



Clutch and Brake Motors C•B Motors

Additional Information

- Technical Reference F-1
- General Information G-1

Clutch and Brake Motors

C•B Motors

This compact precision motor is equipped with an internal clutch and brake mechanism for use with a gearhead. This combination makes it the ideal motor for applications involving frequent START/STOP operation, positioning, indexing, jogging and incremental feeding.

■ Features

● Suitable for High-frequency Operation

The combination of a constantly rotating induction motor and a clutch and brake unit enables high frequency starting and stopping.

● Compact and Easy to Handle

The compact design simplifies handling and enables the drive unit of the machine to be mounted into a small area.

■ Characteristics of C•B Motors

The **C•B** motor is designed so that it runs continuously. This gives the advantage of quicker response time and higher torque in order to move the load.

Output shaft rotation is controlled through the use of the clutch and brake mechanism. The load is stopped by disengaging the clutch and applying the brake. The motor is always affected by the rotor inertia. However, with a clutch and brake unit, the load is not affected by the rotor inertia.



C•B Motor with Gearhead
(Gearhead sold separately)

● Highly Reliable Gearhead Employed

GC- type and **GCH-** type gearheads are specifically designed for **C•B** motors and boast excellent impact resistance, greater strength and high reliability.

For these reasons, **C•B** motors boast superior response over other AC standard motors, starting and stopping in considerably less time.

To meet high-frequency, starting and stopping applications, Oriental Motor uses an induction motor for its continuous duty rating. An induction motor is best suited for uni-directional movements. The **C•B** motor is not suitable for frequent bi-directional starting and stopping motion.

■ Safety Standards and CE Marking (Motor Only)

Standards	Certification Body	Standards File No.	CE Marking
UL1004 UL547 CSA C22.2 No.100 CSA C22.2 No.77	UL	E64197	Low Voltage Directives
EN60950 EN60034-1 EN60034-5 IEC60034-11			

● Details of Safety Standards →Page G-2

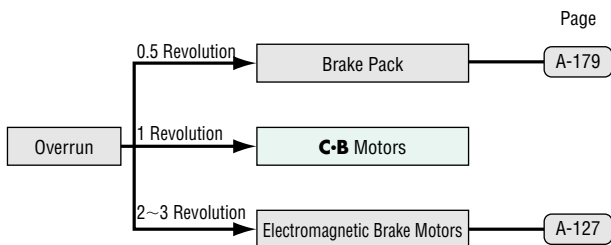
- Motors are recognized by UL. The clutch and brake unit is not UL recognized.
- When the motor is approved under various safety standards, the model name on nameplate is the approved model name.

Other Motor Braking Options

In addition to the brake packs, we provide various brake motors to suit a variety of applications.

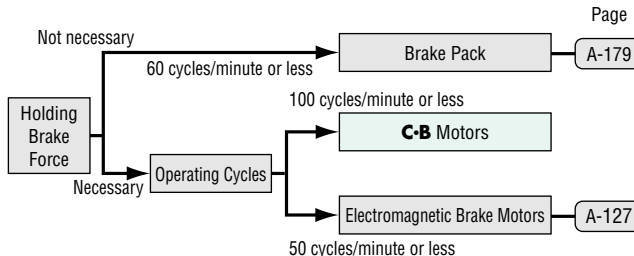
How to Select the Brake Motor

Selecting from stopping accuracy



* The overrun values are those of an individual motor.

