

(RoHS) RoHS-Compliant
2-Phase Stepping Motor and Microstep Driver Package

CMK Series

The **CMK** Series is a motor and driver package consisting of a 2-phase stepping motor and 24 VDC input microstep driver, allowing for a reduction in the size of your equipment and in vibration.



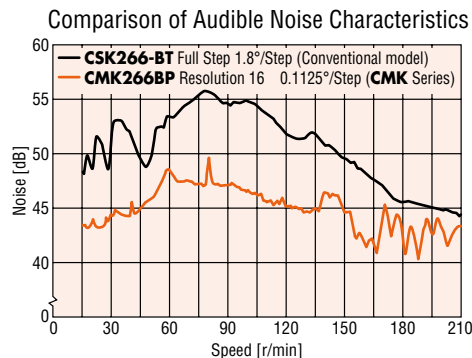
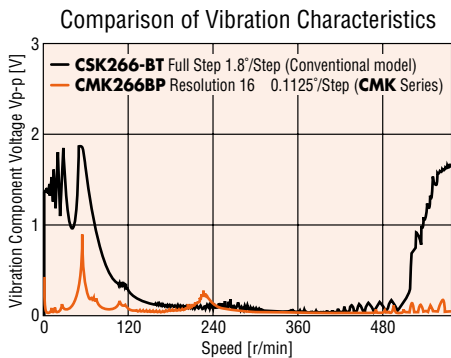
2-Phase Stepping Motor and Driver Package CMK Series,

Achieving Low Vibration and Noise with a Microstep Driver

The newly designed compact DC board-level driver achieves microstep drive in a compact, lightweight body. The 2-phase stepping motor's basic step angle (1.8°/step) is divided by a maximum of 16 resolutions (0.1125°/step) without the use of a reduction mechanism or other mechanical elements, which contributes to the reduction in noise and vibration of your equipment.

Microstep/Step	Resolution	Step Angle
1	200	1.8°
2	400	0.9°
4	800	0.45°
8	1600	0.225°
16	3200	0.1125°

(At basic step angle 1.8°/step)



Full Range of Driver Functions and Features

- Five preset step angles
- Operating current can easily be set with a digital switch
- 1-pulse/2-pulse input mode switching
- Power LED
- Connector with lock (by MOLEX)

◇ Easy-to-Install Heat Sink Shape



Horizontal Installation



Vertical Installation

One of the Smallest Drivers in the Industry Adopting a Microstep Driver

The driver of the **CMK** Series is one of the smallest, lightest drivers in the industry adopting a microstep driver. The driver is 62% lighter and has 41% less install area (based on horizontal installation) compared to our conventional model. This product contributes to the downsizing of your equipment.

Mass: 130 g (0.29 lb.)

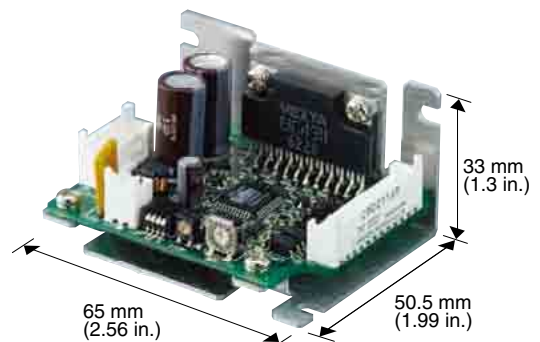


Conventional Model (CSD2120-T)

Mass: 50 g (0.11 lb.)



New Product (CMD21□□P)















Comparison with a conventional driver

- ◇ Mass: **62%** less
- ◇ Install area: **41%** less (based on horizontal installation)
- ◇ Volume: **41%** less [the conventional driver includes a 5 mm (0.2 in.) spacer for installation.]

Adopting a Compact, Lightweight Microstep Driver

Wide Variety

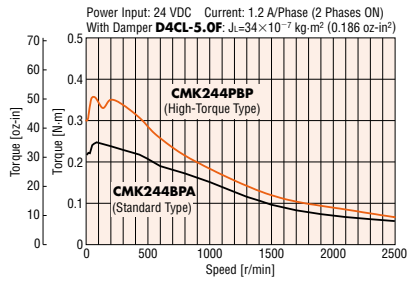
The **CMK** Series motor and driver package comes in five frame sizes of 28 to 60 mm (1.10 to 2.36 in.) as well as four motor types.

Type	Features	□28 mm (□1.10 in.)	□35 mm (□1.38 in.)	□42 mm (□1.65 in.)	□50 mm (□1.97 in.)	□56.4/60 mm (□2.22/2.36 in.)	Driver
High-Torque Type	The high-torque motor has higher torque of approx. 1.5 times compared with the conventional standard type motor.						
High-Resolution Type	High-torque motor offering higher positioning accuracy with the basic step angle set to 0.9°/step, which is just half the basic step angle of the standard type motor.						
Standard Type	The basic model offering a good balance of torque and low vibration/noise characteristics.						
SH Geared Type	These geared types are effective for inertia reduction, increasing torque, higher resolution and suppressing vibration. Six gear ratios are available.						

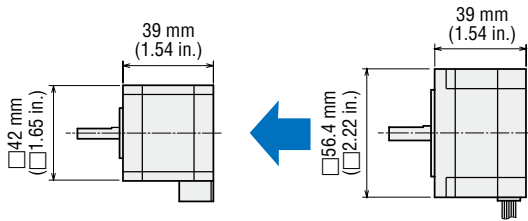
High-Torque Type

The high-torque type adopts a new technology and design. This motor produces higher torque of approximately 1.5 times the level achieved by a conventional standard type motor.

Comparison of Speed – Torque Characteristics



Providing torque equivalent to a motor of the next larger frame size, the high-torque type allows for a reduction in the size of your equipment.



High-Torque Type	Type	Standard Type
CMK244PAP	Model	CMK264AP
0.39 N·m (55 oz-in)	Maximum Holding Torque	0.36 N·m (51 oz-in)

The motor also adopts a connector coupling system for easy installation.

RoHS Compliant

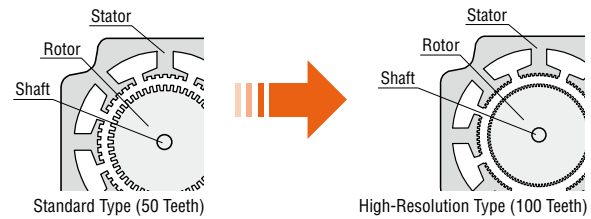
The **CMK** Series conforms to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium.

RoHS (Restriction of Hazardous Substances) Directive:

Directive on restriction of the use of certain hazardous substances in electrical and electronic equipment (2002/95/EC). The RoHS Directive prohibits the use of six chemical substances in electrical and electronic products sold in the EU member states. The six controlled substances are: lead, hexavalent chromium, cadmium, mercury and two specific brominated flame-retardants (PBB and PBDE).

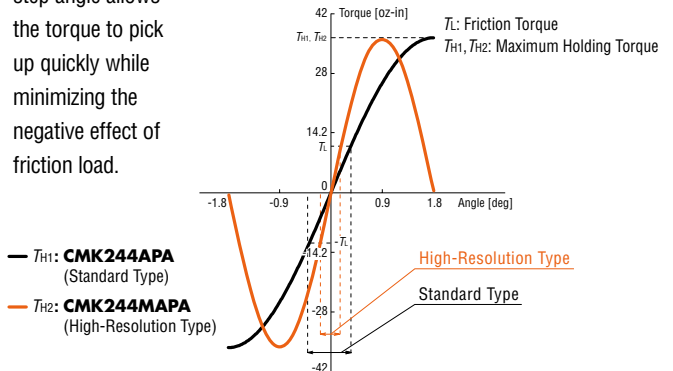
High-Resolution Type

This motor offers a basic step angle of 0.9°, which is half that of the standard type motor. 400 steps per rotation is possible. This motor achieves high resolution, low vibration and improved stopping accuracy.



