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RoHS RoHS-Compliant
Brushless Motor Systems
FBLII Series

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

The **FBLII** Series consists of a high performance, compact, brushless motor and driver. This product is available with 75 W (1/10 HP) and 120 W (1/6 HP) output power.
For easy installation, the combination type (pre-assembled gearmotors) comes with the motor and gearhead already assembled.

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



Features

●Compact and High Power
The use of brushless motor greatly reduces the total motor length while achieving high power. The **FBLII** Series outputs a high power of 120 W (1/6 HP) with a frame size of 90 mm sq. (3.54 in. sq.) and a total length of 80 mm (3.15 in.), allowing to easily downsize applications.

●Excellent Speed Stability
The **FBLII** Series offers excellent speed fluctuation characteristics. Speed fluctuation is only minimally affected by the load.
Speed regulation: with load −1% maximum,
with voltage ±1% maximum,
with temperature ±1% maximum

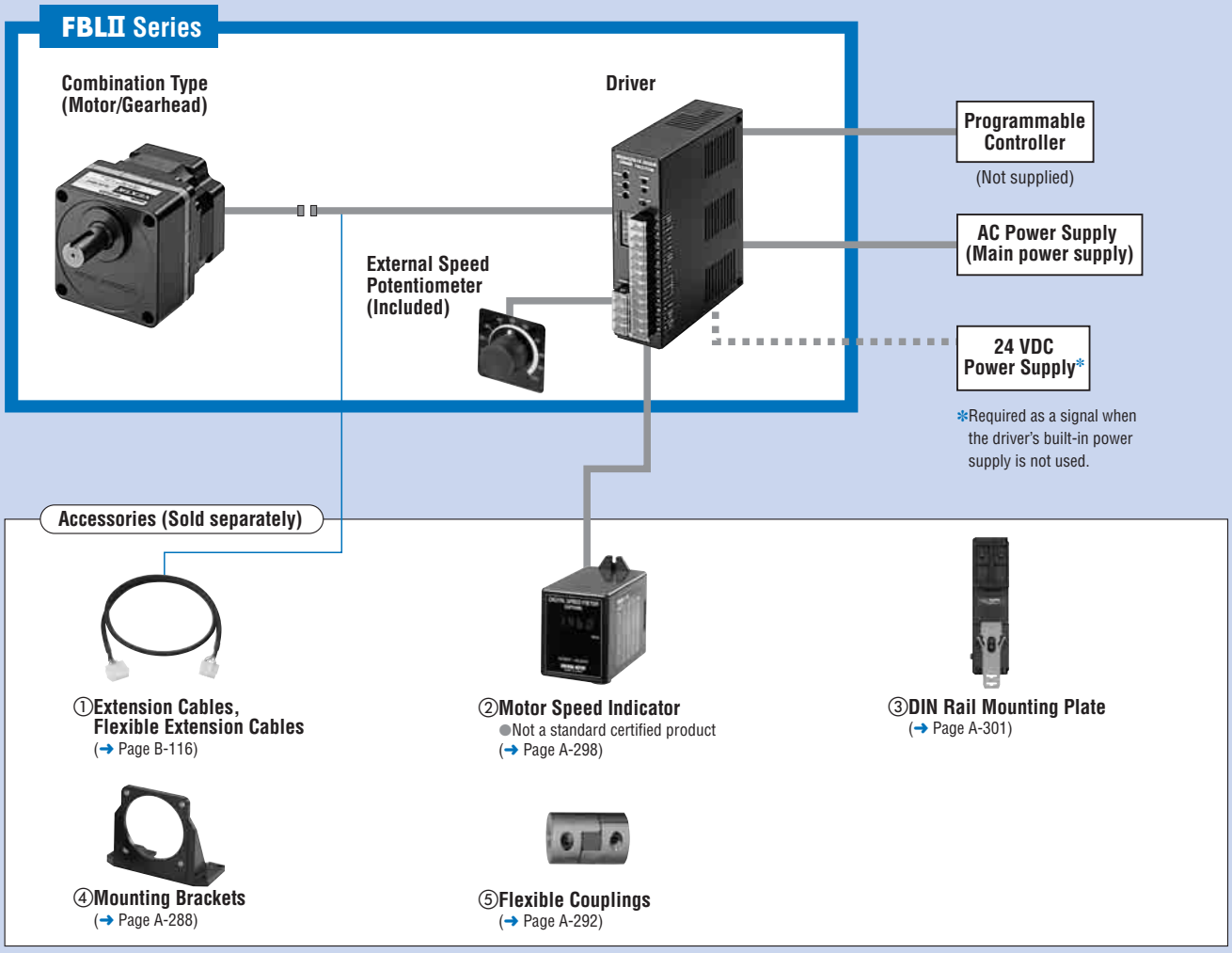
●Wide Range of Speed Control, Flat Torque
In addition to offering a wide speed control range from 300 r/min to 3000 r/min, the motor generates constant torque across the entire speed range.

●RoHS RoHS-Compliant
The **FBLII** 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

●Various Control Functions
In addition to the acceleration/deceleration function that suppresses unwanted shocks when transferring delicate works, the **FBLII** Series provides multi-stage speed settings, instantaneous stop and many other functions to support various applications.

Shown below are other features of **FBLII** Series.
- Conforms to major safety standards and global power supply voltages.
- The distance between the motor and the driver can be extended up to 10.5 m (34.4 ft.) (by using an accessory extension cable).
- DIN rail mounting plate (accessory) is available.

System Configuration



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-116
	Flexible Extension Cables	Cable offering flexibility, used to extend the wiring distance between the motor and driver [1 to 10 m (3.3 to 32.8 ft.)].	
②	Motor Speed Indicator	Indicates motor speed of the speed control motor (**SDM496**).	A-298
③	DIN Rail Mounting Plate	Use this plate when installing the driver to a DIN rail (**PADP01**).	A-301
④	Mounting Brackets	Dedicated mounting bracket for the motor and gearhead.	A-288
⑤	Flexible Couplings	Clamp type coupling that connects the motor or gearhead shaft to the driven shaft.	A-292

●**Example of System Configuration**

FBLII Series Combination Type - Parallel Shaft		(Sold separately) Extension Cable [1 m (3.3 ft.)]	Motor Speed Indicator	DIN Rail Mounting Plate	Mounting Bracket	Flexible Coupling
FBL575AW-30	+	CC01FBL	SDM496	PADP01	SOL5M8	MCL5518F12