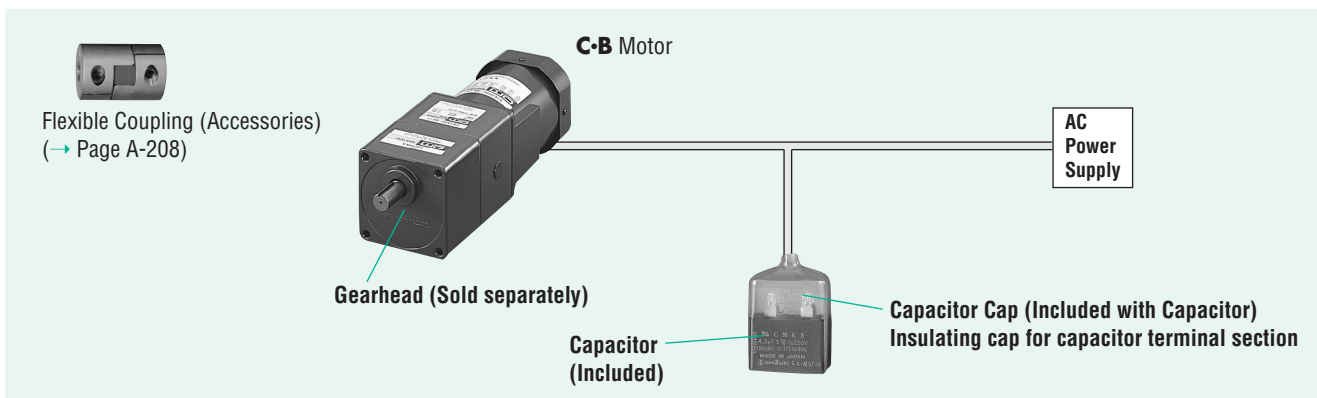
Selecting based on frequency of use



Notes:

- The operating cycles are based merely on brake response. The value specified above is the maximum, so it may not be possible to repeat braking operation at this frequency.
- In an actual application, be certain the surface temperature of the motor case remains below 194°F (90°C) by considering a rise in motor temperature.

System Configuration



The system configuration shown is an example. Other configurations are available.

Product Number Code

C-B Motors

CB I 5 40 - 7 0 1W U

- Motor Type**
I: Induction motor
- Motor Frame Size**
5: 3.54 in. sq. (90mm sq.)
- Output Power**
40: 40 W (1/19 HP)
60: 60 W (1/12 HP)
90: 90 W (1/8 HP)
- Motor Shaft Type**
7: GC- type pinion shaft
8: GCH- type pinion shaft
- Clutch Brake Type**
0: Excitation type
- Included Capacitor**
U: For 110/115 VAC
1W: Single-Phase 110/115 VAC

Series: Clutch and Brake Motor

Note:

- The "U" at the end of the model name indicates that the unit includes a capacitor. This letter is not listed on the motor nameplate.

Gearhead for C-B Motors

5 GC 25 KA

- Gearhead Frame Size**
5: 3.54 in. sq. (90mm sq.)
- Gearhead Type**
GC- type (for use with GC-type pinion shaft motor)
GCH- (for use with GCH-type pinion shaft motor)
- Gear Ratio**
(Example) **25**: Gear Ratio of 25:1
- Type of Ball Bearings and Shaft Size**
KA: Ball Bearing Type (inch size)

Product Line

To select the appropriate **C-B** motor, consult the output power characteristics on page A-175.

Model Frame Size	Output Power		Voltage VAC	Model	Motor Model	Gearhead Model
	HP	W				
3.54 in.sq. (90 mm sq.)	1/19	40	Single-Phase 110/115	CB1540-701WU	5IK40GN-AW-CB1	5GC□KA (Sold Separately)
	1/12	60	Single-Phase 110/115	CB1560-801WU	5IK60GU-AW-CB1	5GCH□KA (Sold Separately)
	1/8	90	Single-Phase 110/115	CB1590-801WU	5IK90GU-AW-CB1	

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

Note:

- The **GC-** and **GCH-** type gearheads are designed specifically for use with the **C-B** motor. Other types of gearheads should not be used.
- The clutch and brake unit is not sold separately from the motor.

Specifications

Motor Specifications—Continuous Rating



Model	Output Power		Voltage VAC	Frequency Hz	Current A	Rated Speed r/min	Capacitor μ F
	HP	W					
Ⓣ CB1540-701WU	1/19	40	Single-Phase 110	60	0.68	1500	9
			Single-Phase 115		0.67		
Ⓣ CB1560-801WU	1/12	60	Single-Phase 110	60	1.09	1450	18
			Single-Phase 115		1.10		
Ⓣ CB1590-801WU	1/8	90	Single-Phase 110	60	1.45	1500	20
			Single-Phase 115		1.44		

Ⓣ Contains a built-in thermal protector. If a motor overheats for any reason, the thermal protector is opened and the motor stops. When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor off before inspecting.