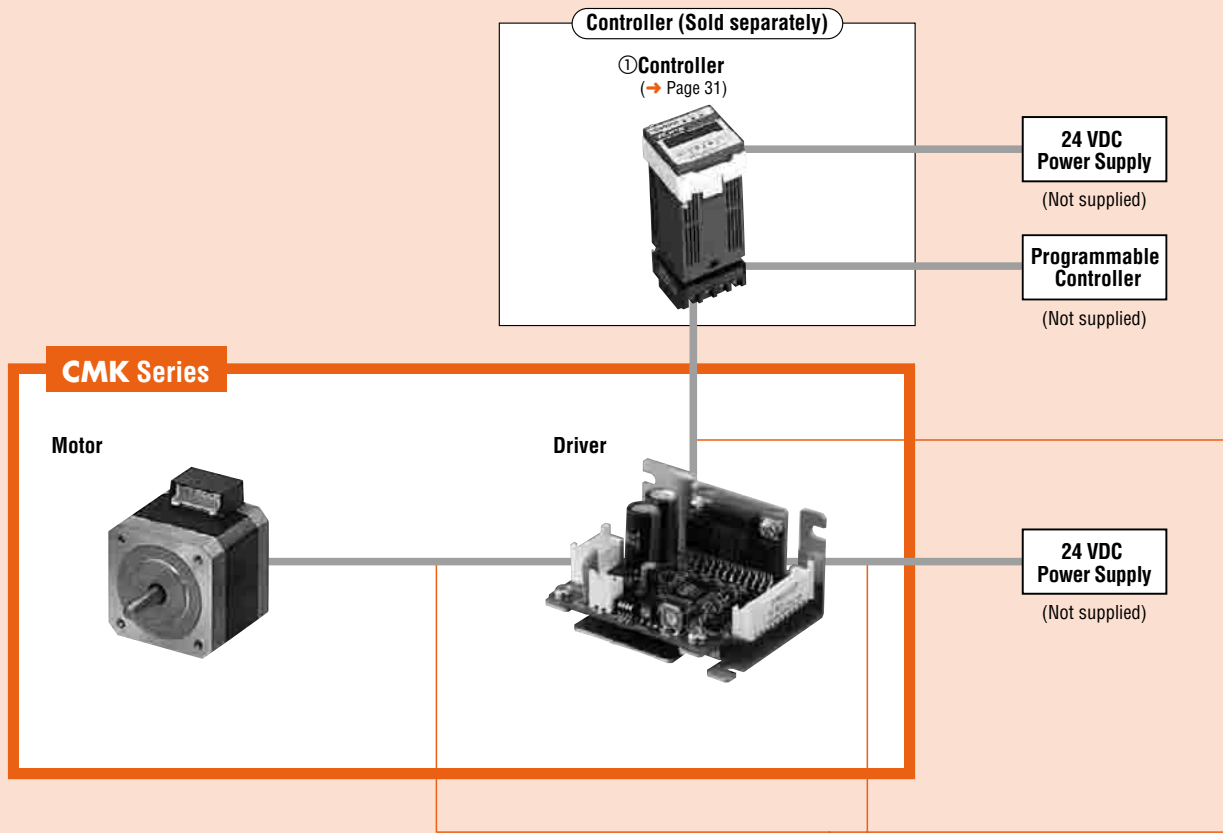
The small basic step angle allows the torque to pick up quickly while minimizing the negative effect of friction load.

Comparison of Angle – Torque Characteristics



System Configuration

An example of a system configuration with the **SG8030J** controller.



Optional Accessories and Peripheral Equipment (Sold separately)



② **Motor Mounting Brackets**
(→ Page 25)



③ **Flexible Couplings**
(→ Page 27)



④ **Clean Dampers**
(→ Page 29)



⑤ **Driver Lead Wire Set**
(→ Page 30)



⑥ **Motor Lead Wire/Connector Assembly***
(→ Page 30)

*Motor lead wire/connector assembly of 0.6 m (2 ft.) is included with the motor and driver package for the connector-coupled types.

No.	Product Name	Overview	Page
①	Controller	This controller outputs pulse commands that determine the rotating amount and rotating speed.	31
②	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	25
③	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	27
④	Clean Dampers	Dedicated damper for suppressing stepping motor vibration.	29
⑤	Driver Lead Wire Set	Cables for connecting the driver and motor, DC power supply or host controller [0.6 m (2 ft.)].	30
⑥	Motor Lead Wire/Connector Assembly	Lead wire with a connector crimped for connector-coupled motors [0.6 m, 1 m (2 ft., 3.3 ft.)].	30

● Example of System Configuration

(Sold separately)

CMK Series	+	Controller	Motor Mounting Bracket	Flexible Coupling	Clean Damper	Driver Lead Wire Set [0.6 m (2 ft.)]
CMK244PBP		SG8030J-U	PALOPA	MCS140506	D4CL-5.0F	LCS01CMK2

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

Product Number Code

High-Torque Type, High-Resolution Type, Standard Type

CMK 2 4 6 P A P

① ② ③ ④ ⑤ ⑥ ⑦

SH Geared Type

CMK 2 6 4 A P A - SG 10

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

①	Series	CMK: CMK Series
②	2-Phase	
③	Motor Frame Size	2: 28 mm (1.10 in.) 3: 35 mm (1.38 in.) 4: 42 mm (1.65 in.) 5: 50 mm (1.97 in.) 6: 56.4 mm (2.22 in.)
④	Motor Case Length	
⑤	Motor Type	P: High-Torque Type M: High-Resolution Type Blank: Standard Type
⑥	Shaft Type	A: Single Shaft B: Double Shaft
⑦	Signal I/O Mode	P: Photocoupler

①	Series	CMK: CMK Series
②	2-Phase	
③	Motor Frame Size	2: 28 mm (1.10 in.) 4: 42 mm (1.65 in.) 6: 60 mm (2.36 in.)
④	Motor Case Length	
⑤	Shaft Type	A: Single Shaft B: Double Shaft
⑥	Signal I/O Mode	P: Photocoupler
⑦	USA Version	
⑧	Gearhead Type	SG: SH Geared Type
⑨	Gear Ratio	

Product Line

High-Torque Type

Model (Single Shaft)	Model (Double Shaft)
CMK223PAP	CMK223PBP
CMK224PAP	CMK224PBP
CMK225PAP	CMK225PBP
CMK233PAP	CMK233PBP
CMK235PAP	CMK235PBP
CMK244PAP	CMK244PBP
CMK246PAP	CMK246PBP

High-Resolution Type

Model (Single Shaft)	Model (Double Shaft)
CMK243MAPA	CMK243MBPA
CMK244MAPA	CMK244MBPA
CMK245MAPA	CMK245MBPA
CMK264MAP	CMK264MBP
CMK266MAP	CMK266MBP
CMK268MAP	CMK268MBP

Standard Type

Model (Single Shaft)	Model (Double Shaft)
CMK243APA	CMK243BPA
CMK244APA	CMK244BPA
CMK245APA	CMK245BPA
CMK256AP	CMK256BP
CMK258AP	CMK258BP
CMK264AP	CMK264BP
CMK266AP	CMK266BP
CMK268AP	CMK268BP

SH Geared Type

Model (Single Shaft)	Model (Double Shaft)
CMK223AP-SG7.2	CMK223BP-SG7.2
CMK223AP-SG9	CMK223BP-SG9
CMK223AP-SG10	CMK223BP-SG10
CMK223AP-SG18	CMK223BP-SG18
CMK223AP-SG36	CMK223BP-SG36
CMK243APA-SG3.6	CMK243BPA-SG3.6
CMK243APA-SG7.2	CMK243BPA-SG7.2
CMK243APA-SG9	CMK243BPA-SG9
CMK243APA-SG10	CMK243BPA-SG10
CMK243APA-SG18	CMK243BPA-SG18
CMK243APA-SG36	CMK243BPA-SG36
CMK264APA-SG3.6	CMK264BPA-SG3.6
CMK264APA-SG7.2	CMK264BPA-SG7.2
CMK264APA-SG9	CMK264BPA-SG9
CMK264APA-SG10	CMK264BPA-SG10
CMK264APA-SG18	CMK264BPA-SG18
CMK264APA-SG36	CMK264BPA-SG36

System Configuration

Product Line

Specifications, Characteristics

Dimensions

Connection and Operation

Motor and Driver Combinations

Accessories

Controllers

High-Torque Type Motor Frame Size 28 mm (1.10 in.)

Specifications RoHS

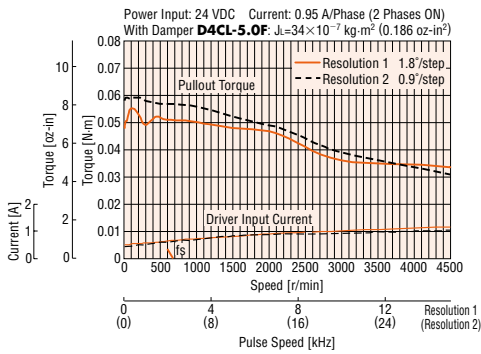
Model	Single Shaft	CMK223PAP *2	CMK224PAP *2	CMK225PAP *2
	Double Shaft	CMK223PBP *2	CMK224PBP *2	CMK225PBP *2
Maximum Holding Torque*1	N·m (oz-in)	0.05 (7.1)	0.075 (10.6)	0.09 (12.7)
Rotor Inertia	J: kg·m ² (oz-in ²)	9 × 10 ⁻⁷ (0.049)	12 × 10 ⁻⁷ (0.066)	18 × 10 ⁻⁷ (0.098)
Rated Current	A/Phase	0.95		
Basic Step Angle	1.8°			
Power Source	24 VDC ± 10% 1.5 A			
Excitation Mode	Microstep			
Mass	Motor	kg (lb.)	0.11 (0.24)	0.14 (0.31)
	Driver	kg (lb.)	0.05 (0.11)	
Dimension No.	Motor	T		
	Driver	T0		

*1 The holding torque (2-phase excitation) is the maximum holding power (torque) the stepping motor has when power is being supplied but the motor shaft is not rotating (rated current).
At motor standstill, the driver's automatic current cutback function reduces the maximum holding torque by approximately 40%.