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

Product Number Code

FBL 5 75 A W - 5

① ② ③ ④ ⑤ ⑥

①	Series	**FBL**: **FBLII** Series
②	Motor Frame Size	**5**: 90 mm (3.54 in.)
③	Output Power (W)	(Example) **75**: 75 W (1/10 HP)
④	Power Supply Voltage	**A**: Single-Phase 100-115 VAC **C**: Single-Phase 200-230 VAC **S**: Three-Phase 200-230 VAC
⑤	**W**: Comforms to Safety Standards	
⑥	Gear Ratio/Shaft Type	Number: Gear ratio for combination types: 8 types from **5** to **200** **A**: Round Shaft Type **GFB**: **GFB** Type Pinion Shaft

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

Output Power	Power Supply Voltage	Model	Gear Ratio
75 W (1/10 HP)	Single-Phase 100-115 VAC	**FBL575AW-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**
	Single-Phase 200-230 VAC	**FBL575CW-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**
	Three-Phase 200-230 VAC	**FBL575SW-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**
120 W (1/6 HP)	Single-Phase 100-115 VAC	**FBL5120AW-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**
	Single-Phase 200-230 VAC	**FBL5120CW-□**	**5**, **10**, **15**, **20**, **30**, **50**, **100**, **200**
	Three-Phase 200-230 VAC	**FBL5120SW-□**	**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, External Speed Potentiometer (with signal wire), Mounting Brackets for Driver (with screws), Mounting Screws, Parallel Key, Operating Manual

Round Shaft Type

Output Power	Power Supply Voltage	Model
75 W (1/10 HP)	Single-Phase 100-115 VAC	**FBL575AW-A**
	Single-Phase 200-230 VAC	**FBL575CW-A**
	Three-Phase 200-230 VAC	**FBL575SW-A**
120 W (1/6 HP)	Single-Phase 100-115 VAC	**FBL5120AW-A**
	Single-Phase 200-230 VAC	**FBL5120CW-A**
	Three-Phase 200-230 VAC	**FBL5120SW-A**

The following items are included in each product.
Motor, Driver, External Speed Potentiometer (with signal wire), Mounting Brackets for Driver (with screws), Operating Manual

Pinion Shaft Type

Output Power	Power Supply Voltage	Model
75 W (1/10 HP)	Single-Phase 100-115 VAC	**FBL575AW-GFB**
	Single-Phase 200-230 VAC	**FBL575CW-GFB**
	Three-Phase 200-230 VAC	**FBL575SW-GFB**
120 W (1/6 HP)	Single-Phase 100-115 VAC	**FBL5120AW-GFB**
	Single-Phase 200-230 VAC	**FBL5120CW-GFB**
	Three-Phase 200-230 VAC	**FBL5120SW-GFB**

The following items are included in each product.
Motor, Driver, External Speed Potentiometer (with signal wire), Mounting Brackets for Driver (with screws), Operating Manual

Gearhead

Output Power of Applicable Motor (Pinion shaft type)	Gearhead Model	Gear Ratio
75 W (1/10 HP) 120 W (1/6 HP)	**GFB5G□**	**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, Mounting Screws for Connecting Motor and Gearhead, Mounting Screws, Parallel Key, Operating Manual

Specifications

●75 W (1/10 HP), 120 W (1/6 HP) RoHS

Model	Combination Type – Parallel Shaft Gearhead	FBL575AW-□	FBL575CW-□	FBL575SW-□	FBL5120AW-□	FBL5120CW-□	FBL5120SW-□
	Round Shaft Type	FBL575AW-A	FBL575CW-A	FBL575SW-A	FBL5120AW-A	FBL5120CW-A	FBL5120SW-A
Rated Output Power (Continuous) W (HP)		75 (1/10)			120 (1/6)		
Power Source	Rated Voltage VAC	Single-Phase 100-115	Single-Phase 200-230	Three-Phase 200-230	Single-Phase 100-115	Single-Phase 200-230	Three-Phase 200-230
	Permissible Voltage Range	±10%					
	Rated Frequency Hz	50/60					
	Rated Input Current A	2.3	1.4	0.75	3.0	1.8	1.0
	Maximum Input Current A	2.6	2.0	1.2	3.8	2.7	1.6
Rated Torque N·m (oz-in)		0.25 (35)			0.4 (56)		
Starting Torque N·m (oz-in)		0.32 (45)			0.5 (71)		
Rated Speed r/min		3000					
Speed Control Range r/min		300～3000					
Round Shaft Type Permissible Load Inertia J ×10⁻⁴kg·m² (oz-in²)		3.75 (21)			5.62 (31)		
Rotor Inertia J ×10⁻⁴kg·m² (oz-in²)		0.968 (5.3)			1.961 (10.7)		
Speed Regulation	Load	−1% max. (0～Rated torque, at rated speed, at rated voltage, at normal ambient temperature)					
	Voltage	±1% max. (Rated voltage ±10%, at rated speed, with no load, at normal ambient temperature)					
	Temperature	±1% max. [0～+50°C (+32～+122°F), at rated speed, with no load, at rated voltage]					

✻Single-phase motors are certified by DEMKO.
● 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 Methods	Select one of the following methods: · Set using the internal speed potentiometer · Set using an external speed potentiometer: **PAVR-20KZ** (20 kΩ, 1/4 W) · Set using external DC voltage: 0～5 VDC
Input Signals	Photocoupler input Input resistance 4.8 kΩ, 24 VDC±10% Common to EXT. VR., CW, CCW, SLOW DOWN
Output Signals	Open-collector output External use condition 26.4 VDC, 10 mA max. Common to SPEED OUT, ALARM OUT
Protective Functions*	When the following are activated, the motor will coast to a stop and the ALARM output will be OFF. · Overload protection: Activated when the motor load exceeds rated torque for a minimum of 5 seconds. · Overheat protection: Activated when the temperature of the heat sink inside driver exceeds approximately 90°C (194°F). · Overvoltage protection: Activated when a gravitational operation is performed or a load exceeding the permissible load inertia is driven. · Undervoltage protection: Activated when the power supply voltage applied to the driver dropped below the specified voltage (−10%). · Missing phase protection: Activated when the sensor wire inside the motor cable is disconnected during motor operation.
Time Rating	Continuous

