RoHS RoHS-Compliant

Brushless DC Motor and Driver Package

BLF Series

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

The **BLF** Series brushless DC motor achieved a maximum motor speed of 4000 r/min. With the digital operator, digital setting and display are possible, offering wide-ranging functions to meet your diverse needs.

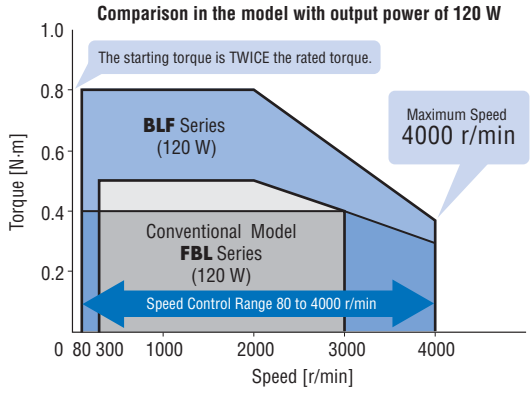
Motor: c UL us CE Driver: c UL us LISTED CE

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

■Features

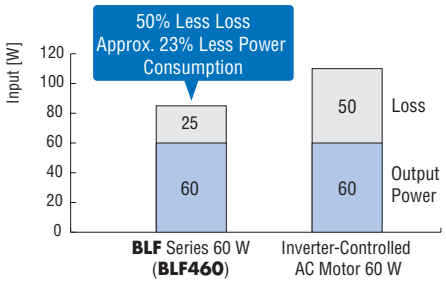
●Wide Speed Control Range from 80 r/min up to 4000 r/min

A wide speed control range from 80 to 4000 r/min (speed ratio of 1:50) enables the motor to be used for various applications.



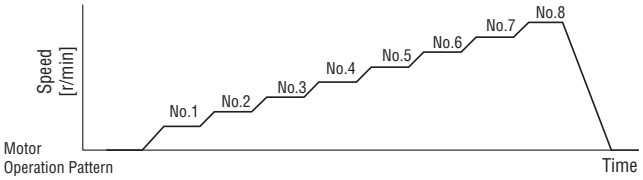
●Energy-Saving

At an output power of 60 W, the power loss of the **BLF** Series is approximately half that of an inverter-controlled AC motor, which contributes to the energy-saving operation of your equipment.



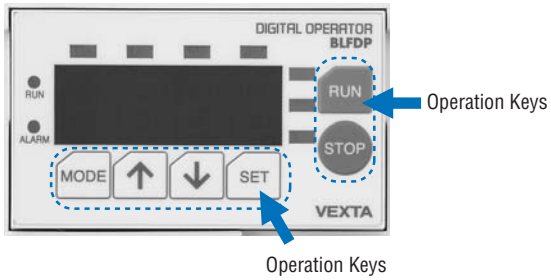
●Multi-Speed Operation Using up to Eight Speeds

Up to eight speeds can be set by digital setting. On the digital operator, the speed can be set in units of 1 r/min and a different acceleration/deceleration time can be set for each speed. Switch the speed according to your needs.



●Easy Operation with the Digital Operator

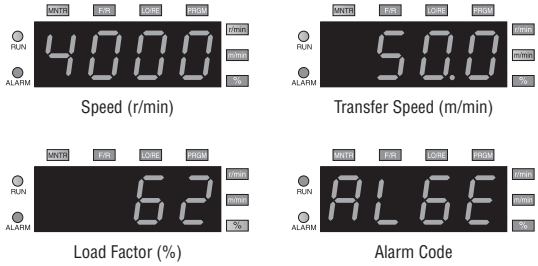
You can perform various settings and operations using the six operation keys on the digital operator.



●Various Digital Displays

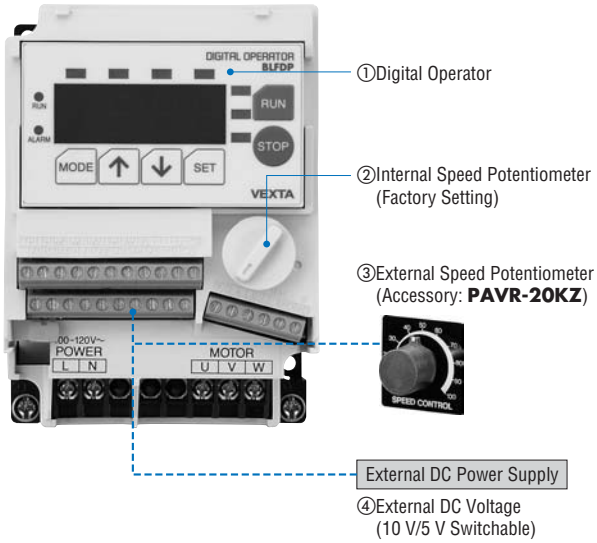
Speed, load factor, alarm code, etc. can be displayed digitally.

●The speed can be displayed as gearhead output shaft speed.



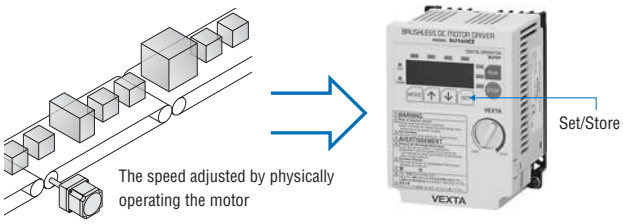
●Four Speed Setting Methods

Select one of four speed setting methods according to the condition in which your equipment is used.



●Speed Teaching Function

The speed adjusted by physically operating the motor can be set and stored.



●Sink/Source Logic Switchable

To ensure safety and usability, sink/source logic can be selected by a switch.

- The factory setting is the source logic.

●Full Range of Protective Functions

The **BLF** Series detects various motor and driver errors such as overload, overvoltage, undervoltage, missing phase, overspeed, overcurrent, EEPROM error, CPU error, operation error and external error. Upon detection of an error, the driver will immediately stop the motor and output an alarm signal.

●Detachable Digital Operator

The digital operator can be detached from the driver and used at a location as far as 5 m away using an accessory remote-control kit. Use the digital operator as a handy operation unit or display outside the switch board. (The digital operator conforms to IP65 when the remote-control kit is used.)

Digital Operator

●A Maximum Motor/Driver Wiring Distance of 20 m

By separating the motor cable and signal cable, the **BLF** Series is less vulnerable to noise and capable of an extension of the motor/driver wiring distance to a maximum of 20 m.
Select connection cables (sold separately) from among the eight lengths of 1 m to 20 m.

Note:

- Be sure to purchase connection cables (sold separately).

Motor Side Driver Side

Motor Connection Cable

Motor Side Driver Side

Signal Connection Cable

●Uses a Terminal Block for Driver Connection

The driver-end of each cable has terminals, instead of a connector, to make it easy to wire the cable into a switch board.

●Long Life Gearhead Rating of 10000 Hours

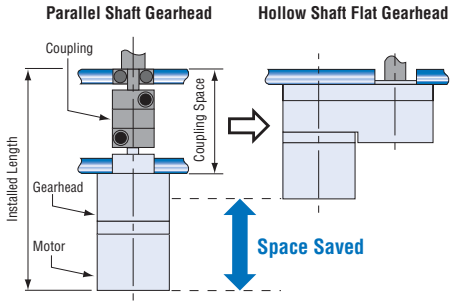
The rated life of the parallel shaft gearhead and hollow shaft flat gearhead is 10000 hours (at 3000 r/min). The parallel shaft gearhead achieves a rated life of twice as long as that of a conventional gearhead.

- The 120 W parallel shaft gearhead has a tapped hole at the shaft tip.

●Features of Hollow Shaft Flat Gearhead

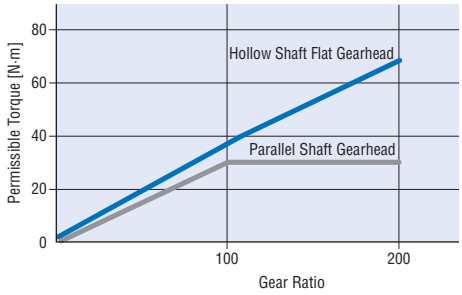
◇Space-Saving and Low-Cost

The output shaft can be coupled directly to your 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 parallel shaft gearhead saturates at high gear ratios, the hollow shaft flat gearhead enables the motor torque to be fully utilized.



●IP65 Protection

The motor (excluding the mounting surface of the round shaft type and the connector) and digital operator (when an accessory remote-control kit is used.) provide a high level of protection conforming to IP65. It means you can use the **BLF** Series in locations where the unit may come into contact with water.

- The **BLF** Series is not designed for washing directly in water or use in an environment where the unit constantly receives water splashes. The protection class of the driver is IP20.

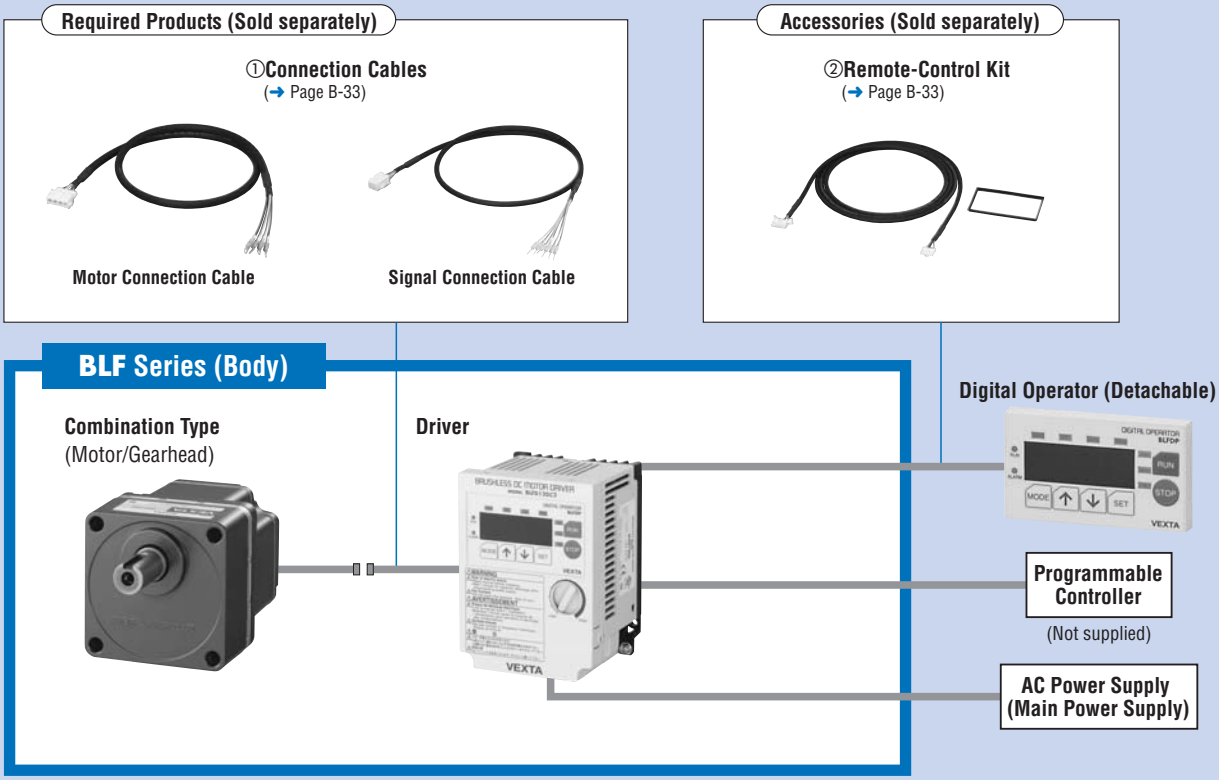
●RoHS RoHS-Compliant

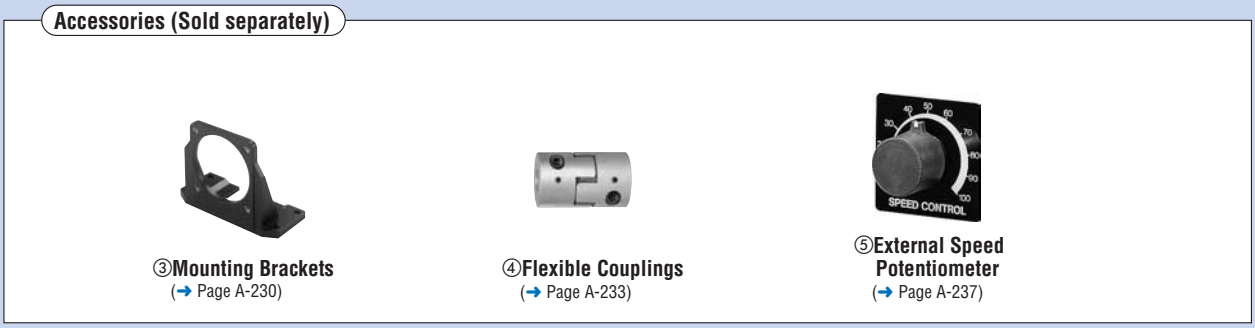
The **BLF** Series conforms to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium.