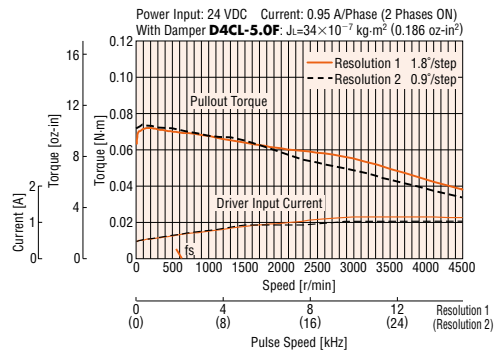
*2 Motor lead wire/connector assembly of 0.6 m (2 ft.) is included with the motor and driver package for the connector-coupled types.

Speed – Torque Characteristics fs: Maximum Starting Frequency

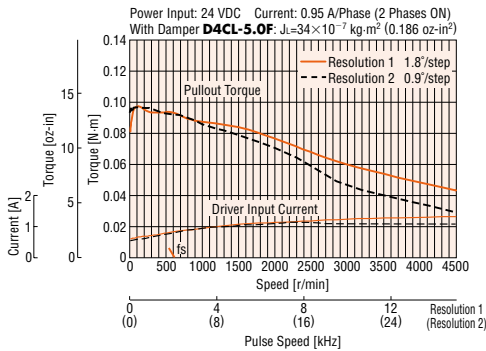
CMK223PAP/CMK223PBP



CMK224PAP/CMK224PBP



CMK225PAP/CMK225PBP



● The pulse input circuit responds to approximately 100 kHz with a pulse duty of 50%.

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F).
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 40%.

High-Torque Type Motor Frame Size 35 mm (1.38 in.), 42 mm (1.65 in.)

Specifications RoHS

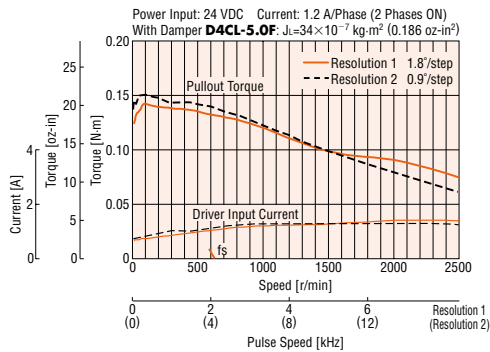
Model	Single Shaft	CMK233PAP *2	CMK235PAP *2	CMK244PAP *2	CMK246PAP *2
	Double Shaft	CMK233PBP *2	CMK235PBP *2	CMK244PBP *2	CMK246PBP *2
Maximum Holding Torque*1	N·m (oz·in)	0.16 (22)	0.3 (42)	0.39 (55)	0.75 (106)
Rotor Inertia	J: kg·m ² (oz·in ²)	24×10 ⁻⁷ (0.131)	50×10 ⁻⁷ (0.27)	57×10 ⁻⁷ (0.31)	114×10 ⁻⁷ (0.62)
Rated Current	A/Phase	1.2			
Basic Step Angle		1.8°			
Power Source		24 VDC ± 10% 1.7 A			
Excitation Mode		Microstep			
Mass	Motor kg (lb.)	0.18 (0.4)	0.285 (0.63)	0.3 (0.66)	0.5 (1.1)
	Driver kg (lb.)	0.05 (0.11)			
Dimension No.	Motor	②		③	
	Driver	⑩			

*1 The holding torque (2-phase excitation) is the maximum holding power (torque) the stepping motor has when power is being supplied but the motor shaft is not rotating (rated current). At motor standstill, the driver's automatic current cutback function reduces the maximum holding torque by approximately 40%.

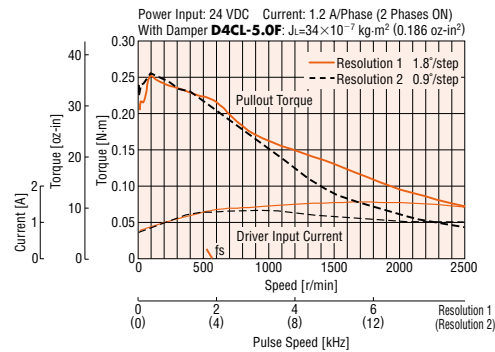
*2 Motor lead wire/connector assembly of 0.6 m (2 ft.) is included with the motor and driver package for the connector-coupled types.

Speed – Torque Characteristics fs: Maximum Starting Frequency

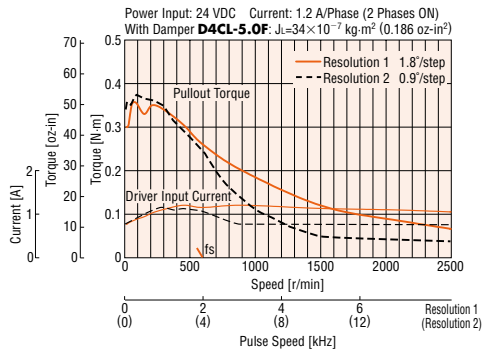
CMK233PAP/CMK233PBP



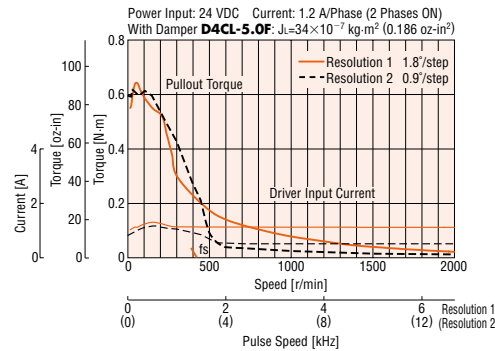
CMK235PAP/CMK235PBP



CMK244PAP/CMK244PBP



CMK246PAP/CMK246PBP



● The pulse input circuit responds to approximately 100 kHz with a pulse duty of 50%.

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F).
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 40%.

High-Resolution Type Motor Frame Size 42 mm (1.65 in.), 56.4 mm (2.22 in.)

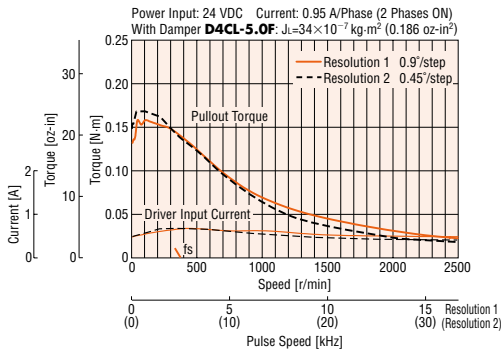
Specifications RoHS

Model	Single Shaft	CMK243MAPA	CMK244MAPA	CMK245MAPA	CMK264MAP	CMK266MAP	CMK268MAP
	Double Shaft	CMK243MBPA	CMK244MBPA	CMK245MBPA	CMK264MBP	CMK266MBP	CMK268MBP
Maximum Holding Torque*	N·m (oz·in)	0.16 (22)	0.26 (36)	0.32 (45)	0.37 (52)	0.9 (127)	1.35 (191)
Rotor Inertia	J: kg·m ⁻² (oz·in ⁻²)	35×10 ⁻⁷ (0.191)	54×10 ⁻⁷ (0.3)	68×10 ⁻⁷ (0.37)	120×10 ⁻⁷ (0.66)	300×10 ⁻⁷ (1.64)	480×10 ⁻⁷ (2.6)
Rated Current	A/Phase	0.95	1.2		2		
Basic Step Angle		0.9°					
Power Source		24 VDC±10% 1.5 A		24 VDC±10% 1.7 A		24 VDC±10% 2.9 A	
Excitation Mode		Microstep					
Mass	Motor	kg (lb.)	0.24 (0.53)	0.3 (0.66)	0.37 (0.81)	0.45 (0.99)	0.7 (1.54)
	Driver	kg (lb.)	0.05 (0.11)				
Dimension No.	Motor	[4]				[6]	
	Driver	[10]					

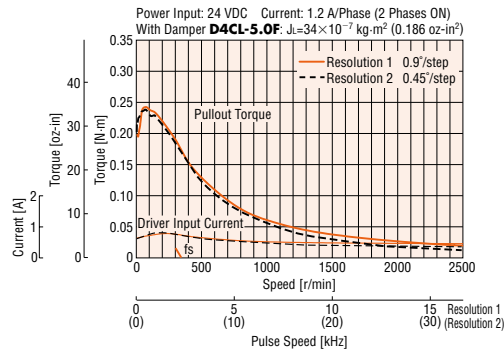
*The holding torque (2-phase excitation) is the maximum holding power (torque) the stepping motor has when power is being supplied but the motor shaft is not rotating (rated current). At motor standstill, the driver's automatic current cutback function reduces the maximum holding torque by approximately 40%.