Clutch/Brake Specifications

Model Frame Size	Clutch/Brake	Holding Brake Torque		Voltage VDC	Input W (at 68°F (20°C))	Cycle Rates time/minute
		oz-in	mN·m			
3.54 in.sq. (90 mm sq.)	Clutch	210	1500	24	8.4	100
	Brake	210	1500	24	6.2	

General Specifications

(At rated motor operation under normal ambient temperature and humidity.)

Item	Specifications
Insulation Resistance	100MΩ or more when 500 VDC is applied between the windings and the frame after rated motor operation under normal ambient temperature and humidity.
Dielectric Strength	Sufficient to withstand 1.5 kV at 60 Hz applied between the windings and the frame after rated motor operation under normal ambient temperature and humidity for 1 minute.
Temperature Rise	144°F (80°C) or less measured by the resistance change method after rated motor operation with a gearhead.
Insulation Class	Class B [266°F (130°C)]
Ambient Temperature Range	14°F~104°F (-10°C~+40°C) (nonfreezing)
Ambient Humidity	85% maximum (noncondensing)
Degree of Protection	IP20

Permissible Overhung Load and Permissible Thrust Load

Unit = lb. (N)

Model	Gear Ratio	Permissible Overhung Load		Permissible Thrust Load
		0.39 in. (10 mm) from shaft end	0.79 in. (20 mm) from shaft end	
5GC□KA	3.6~18	56 (250)	78 (350)	22 (100)
	30~180	67 (300)	101 (450)	
5GCH□KA	3.6~9	90 (400)	112 (500)	33 (150)
	15~18	101 (450)	135 (600)	
	30~180	112 (500)	157 (700)	

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

Gear Ratio and Speed Range

Unit = r/min

Gear Ratio	3.6	6	9	15	18	30	36	60	90	120	180
60 Hz	500	300	200	120	100	60	50	30	20	15	10

● The speed is calculated by dividing the motor's synchronous speed (60 Hz: 1800 r/min) by the gear ratio. The actual loaded speed is 2~20% less than the displayed value, depending on the amount of the load.

Output Power Characteristics

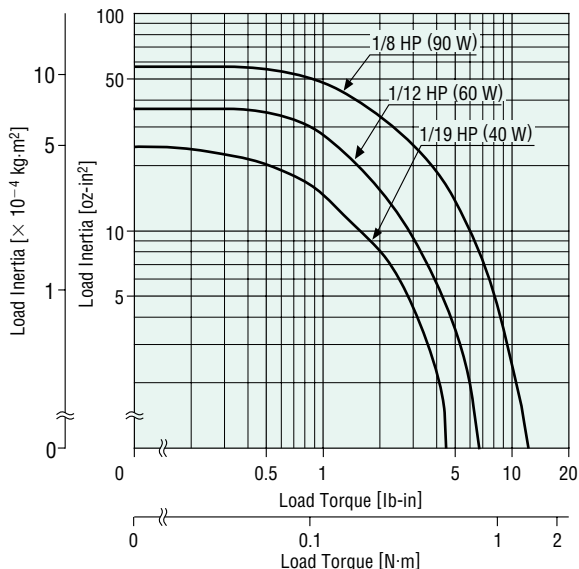
The most appropriate **C-B** motor may be determined by load torque and load inertia requirements of the motor and gearhead using the output selection charts below.

The curves represent the relationship between load torque and load inertia for a minimum of two million starts and stops. The motor should be operated inside the limits of the load torque-load inertia curves given.

Find the clutch and brake motor best suited for your application as follows:

- ① Determine the maximum load torque required at the gearhead output shaft.
- ② Calculate the reflected load inertia effective at the gearhead output shaft.
- ③ Plot the values found in ① and ② into the graph of the applicable speed. The motor model whose characteristic curve is the closest and above the point you entered is the most suitable motor for your purpose.