✻With the **FBLII** 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 input terminal and the 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 I/O terminal for 1 minute after continuous operation under normal ambient temperature and humidity.
Operating Environment	Ambient Temperature	0～+50°C (+32～+122°F) (non-freezing)	
	Ambient Humidity	85% or less (non-condensing)	
	Atmosphere	No corrosive gases or dust	
Insulation Class		UL, CSA: Class A [105°C (221°F)] EN: Class E [120°C (248°F)]	–
Degree of Protection		IP40	IP10

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

Unit = N·m (lb-in)

Model	Gear Ratio	5	10	15	20	30	50	100	200
	Speed Range r/min	60～600	30～300	20～200	15～150	10～100	6～60	3～30	1.5～15
FBL575AW-□ **FBL575CW-□** **FBL575SW-□**		1.1 (9.7)	2.3 (20)	3.4 (30)	4.5 (39)	6.5 (57)	10.8 (95)	21.5 (190)	30 (260)
FBL5120AW-□ **FBL5120CW-□** **FBL5120SW-□**		1.8 (15.9)	3.6 (31)	5.4 (47)	7.2 (63)	10.3 (91)	17.2 (152)	30 (260)	30 (260)

● 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.

Permissible Overhung Load and Permissible Thrust Load

Combination Type

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.
FBL575AW-□ **FBL575CW-□** **FBL575SW-□**	**5**	300	67	400	90	150	33
FBL5120AW-□ **FBL5120CW-□** **FBL5120SW-□**	**10**, **15**, **20**	400	90	500	112		
	30, **50**, **100**, **200**	500	112	650	146		

● 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.	
FBL575AW-A **FBL575CW-A** **FBL575SW-A**	130	29	150	33	The permissible thrust load shall be no greater than half the motor mass.
FBL5120AW-A **FBL5120CW-A** **FBL5120SW-A**	160	36	170	38	

Permissible Load Inertia J of Combination Type

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

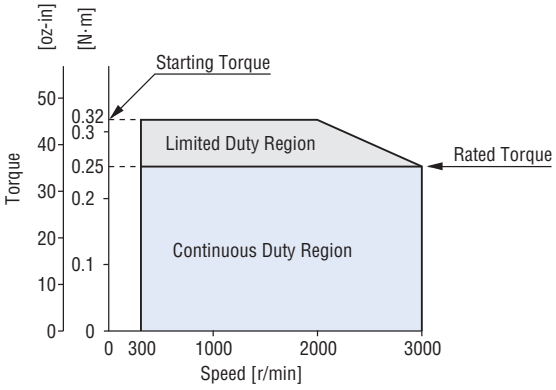
Model / Gear Ratio	5	10	15	20	30	50	100	200
FBL575AW-□ **FBL575CW-□** **FBL575SW-□** **FBL5120AW-□** **FBL5120CW-□** **FBL5120SW-□**	25 (137)	100 (550)	225 (1230)	400 (2200)	900 (4900)	2500 (13700)	2500 (13700)	2500 (13700)

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

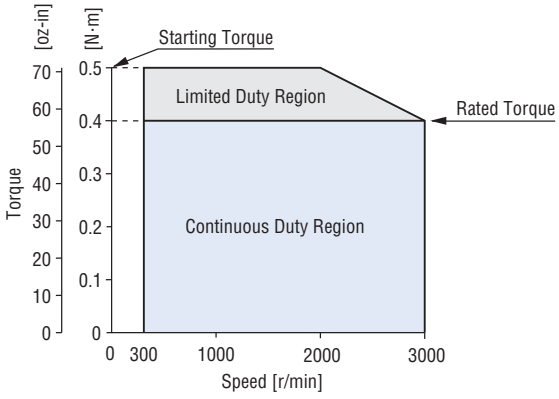
Speed – Torque Characteristics

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.

FBL575AW-□/FBL575CW-□/FBL575SW-□
FBL575AW-A/FBL575CW-A/FBL575SW-A



FBL5120AW-□/FBL5120CW-□/FBL5120SW-□
FBL5120AW-A/FBL5120CW-A/FBL5120SW-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 (in.)

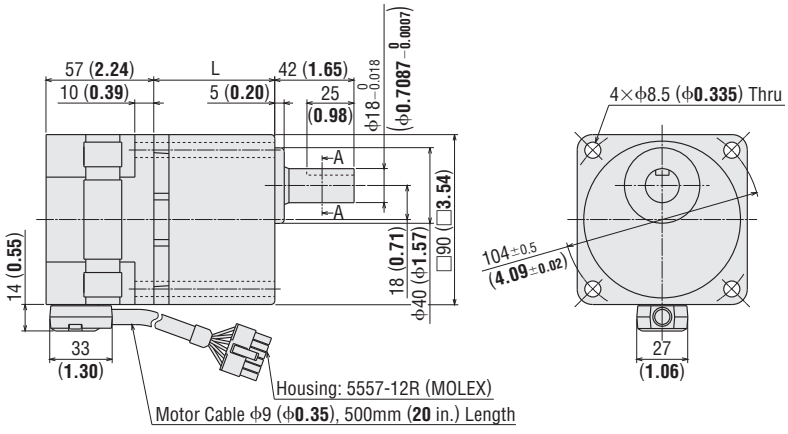
- Mounting screws are included with the combination type. Dimensions for mounting screws ➜ Page B-222

●75 W (1/10 HP)

◇Motor/Gearhead

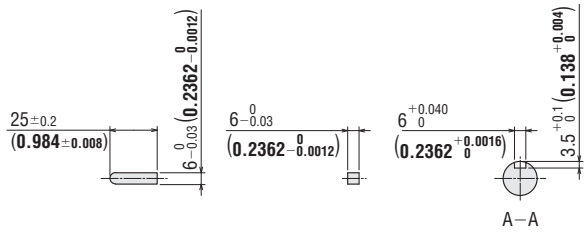
Model	Motor Model	Gearhead Model	Gear Ratio	L	DXF
FBL575AW-□	FBLM575W-GFB	GFB5G□	**5**~**20**	45 (1.77)	A204A
FBL575CW-□			**30**~**100**	58 (2.28)	A204B
FBL575SW-□			**200**	64 (2.52)	A204C

Mass: 3.0 kg (6.6 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.