Speed – Torque Characteristics fs: Maximum Starting Frequency

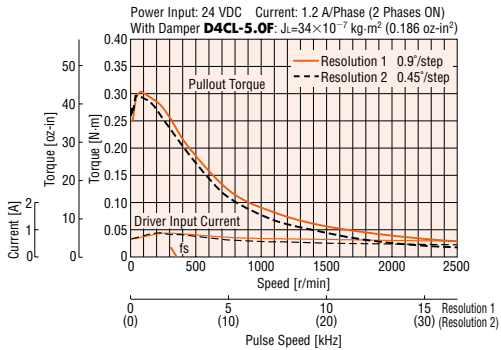
CMK243MAPA/CMK243MBPA



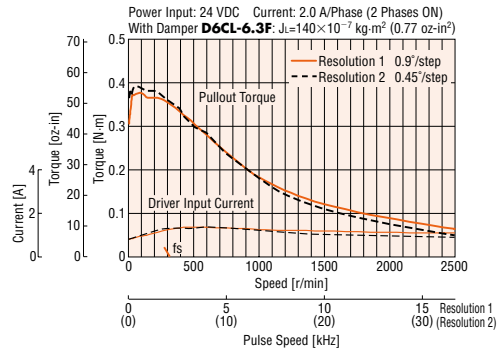
CMK244MAPA/CMK244MBPA



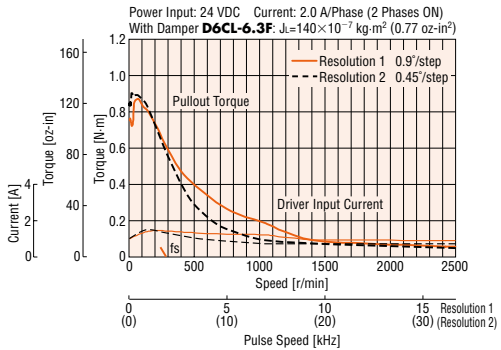
CMK245MAPA/CMK245MBPA



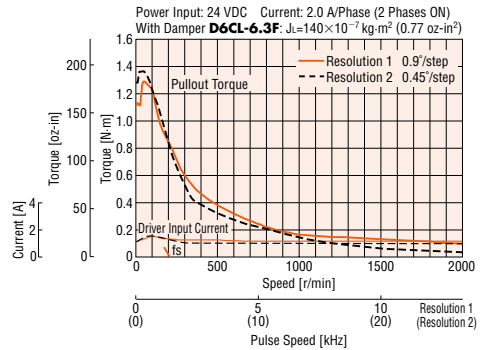
CMK264MAP/CMK264MBP



CMK266MAP/CMK266MBP



CMK268MAP/CMK268MBP



● The pulse input circuit responds to approximately 100 kHz with a pulse duty of 50%.

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F).
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 40%.

Standard Type Motor Frame Size 42 mm (1.65 in.), 50 mm (1.97 in.)

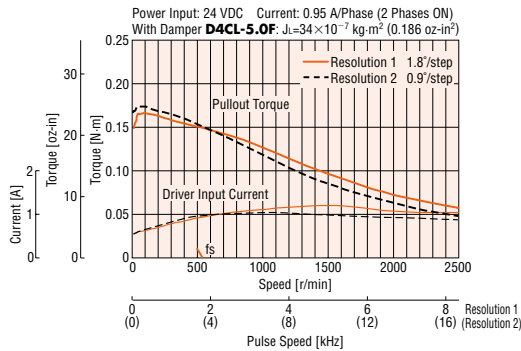
Specifications RoHS

Model	Single Shaft	CMK243APA	CMK244APA	CMK245APA	CMK256AP	CMK258AP
	Double Shaft	CMK243BPA	CMK244BPA	CMK245BPA	CMK256BP	CMK258BP
Maximum Holding Torque*	N·m (oz·in)	0.16 (22)	0.26 (36)	0.32 (45)	0.56 (79)	1.2 (170)
Rotor Inertia	J: kg·m ² (oz·in ²)	35×10 ⁻⁷ (0.191)	54×10 ⁻⁷ (0.3)	68×10 ⁻⁷ (0.37)	230×10 ⁻⁷ (1.26)	420×10 ⁻⁷ (2.3)
Rated Current	A/Phase	0.95	1.2	1.2	2	2
Basic Step Angle		1.8°				
Power Source		24 VDC±10% 1.5 A		24 VDC±10% 1.7 A		24 VDC±10% 2.9 A
Excitation Mode		Microstep				
Mass	Motor kg (lb.)	0.21 (0.46)	0.27 (0.59)	0.35 (0.77)	0.53 (1.17)	0.89 (1.96)
	Driver kg (lb.)	0.05 (0.11)				
Dimension No.	Motor	4			5	
	Driver	10				

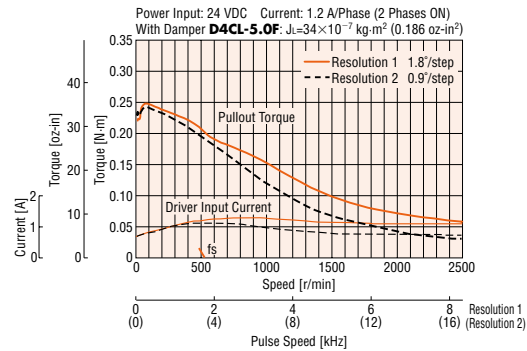
*The holding torque (2-phase excitation) is the maximum holding power (torque) the stepping motor has when power is being supplied but the motor shaft is not rotating (rated current). At motor standstill, the driver's automatic current cutback function reduces the maximum holding torque by approximately 40%.

Speed – Torque Characteristics fs: Maximum Starting Frequency

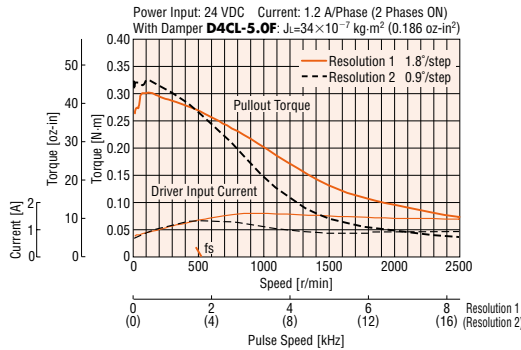
CMK243APA/CMK243BPA



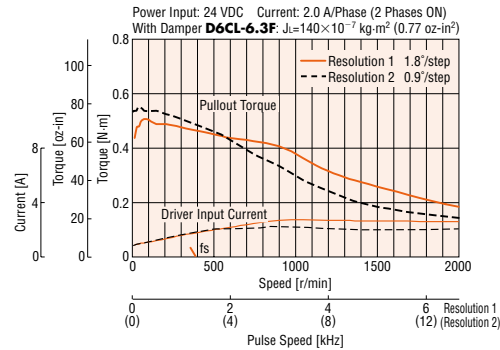
CMK244APA/CMK244BPA



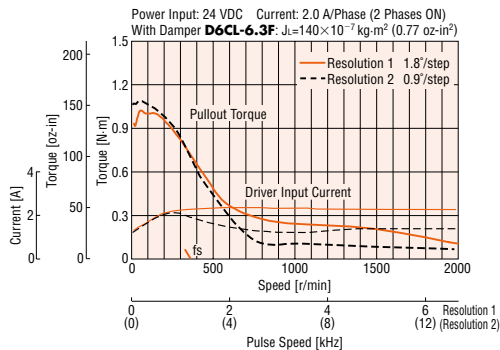
CMK245APA/CMK245BPA



CMK256AP/CMK256BP



CMK258AP/CMK258BP



● The pulse input circuit responds to approximately 100 kHz with a pulse duty of 50%.

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F).
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 40%.

Standard Type Motor Frame Size 56.4 mm (2.22 in.)