Speed at Output Shaft: 500 r/min Gear Ratio 3.6:1 at 60 Hz



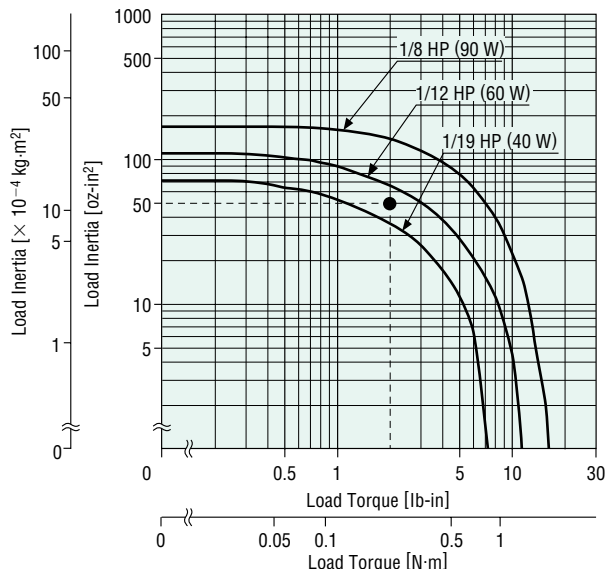
Selection Example

- Required Speed: 300 r/min
- Load Torque: 2 lb-in
- Load Inertia: 50 oz-in²

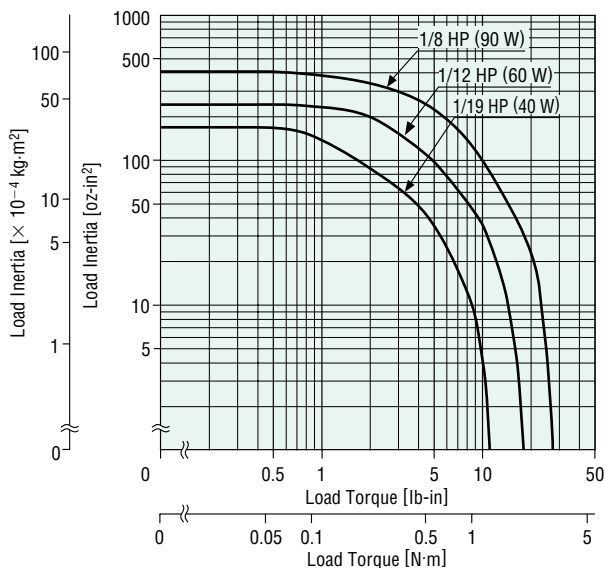
As an example, the value corresponding to these operating requirements has been marked in the application graph for 300 r/min.

- The speed indicated is calculated by dividing the motor synchronous speed (1800 r/min at 60 Hz) by the speed reduction ratio. Note that depending on the load, the actual speed may be 2~20% lower than indicated in the graph.

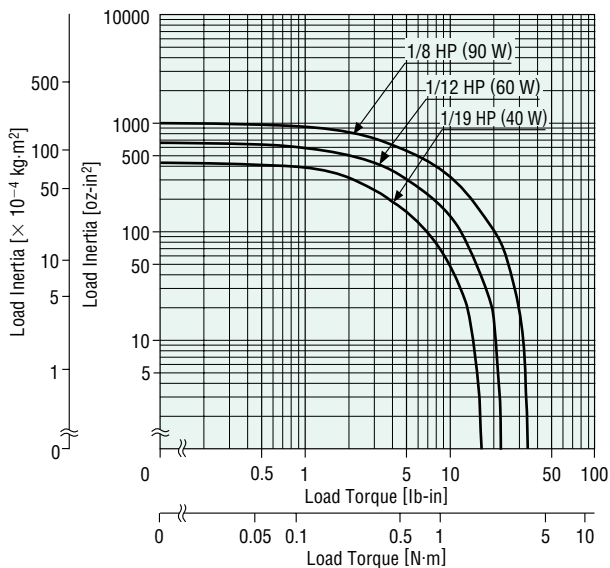
Speed at Output Shaft: 300 r/min Gear Ratio 6:1 at 60 Hz



