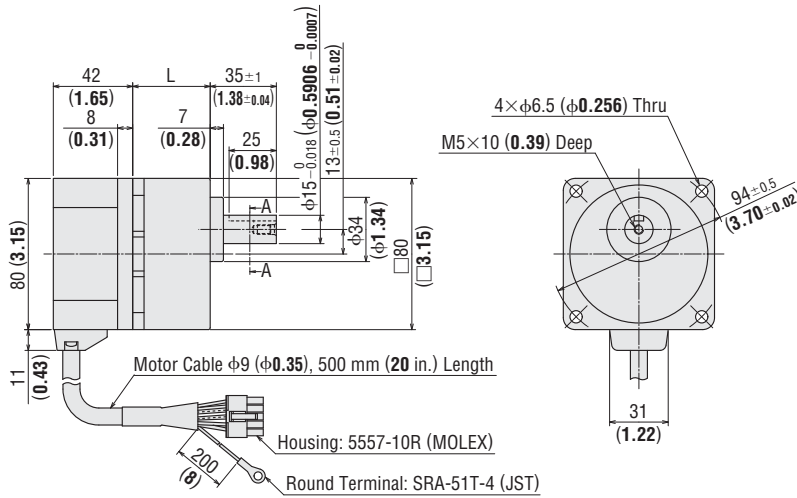


● 40 W (1/19 HP)

◇ Motor/Parallel Shaft Gearhead

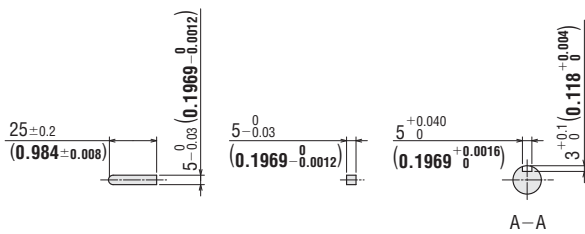
Model	Motor Model	Gearhead Model	Gear Ratio	L	DXF
BLU440A- □	BLUM440-GFS	GFS4G□	5~20	41 (1.61)	A422A
BLU440C- □			30~100	46 (1.81)	A422B
BLU440S- □			200	51 (2.01)	A422C

Mass: 1.8 kg (4.0 lb.) (Including gearhead)



◇ Key and Key Slot

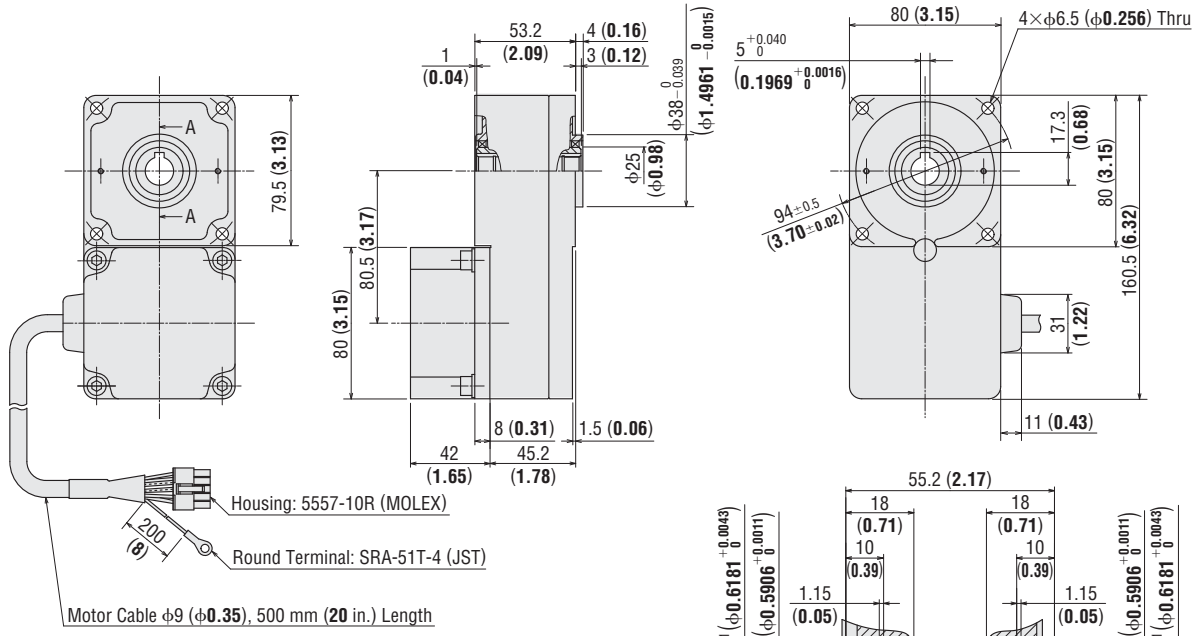
(The key is included with the gearhead)