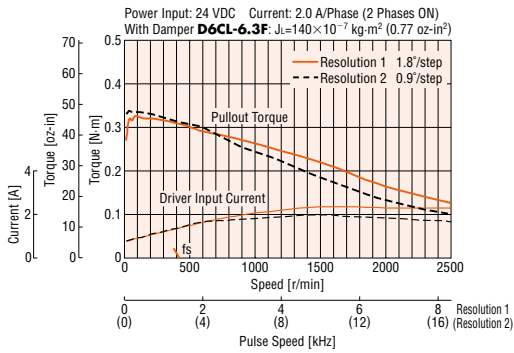
Specifications RoHS

Model	Single Shaft	CMK264AP	CMK266AP	CMK268AP
	Double Shaft	CMK264BP	CMK266BP	CMK268BP
Maximum Holding Torque*	N·m (oz·in)	0.36 (51)	0.82 (116)	1.35 (191)
Rotor Inertia	J: kg·m ² (oz·in ²)	120×10 ⁻⁷ (0.66)	300×10 ⁻⁷ (1.64)	480×10 ⁻⁷ (2.6)
Rated Current	A/Phase	2		
Basic Step Angle	1.8°			
Power Source	24 VDC ±10% 2.9 A			
Excitation Mode	Microstep			
Mass	Motor	kg (lb.)	0.45 (0.99)	0.7 (1.54)
	Driver	kg (lb.)	0.05 (0.11)	
Dimension No.	Motor	6		
	Driver	10		

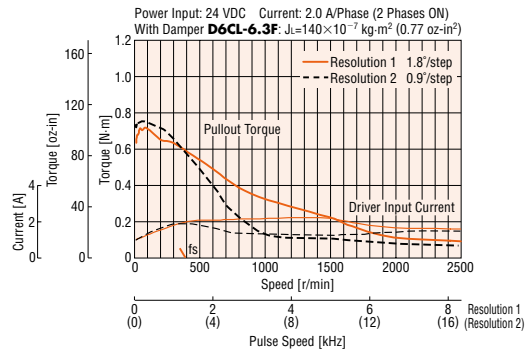
*The holding torque (2-phase excitation) is the maximum holding power (torque) the stepping motor has when power is being supplied but the motor shaft is not rotating (rated current). At motor standstill, the driver's automatic current cutback function reduces the maximum holding torque by approximately 40%.

Speed – Torque Characteristics fs: Maximum Starting Frequency

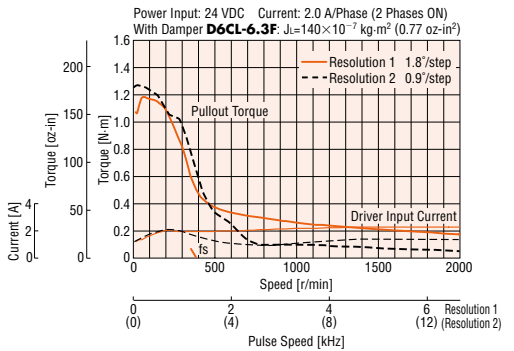
CMK264AP/CMK264BP



CMK266AP/CMK266BP



CMK268AP/CMK268BP



● The pulse input circuit responds to approximately 100 kHz with a pulse duty of 50%.

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F).
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 40%.

SH Geared Type Motor Frame Size 28 mm (1.10 in.)

Specifications RoHS

Model	Single Shaft	CMK223AP-SG7.2 ^{*3}	CMK223AP-SG9 ^{*3}	CMK223AP-SG10 ^{*3}	CMK223AP-SG18 ^{*3}	CMK223AP-SG36 ^{*3}
	Double Shaft	CMK223BP-SG7.2 ^{*3}	CMK223BP-SG9 ^{*3}	CMK223BP-SG10 ^{*3}	CMK223BP-SG18 ^{*3}	CMK223BP-SG36 ^{*3}
Maximum Holding Torque ^{*1}	N·m (oz·in)	0.3 (42)			0.4 (56)	
Rotor Inertia	J: kg·m ² (oz·in ²)	9×10 ⁻⁷ (0.049)				
Rated Current	A/Phase	0.95				
Basic Step Angle		0.25°	0.2°	0.18°	0.1°	0.05°
Gear Ratio		7.2:1	9:1	10:1	18:1	36:1
Permissible Torque ^{*2}	N·m (oz·in)	0.3 (42)			0.4 (56)	
Permissible Speed Range	r/min	0~250	0~200	0~180	0~100	0~50
Power Source		24 VDC ± 10% 1.5 A				
Excitation Mode		Microstep				
Mass	Motor	kg (lb.)				
	Driver	0.16 (0.35)				
Dimension No.	Motor	7				
	Driver	10				

* 1 The holding torque (2-phase excitation) is the maximum holding power (torque) the stepping motor has when power is being supplied but the motor shaft is not rotating (rated current).

At motor standstill, the driver's automatic current cutback function reduces the maximum holding torque by approximately 40%.

* 2 The permissible torque represents the torque value limited by the mechanical strength of the gear when operated at a constant speed. The total torque including acceleration/deceleration torque should not exceed this value.

* 3 Motor lead wire/connector assembly of 0.6 m (2 ft.) is included with the motor and driver package for the connector-coupled types.

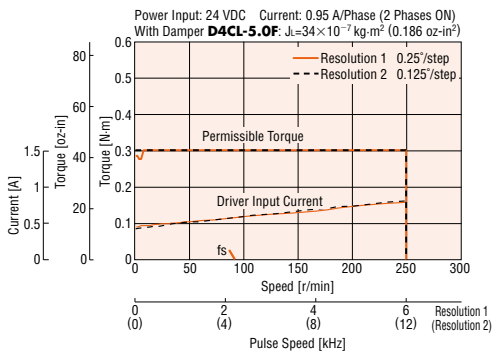
Notes:

● Backlash value is approximately 1 to 2°.

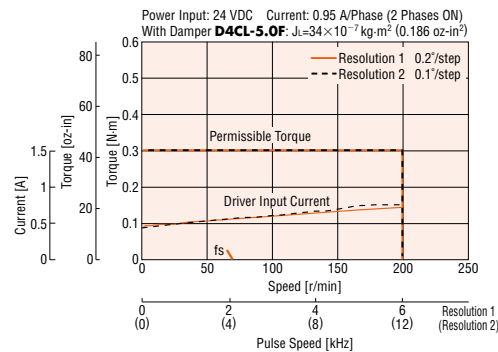
● Direction of rotation of the motor and that of the gear output shaft are the same for gear ratios 7.2:1 and 36:1. It is the opposite for 9:1, 10:1 and 18:1 gear ratios.

Speed – Torque Characteristics fs: Maximum Starting Frequency

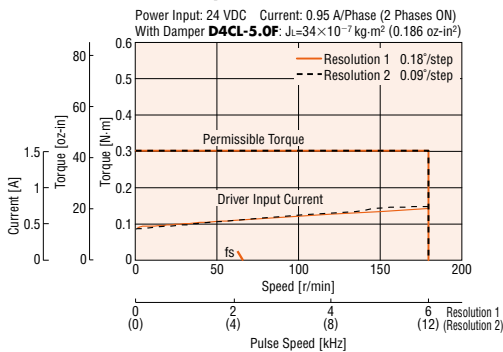
CMK223AP-SG7.2/CMK223BP-SG7.2



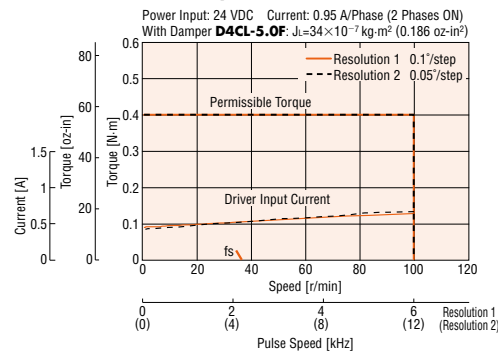
CMK223AP-SG9/CMK223BP-SG9



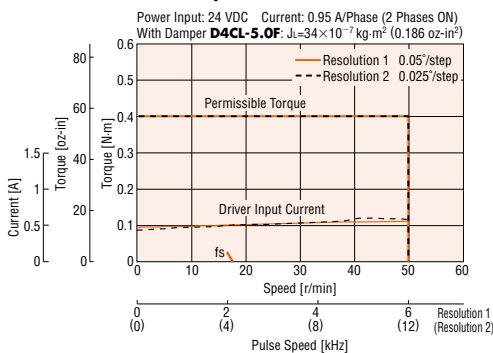
CMK223AP-SG10/CMK223BP-SG10



CMK223AP-SG18/CMK223BP-SG18



CMK223AP-SG36/CMK223BP-SG36



● The pulse input circuit responds to approximately 100 kHz with a pulse duty of 50%.

Notes:

● Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F).

● The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 40%.

SH Geared Type Motor Frame Size 42 mm (1.65 in.)