- Details of RoHS Directive ➜ Page G-23

System Configuration

Combination Type – Parallel Shaft Gearhead/Round Shaft Type





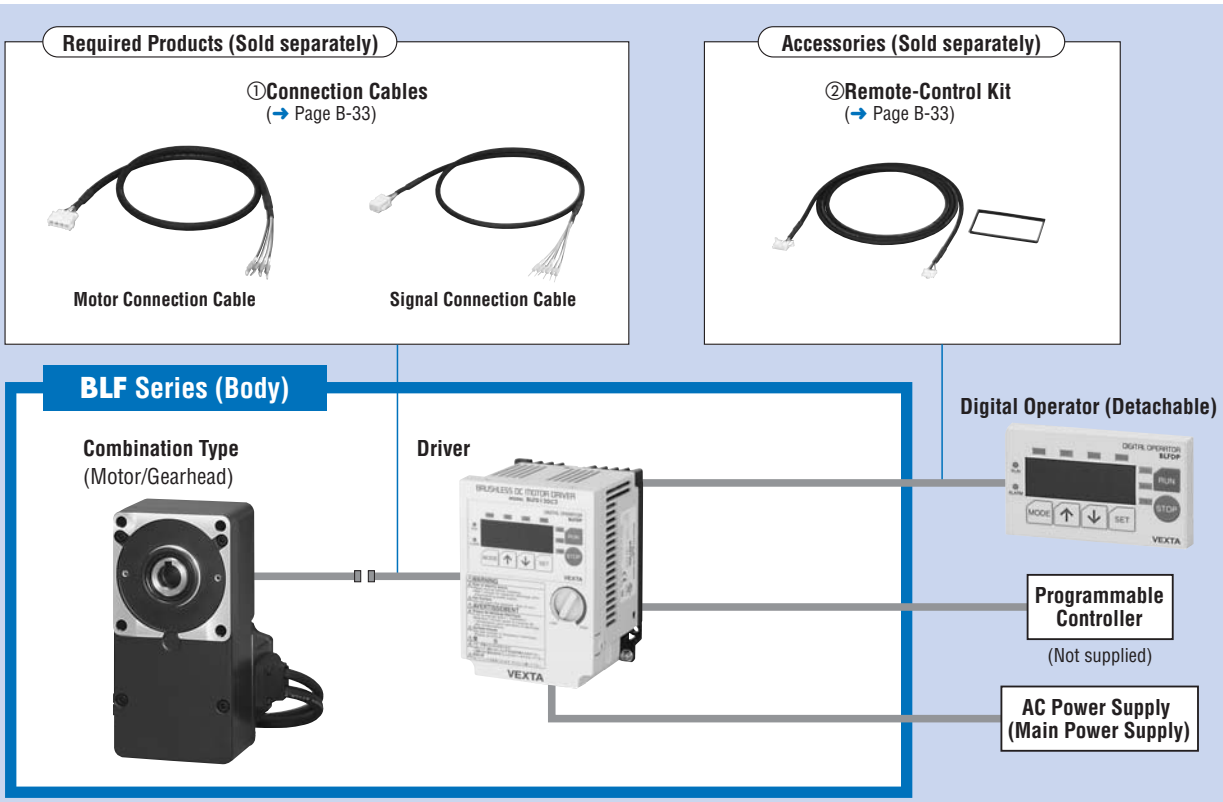
No.	Product Name	Overview	Page
①	Connection Cables	Dedicated cable for connecting the motor and driver (1 to 20 m). Be sure to purchase this cable.	B-33
②	Remote-Control Kit	Use this kit when removing the digital operator from the driver to operate it remotely.	B-33
③	Mounting Brackets	Dedicated mounting bracket for the motor and gearhead.	A-230
④	Flexible Couplings	Clamp type coupling that connects the motor or gearhead shaft to the driven shaft.	A-233
⑤	External Speed Potentiometer	Used to set and adjust the speed of the speed control motor (**PAVR-20KZ**).	A-237

Example of System Configuration

(Body)	(Sold separately)		(Sold separately)			
BLF Series Combination Type – Parallel Shaft	Connection Cable (Cable Set, 1 m)	+	Remote-Control Kit (2 m)	Mounting Bracket	Flexible Coupling	External Speed Potentiometer
BLF460C-30	CC01BLF		BLFHS-02	SOL4M6	MCL551515	PAVR-20KZ

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

●Combination Type – Hollow Shaft Flat Gearhead



No.	Product Name	Overview	Page
①	Connection Cables	Dedicated cable for connecting the motor and driver (1 to 20 m). Be sure to purchase this cable.	B-33
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③	External Speed Potentiometer	Used to set and adjust the speed of the speed control motor (**PAVR-20KZ**).	A-237

●Example of System Configuration

(Body)	(Sold separately)		(Sold separately)	
BLF Series Combination Type – Hollow Shaft	Connection Cable (Cable Set, 1 m)	+	Remote-Control Kit (2 m)	External Speed Potentiometer
BLF460C-30FR	CC01BLF		BLFHS-02	PAVR-20KZ

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

Product Number Code

BLF 2 30 C - 5 FR

① ② ③ ④ ⑤ ⑥

①	Series	**BLF**: **BLF** Series
②	Motor Frame Size	**2**: 60 mm **4**: 80 mm **5**: 90 mm **6**: 104 mm (110 mm for Gearhead)
③	Output Power (W)	(Example) **30**: 30 W
④	Power Supply Voltage	**A**: Single-Phase 100-120 VAC **C**: Single-Phase 200-240 VAC **S**: Three-Phase 200-240 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

Be sure to purchase connection cables.

Output Power	Power Supply Voltage	Model	Gear Ratio	Page
30 W	Single-Phase 100-120 VAC	**BLF230A-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
	Single-Phase 200-240 VAC	**BLF230C-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	B-16
	Three-Phase 200-240 VAC	**BLF230S-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
60 W	Single-Phase 100-120 VAC	**BLF460A-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
	Single-Phase 200-240 VAC	**BLF460C-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	B-16
	Three-Phase 200-240 VAC	**BLF460S-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
120 W	Single-Phase 100-120 VAC	**BLF5120A-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
	Single-Phase 200-240 VAC	**BLF5120C-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	B-16
	Three-Phase 200-240 VAC	**BLF5120S-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
200 W	Single-Phase 100-120 VAC	**BLF6200A-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
	Single-Phase 200-240 VAC	**BLF6200C-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	B-16
	Three-Phase 200-240 VAC	**BLF6200S-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻

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

✻ For the single-phase 100-120 VAC models and three-phase 200-240 VAC models, please contact the nearest Oriental Motor sales office.

The following items are included in each product.
Motor, Driver, Gearhead, Mounting Screws, Parallel Key, Operating Manual

Combination Type – Hollow Shaft Flat Gearhead

Be sure to purchase connection cables.

Output Power	Power Supply Voltage	Model	Gear Ratio	Page
30 W	Single-Phase 100-120 VAC	**BLF230A-□FR**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
	Single-Phase 200-240 VAC	**BLF230C-□FR**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	B-16
	Three-Phase 200-240 VAC	**BLF230S-□FR**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
60 W	Single-Phase 100-120 VAC	**BLF460A-□FR**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
	Single-Phase 200-240 VAC	**BLF460C-□FR**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	B-16
	Three-Phase 200-240 VAC	**BLF460S-□FR**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
120 W	Single-Phase 100-120 VAC	**BLF5120A-□FR**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻
	Single-Phase 200-240 VAC	**BLF5120C-□FR**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	B-16
	Three-Phase 200-240 VAC	**BLF5120S-□FR**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**	✻

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

✻ For the single-phase 100-120 VAC models and three-phase 200-240 VAC models, please contact the nearest Oriental Motor sales office.

The following items are included in each product.
Motor, Driver, Gearhead, Mounting Screws, Parallel Key, Safety Cover (with screws), Operating Manual

●Round Shaft Type

Be sure to purchase connection cables.

Output Power	Power Supply Voltage	Model	Page
30 W	Single-Phase 100-120 VAC	**BLF230A-A**	✻
	Single-Phase 200-240 VAC	**BLF230C-A**	B-16
	Three-Phase 200-240 VAC	**BLF230S-A**	✻
60 W	Single-Phase 100-120 VAC	**BLF460A-A**	✻
	Single-Phase 200-240 VAC	**BLF460C-A**	B-16
	Three-Phase 200-240 VAC	**BLF460S-A**	✻
120 W	Single-Phase 100-120 VAC	**BLF5120A-A**	✻
	Single-Phase 200-240 VAC	**BLF5120C-A**	B-16
	Three-Phase 200-240 VAC	**BLF5120S-A**	✻
200 W	Single-Phase 100-120 VAC	**BLF6200A-A**	✻
	Single-Phase 200-240 VAC	**BLF6200C-A**	B-16
	Three-Phase 200-240 VAC	**BLF6200S-A**	✻

✻For the single-phase 100-120 VAC models and three-phase 200-240 VAC models, please contact the nearest Oriental Motor sales office.

The following items are included in each product.
Motor, Driver, Operating Manual

●Pinion Shaft Type

Be sure to purchase connection cables.

Output Power	Power Supply Voltage	Model	Page
30 W	Single-Phase 100-120 VAC	**BLF230A-GFS**	✻
	Single-Phase 200-240 VAC	**BLF230C-GFS**	B-16
	Three-Phase 200-240 VAC	**BLF230S-GFS**	✻
60 W	Single-Phase 100-120 VAC	**BLF460A-GFS**	✻
	Single-Phase 200-240 VAC	**BLF460C-GFS**	B-16
	Three-Phase 200-240 VAC	**BLF460S-GFS**	✻
120 W	Single-Phase 100-120 VAC	**BLF5120A-GFS**	✻
	Single-Phase 200-240 VAC	**BLF5120C-GFS**	B-16
	Three-Phase 200-240 VAC	**BLF5120S-GFS**	✻
200 W	Single-Phase 100-120 VAC	**BLF6200A-GFS**	✻
	Single-Phase 200-240 VAC	**BLF6200C-GFS**	B-16
	Three-Phase 200-240 VAC	**BLF6200S-GFS**	✻

✻For the single-phase 100-120 VAC models and three-phase 200-240 VAC models, please contact the nearest Oriental Motor sales office.

The following items are included in each product.
Motor, Driver, Operating Manual

●Gearhead

◇Parallel Shaft Gearhead

Output Power of Applicable Motor (Pinion Shaft Type)	Gearhead Model	Gear Ratio
30 W	**GFS2G□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**
60 W	**GFS4G□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**
120 W	**GFS5G□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**
200 W	**GFS6G□**	**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
30 W	**GFS2G□FR**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**
60 W	**GFS4G□FR**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**
120 W	**GFS5G□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

●Connection Cables (Sold separately)

◇Cable Set

The cable set consists of two cables including a motor connection cable and a signal connection cable.

Length	Model
1 m	**CC01BLF**
2 m	**CC02BLF**
3 m	**CC03BLF**
5 m	**CC05BLF**
7 m	**CC07BLF**
10 m	**CC10BLF**
15 m	**CC15BLF**
20 m	**CC20BLF**

●The **BLF** Series requires two dedicated cables, one for the motor and the other for signals, for connection between the motor and driver. Be sure to purchase the connection cable set.