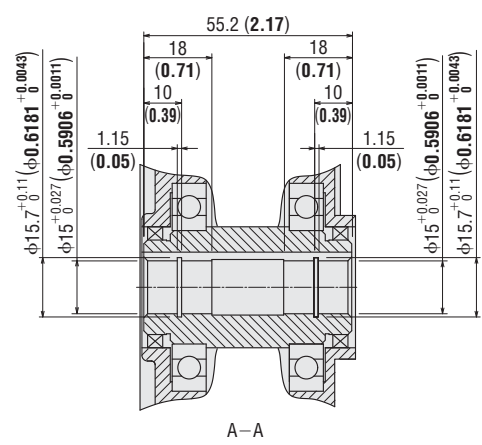
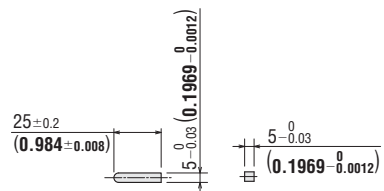
● Enter the gear ratio in the box (□) within the model name.

◇ Motor/Hollow Shaft Flat Gearhead
BLU440A-□FR, BLU440C-□FR, BLU440S-□FR

Motor: BLUM440-GFS
 Gearhead: GFS4G□FR
 Mass: 2.4 kg (5.3 lb.) (Including gearhead)
DXF A423

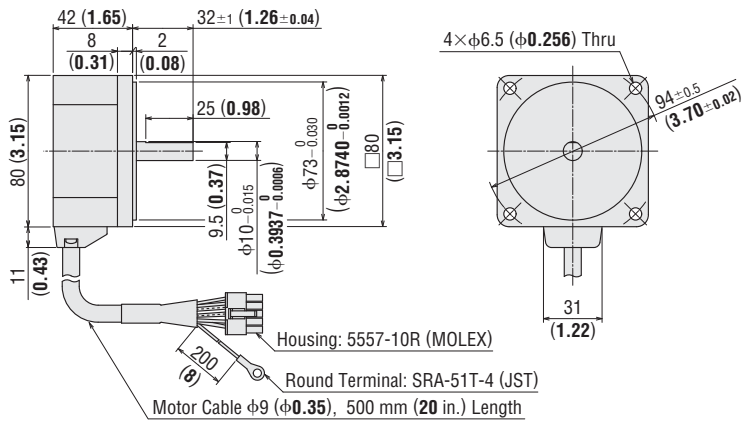


◇ Key (Included)



◇ Round Shaft Type

BLU440A-A, BLU440C-A, BLU440S-A
 Motor: BLUM440-A
 Mass: 0.8 kg (1.76 lb.)
DXF A424