Specifications RoHS

Model	Single Shaft	CMK243APA-SG3.6	CMK243APA-SG7.2	CMK243APA-SG9	CMK243APA-SG10	CMK243APA-SG18	CMK243APA-SG36
	Double Shaft	CMK243BPA-SG3.6	CMK243BPA-SG7.2	CMK243BPA-SG9	CMK243BPA-SG10	CMK243BPA-SG18	CMK243BPA-SG36
Maximum Holding Torque ^{*1}	N·m (lb·in)	0.2 (1.77)	0.4 (3.5)	0.5 (4.4)	0.56 (4.9)	0.8 (7)	
Rotor Inertia	J: kg·m ² (oz·in ²)	35 × 10 ⁻⁷ (0.191)					
Rated Current	A/Phase	0.95					
Basic Step Angle		0.5°	0.25°	0.2°	0.18°	0.1°	0.05°
Gear Ratio		3.6:1	7.2:1	9:1	10:1	18:1	36:1
Permissible Torque ^{*2}	N·m (lb·in)	0.2 (1.77)	0.4 (3.5)	0.5 (4.4)	0.56 (4.9)	0.8 (7)	
Permissible Speed Range	r/min	0~500	0~250	0~200	0~180	0~100	0~50
Power Source		24 VDC ± 10% 1.5 A					
Excitation Mode		Microstep					
Mass	Motor	kg (lb.)					
	Driver	0.35 (0.77)					
Dimension No.	Motor	8					
	Driver	10					

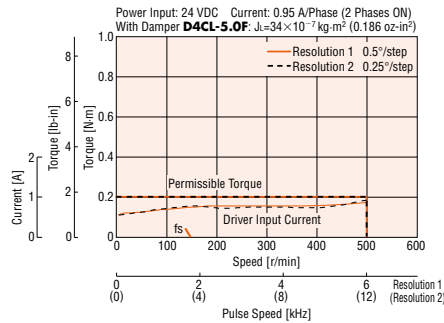
- *1 The holding torque (2-phase excitation) is the maximum holding power (torque) the stepping motor has when power is being supplied but the motor shaft is not rotating (rated current). At motor standstill, the driver's automatic current cutback function reduces the maximum holding torque by approximately 40%.
- *2 The permissible torque represents the torque value limited by the mechanical strength of the gear when operated at a constant speed. The total torque including acceleration/deceleration torque should not exceed this value.

Notes:

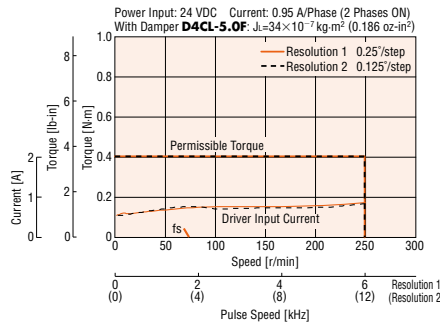
- Backlash value is approximately 1 to 2°.
- Direction of rotation of the motor and that of the gear output shaft are the same for gear ratios 3.6:1, 7.2:1, 9:1 and 10:1. It is the opposite for 18:1 and 36:1 gear ratios.

Speed – Torque Characteristics fs: Maximum Starting Frequency

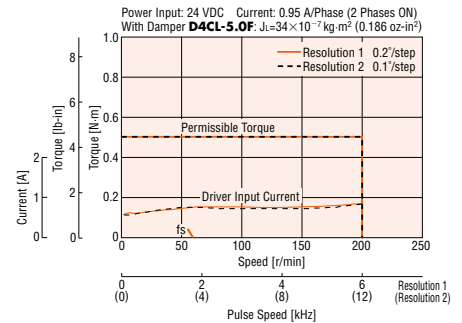
CMK243APA-SG3.6/ CMK243BPA-SG3.6



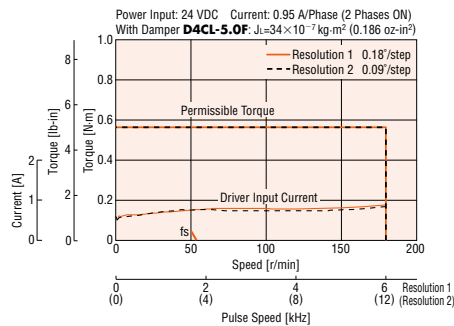
CMK243APA-SG7.2/ CMK243BPA-SG7.2



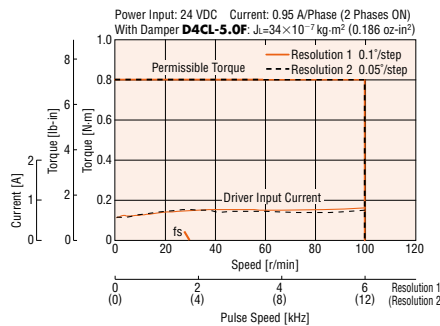
CMK243APA-SG9/ CMK243BPA-SG9



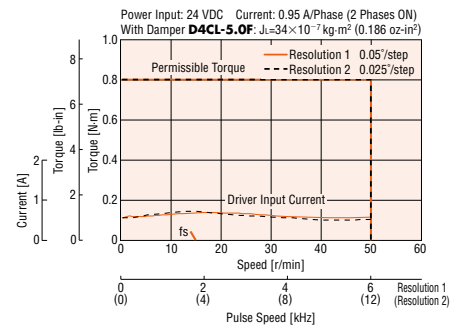
CMK243APA-SG10/ CMK243BPA-SG10



CMK243APA-SG18/ CMK243BPA-SG18



CMK243APA-SG36/ CMK243BPA-SG36



- The pulse input circuit responds to approximately 100 kHz with a pulse duty of 50%.

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F).
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 40%.

SH Geared Type Motor Frame Size 60 mm (2.36 in.)

Specifications RoHS

Model	Single Shaft	CMK264APA-SG3.6	CMK264APA-SG7.2	CMK264APA-SG9	CMK264APA-SG10	CMK264APA-SG18	CMK264APA-SG36
	Double Shaft	CMK264BPA-SG3.6	CMK264BPA-SG7.2	CMK264BPA-SG9	CMK264BPA-SG10	CMK264BPA-SG18	CMK264BPA-SG36
Maximum Holding Torque*1	N·m (lb·in)	1 (8.8)	2 (17.7)	2.5 (22)	2.7 (23)	3 (26)	4 (35)
Rotor Inertia	J: kg·m ² (oz·in ²)	120 × 10 ⁻⁷ (0.66)					
Rated Current	A/Phase	2					
Basic Step Angle		0.5°	0.25°	0.2°	0.18°	0.1°	0.05°
Gear Ratio		3.6:1	7.2:1	9:1	10:1	18:1	36:1
Permissible Torque*2	N·m (lb·in)	1 (8.8)	2 (17.7)	2.5 (22)	2.7 (23)	3 (26)	4 (35)
Permissible Speed Range	r/min	0~500	0~250	0~200	0~180	0~100	0~50
Power Source		24 VDC ± 10% 2.9 A					
Excitation Mode		Microstep					
Mass	Motor	kg (lb.)					
	Driver	0.75 (1.65)					
Dimension No.	Motor	9					
	Driver	10					

*1 The holding torque (2-phase excitation) is the maximum holding power (torque) the stepping motor has when power is being supplied but the motor shaft is not rotating (rated current). At motor standstill, the driver's automatic current cutback function reduces the maximum holding torque by approximately 40%.

*2 The permissible torque represents the torque value limited by the mechanical strength of the gear when operated at a constant speed. The total torque including acceleration/deceleration torque should not exceed this value.

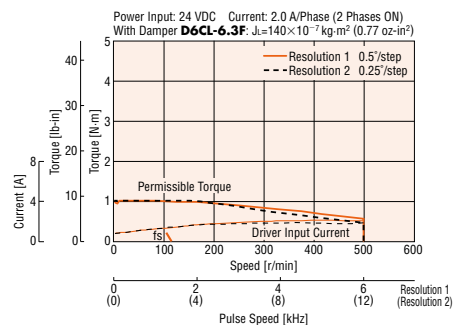
Notes:

● Backlash value is approximately 1 to 2°.

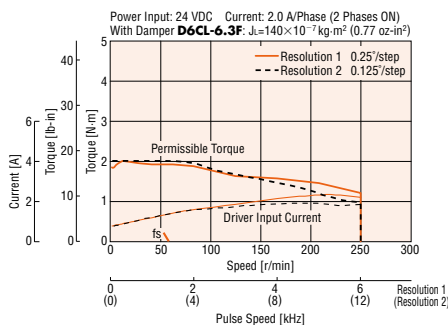
● Direction of rotation of the motor and that of the gear output shaft are the same for gear ratios 3.6:1, 7.2:1, 9:1 and 10:1. It is the opposite for 18:1 and 36:1 gear ratios.