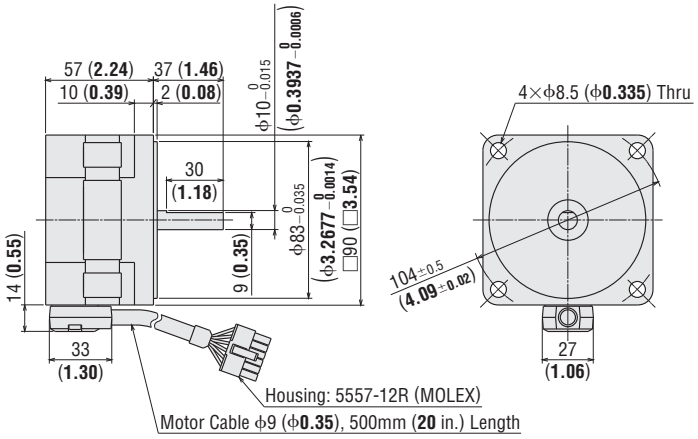
◇Round Shaft Type

FBL575AW-A, **FBL575CW-A**, **FBL575SW-A**

Motor: FBLM575W-A

Mass: 1.5kg (3.3 lb.)

DXF A206

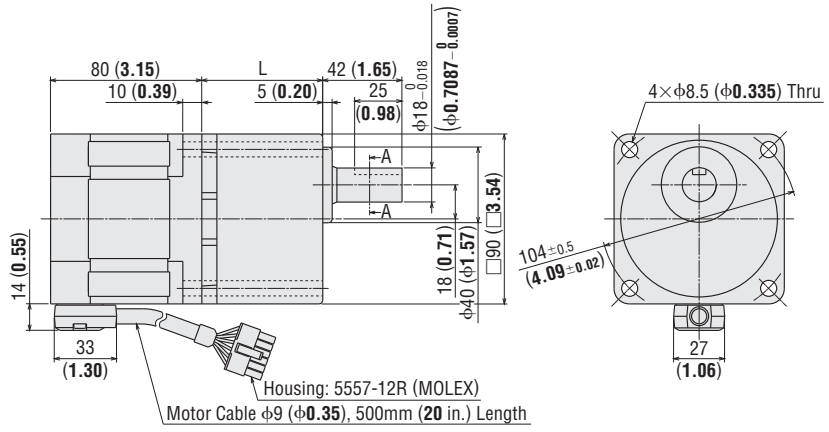


●120 W (1/6 HP)

◇Motor/Gearhead

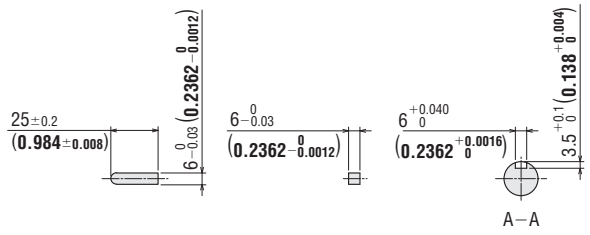
Model	Motor Model	Gearhead Model	Gear Ratio	L	DXF
FBL5120AW-□	FBLM5120W-GFB	GFB5G□	**5～20**	45 (1.77)	A205A
FBL5120CW-□			**30～100**	58 (2.28)	A205B
FBL5120SW-□			**200**	64 (2.52)	A205C

Mass: 4.0 kg (8.8 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.

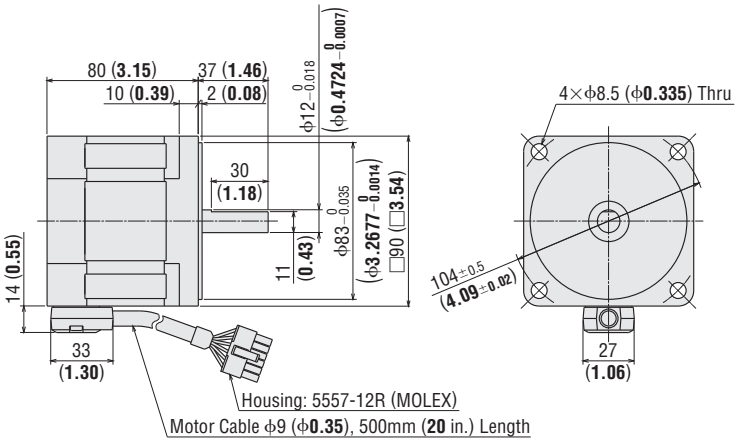
◇Round Shaft Type

FBL5120AW-A, **FBL5120CW-A**, **FBL5120SW-A**

Motor: FBLM5120W-A

Mass: 2.5kg (5.5 lb.)

DXF A207

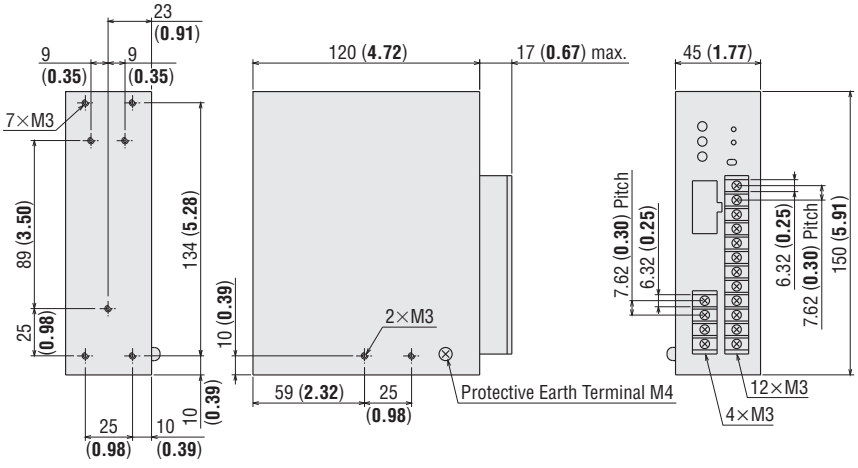


◇Driver (Common to all models)

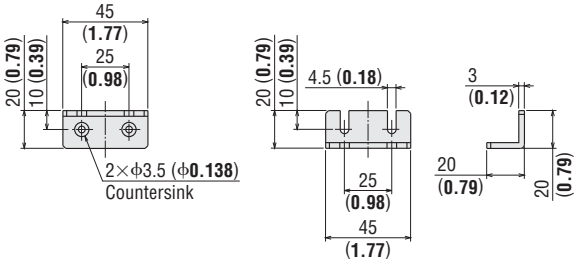
FBLD75AW, FBLD75CW, FBLD75SW,
FBLD120AW, FBLD120CW, FBLD120SW

Mass: 0.8kg (1.76 lb.)