Specifications

●30 W, 60 W, 120 W, 200 W RoHS

Motor: c UL us CE /Driver: c UL us LISTED CE

Model	Combination Type – Parallel Shaft Gearhead	BLF230C-□	BLF460C-□	BLF5120C-□	BLF6200C-□
	Combination Type – Hollow Shaft Flat Gearhead	BLF230C-□FR	BLF460C-□FR	BLF5120C-□FR	–
	Round Shaft Type	BLF230C-A	BLF460C-A	BLF5120C-A	BLF6200C-A
Rated Output Power (Continuous) W		30	60	120	200
Power Source	Rated Voltage VAC	Single-Phase 200-240			
	Permissible Voltage Range	±10%			
	Rated Frequency Hz	50/60			
	Permissible Frequency Range	±5%			
	Rated Input Current A	0.8	1.2	2.0	2.8
	Maximum Input Current A	1.7	3.0	4.5	5.1
Rated Torque N·m		0.1	0.2	0.4	0.65
Starting Torque N·m		0.2	0.4	0.8	1.15
Rated Speed r/min		3000			
Speed Control Range r/min		80～4000			
Round Shaft Type Permissible Load Inertia $J\times10^{-4}$ kg·m²		1.8	3.75	5.6	8.75
Rotor Inertia $J\times10^{-4}$ kg·m²		0.087	0.236	0.675	0.61
Speed Regulation* (When digital operator is used)	Load	±0.2% max. (0～Rated torque, at rated speed, at rated voltage, at normal ambient temperature)			
	Voltage	±0.2% max. (Rated voltage ±10%, at rated speed, with no load, at normal ambient temperature)			
	Temperature	±0.2% max. (0～+50˚C, at rated speed, with no load, at rated voltage)			

*Speed regulation values vary depending on the speed setting method.
Settings from internal speed potentiometer, external speed potentiometer, external DC voltage; Load: ±0.5% max., Voltage: ±0.5% max., Temperature: ±0.5% max.

- 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 100-120 VAC and three-phase 200-240 VAC are also available. Please contact the nearest Oriental Motor sales office.

Common Specifications

Item	Specifications
Speed Setting Method	Select one of the following methods: · Set using the internal speed potentiometer · Set using the digital operator: Up to eight speeds · Set using an accessory external speed potentiometer: **PAVR-20KZ** (20 kΩ, 1/4 W) (sold separately) · Set using external DC voltage: 0～5 VDC or 0～10 VDC
Acceleration/Deceleration Time (At 3000 r/min)	0.2～15 sec. (factory setting: 0.5 sec.) Up to eight speeds using the digital operator
Input Signal (In the remote mode)	Photocoupler input mode Input resistance 3.3 kΩ Internal power supply voltage: 14 VDC±10% Connectable external voltage: 24 VDC±10% (only for source logic) Source input (factory setting), Sink input/2-wire input mode (factory setting), or 3-wire input mode CW (START/STOP) input, CCW (RUN/BRAKE) input, STOP-MODE (CW/CCW) input, Speed data select, Alarm reset input, External error input Names in ( ) apply in the 3-wire input mode.
Output Signal	Open-collector output 4.5～26.4 VDC, 10 mA max. (5～10 mA for Speed output) Speed output (30 pulses/rotation), Alarm output1, Alarm output2
Protective Function*	When the following are activated, the "Alarm" signal will be output and the motor will coast to a stop. (The motor will stop instantaneously in the event of an external error.) · 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 120 VAC or 240 VAC by a minimum of 20%, a gravitational operation is performed or a load exceeding the permissible load inertia is driven. · Undervoltage Protection: Activated when the voltage applied to the driver falls below 100 VAC or 200 VAC by a minimum of 40%. · Missing Phase Protection: Activated when an error is detected in the signals received from the motor due to poor connection or breakage of the signal cable, etc. · Overspeed Protection: Activated when the speed of the motor shaft exceeds 4800 r/min. · Overcurrent Protection: Activated when an excessive current flows through the driver due to a ground fault, etc. · CPU Error, EEPROM Error, External Error, Operation Error
Maximum Extension Distance	Motor/Driver Distance: 20.4 m (when a dedicated connection cable is used)
Time Rating	Continuous

*With the **BLF** 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 input terminal and the protective earth terminal, and between the power supply input terminal and the I/O terminal after continuous operation under normal ambient temperature and humidity.
Dielectric Strength		Sufficient to withstand 1.5 kV 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 kV at 50 Hz applied between the power supply input terminal and the protective earth terminal for 1 minute, and 3 kV at 50 Hz applied between the power supply input terminal and the I/O terminal for 1 minute after continuous operation under normal ambient temperature and humidity.
Temperature Rise		Temperature rise of the windings and the case are 50°C or less, and 40°C or less*1 respectively measured by the thermocouple method after continuous operation under normal ambient temperature and humidity.	Temperature rise of heat sink are 50°C or less measured by the thermocouple method after continuous operation under normal ambient temperature and humidity.
Operating Environment	Ambient Temperature	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)	IP20

*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.
BLF230C-A: 115×115 mm, 5 mm thick
BLF460C-A: 135×135 mm, 5 mm thick
BLF5120C-A: 165×165 mm, 5 mm thick
BLF6200C-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
	Motor Speed 80 r/min	16	8	5.3	4	2.7	1.6	0.8	0.4
	Motor Speed 3000 r/min	600	300	200	150	100	60	30	15
	Motor Speed 4000 r/min	800	400	267	200	133	80	40	20
BLF230C-□	80～3000 r/min	0.45	0.9	1.4	1.8	2.6	4.3	6	6
	4000 r/min	0.34	0.68	1	1.4	1.9	3.2	5.4	5.4
BLF460C-□	80～3000 r/min	0.9	1.8	2.7	3.6	5.2	8.6	16	16
	4000 r/min	0.68	1.4	2	2.7	3.9	6.5	12.9	14
BLF5120C-□	80～3000 r/min	1.8	3.6	5.4	7.2	10.3	17.2	30	30
	4000 r/min	1.4	2.7	4.1	5.4	7.7	12.9	25.8	27
BLF6200C-□	80～3000 r/min	2.9	5.9	8.8	11.7	16.8	28	52.7	70
	4000 r/min	2.0	4.1	6.1	8.1	11.6	19.4	36.5	63

● 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
	Motor Speed 80 r/min	16	8	5.3	4	2.7	1.6	0.8	0.4
	Motor Speed 3000 r/min	600	300	200	150	100	60	30	15
	Motor Speed 4000 r/min	800	400	267	200	133	80	40	20
BLF230C-□FR	80～3000 r/min	0.4	0.85	1.3	1.7	2.6	4.3	8.5	17
	4000 r/min	0.3	0.64	0.96	1.3	1.9	3.2	6.4	12.8
BLF460C-□FR	80～3000 r/min	0.85	1.7	2.6	3.4	5.1	8.5	17	34
	4000 r/min	0.64	1.3	1.9	2.6	3.8	6.4	12.8	25.5
BLF5120C-□FR	80～3000 r/min	1.7	3.4	5.1	6.8	10.2	17	34	68
	4000 r/min	1.3	2.6	3.8	5.1	7.7	12.8	25.5	51

● 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-32

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	
BLF230C-□	**5**	80～3000 r/min	100	150	40
		4000 r/min	90	110	
	10, **15**, **20**	80～3000 r/min	150	200	
		4000 r/min	130	170	
	30, **50**, **100**, **200**	80～3000 r/min	200	300	
		4000 r/min	180	230	
BLF460C-□	**5**	80～3000r/min	200	250	100
		4000 r/min	180	220	
	10, **15**, **20**	80～3000 r/min	300	350	
		4000 r/min	270	330	
	30, **50**, **100**, **200**	80～3000 r/min	450	550	
		4000 r/min	420	500	
BLF5120C-□	**5**	80～3000 r/min	300	400	150
		4000 r/min	230	300	
	10, **15**, **20**	80～3000 r/min	400	500	
		4000 r/min	370	430	
	30, **50**, **100**, **200**	80～3000 r/min	500	650	
		4000 r/min	450	550	
BLF6200C-□	**5**, **10**, **15**, **20**	80～3000 r/min	550	800	200
		4000 r/min	500	700	
	30, **50**	80～3000 r/min	1000	1250	300
		4000 r/min	900	1100	
	100, **200**	80～3000 r/min	1400	1700	400
		4000 r/min	1200	1400	

● 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	
BLF230C-□FR	**5**, **10**	80～3000 r/min	450	370	200
		4000 r/min	410	330	
	15, **20**, **30**, **50**, **100**, **200**	80～3000 r/min	500	400	
		4000 r/min	460	370	
BLF460C-□FR	**5**, **10**	80～3000 r/min	800	660	400
		4000 r/min	730	600	
	15, **20**, **30**, **50**, **100**, **200**	80～3000 r/min	1200	1000	
		4000 r/min	1100	910	
BLF5120C-□FR	**5**, **10**	80～3000 r/min	900	770	500
		4000 r/min	820	700	
	15, **20**	80～3000 r/min	1300	1110	
		4000 r/min	1200	1020	
	30, **50**, **100**, **200**	80～3000 r/min	1500	1280	
		4000 r/min	1400	1200	

● 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	
BLF230C-A	80	100	The permissible thrust load shall be no greater than half the motor mass.
BLF460C-A	110	130	
BLF5120C-A	150	170	
BLF6200C-A	197	221	

Permissible Load Inertia of Combination Type: J

Combination Type – Parallel Shaft Gearhead

Unit = $\times 10^{-4}$ kg·m^2

Model \ Gear Ratio	5	10	15	20	30	50	100	200
BLF230C-□	1.55	6.2	14	24.8	55.8	155	155	155
BLF460C-□	5.5	22	49.5	88	198	550	550	550
BLF5120C-□	25	100	225	400	900	2500	2500	2500
BLF6200C-□	37.5	150	338	600	1350	3750	3750	3750

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

Combination Type – Hollow Shaft Flat Gearhead

Unit = $\times 10^{-4}$ kg·m^2

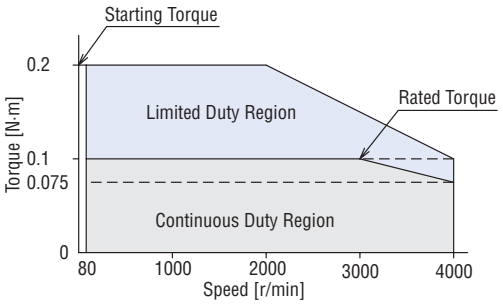
Model \ Gear Ratio	5	10	15	20	30	50	100	200
BLF230C-□FR	1.55	6.2	14	24.8	55.8	155	155	155
BLF460C-□FR	5.5	22	49.5	88	198	550	550	550
BLF5120C-□FR	25	100	225	400	900	2500	2500	2500

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

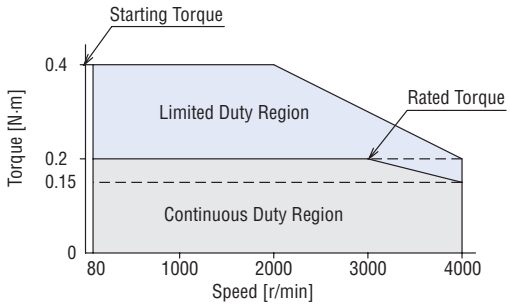
Speed – Torque Characteristics

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.

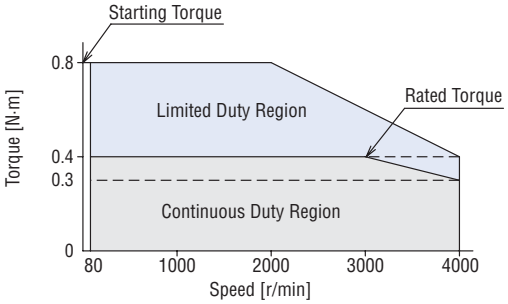
BLF230C-□/BLF230C-□FR/BLF230C-A



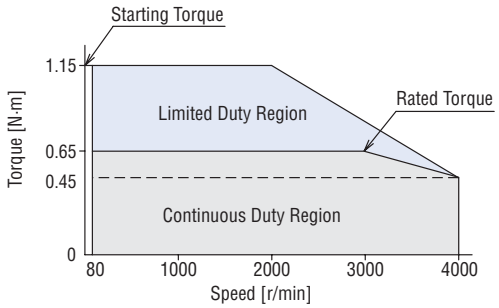
BLF460C-□/BLF460C-□FR/BLF460C-A



BLF5120C-□/BLF5120C-□FR/BLF5120C-A



BLF6200C-□/BLF6200C-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)

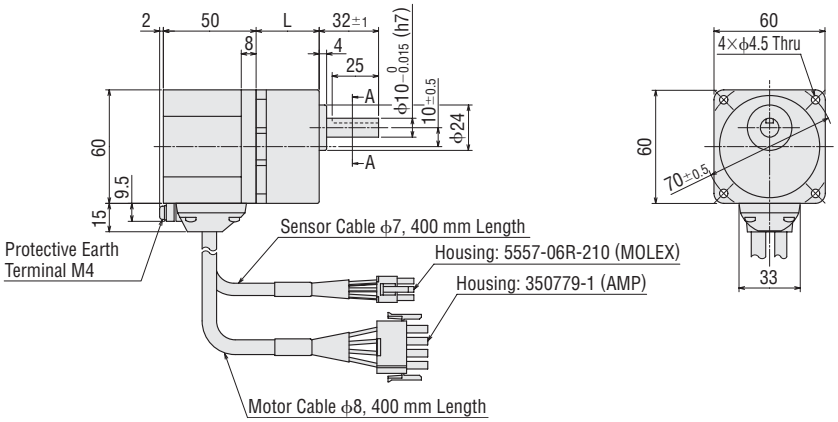
●Mounting screws are included with the combination type. Dimensions for mounting screws ➜ Page B-72