Speed – Torque Characteristics fs: Maximum Starting Frequency

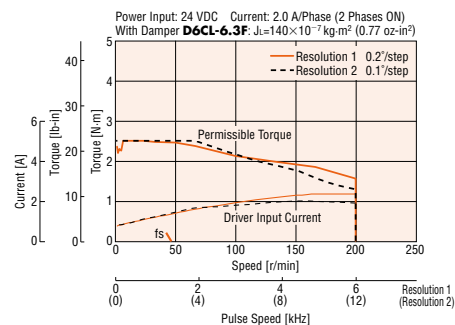
CMK264APA-SG3.6/ CMK264BPA-SG3.6



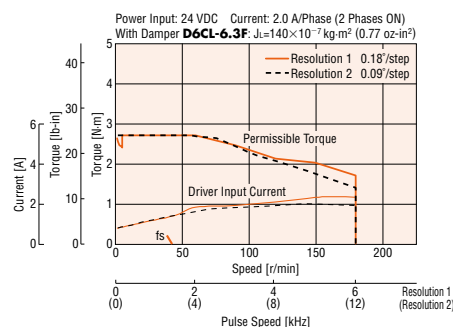
CMK264APA-SG7.2/ CMK264BPA-SG7.2



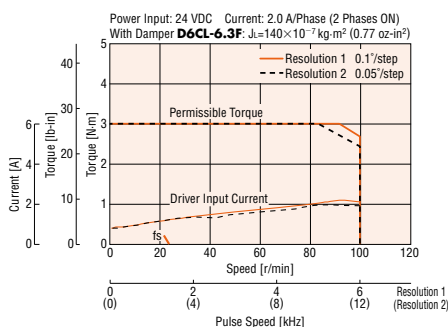
CMK264APA-SG9/ CMK264BPA-SG9



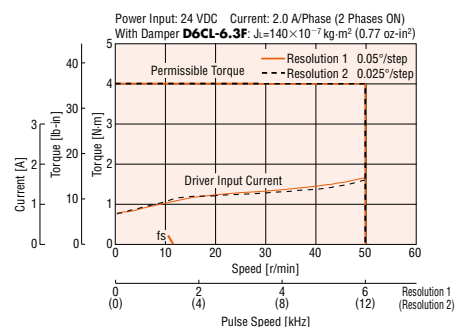
CMK264APA-SG10/ CMK264BPA-SG10



CMK264APA-SG18/ CMK264BPA-SG18



CMK264APA-SG36/ CMK264BPA-SG36



● The pulse input circuit responds to approximately 100 kHz with a pulse duty of 50%.

Notes:

● Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F).

● The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 40%.

Driver Specifications

Input Signal	Input Mode	Photocoupler input Pulse (CW pulse) signal/Rotation direction (CCW pulse) signal: Input resistance 200 Ω, Input current 5~20 mA Photocoupler ON: +3~5.25 V Photocoupler OFF: 0~+1 V (Voltage between terminals) All windings off signal/Step angle select signal/Automatic current cutback release signal: Input resistance 3.3 kΩ, Input current 1 mA (5 VDC)/8 mA (24 VDC) Photocoupler ON: +4.5~26.4 V Photocoupler OFF: 0~+1 V (Voltage between terminals)
	Pulse Signal (CW Pulse Signal)	Operation command pulse signal (CW direction operation command pulse signal when in 2-pulse input mode) Negative logic pulse input Pulse width: 5 μs minimum; Pulse rise/fall: 2 μs maximum Pulse duty: 50% and below The motor moves one step when the pulse input is switched from ON to OFF. Maximum input pulse frequency: 100 kHz (When the pulse duty is 50%)
	Rotation Direction Signal (CCW Pulse Signal)	Rotation direction signal (CCW direction operation command pulse signal when in 2-pulse input mode Photocoupler ON: CW, Photocoupler OFF: CCW) Negative logic pulse input Pulse width: 5 μs minimum; Pulse rise/fall: 2 μs maximum Pulse duty: 50% and below The motor moves one step when the pulse input is switched from ON to OFF. Maximum input pulse frequency: 100 kHz (When the pulse duty is 50%)
	All Windings Off Signal	When in the "photocoupler ON" state, the output current to the motor is cut off and the motor shaft can be rotated by external force. When in the "photocoupler OFF" state, the output current to the motor is turned on.
	Step Angle Select Signal	When in the "photocoupler ON" state, the motor operates at the basic step angle regardless of the settings of the step angle setting switches. When in the "photocoupler OFF" state, the motor operates at the step angle set by the step angle setting switches.
	Automatic Current Cutback Release Signal	When in the "photocoupler ON" state, the automatic current cutback function will not be activated even after the motor stops. When in the "photocoupler OFF" state, the automatic current cutback function will be activated after the motor stops (after approx. 100 ms).
Output Signal	Output Mode	Photocoupler, Open-collector output External use condition: 24 VDC maximum, 10 mA maximum
	Excitation Timing Signal	The signal is output when the excitation sequence is at STEP "0." (Photocoupler: ON) • High-torque type, standard type Example) 1.8°/step (resolution 1): signal output every 4 pulses 0.45°/step (resolution 4): signal output every 16 pulses • High-resolution type Example) 0.9°/step (resolution 1): signal output every 4 pulses 0.225°/step (resolution 4): signal output every 16 pulses • SH geared type (gear ratio 18:1) Example) 0.1°/step (resolution 1): signal output every 4 pulses 0.025°/step (resolution 4): signal output every 16 pulses
Function		Automatic current cutback, Step angle select, Pulse input mode switch, All windings off, Excitation timing
Cooling Method		Natural ventilation

General Specifications

Specifications		Motor	Driver
Insulation Class		Class B [130°C (266°F)]	—
Insulation Resistance		100 MΩ or more when 500 VDC megger is applied between the windings and the case under normal ambient temperature and humidity.	—
Dielectric Strength		Sufficient to withstand 1.0 kV at 50 Hz or 60 Hz applied between the windings and the case for 1 minute under normal ambient temperature and humidity. [0.5 kV for models with frame size 42 mm (1.65 in.) or smaller]	—
Operating Environment (In operation)	Ambient Temperature	-10~+50°C (+14~+122°F) (non-freezing)	0~+40°C (+32~+104°F) (non-freezing)
	Ambient Humidity	85% or less (non-condensing)	
	Atmosphere	No corrosive gases, dust, water or oil	
Temperature Rise		Temperature rise of windings are 80°C (144°F) or less measured by the resistance change method (at rated voltage, at standstill, two phases excited)	—
Stop Position Accuracy*1		±3 arc minutes (±0.05°)	—
Shaft Runout		0.05 mm (0.002 in.) T.I.R.*4	—
Radial Play*2		0.025 mm (0.001 in.) maximum of 5 N (1.12 lb.)	—
Axial Play*3		0.075 mm (0.003 in.) maximum of 10 N (2.2 lb.)	—
Concentricity		0.075 mm (0.003 in.) T.I.R.*4	—
Perpendicularity		0.075 mm (0.003 in.) T.I.R.*4	—

*1 This value is for full step under no load. (The value changes with the size of the load.)

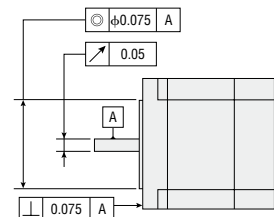
*2 Radial Play: Displacement in shaft position in the radial direction, when a 5 N (1.12 lb.) load is applied in the vertical direction to the tip of the motor's shaft.

*3 Axial Play: Displacement in shaft position in the axial direction, when a 10 N (2.2 lb.) load is applied to the motor's shaft in the axial direction.

*4 T.I.R. (Total Indicator Reading): The total dial gauge reading when the measurement section is rotated one revolution centered on the reference axis center.

Note:

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



Permissible Overhung Load and Permissible Thrust Load

Unit = N (lb.)

Type	Model	Permissible Overhung Load Distance from Shaft End mm (in.)					Permissible Thrust Load	
		0	5 (0.2)	10 (0.39)	15 (0.59)	20 (0.79)		
High-Torque Type	CMK223P □P CMK224P □P CMK225P □P	25 (5.6)	34 (7.6)	52 (11.7)	–	–	The permissible thrust load shall be no greater than the motor mass.	
	CMK233P □P CMK235P □P	20 (4.5)	25 (5.6)	34 (7.6)	52 (11.7)	–		
	CMK244P □P CMK246P □P	20 (4.5)	25 (5.6)	34 (7.6)	52 (11.7)	–		
High-Resolution Type	CMK243M □PA CMK244M □PA CMK245M □PA	20 (4.5)	25 (5.6)	34 (7.6)	52 (11.7)	–		
	CMK264M □P CMK266M □P CMK268M □P	54 (12.1)	67 (15)	89 (20)	130 (29)	–		
	Standard Type	CMK243 □PA CMK244 □PA CMK245 □PA	20 (4.5)	25 (5.6)	34 (7.6)	52 (11.7)		–
CMK256 □P CMK258 □P		54 (12.1)	67 (15)	89 (20)	130 (29)	–		
CMK264 □P CMK266 □P CMK268 □P		54 (12.1)	67 (15)	89 (20)	130 (29)	–		
SH Geared Type	CMK223 □P-SG7.2 CMK223 □P-SG9 CMK223 □P-SG10 CMK223 □P-SG18 CMK223 □P-SG36	15 (3.3)	17 (3.8)	20 (4.5)	23 (5.1)	–		10 (2.2)
	CMK243 □PA-SG3.6 CMK243 □PA-SG7.2 CMK243 □PA-SG9 CMK243 □PA-SG10 CMK243 □PA-SG18 CMK243 □PA-SG36	10 (2.2)	15 (3.3)	20 (4.5)	30 (6.7)	–		15 (3.3)
	CMK264 □PA-SG3.6 CMK264 □PA-SG7.2 CMK264 □PA-SG9 CMK264 □PA-SG10	30 (6.7)	40 (9)	50 (11.2)	60 (13.5)	70 (15.7)	30 (6.7)	
	CMK264 □PA-SG18 CMK264 □PA-SG36	80 (18)	100 (22)	120 (27)	140 (31)	160 (36)		

● Enter **A** (single shaft) or **B** (double shaft) in the box (□) within the model name.