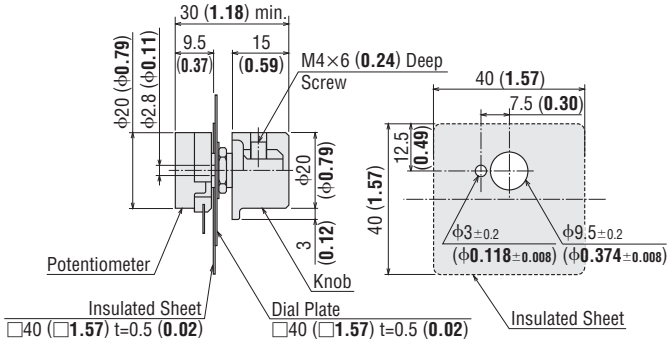
DXF A283



◇Driver Base Mounting Bracket Tab (2 pieces included)

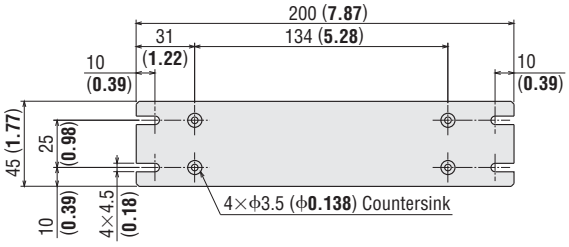


◇External Speed Potentiometer (Included)



Recommended thickness of a mounting plate is a maximum 4.5 mm (**0.18** in.).

◇Driver Back Mounting Tab (Included)



Connection and Operation

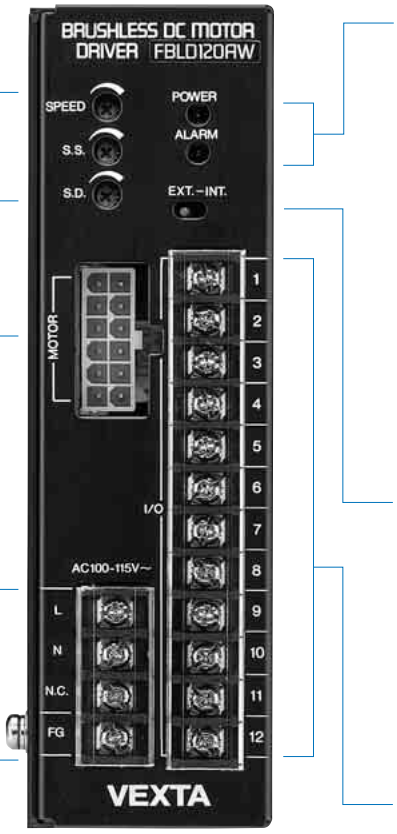
Names and Functions of Driver Parts

Internal Potentiometer	
Display	Function
SPEED	Internal Speed Potentiometer
S.S.	Acceleration Time Potentiometer*
S.D.	Deceleration Time Potentiometer*

*Acceleration/Deceleration Time Setting: 0.5~15 sec. (3000 r/min)

For Motor Connector

Power Supply Terminal Block



LED Display		
Display	Function	Lighting Condition
POWER	Power Indicator	Lights when the power is ON.
ALARM	Alarm Indicator	•When the motor load exceeds rated torque for a minimum of 5 seconds. •When the temperature of the heat sink inside driver exceeds approximately 90°C (194°F). •When a load exceeding the permissible load inertia is driven. •When a gravitational operation is performed. •When the power supply voltage applied to the driver dropped below the specified voltage (−10%). •When the sensor wire inside the motor cable is disconnected.

I/O Power Supply Switch	
Display	Function
EXT.	When controlling from a programmable controller or other external power supply. (Factory setting)
INT.	When controlling with a relay or switch. (Driver built-in power supply)

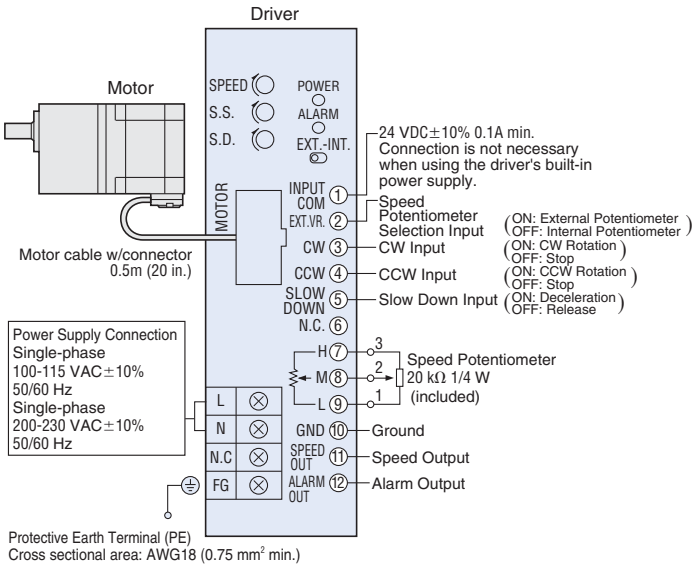
● When the switch is set to EXT., the input circuit is insulated by the photocoupler. However when the switch is set to INT., the input circuit is not insulated, so the system will not work, even if an input signal is input, unless GND is connected to a controller.

Input/Output Signal Terminal Block		
Display	Signal Name	Function
INPUT COM	Power Supply for Input Signals	External power supply +24 VDC A connection is not necessary when using the driver's built-in power supply.
EXT.VR.	Speed Setting Selection Input	Input signal for selecting internal or external speed potentiometer.
CW	CW Rotation Input	Input signal for selecting CW rotation/stop.
CCW	CCW Rotation Input	Input signal for selecting CCW rotation/stop.
SLOW DOWN	Deceleration Input	Input terminal for decelerating the motor to a stop.
N.C.	—	Not used.
H M L	Speed Setting Input	Used when controlling the speed by an external potentiometer or DC voltage.
GND	Ground	Common ground terminal for input/output signals.
SPEED OUT	Speed Output (Open-Collector Output)	Used when monitoring the motor speed; 12 pulses are output for each motor rotation.
ALARM OUT	Alarm Output (Open-Collector Output)	This signal is output when a protective function is activated. The ALARM LED lights and the motor coasts to a stop. To reset, turn off the power for 30 seconds, then turn the power on again.