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

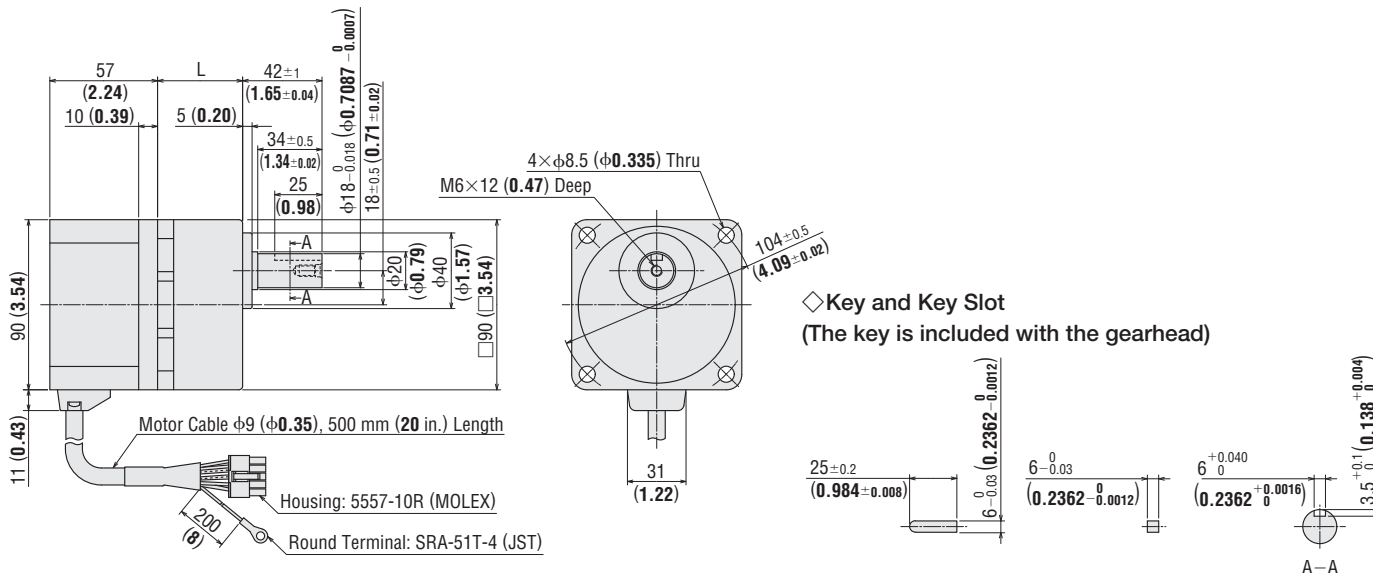
Introduction
AC Input BX
AC Input BLF
AC Input BLU
AC Input FBI, LI
DC Input BLH
BHF
FE100 / FE200
ES01 / ES02
US
Installation

● 90 W (1/8 HP)

◇ Motor/Parallel Shaft Gearhead

Model	Motor Model	Gearhead Model	Gear Ratio	L	DXF
BLU590A-□	BLUM590-GFS	GFS5G□	5~20	45 (1.77)	A425A
BLU590C-□			30~100	58 (2.28)	A425B
BLU590S-□			200	64 (2.52)	A425C

Mass: 2.9 kg (6.4 lb.) (Including gearhead)