●30 W

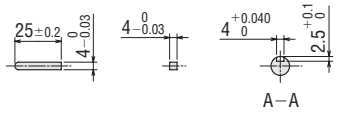
◇Motor/Parallel Shaft Gearhead

Model	Motor Model	Gearhead Model	Gear Ratio	L
BLF230C-□	BLFM230-GFS	GFS2G□	**5～20**	34
			30～100	38
			200	43

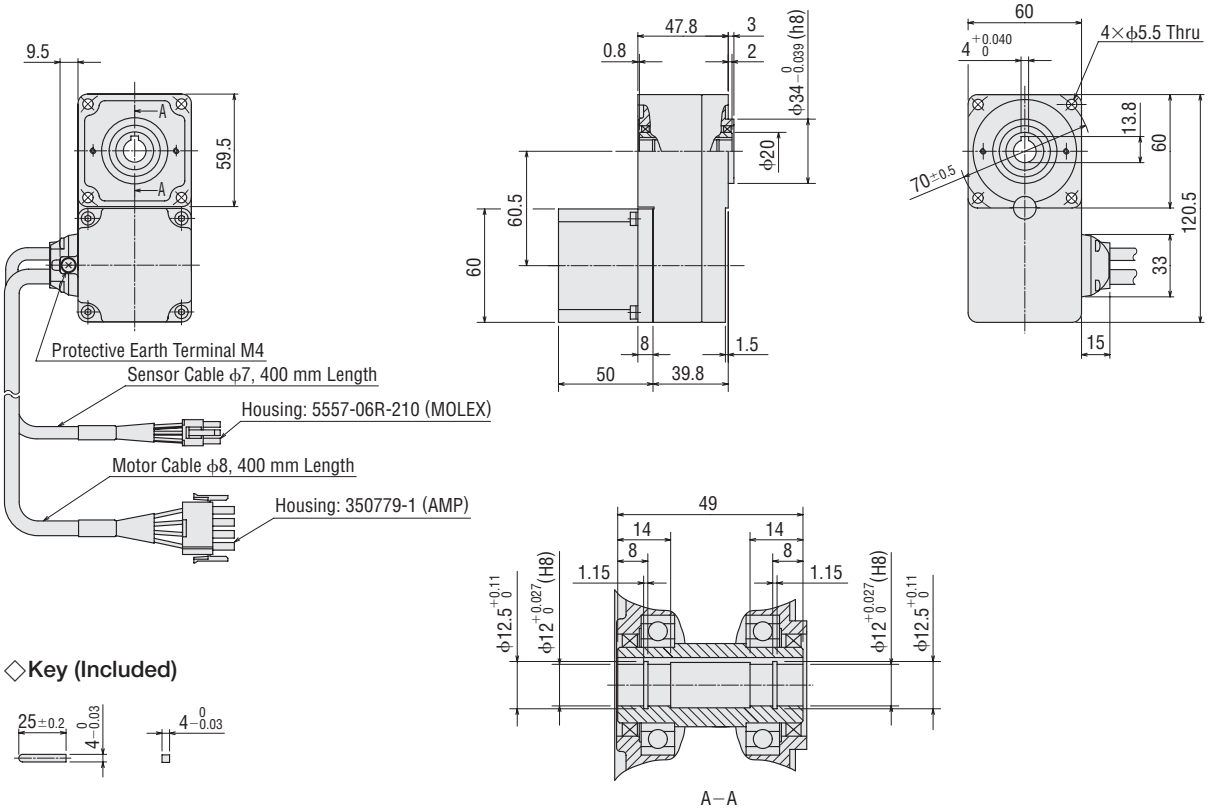
Mass: 1.1 kg (Including gearhead)



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



◇Motor/Hollow Shaft Flat Gearhead
BLF230C-□FR
Motor: BLFM230-GFS
Gearhead: GFS2G□FR
Mass: 1.4 kg (Including gearhead)



◇Key (Included)

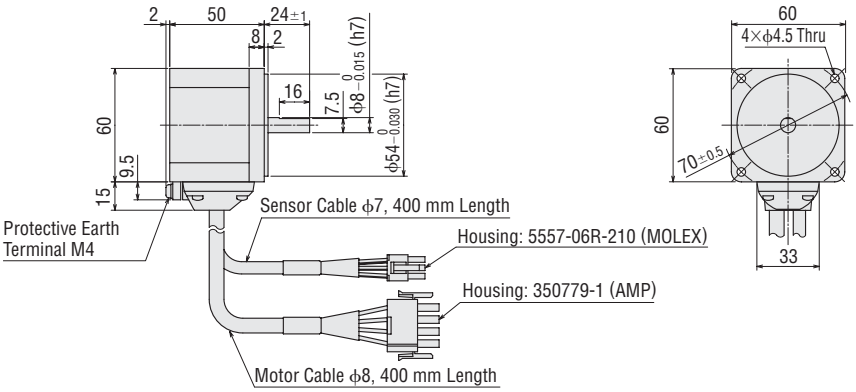
●Enter the gear ratio in the box (□) within the model name.

◇Round Shaft Type

BLF230C-A

Motor: BLFM230-A

Mass: 0.6 kg

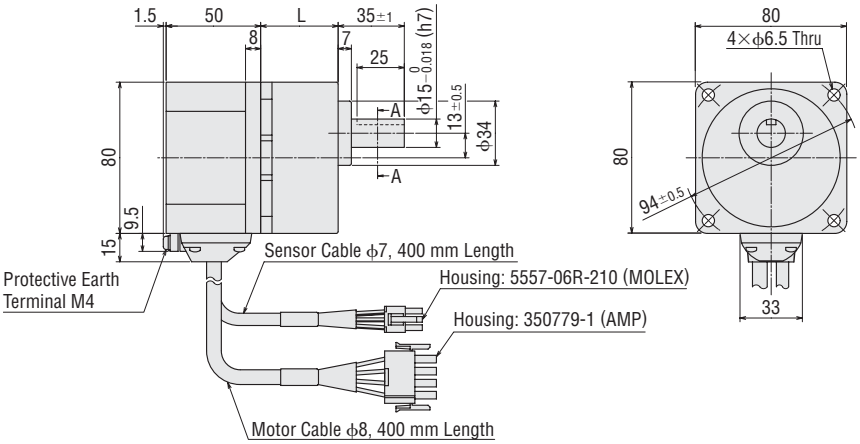


●60 W

◇Motor/Parallel Shaft Gearhead

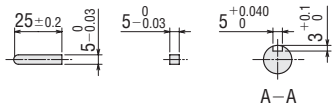
Model	Motor Model	Gearhead Model	Gear Ratio	L
BLF460C-□	BLFM460-GFS	GFS4G□	**5~20**	41
			30~100	46
			200	51

Mass: 1.9 kg (Including gearhead)



◇Key and Key Slot

(The key is included with the gearhead)



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

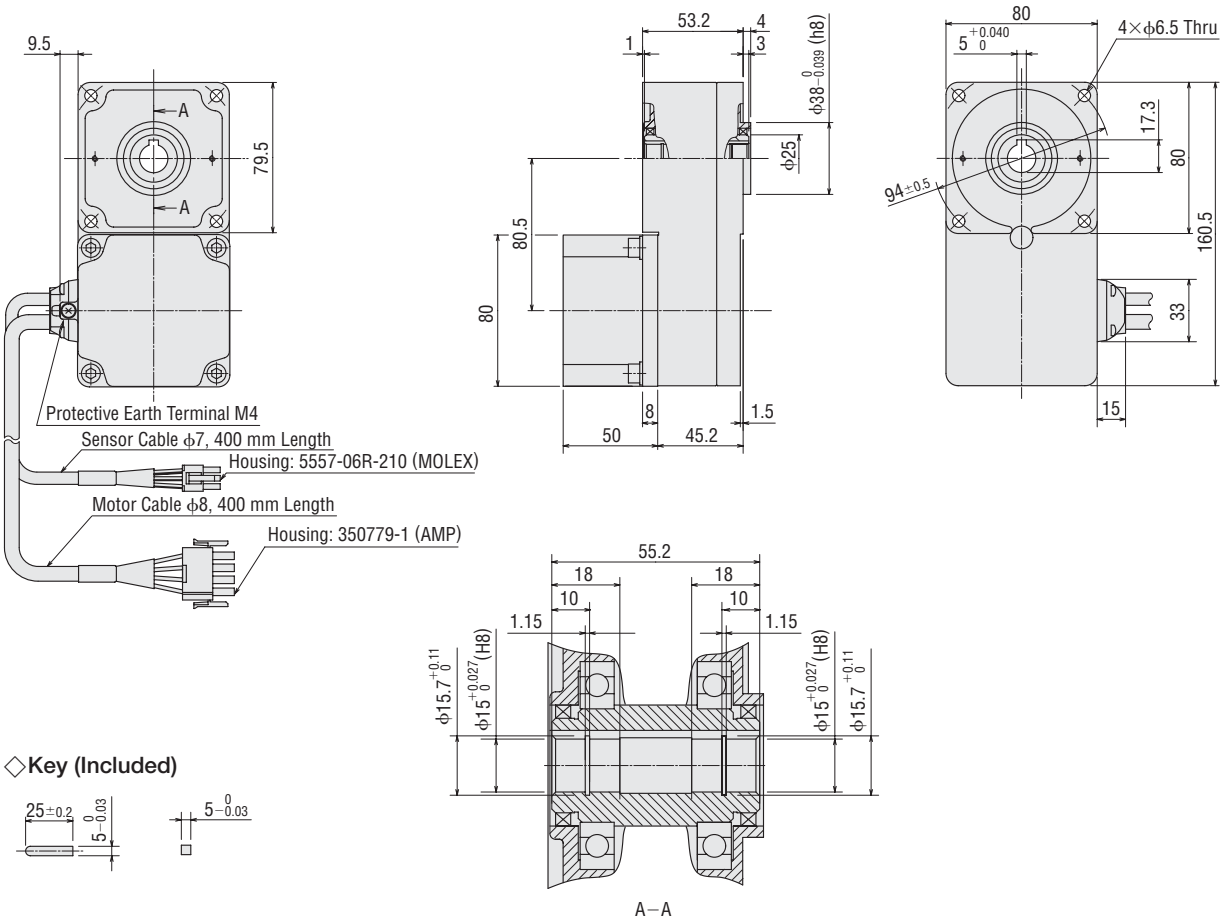
◇Motor/Hollow Shaft Flat Gearhead

BLF460C-□FR

Motor: BLFM460-GFS

Gearhead: GFS4G□FR

Mass: 2.5 kg (Including gearhead)



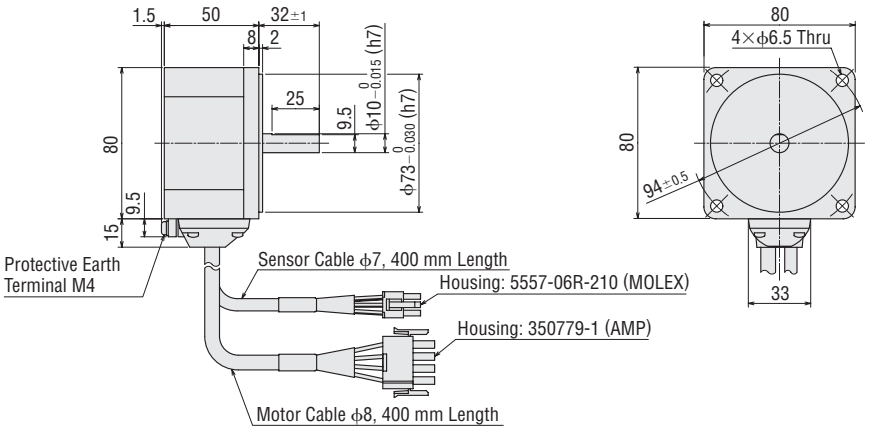
◇Key (Included)

◇Round Shaft Type

BLF460C-A

Motor: BLFM460-A

Mass: 0.9 kg



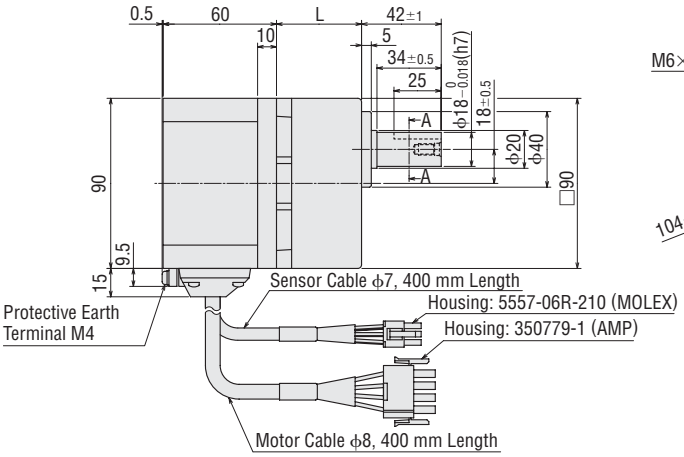
● Enter the gear ratio in the box (□) within the model name.