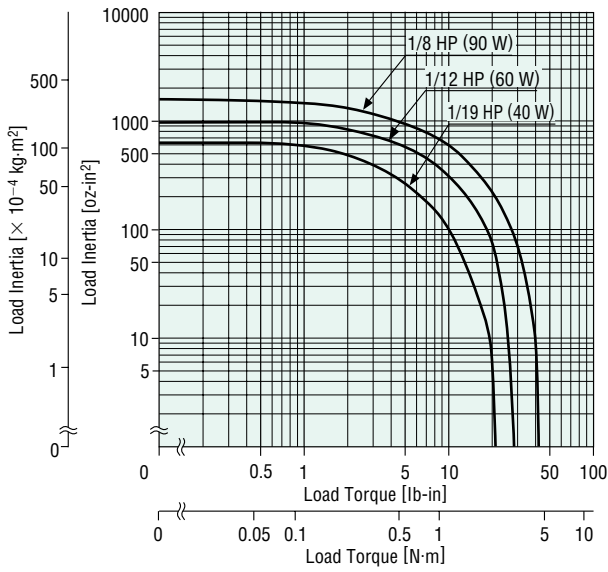
Speed at Output Shaft: 200 r/min Gear Ratio 9:1 at 60 Hz



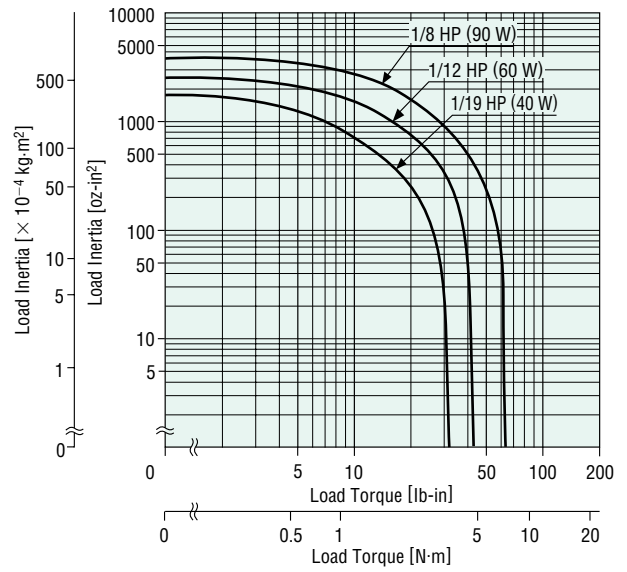
Speed at Output Shaft: 120 r/min Gear Ratio 15:1 at 60 Hz



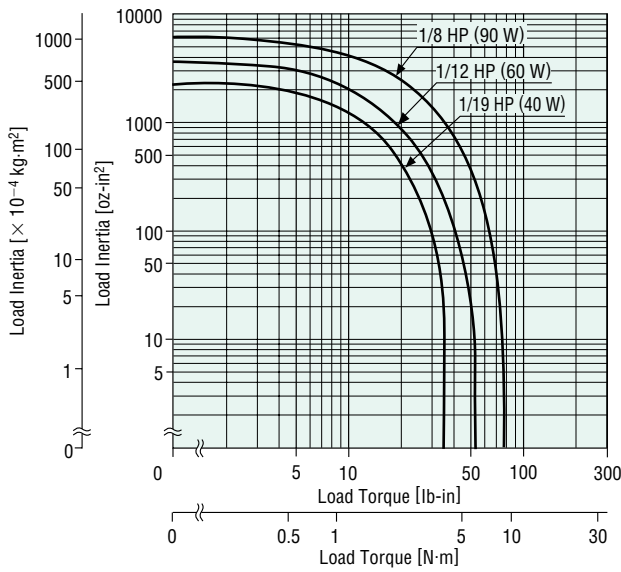
● Speed at Output Shaft: 100 r/min
Gear Ratio 18:1 at 60 Hz