◇ Motor/Hollow Shaft Flat Gearhead

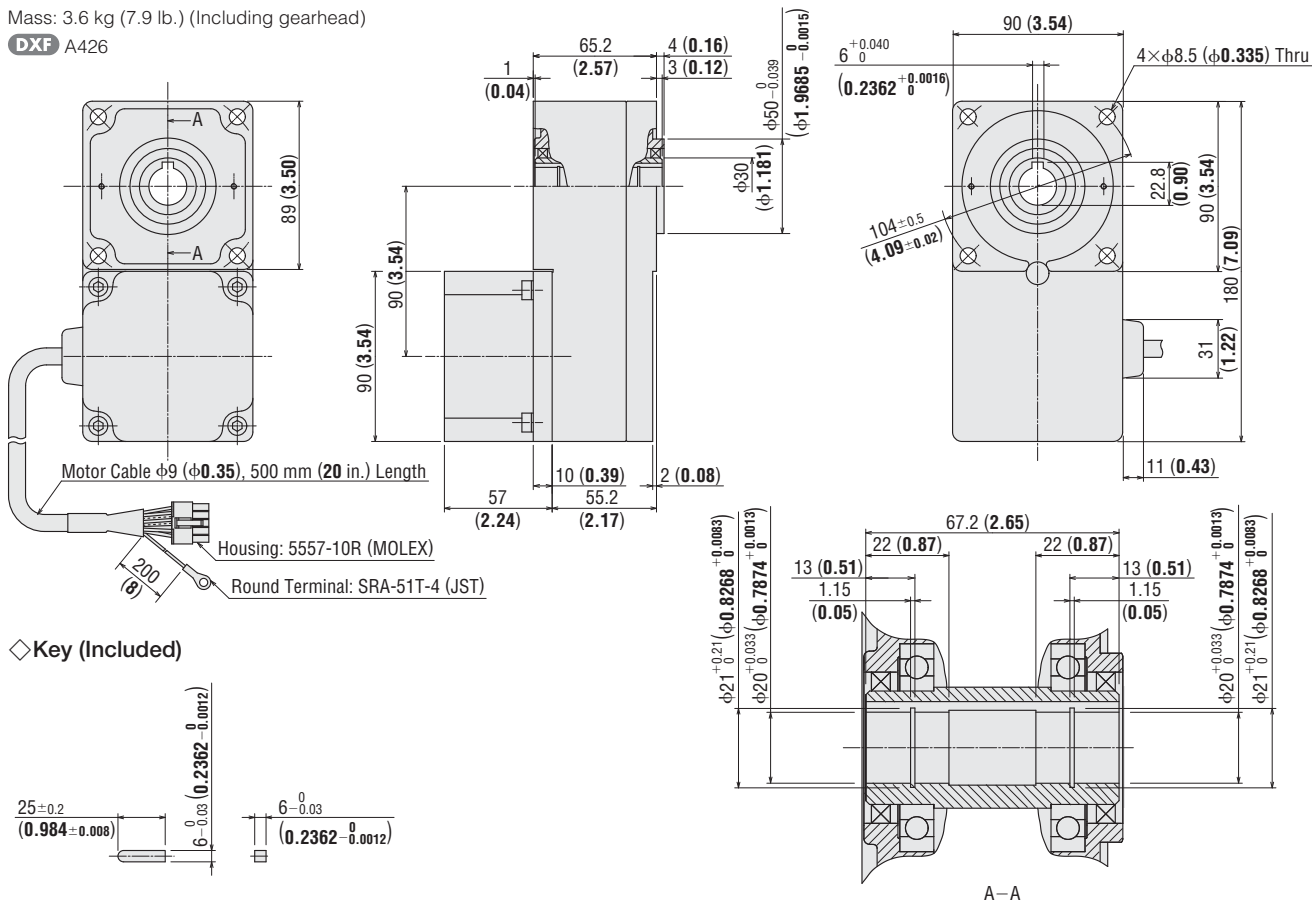
BLU590A-□FR, BLU590C-□FR, BLU590S-□FR

Motor: BLUM590-GFS

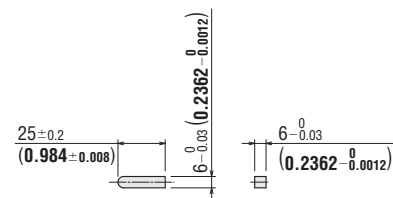
Gearhead: GFS5G□FR

Mass: 3.6 kg (7.9 lb.) (Including gearhead)

DXF A426



◇ Key (Included)



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

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

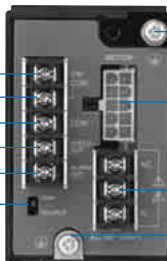


Front of Driver

Input/Output Signal Connection Terminals

CW Input
Common (COM)
CCW Input
SPEED Output
ALARM Output

Protective Earth Terminal
Motor Connector
Power Connection Terminals
Protective Earth Terminal



Back of Driver

Sink/Source-Input Select Switch

<input checked="" type="checkbox"/> SINK	Set to the SINK side when the sink logic is to be used.
<input type="checkbox"/> SOURCE	Set to the SOURCE side when the source logic is to be used.