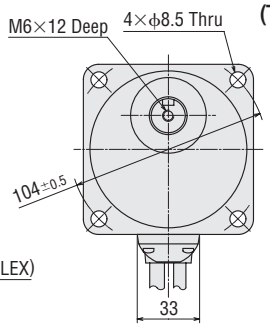
●120 W

◇Motor/Parallel Shaft Gearhead

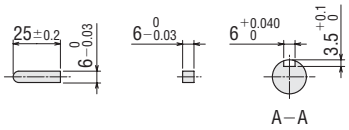
Model	Motor Model	Gearhead Model	Gear Ratio	L
BLF5120C-□	BLFM5120-GFS	GFS5G□	**5~20**	45
			30~100	58
			200	64

Mass: 3.0 kg (Including gearhead)

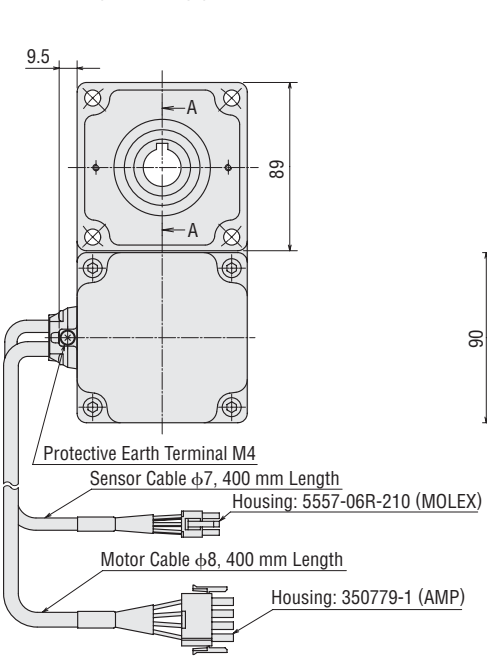


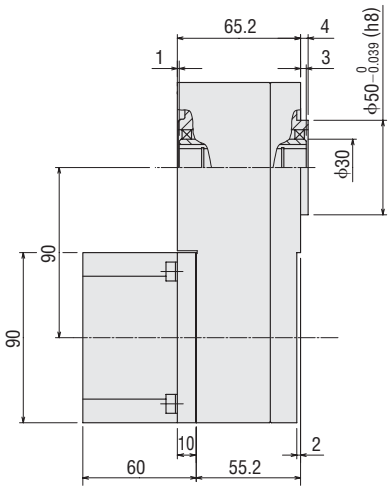


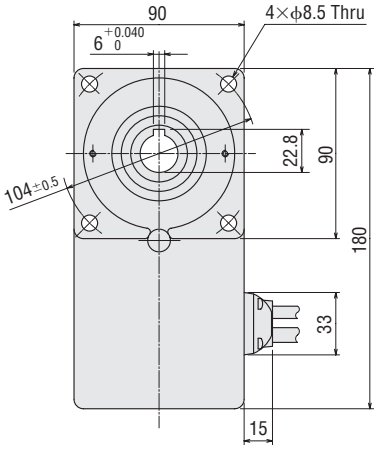
◇Key and Key Slot
(The key is included with the gearhead)

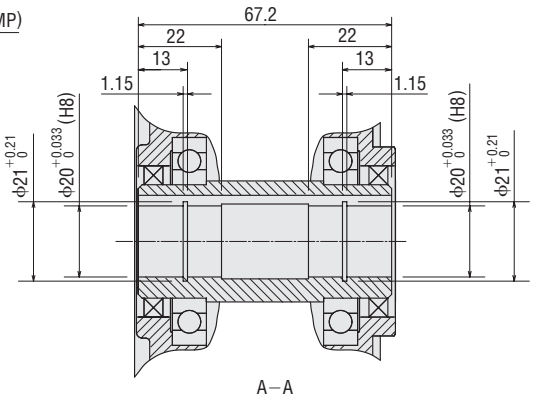


◇Motor/Hollow Shaft Flat Gearhead
BLF5120C-□FR
Motor: BLFM5120-GFS
Gearhead: GFS5G□FR
Mass: 3.7 kg (Including gearhead)

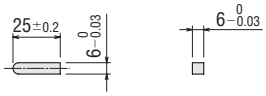








◇Key (Included)



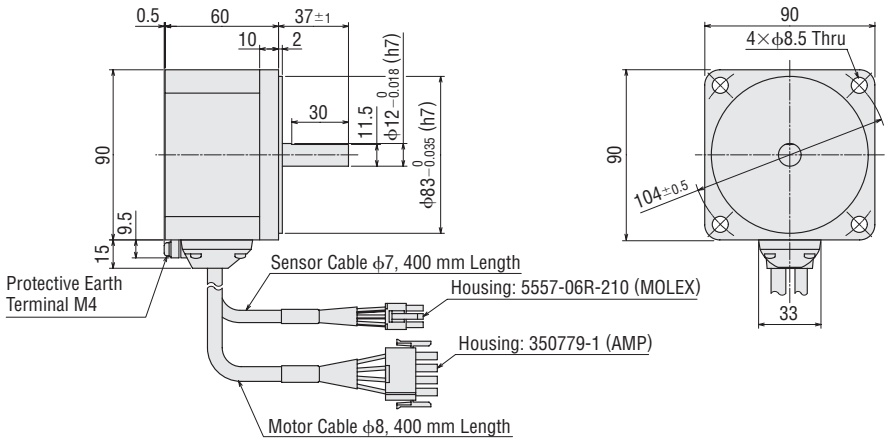
● Enter the gear ratio in the box (□) within the model name.

◇Round Shaft Type

BLF5120C-A

Motor: BLFM5120-A

Mass: 1.5 kg

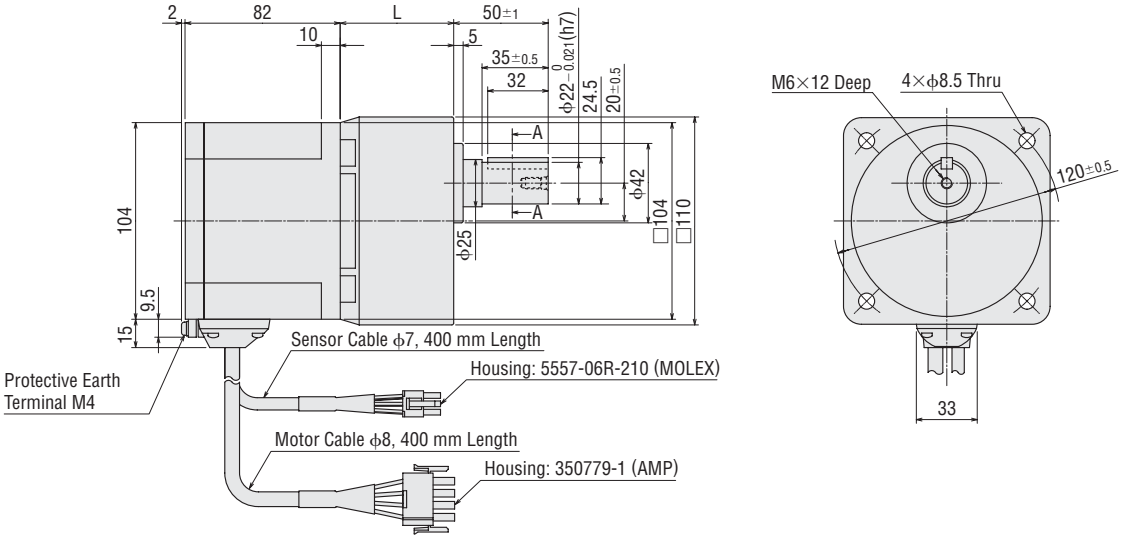


●200 W

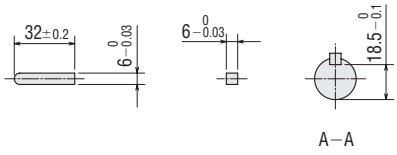
◇Motor/Parallel Shaft Gearhead

Model	Motor Model	Gearhead Model	Gear Ratio	L
BLF6200C-□	BLFM6200-GFS	GFS6G□	**5~20**	60
			30, 50	72
			100, 200	86

Mass: 5.4 kg (Including gearhead)



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



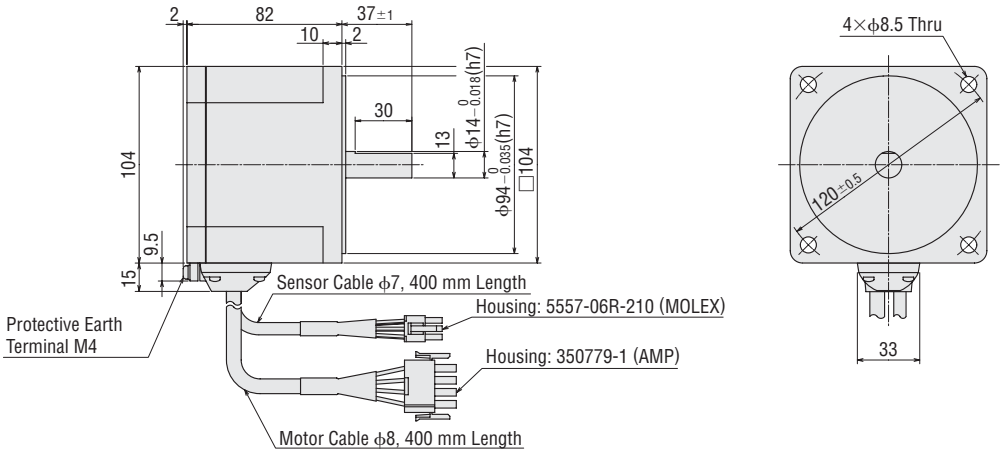
●At the time of shipment, a parallel key is inserted on the gearhead's shaft.

◇Round Shaft Type

BLF6200C-A

Motor: BLFM6200-A

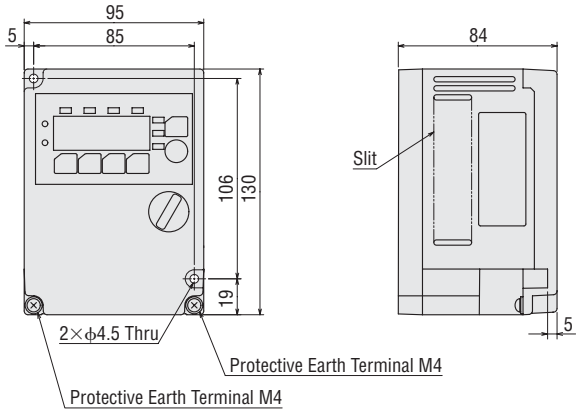
Mass: 2.4 kg



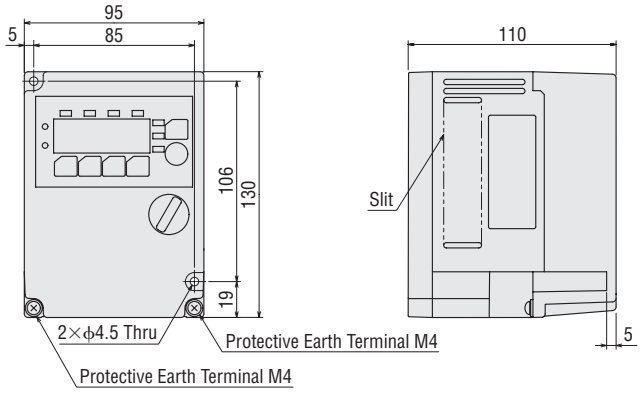
●Enter the gear ratio in the box (□) within the model name.