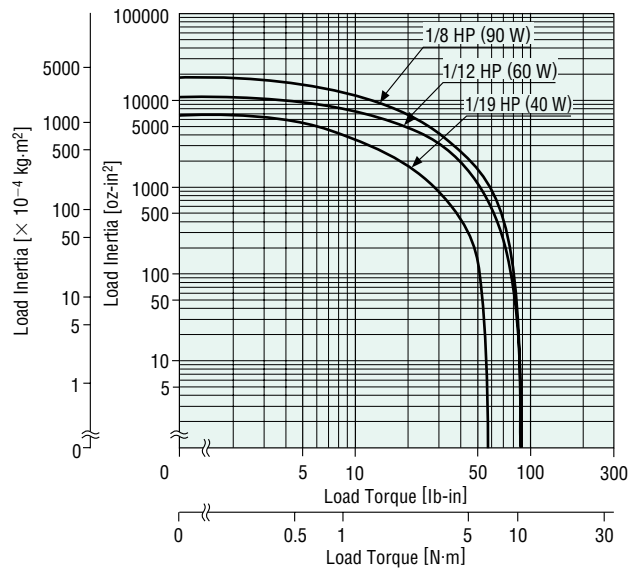
● Speed at Output Shaft: 60 r/min
Gear Ratio 30:1 at 60 Hz



● Speed at Output Shaft: 50 r/min
Gear Ratio 36:1 at 60 Hz



● Speed at Output Shaft: 30 r/min or slower
Gear Ratio 60:1 or greater at 60 Hz



Note:

- When using a **C-B** motor at an output shaft speed of less than 30 r/min (when using with gearheads of speed reduction ratios greater than 60:1 at 60 Hz), refer to output selection chart entitled "30 r/min or slower."

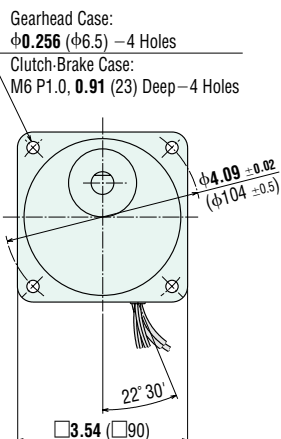
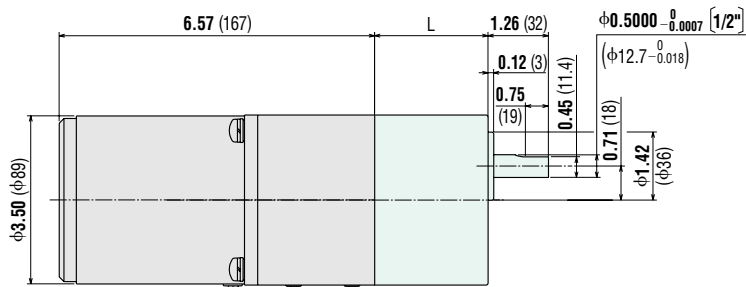
Dimensions Scale 1/4, Unit = inch (mm)

Mounting screws are included with gearheads. Dimensions for screws → A-223

Motor
CB1540-701WU
Weight: 8.4 lb. (3.8 kg)

Gearhead
5GC□KA
Weight: 3.3 lb. (1.5 kg)

DXF A261AU (**5GC3.6KA-18KA**)
A261BU (**5GC30KA-180KA**)



3 Motor Leads 12 inch (300 mm) Length
UL Style 3271, AWG 20

2 Brake Leads 12 inch (300 mm) Length
UL Style 3266, AWG 22

2 Clutch Leads 12 inch (300 mm) Length
UL Style 3266, AWG 22

5GC3.6KA~18KA: L = 1.65 (42)
5GC30KA~180KA: L = 2.36 (60)