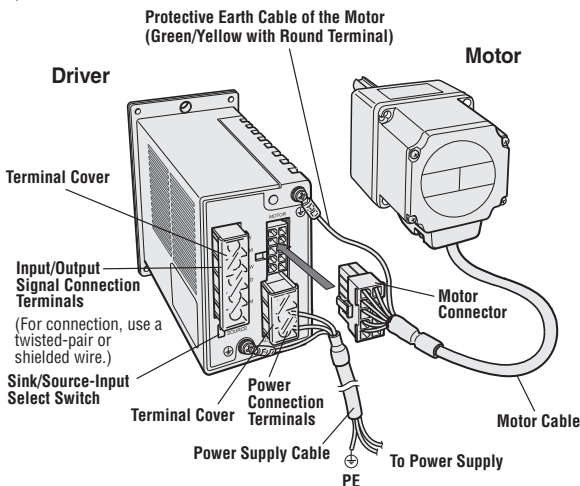
*The factory setting is SINK side.

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

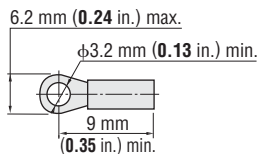
Insert the motor cable connector into the motor connector (MOTOR) on the driver. To extend the distance between the motor and driver, use an accessory extension cable. The connection can be extended to a maximum of 10.5 m (34.4 ft.). Connect the motor's protective earth cable (green/yellow) to the driver, 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 mm²) 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

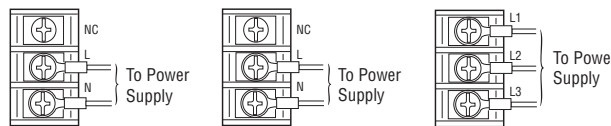
Connect the included power supply cable to the power connection terminals of the driver. Connect the red and black lead wires to the power connection terminals, and green/yellow lead wire to the protective earth terminal. When the included power supply cable is not used, use a cable of AWG22 (0.3 mm²) or thicker. For the protective earth cable, use a cable of AWG18 (0.75 mm²) or thicker.

Applicable Crimp Terminals

Round Terminal with Insulation (M3)



- Single-Phase 100~115 VAC
- Single-Phase 200~230 VAC
- Three-Phase 200~230 VAC



Operation

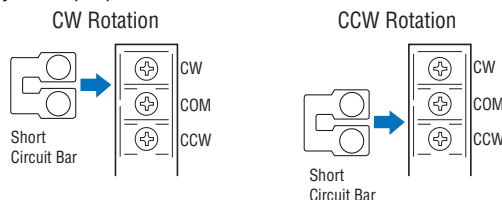
The direction of motor rotation is as viewed from the output shaft end of the motor. "CW" indicates clockwise direction, while "CCW" indicates counterclockwise direction.

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.

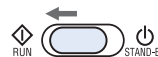


The direction of rotation depends on how the short circuit bar at the back of driver is connected. Connect the short circuit bar between the CW and COM or CCW and COM. Do not use the short circuit bar for any other purpose.



Operation Using External Signals

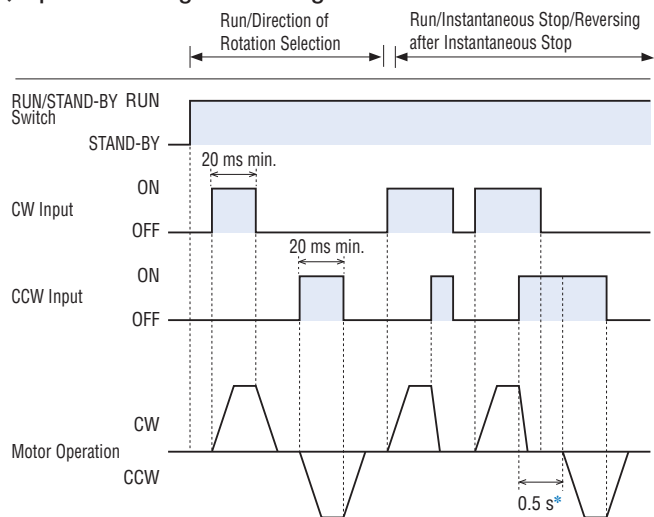
Set the RUN/STAND-BY switch to the "RUN" position.