◇**Driver**

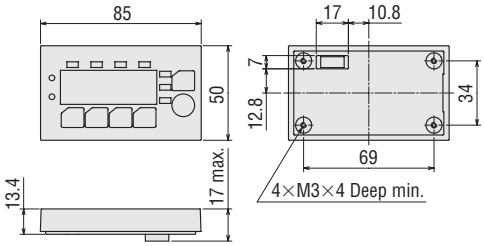
BLFD30C2
BLFD60C2
BLFD120C2
Mass: 0.9 kg



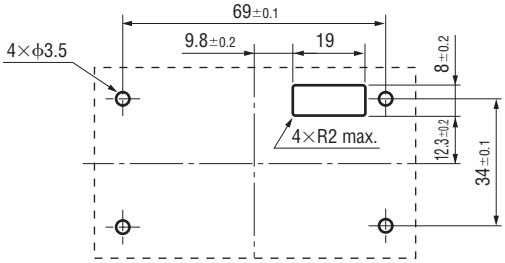
BLFD200C2
Mass: 1.3 kg



◇**Digital Operator**
(Detached from the driver)

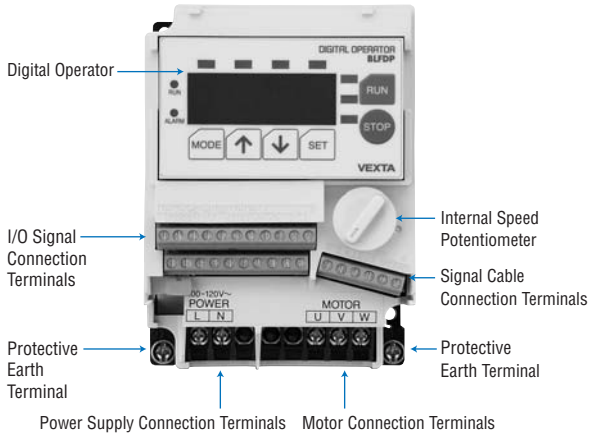


◇**Digital Operator Panel Cut-Out**

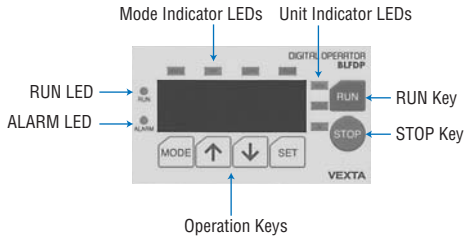


Connection and Operation

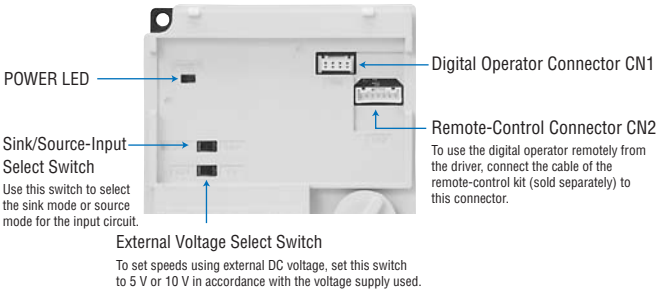
Names and Functions of Driver Parts



◇Digital Operator



When the digital operator is detached



I/O Signal

Terminal Name	Signal	Signal Name	Function and Operation
TH	Input	N. C.	Do not connect any signal to this terminal.
TH		N. C.	Do not connect any signal to this terminal.
M0		M0 Input	These signals are used to select operation data in multi-speed operation. One of up to eight preset speed data can be selected using the M0, M1 and M2 inputs.
M1		M1 Input	
M2		M2 Input	
VH		VH Input	These signals are used to set speeds via an external speed potentiometer or external DC voltage.
VM		VM Input	
VL		VL Input	
C3		IN-COM1	Input signal common (0 V)
X0*1		EXT-ERROR Input	External error input (Normal close)
C0		IN-COM0	Input signal common
C1		IN-COM0	Input signal common
X1*2		2-Wire Mode: CW Input	Clockwise direction/stop switch input signal
		3-Wire Mode: START/STOP Input	Start/stop input signal
X2*2		2-Wire Mode: CCW Input	Counterclockwise direction/stop switch input signal
		3-Wire Mode: RUN/BRAKE Input	Run/instantaneous stop input signal
X3*2		2-Wire Mode: STOP-MODE Input	This signal is input to select the motor stop action.
		3-Wire Mode: CW/CCW Input	Clockwise/counterclockwise direction input signal
X4		N. C.	Do not connect any signal to this terminal.
X5		ALARM-RESET Input	This signal is used to reset alarms.
Y1	Output	ALARM-OUT1 Output	This signal is output upon generation of an alarm. (Normal close)
Y2		ALARM-OUT2 Output	This signal is output upon actuation of the overload protective function or overload warning function. (Normal close)
Y0		SPEED-OUT Output	30 pulses are output per each rotation of the motor output shaft.
C2		OUT-COM	Output signal common

*1 Do not remove the short circuit bar if the EXT-ERROR input is not used.

*2 The functions of the external-input signal terminals X1, X2 and X3 can be changed between the 2-wire input mode and 3-wire input mode. The functions under the 2-wire input mode are initially assigned to the terminals.

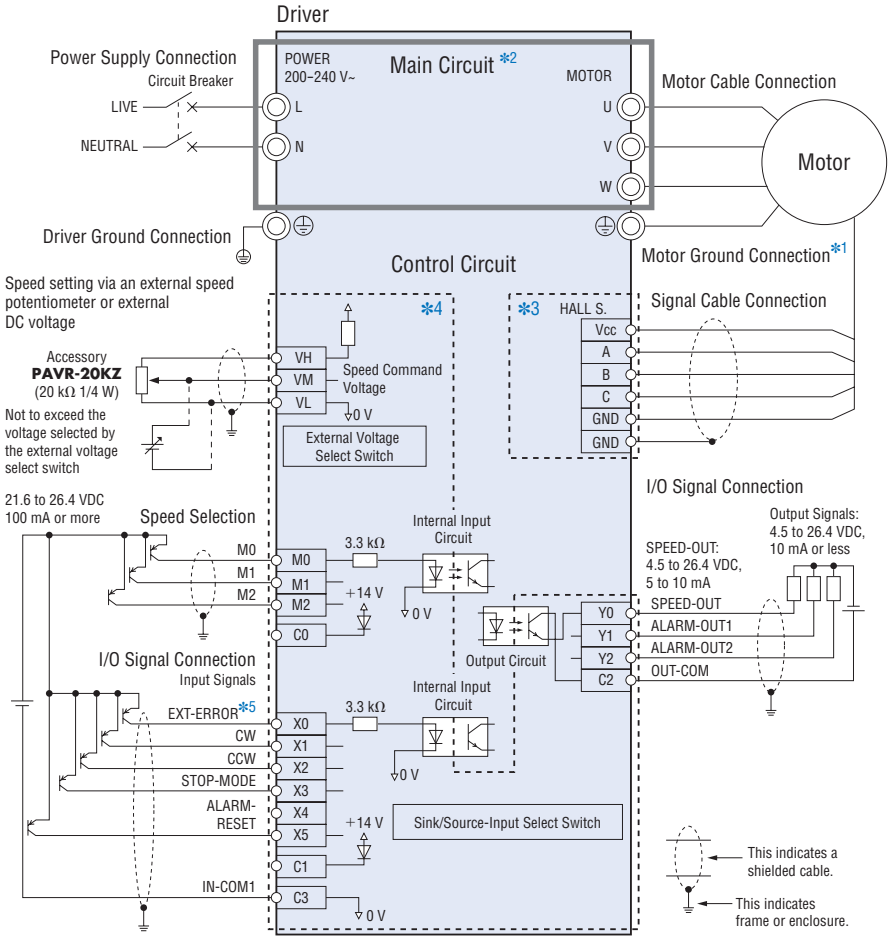
Digital Operator Indicator

Display		Function	Details
RUN		Running	A green lamp stays lit while the motor is running.
ALARM		Alarm	A red lamp turns on when an alarm occurs.
Mode	MNTR	Monitor mode	The motor can be operated in this mode. The motor speed and load condition are displayed during motor operation.
	F/R	Direction setting mode	If the digital operator is used to operate the motor, set the motor direction in this mode. For: Clockwise direction, rEv: Counterclockwise direction
	LO/RE	Digital operator/external-input signal mode	In this mode, set whether to use the digital operator or external I/O signals to input the motor operation/stop signals. Lo: Digital operator, rE: External-input signals
	PRGM	Data setting mode	In this mode, set the data needed to operate the motor. Operation data (eight speeds and acceleration/deceleration times) Gear ratio setting/conveyor speed setting Input mode Overload warning function
Display Unit	r/min	Motor speed	The speed of the motor or gearhead output shaft is displayed.
	m/min	Conveyor speed	An equivalent moving speed of the work on a conveyor or other transfer system is displayed.
	%	Load factor*	The actual load is displayed as a percentage of the rated torque being 100%.

*A maximum error of approximately 20% may generate when the motor is operated at the rated speed under the rated load.

●Connection Diagrams

The figure below is a connection diagram for a configuration based on a single-phase 200-240 VAC supply voltage, with the sink/source-input select switch set to the source side.



*1 The grounding method will vary depending on the length of the connection cable.
When the connection cable is 7 m or shorter: Connect the protective earth terminal on the connection cable to the protective earth terminal on the driver.
When the connection cable is 10 m or longer: Connect the protective earth terminal of the motor directly to the grounding point.

*2 The main circuit is insulated to prevent electrical shock resulting from accidental contact by a hand, etc.

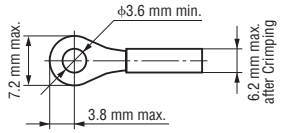
*3 The signal cable connection terminals and the signal cable including the shielded cable comprise an ELV circuit, which is insulated from dangerous voltages only by means of basic insulation. Therefore, connect the shielded cable to the GND point specified in the connection diagram, instead of connecting it to a protective earth terminal.

*4 The I/O signal connection terminals comprise a SELV circuit, which is insulated from dangerous voltages by means of double insulation or reinforced insulation.

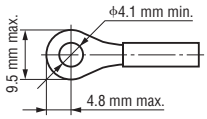
*5 X0 is an external error input. When this signal turns OFF, an alarm will be output.

◇Applicable Crimp Terminals

· Power Supply Connection Terminal (M3.5): Round Terminal with Insulation

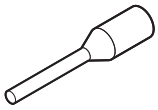


· Protective Earth Terminal (M4): Round Terminal with Insulation



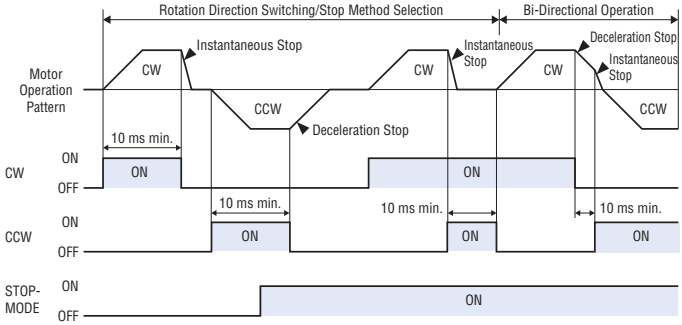
· I/O Terminals

Use the terminals specified below for connection using crimp terminals. Please note that the applicable crimp terminal will vary depending on the size of the wire. The following terminals can be used with wires of AWG26 to 22.
[Manufacturer: Phoenix Contact]
AI 0.25-6 Applicable cable size
: AWG26 to 24 (0.14 to 0.2 mm²)
AI 0.34-6 Applicable cable size
: AWG22 (0.3 mm²)



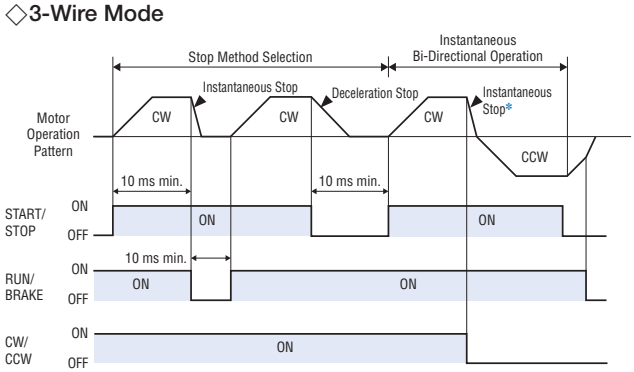
●Timing Chart

◇2-Wire Mode



- The CW input signal, CCW input signal and STOP-MODE signal can be used to control all motor operations, such as run, stop, direction switching, deceleration stop and instantaneous stop.
- Switching the CW signal ON will cause the motor to turn clockwise as viewed from the motor shaft, while switching the CCW signal ON will cause the motor to turn counterclockwise. Switching each signal OFF will stop the motor. If both the CW signal and CCW signal are turned ON at the same time, the motor will stop instantaneously. The motor will start at the rise time corresponding to the acceleration time (ACC) set on the digital operator.
- Switching the STOP-MODE signal ON will cause the motor to decelerate at the deceleration time (DEC) set on the digital operator until it eventually stops. Switching the STOP-MODE signal OFF will cause the motor to stop instantaneously.