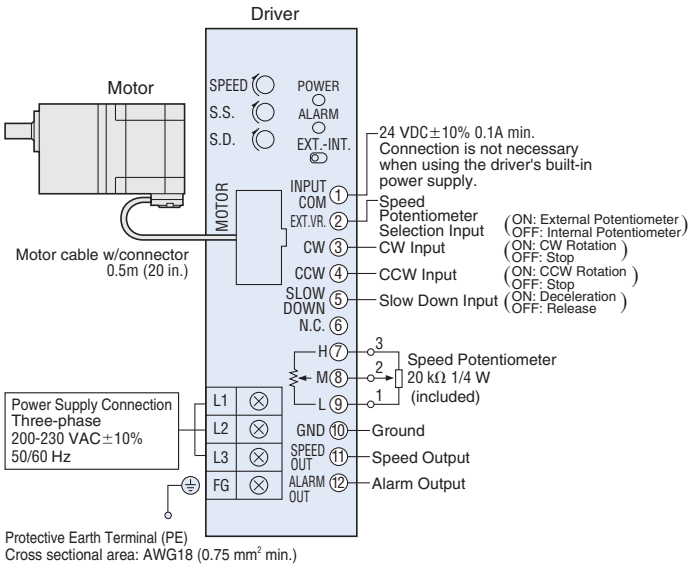
Features B-104 / System Configuration B-105 / Product Line B-106 / Specifications B-107

●Connection Diagrams

◇FBL575AW, FBL575CW, FBL5120AW, FBL5120CW



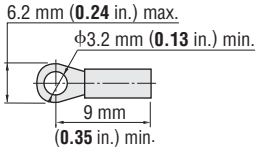
◇FBL575SW, FBL5120SW



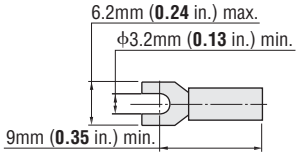
- Motor cable should be no more than 10.5 m (34.4 ft.) in length. The motor comes with 0.5m (20 in.) long connector-equipped cable which can be extended by using an accessory extension cable (sold separately).
  There are six different length extension cables. Also there are flexible extension cables.
  [Length: 1 m (3.3 ft.), 2 m (6.6 ft.), 3 m (9.8 ft.), 5 m (16.8 ft.), 7 m (23.0 ft.), 10 m (32.8 ft.)]
  Extension cables, flexible extension cables ➜ Page B-116
- Signal wires and motor wires should be kept away from equipment, power cables and other sources of magnetic noise.

◇Applicable Crimp Terminals

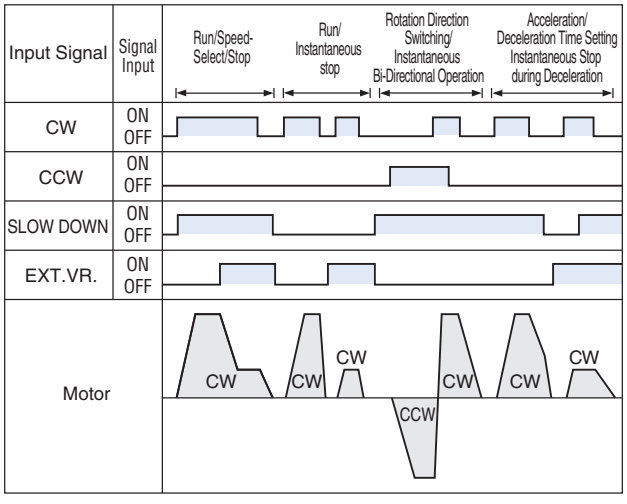
- Round Terminal with Insulation (M3)



- U-Shape Terminal with Insulation (M3)



●Timing Chart



- The CW input signal, CCW input signal and SLOW DOWN input signal can be used to control all motor operations, such as run, stop, direction switching, deceleration stop and instantaneous stop.
- Switching the CW input signal ON will cause the motor to turn clockwise as viewed from the motor shaft, while switching the CCW input signal ON will cause the motor to turn counterclockwise. Switching each input signal OFF will stop the motor. If both the CW and CCW input signal are turned ON at the same time, the motor will turn clockwise. The motor will start at the rise time corresponding to the time set on the acceleration time potentiometer.
- Switching the SLOW DOWN input signal ON will cause the motor decelerates and the motor stops at the time set on the deceleration time potentiometer. Switching the SLOW DOWN input signal OFF will cause the motor to stop instantaneously.
- Switching the EXT.VR. input signal ON, the external speed potentiometer (external DC voltage) can be used to set speed, while internal speed potentiometer can be selected by switching the EXT.VR. input signal OFF.

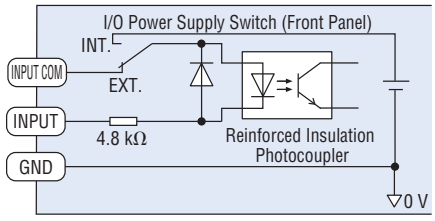
Notes:

- Pay attention to the temperature rise of the motor when used in applications requiring short cycles of start/stop (instantaneous stop) operation and bi-directional operation.
- Operate the motor so that the temperature of the motor case remains below 90°C (194°F) and the temperature of the driver remains below 80°C (176°F). If the temperature of the heat sink in the driver exceeds 90°C (194°F), the overheat protection activates and stops the motor.
- Cannot be used while the gravitational operation or other application where the motor shaft is turned by the load. To prevent damage to the driver during gravitational operations, if the primary voltage of the driver's inverter exceeds the permissible value, the protective circuit will be activated.

●Input/Output Signal Circuit

◇Input Circuit

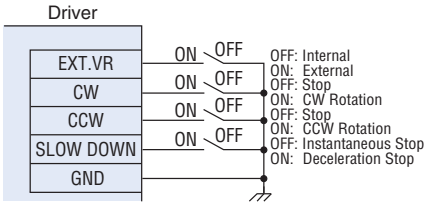
Common to EXT.VR., CW, CCW, SLOW DOWN



◇Connection Example for Input Circuit

• Control by Small Capacity Relays

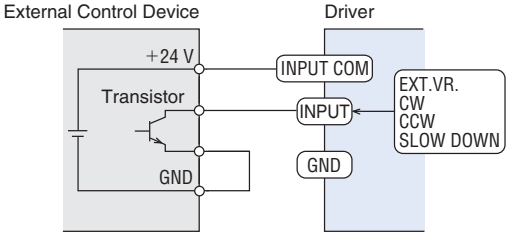
Flip the I/O power supply switch to INT. position.



Use a small capacity contact point type relay capable of switching 24 VDC, 0.5 mA.