- Refer to "Input circuit connection example" shown on the page B-101 for connection.

● Timing Chart

◇ Operation Using External Signals



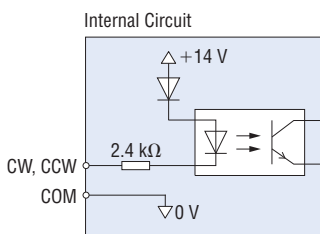
- * Motor does not run for 0.5 sec after instantaneous stop, if a reversing run signal is input.
- Note:**
- The CW and CCW input signals must be ON for at least 20 msec.
- When both the CW and CCW inputs are turned on, the motor stops instantaneously.

● Input/Output Signal Circuits

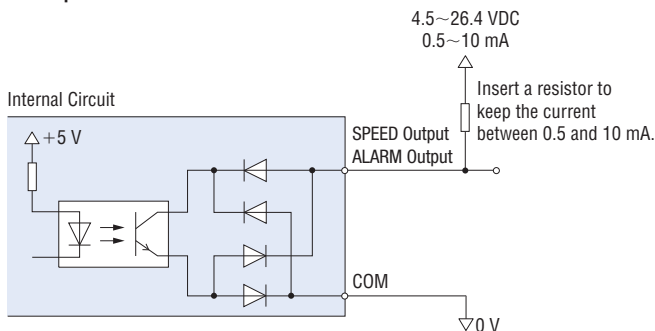
The factory setting is the sink logic. Select the sink logic or source logic according to the external control device you will be using.

◇ Sink Logic

● Input Circuit

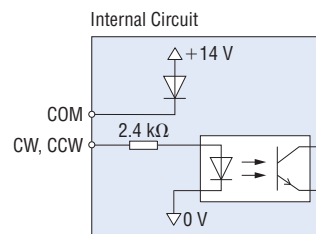


● Output Circuit

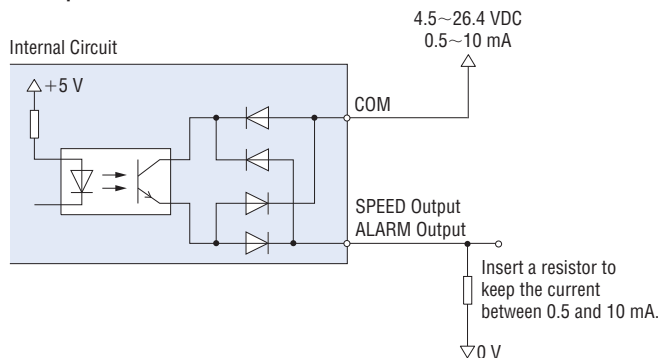


◇ Source Logic

● Input Circuit

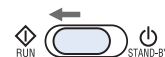


● Output Circuit

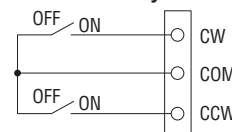


◇ Input Circuit Connection Example

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

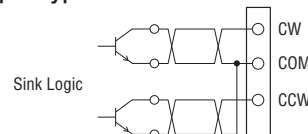


● Small-Capacity Switch and Relay



- 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

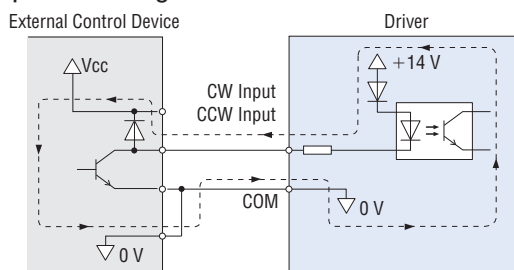
When you want to use an external control device with a built-in clamp diode, pay attention to the sequence of turning on or off the power.

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.