◇3-Wire Mode



- The START/STOP signal, RUN/BRAKE signal and CW/CCW signal can be used to control all motor operations, such as run/stop, instantaneous stop and direction switching.
- Switching both the START/STOP signal and RUN/BRAKE signal ON at the same time will start the motor. At this time, switching the CW/CCW signal ON will cause the motor to turn clockwise as viewed from the motor shaft, while switching the signal OFF will cause the motor to turn counterclockwise. The motor will start at the rise time corresponding to the acceleration time (ACC) set on the digital operator.
- Switching the RUN/BRAKE signal OFF while the START/STOP signal is ON will cause the motor to stop instantaneously. Switching the START/STOP signal OFF while the RUN/BRAKE signal is ON will cause the motor to decelerate at the deceleration time (DEC) set on the digital operator until it eventually stops.

*Changing the direction while the motor is running will cause the motor to stop instantaneously and then change its direction.

●I/O Signal Circuits

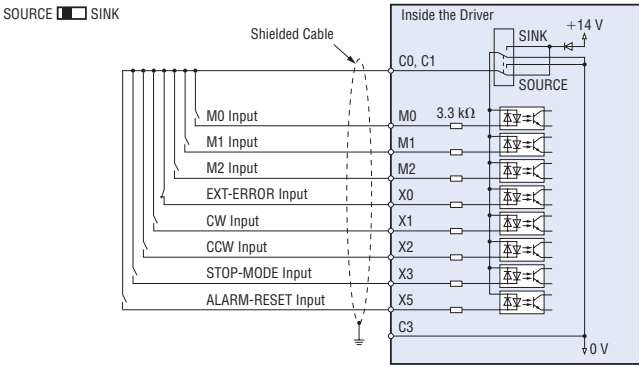
The initial setting is the source logic. Select the sink logic or source logic according to the controller you will be using.

◇Input Circuit

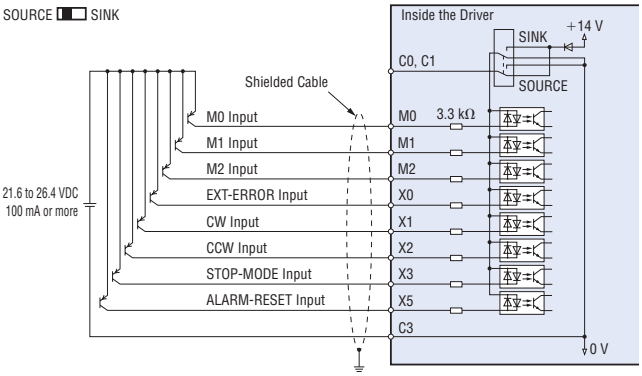
Common to the CW (START/STOP), CCW (RUN/BRAKE), STOP-MODE (CW/CCW), EXT-ERROR, ALARM-RESET and operation-data selection inputs.

• Source Logic

Controlled by Relays or Switches

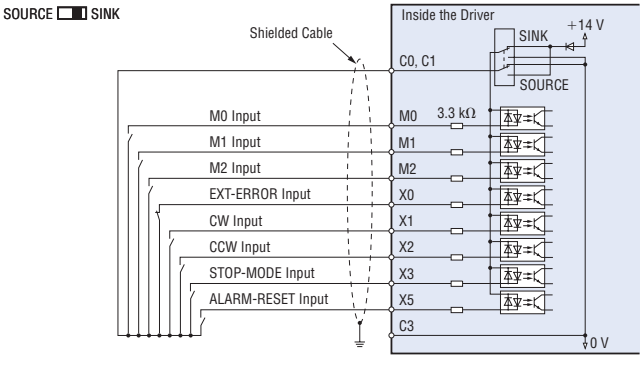


Controlled by Transistor

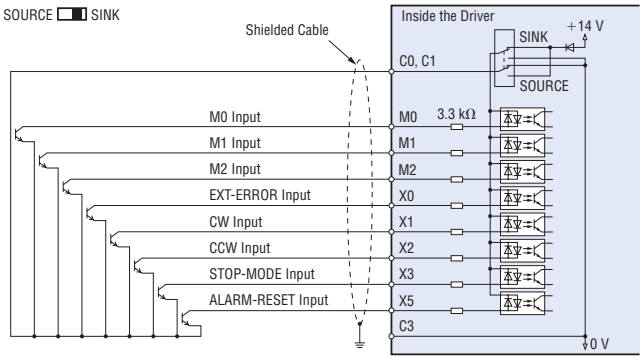


• Sink Logic

Controlled by Relays or Switches



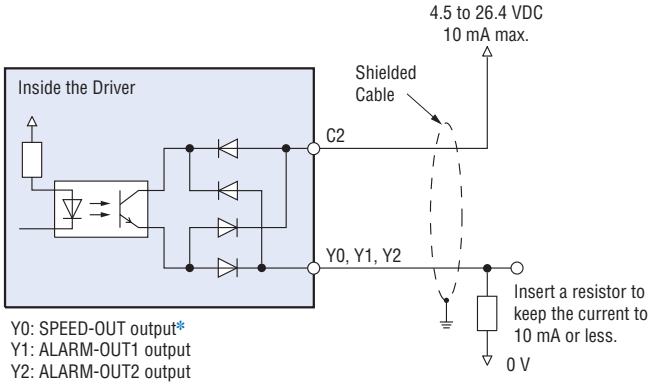
Controlled by Transistor



◇Output Circuit

Common to the SPEED-OUT, ALARM-OUT1 and ALARM-OUT2 outputs.

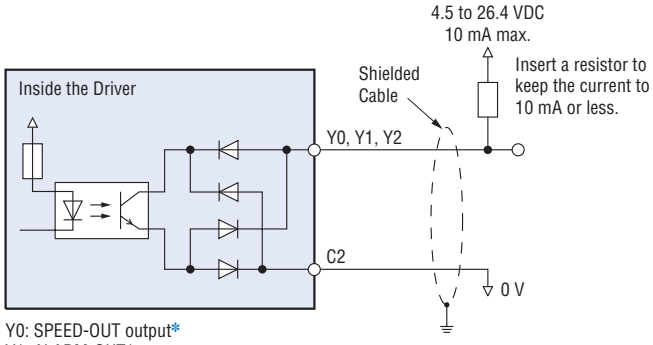
• Source Logic



Y0: SPEED-OUT output*
Y1: ALARM-OUT1 output
Y2: ALARM-OUT2 output

*Supply a current of 5 mA or more to the SPEED-OUT output.

• Sink Logic



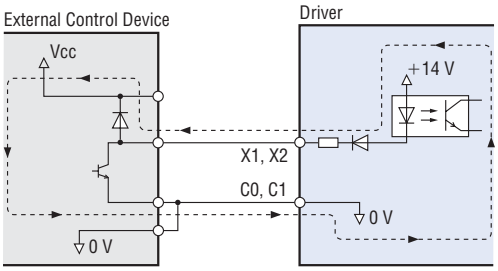
Y0: SPEED-OUT output*
Y1: ALARM-OUT1 output
Y2: ALARM-OUT2 output

*Supply a current of 5 mA or more to the SPEED-OUT output.

◇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, if the external control device power is turned off with the driver power turned on, current will be applied and the motor may 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



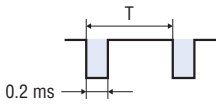
◇SPEED-OUT Output

Pulse signals of 30 pulses (pulse width: 0.2 ms) are output per each rotation of the motor output shaft in synchronization with the motor operation.

By measuring the frequency of SPEED-OUT outputs, the motor speed can be calculated.

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

$$\text{Motor shaft speed (r/min)} = \frac{\text{SPEED-OUT output frequency}}{30} \times 60$$



◇ALARM-OUT1 Output

When any of the driver's protective functions is activated, the ALARM-OUT1 output will turn OFF and the digital operator will display an alarm code. The motor will coast to a stop.

◇ALARM-OUT2 Output

The ALARM-OUT2 output will turn OFF when the driver's overload protective function or overload warning function is activated. Actuation of any other protective function will not turn this output OFF.

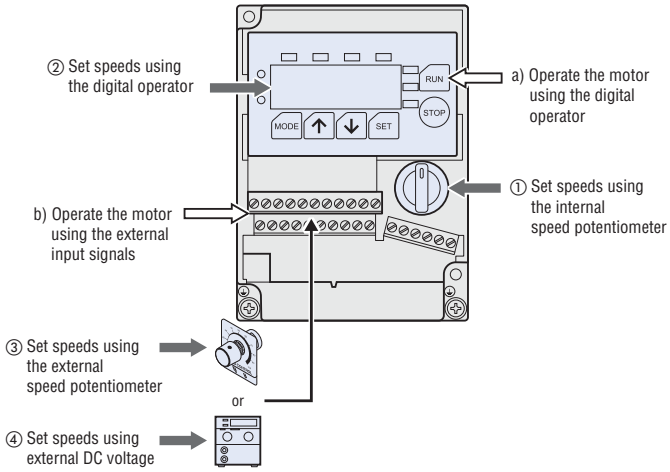
The overload warning function is activated based on a preset load factor relative to the rated torque. The ALARM-OUT2 output will turn OFF once the set load factor is exceeded.

(A desired load factor can be set at 10% intervals between 50 and 100%.)

Type of Protective Function	ALARM-OUT1 Output	ALARM-OUT2 Output
Normal Operation	ON	ON
Overload Protective Function	OFF	OFF
Other Protective Function	OFF	ON
Overload Warning Function*	ON	OFF

*A maximum error of approximately 20% may generate when the motor is operated at the rated speed under the rated load.

●Operating Methods



One of the following two operating methods (a and b) can be set by switching between the digital-operator mode and external-input signal mode.

a) Operate the motor using the RUN and STOP keys on the digital operator

b) Operate the motor using external-input signals

●Speed Setting Methods

One of the following four methods (① to ④) can be used to set speeds:

① Set speeds using the internal speed potentiometer

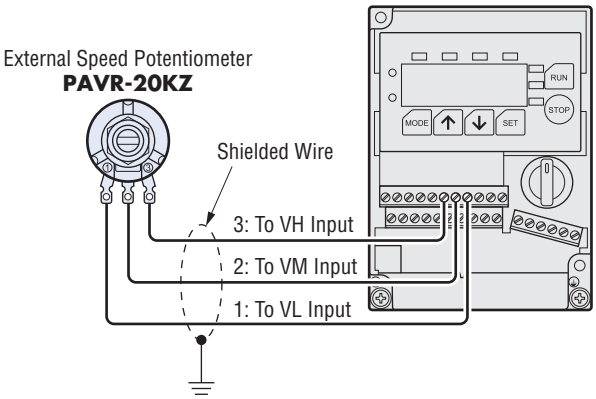
Set speeds using the potentiometer provided on the driver's front panel.

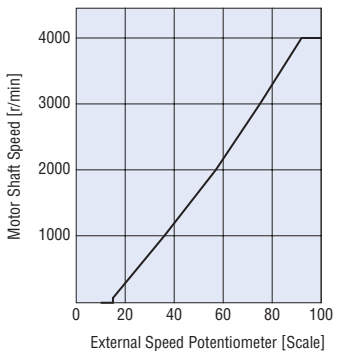
② Set speeds using the digital operator

The digital operator can be used to set speeds in units of 1 r/min. Up to eight speed data can be set.

③ Set speeds using an external speed potentiometer (sold separately)

To set speeds at a location away from the driver, connect an accessory external speed potentiometer as shown below.