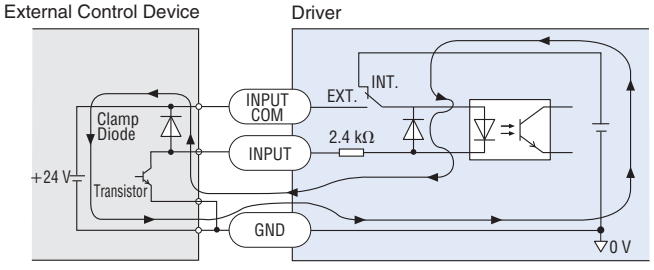
• Control by Transistor Output Type Controller

Flip the I/O power supply switch to EXT. position (factory setting).



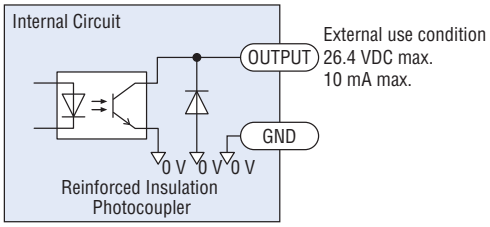
◇When an External Control Device with a Built-In Clamp Diode is Used

When using a controller with an internal clamp diode, be sure to set the I/O power supply switch on the front panel to the EXT. (external DC power supply) position. If the I/O power supply switch is in the INT. (built-in power supply) position, the current will flow as indicated by the arrows in the diagram, thereby causing the motor to run abnormally.

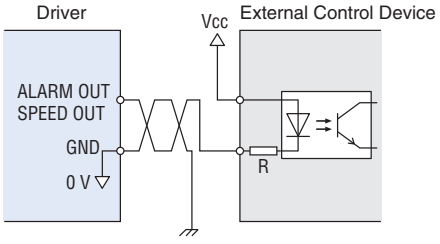


◇Output Circuit

Common to SPEED OUT and ALARM OUT



◇Connection Example for Output Circuit



Speed output: Output at a rate of 12 pulses per motor rotation.

$$\text{Motor speed [r/min]} = \frac{\text{Speed output frequency [Hz]}}{12} \times 60$$

Alarm output: Output when the protective function for overload, overheat, overvoltage, under voltage or missing phase has been activated. When output, the current flows between ALARM OUT and GND terminal.

Notes:

- Output signal is open-collector output, so an external power supply (Vcc) is required.
- Use a power supply of no more than 26.4 VDC and connect a limit resistor (R) so that the output current does not exceed 10 mA. When using neither the speed output function nor the alarm output function, this connection is not required.

- To display or monitor the speed of the motor output shaft or the reduced speed of the gearhead output shaft, use an optional **SDM496** motor speed indicator.
Motor speed indicator ➜ Page A-298

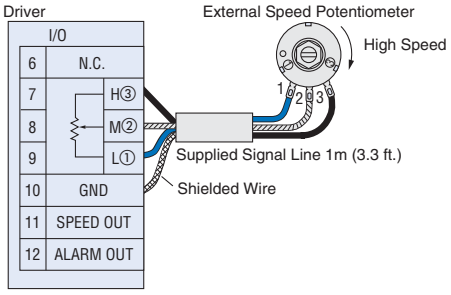
●Speed Setting Method

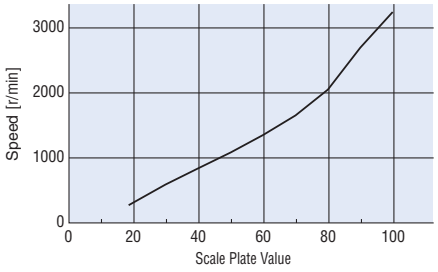
◇Internal Speed Potentiometer

Motor speed is adjusted by using the internal potentiometer located on the front panel. The internal speed potentiometer is selected when the EXT.VR. input has been set to OFF.

◇External Speed Potentiometer (Included)

To set speeds at a location away from the driver, connect an external speed potentiometer as shown below. The EXT.VR. input should be set to ON.





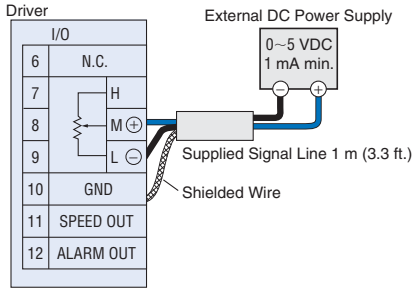
External Speed Potentiometer Scale–Speed Characteristics
(Representative values)

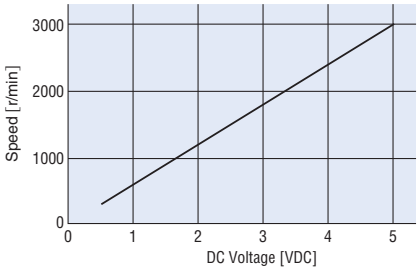
Note:

- Use included signal wires [(ϕ3.3 mm×1 m (ϕ0.13 in.×3.3 ft.)] when speed setting using the external speed potentiometer. The shielded wire of the signal line should be connected to the GND terminal. Also note that the shielded wire does not contact with other terminals on the external speed potentiometer.

◇External DC Voltage

When setting the motor speed with an external DC voltage, do so in the following manner. The EXT.VR. input should be set to ON.





External DC Voltage–Speed Characteristics
(Representative values)

- Do not allow the voltage to exceed 5 VDC, and connect the positive and negative terminals of the power supply correctly.

Note:

- Use included signal wires [(ϕ3.3 mm×1 m (ϕ0.13 in.×3.3 ft.)] when speed setting using external DC voltage. The shielded wire of the signal line should be connected to the GND terminal. Also note that the shielded wire does not contact with other terminals on the DC voltage source.

●Multi-Motor Control

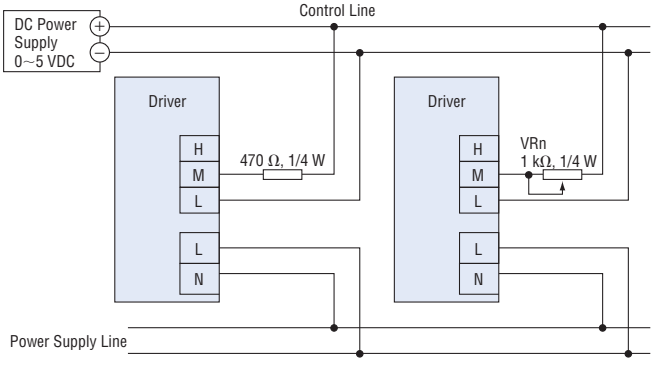
Two or more sets of motor and driver can be operated at the same speed by using a DC power supply or an external speed potentiometer. The figure below is for single-phase power supply specification. For three-phase power supply specification, connect the power supply line to three-phase power supply. Also note that the diagram does not show the motor or operation control part.