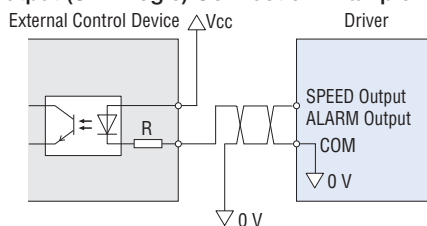
● Example of Sink Logic



◇ 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 (Sink Logic) Connection Example



Note:

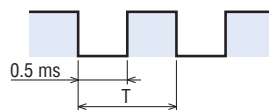
- The ON voltage of the output circuit is approximately 1.5 VDC. Remember this specification when driving other element using the output circuit.

◇ 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.

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

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



- To display or monitor the speed of the motor output shaft or the reduced speed of the gearhead output shaft, use an accessory **SDM496** motor speed indicator (the **SDM496** can be used only when the sink logic is selected).
Motor speed indicator → Page A-298

Notes:

- When you want to extend the input/output signal cable, the length must not exceed 2 m (6.6 ft.). 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

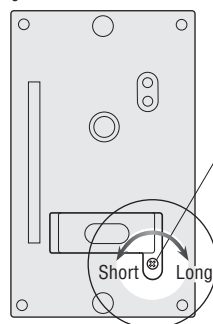
In the following conditions, the driver's protective function will actuate. The ALARM output will turn OFF and the motor will stop. In this case, the protective function that actuated can be checked based on whether the LED is blinking or illuminating steadily.

- 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.

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 (1/38 HP)	BLU220A -□	BLUM220-GFS	GFS2G□	BLUD20A
	BLU220C -□			BLUD20C
	BLU220S -□			BLUD20S
40 W (1/19 HP)	BLU440A -□	BLUM440-GFS	GFS4G□	BLUD40A
	BLU440C -□			BLUD40C
	BLU440S -□			BLUD40S
90 W (1/8 HP)	BLU590A -□	BLUM590-GFS	GFS5G□	BLUD90A
	BLU590C -□			BLUD90C
	BLU590S -□			BLUD90S

● 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 (1/38 HP)	BLU220A -□FR	BLUM220-GFS	GFS2G□FR	BLUD20A
	BLU220C -□FR			BLUD20C
	BLU220S -□FR			BLUD20S
40 W (1/19 HP)	BLU440A -□FR	BLUM440-GFS	GFS4G□FR	BLUD40A
	BLU440C -□FR			BLUD40C
	BLU440S -□FR			BLUD40S
90 W (1/8 HP)	BLU590A -□FR	BLUM590-GFS	GFS5G□FR	BLUD90A
	BLU590C -□FR			BLUD90C
	BLU590S -□FR			BLUD90S

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

Round Shaft Type

Output Power	Model	Motor Model	Driver Model
20 W (1/38 HP)	BLU220A-A	BLUM220-A	BLUD20A
	BLU220C-A		BLUD20C
	BLU220S-A		BLUD20S
40 W (1/19 HP)	BLU440A-A	BLUM440-A	BLUD40A
	BLU440C-A		BLUD40C
	BLU440S-A		BLUD40S
90 W (1/8 HP)	BLU590A-A	BLUM590-A	BLUD90A
	BLU590C-A		BLUD90C
	BLU590S-A		BLUD90S

Pinion Shaft Type

Output Power	Model	Motor Model	Driver Model
20 W (1/38 HP)	BLU220A-GFS	BLUM220-GFS	BLUD20A
	BLU220C-GFS		BLUD20C
	BLU220S-GFS		BLUD20S
40 W (1/19 HP)	BLU440A-GFS	BLUM440-GFS	BLUD40A
	BLU440C-GFS		BLUD40C
	BLU440S-GFS		BLUD40S
90 W (1/8 HP)	BLU590A-GFS	BLUM590-GFS	BLUD90A
	BLU590C-GFS		BLUD90C
	BLU590S-GFS		BLUD90S

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 (34.4 ft.).

Model	Length: L [m (ft.)]
CC01AXU	1 (3.3)
CC02AXU	2 (6.6)
CC03AXU	3 (9.8)
CC05AXU	5 (16.4)
CC10AXU	10 (32.8)

Dimensions Unit = mm (in.)