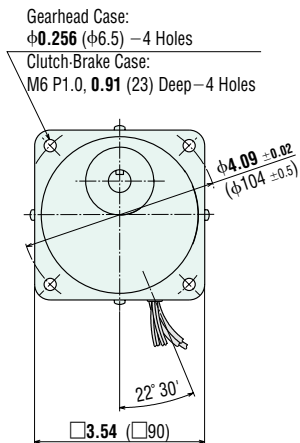
Motor
CB1560-801WU
Weight: 8.8 lb. (4.0 kg)

Gearhead
5GCH□KA
Weight: 3.3 lb. (1.5 kg)

DXF A262U

CB1590-801WU / **5GCH□KA**
Weight: 9.9 lb. (4.5 kg) / Weight: 3.3 lb. (1.5 kg)

DXF A263U



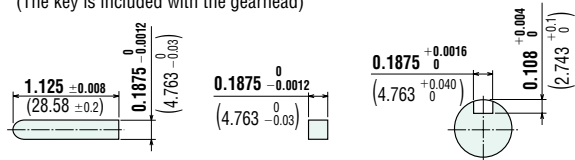
3 Motor Leads 12 inch (300 mm) Length
UL Style 3271, AWG 20

2 Brake Leads 12 inch (300 mm) Length
UL Style 3266, AWG 22

2 Clutch Leads 12 inch (300 mm) Length
UL Style 3266, AWG 22

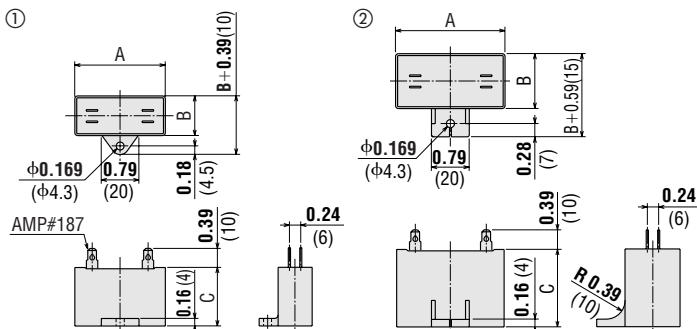
● Key and Key Slot (Scale 1/2)

(The key is included with the gearhead)



Motor Model Type	L	
	inch	(mm)
CB1560-801WU	7.17	(182)
CB1590-801WU	7.76	(197)

● Capacitor (included with the C-B motor) Unit = inch (mm)



Motor Model	Capacitor Model	Dimensions in. (mm)			Weight oz. (g)	No.
		A	B	C		
CB1540-701WU	CH90CFAUL	1.89 (48)	0.83 (21)	1.22 (31)	1.4 (40)	①
CB1560-801WU	CH180CFAUL	2.28 (58)	0.93 (23.5)	1.46 (37)	2.5 (70)	②
CB1590-801WU	CH200CFAUL	2.28 (58)	1.14 (29)	1.61 (41)	3.4 (95)	②

● If you need to order a capacitor without a motor, add "-C" to the capacitor model name shown.
A capacitor cap is included with the capacitor.

■ Connection Diagrams

Model	Motor	Clutch and Brake
CBI540-701WU CBI560-801WU CBI590-801WU		

- The direction of motor rotation is as viewed from the shaft end of the motor.
- **How to connect a capacitors** → Page A-225
- The surge absorber circuit is included with the **C-B** motor.
- Clutch and brake coil lead wires are non-polar.

Notes:

- Change the direction of motor rotation only after bringing the motor to a stop. If an attempt is made to change the direction of rotation while the motor is rotating, the motor may ignore the reversing command or change its direction of rotation after some delay.
- When using **C-B** motors, a 24 VDC power supply for the clutch and brake is required in addition to the motor power supply.
- Transformer capacity on the DC power supply should be at least 1.3 times the rated power consumption of the clutch and brake.
- Be sure to use full-wave rectified DC power supply.
- Do not try to activate clutch and brake simultaneously. When shifting from clutch to brake or vice versa, leave a time lag of at least 20 ms.

● Inner Connection Diagram for 4-Terminal Capacitor

Terminals of the capacitor are connected as shown in the figure. For lead wire connection, use one lead wire per terminal.