◇When External DC Power Supply is Used

- Use a DC power supply with current capacity equal to or greater than the value obtained by the following expression.

  Current capacity (N is the number of drivers) I = 1×N (mA)
  Example: When two drivers are used, current capacity should be at least 2 mA.

- Connect the other input/output lines to each driver individually.
- Motor speed differences can be adjusted by connecting a resistor of 470 Ω, 1/4 W to the M terminal of the first driver, and a 1 kΩ, 1/4 W variable resistor (VRn) to the M terminals of the other drivers.



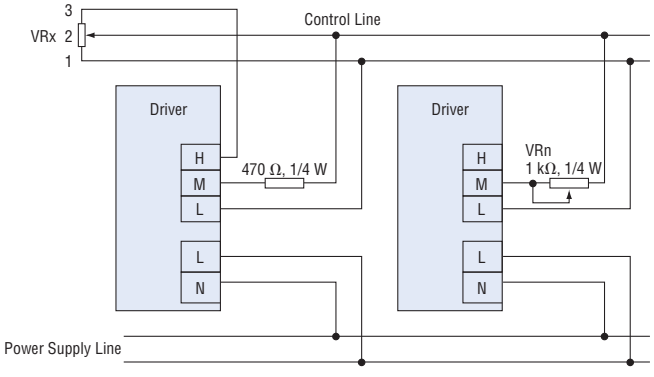
◇When External Speed Potentiometer is Used

As shown below, make the power supply line and the speed control line common to set the speed at VRx.

- The required resistance of the external speed potentiometer is calculated by the following expression.

  Resistance value (N is the number of drivers) VRx = 20/N (kΩ), N/4 (W)
  Example: When two drivers are used, the resistance is 10 kΩ, 1/2 W.

- Connect the other input/output lines to each driver individually.
- Motor speed differences can be adjusted by connecting a resistor of 470 Ω, 1/4 W to the M terminal of the first driver, and a 1 kΩ, 1/4 W variable resistor (VRn) to the M terminals of the other drivers.
- No more than 20 motors should be operated simultaneously when using the external speed potentiometer.



List of Motor and Driver Combinations

Combination Type

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

Output Power	Model	Motor Model	Gearhead Model	Driver Model
75 W (1/10 HP)	**FBL575AW-□**	FBLM575W-GFB	GFB5G□	FBLD75AW
	FBL575CW-□			FBLD75CW
	FBL575SW-□			FBLD75SW
120 W (1/6 HP)	**FBL5120AW-□**	FBLM5120W-GFB	GFB5G□	FBLD120AW
	FBL5120CW-□			FBLD120CW
	FBL5120SW-□			FBLD120SW

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

Round Shaft Type

Output Power	Model	Motor Model	Driver Model
75 W (1/10 HP)	**FBL575AW-A**	FBLM575W-A	FBLD75AW
	FBL575CW-A		FBLD75CW
	FBL575SW-A		FBLD75SW
120 W (1/6 HP)	**FBL5120AW-A**	FBLM5120W-A	FBLD120AW
	FBL5120CW-A		FBLD120CW
	FBL5120SW-A		FBLD120SW

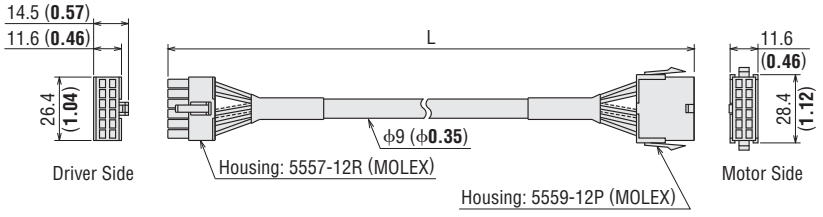
Accessories (Sold separately)

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.)]
CC01FBL	1 (3.3)
CC02FBL	2 (6.6)
CC03FBL	3 (9.8)
CC05FBL	5 (16.4)
CC07FBL	7 (23.0)
CC10FBL	10 (32.8)

◇**Dimensions** Unit = mm (in.)

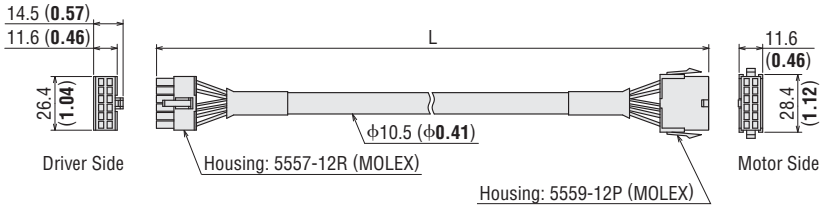


Flexible Extension Cables RoHS

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.).
We recommend this cable when the motor is installed on a moving section and the cable is bent and flexed.

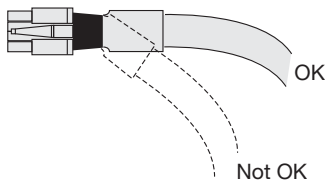
Model	Length: L [m (ft.)]
CC01FBLR	1 (3.3)
CC02FBLR	2 (6.6)
CC03FBLR	3 (9.8)
CC05FBLR	5 (16.4)
CC07FBLR	7 (23.0)
CC10FBLR	10 (32.8)

◇**Dimensions** Unit = mm (in.)

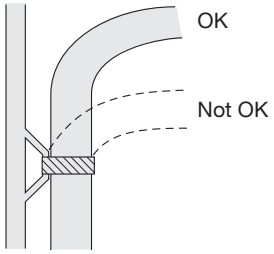


◇Notes on use of a Flexible Extension Cable

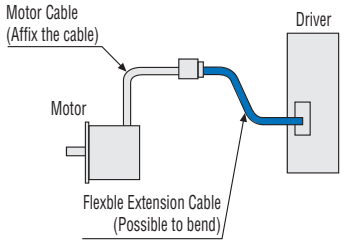
①Do not allow the cable to bend at the cable connector.



②Keep the bending radius to 60 mm (2.36 in.) or more.



③The motor cable is not a flexible cable. If the motor cable is to be bent, bend it at the flexible extension cable.



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