External Speed Potentiometer Scale – Speed Characteristics (Representative values)

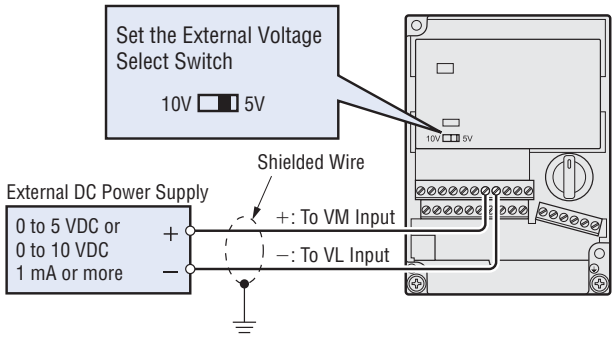
Note:

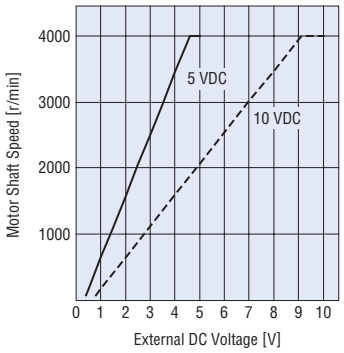
● The speed in the graph represents the speed of a motor alone. The gearhead output shaft speed of the combination type is calculated by dividing the graph speed by the gear ratio.

④ Set speeds using external DC voltage

Set the external voltage select switch on the driver in accordance with the external DC voltage to be supplied. Detach the digital operator and set the switch to either 5 V or 10 V.

Thereafter, connect an external DC power supply as shown below. Connect the positive and negative terminals of the power supply correctly.





External DC Voltage – Speed Characteristics (Representative values)

Note:

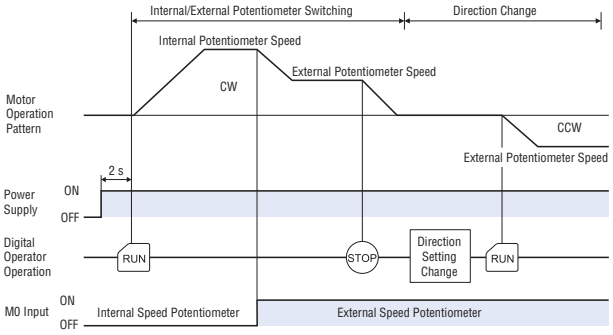
- The speed in the graph represents the speed of a motor alone. The gearhead output shaft speed of the combination type is calculated by dividing the graph speed by the gear ratio.

●Multi-Speed Operation

◇Two-Speed Operation

The speed set by the internal speed potentiometer and another set by an external speed potentiometer can be combined for two-speed operation by switching the operation-data selection input M0.

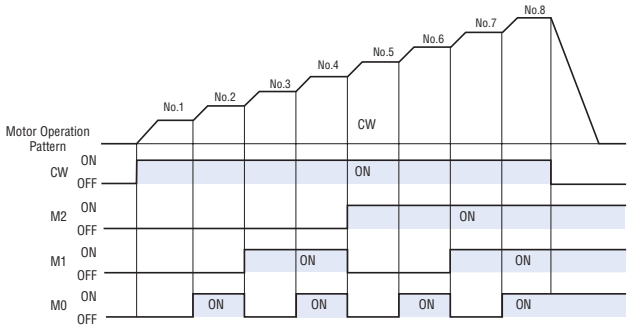
M0 Input	M1 Input	M2 Input	Speed Setting Method
OFF	OFF	OFF	Internal speed potentiometer
ON	OFF	OFF	External speed potentiometer



◇Eight-Speed Operation

A multi-speed operation using up to eight speeds can be performed by setting desired speeds in operation data No. 1 to 8 and then switching the speed using operation-data selection input M0, M1 or M2.

Operation Data	M0 Input	M1 Input	M2 Input	Speed Setting Method
No. 1	OFF	OFF	OFF	Internal speed potentiometer/Digital operator
No. 2	ON	OFF	OFF	External speed potentiometer/Digital operator
No. 3	OFF	ON	OFF	Digital operator
No. 4	ON	ON	OFF	Digital operator
No. 5	OFF	OFF	ON	Digital operator
No. 6	ON	OFF	ON	Digital operator
No. 7	OFF	ON	ON	Digital operator
No. 8	ON	ON	ON	Digital operator



●Multi-Motor Control

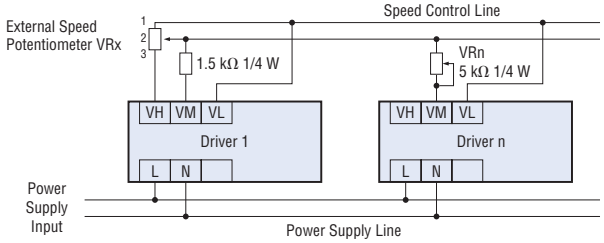
Two or more motors can be operated at the same speed using a single external speed potentiometer or external DC voltage.
The diagram below applies to a single-phase power supply specification. Also note that the diagram does not show the motor or operation control part.

◇Using an External Speed Potentiometer (Sold separately)

As shown in the diagram, use a common power supply line and a common speed control line for each driver and set speeds using the external speed potentiometer VRx.
The resistance of the external speed potentiometer is determined using the formula below:

Resistance when n numbers of drivers are connected:
VRx = 20/n (kΩ), n/4 (W)
Example: When two drivers are connected
VRx = 20/2 = 10 (kΩ), 2/4 = 1/2 (W)
Accordingly, the resistance is calculated as 10 kΩ, 1/2 W.

To adjust the speed difference between motors, connect a 1.5 kΩ, 1/4 W resistor to the VM terminal on the first driver, and connect a 5 kΩ, 1/4 W variable resistor (VRn) to the VM terminal on each of the remaining drivers.
Up to five drivers can be operated in parallel using an external speed potentiometer.

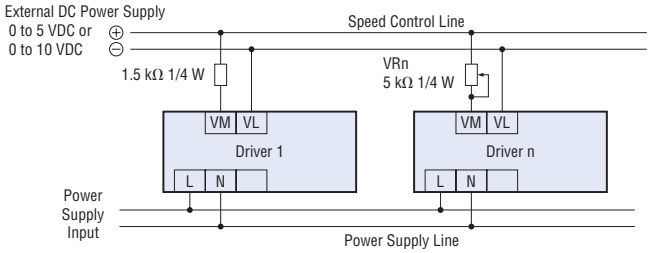


◇Using External DC Voltage

As shown in the diagram, use a common power supply line and a common speed control line for each driver and connect all drivers to a 5 V or 10 V DC power supply.
The power-supply capacity of the external DC power supply is determined using the formula below:

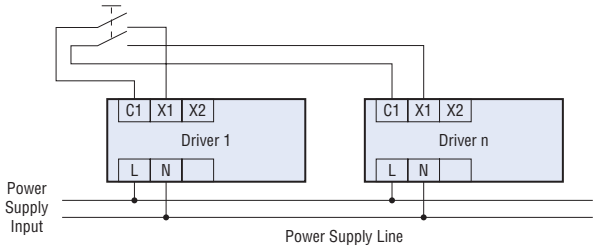
Power-supply capacity when n numbers of drivers are connected:
I = 1 × n (mA)
Example: When two drivers are connected
I = 1 × 2 = 2 (mA)
Accordingly, the power-supply capacity is calculated as 2 mA or more.

To adjust the speed difference between motors, connect a 1.5 kΩ, 1/4 W resistor to the VM terminal on the first driver, and connect a 5 kΩ, 1/4 W variable resistor (VRn) to the VM terminal on each of the remaining drivers.



◇Using the Digital Operator

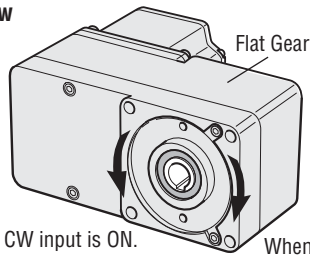
When multiple drivers are connected where the same data are set digitally in each driver, the operations of multiple motors can be controlled via an external input signals using the wiring circuit shown below.



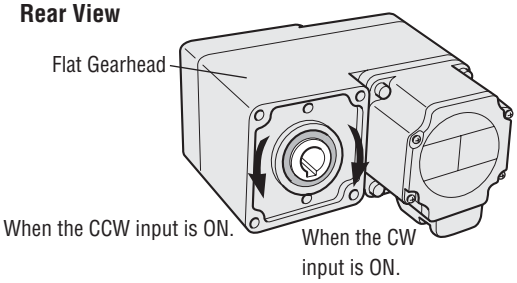
Rotation Direction of the Hollow Shaft Flat Gearhead

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
30 W	**BLF230C-□**	BLFM230-GFS	GFS2G□	BLFD30C2
60 W	**BLF460C-□**	BLFM460-GFS	GFS4G□	BLFD60C2
120 W	**BLF5120C-□**	BLFM5120-GFS	GFS5G□	BLFD120C2
200 W	**BLF6200C-□**	BLFM6200-GFS	GFS6G□	BLFD200C2

● 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
30 W	**BLF230C-□FR**	BLFM230-GFS	GFS2G□FR	BLFD30C2
60 W	**BLF460C-□FR**	BLFM460-GFS	GFS4G□FR	BLFD60C2
120 W	**BLF5120C-□FR**	BLFM5120-GFS	GFS5G□FR	BLFD120C2

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

Round Shaft Type

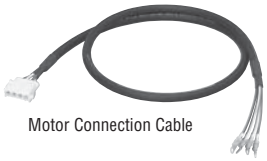
Output Power	Model	Motor Model	Driver Model
30 W	**BLF230C-A**	BLFM230-A	BLFD30C2
60 W	**BLF460C-A**	BLFM460-A	BLFD60C2
120 W	**BLF5120C-A**	BLFM5120-A	BLFD120C2
200 W	**BLF6200C-A**	BLFM6200-A	BLFD200C2

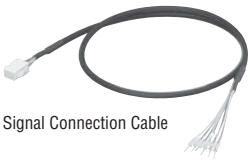
Pinion Shaft Type

Output Power	Model	Motor Model	Driver Model
30 W	**BLF230C-GFS**	BLFM230-GFS	BLFD30C2
60 W	**BLF460C-GFS**	BLFM460-GFS	BLFD60C2
120 W	**BLF5120C-GFS**	BLFM5120-GFS	BLFD120C2
200 W	**BLF6200C-GFS**	BLFM6200-GFS	BLFD200C2

■Connection Cables (Sold separately) RoHS

These dedicated cables are used to connect the motor and driver.
The **BLF** Series does not come with connection cables, so be sure to purchase a connection cable set.
The cable set consists of two cables including a motor connection cable and a signal connection cable.


Motor Connection Cable

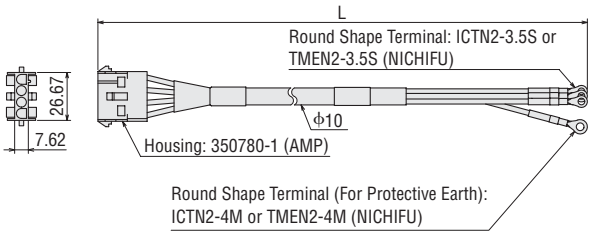

Signal Connection Cable

●Cable Set

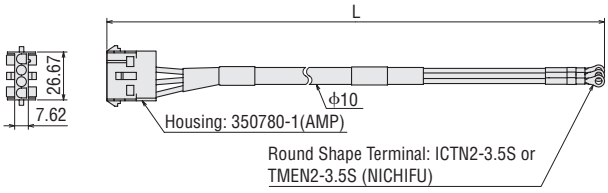
Model	Length: L (m)
CC01BLF	1
CC02BLF	2
CC03BLF	3
CC05BLF	5
CC07BLF	7
CC10BLF	10
CC15BLF	15
CC20BLF	20

●Dimensions (Unit = mm)

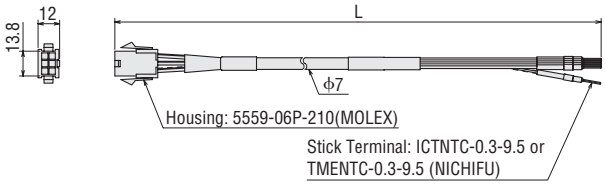
◇Motor Connection Cable L: 1 to 7 m



◇Motor Connection Cable L: 10 to 20 m



◇Signal Connection Cable

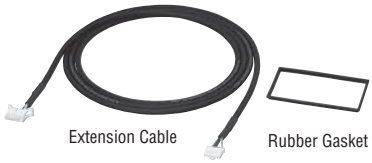


■Accessories (Sold separately)

●Remote-Control Kit RoHS

The remote-control kit is useful if you want to detach the digital operator from the driver and install it on the frame of the equipment, etc., for remote operation.
The kit includes an extension cable for digital operator/driver connection (2 or 5 m) and a rubber gasket.

Model	Length: L (m)
BLFHS-02	2
BLFHS-05	5


Extension Cable

Rubber Gasket

Example of Use

Digital Operator