System Configuration

Product Line

Specifications, Characteristics

Dimensions

Connection and Operation

Motor and Driver Combinations

Accessories

Controllers

Dimensions Unit = mm (inch)

● Motor

◇ High-Torque Type

1 □ 28 mm (□ 1.10 in.)

Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
CMK223PAP	PK223PA	32	—	0.11	B326
CMK223PBP	PK223PB	(1.26)	42 (1.65)	(0.24)	
CMK224PAP	PK224PA	40	—	0.14	B327
CMK224PBP	PK224PB	(1.57)	50 (1.97)	(0.31)	
CMK225PAP	PK225PA	51.5	—	0.2	B328
CMK225PBP	PK225PB	(2.03)	61.5 (2.42)	(0.44)	

Motor lead wire/connector assembly of 0.6 m (2 ft.) is included with the package. UL Style 3265, AWG24

If you are purchasing only a motor for maintenance purpose, etc., motor lead wire/connector assembly and connector will not be supplied. They must be purchased separately.

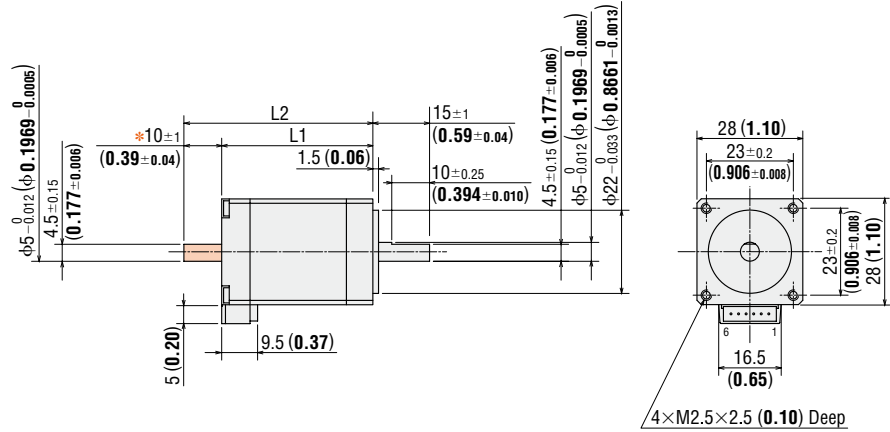
→ Page 30

● Applicable Connector

Connector housing: 51065-0600 (MOLEX)

Contact: 50212-8100 (MOLEX)

Crimp tool: 57176-5000 (MOLEX)



*The length of machining on double shaft model is $10_{\pm 0.25}$ (0.394 ± 0.010).

2 □ 35 mm (□ 1.38 in.)

Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
CMK233PAP	PK233PA	37	—	0.18	B329
CMK233PBP	PK233PB	(1.46)	52 (2.05)	(0.4)	
CMK235PAP	PK235PA	52	—	0.285	B330
CMK235PBP	PK235PB	(2.05)	67 (2.64)	(0.63)	

Motor lead wire/connector assembly of 0.6 m (2 ft.) is included with the package. UL Style 3265, AWG24

If you are purchasing only a motor for maintenance purpose, etc., motor lead wire/connector assembly and connector will not be supplied. They must be purchased separately.

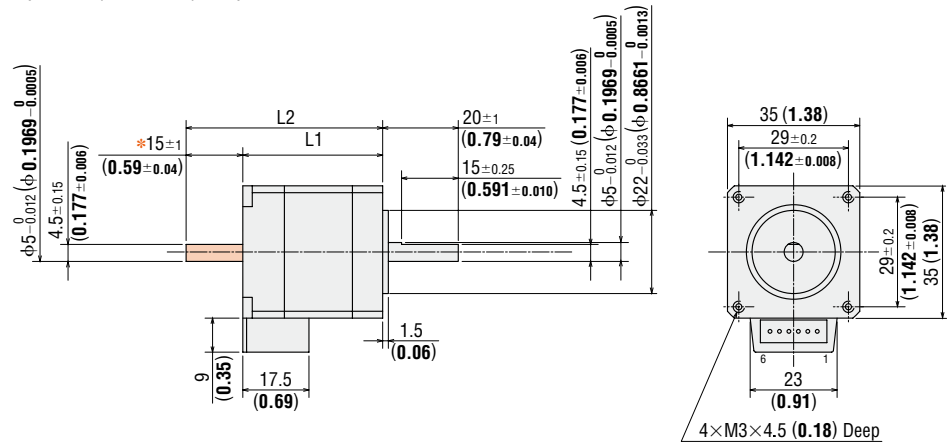
→ Page 30

● Applicable Connector

Connector housing: 51103-0600 (MOLEX)

Contact: 50351-8100 (MOLEX)

Crimp tool: 57295-5000 (MOLEX)



*The length of machining on double shaft model is $15_{\pm 0.25}$ (0.591 ± 0.010).

● These dimensions are for double shaft models. For single shaft models, ignore the shaded (■) areas.

3 □42 mm (□1.65 in.)

Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
CMK244PAP	PK244PA	39	—	0.3	B331
CMK244PBP	PK244PB	(1.54)	54 (2.13)	(0.66)	
CMK246PAP	PK246PA	59	—	0.5	B332
CMK246PBP	PK246PB	(2.32)	74 (2.91)	(1.1)	

Motor lead wire/connector assembly of 0.6 m (2 ft.) is included with the package. UL Style 3265, AWG24

If you are purchasing only a motor for maintenance purpose, etc., motor lead wire/connector assembly and connector will not be supplied. They must be purchased separately.

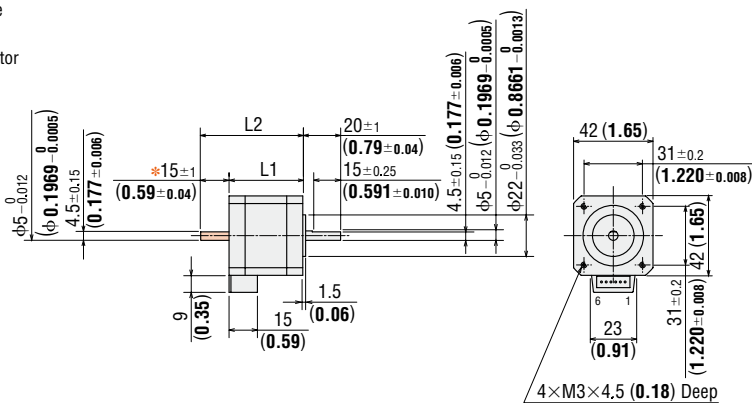
→ Page 30

● Applicable Connector

Connector housing: 51103-0600 (MOLEX)

Contact: 50351-8100 (MOLEX)

Crimp tool: 57295-5000 (MOLEX)

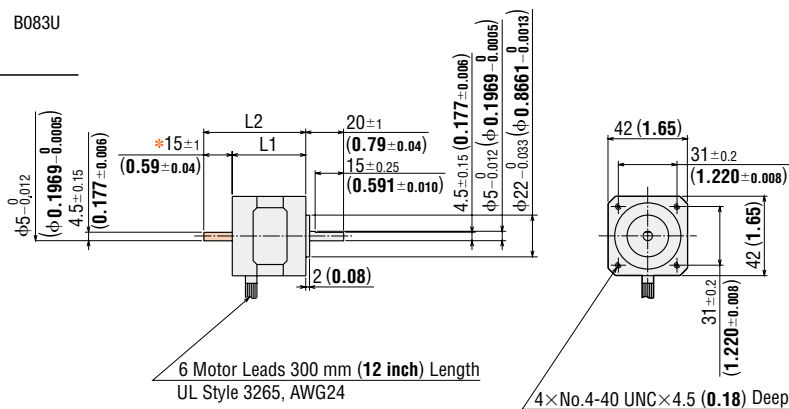


*The length of machining on double shaft model is $15 \pm 0.25 (0.591 \pm 0.010)$.

◇ High-Resolution Type, Standard Type

4 □42 mm (□1.65 in.)

Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
CMK243APA	PK243-01AA	33 (1.3)	—	0.21 (0.46)	B081U
CMK243MAPA	PK243MAA			0.24 (0.53)	
CMK243BPA	PK243-01BA	39 (1.54)	48 (1.89)	0.21 (0.46)	B082U
CMK243MBPA	PK243MBA			0.24 (0.53)	
CMK244APA	PK244-01AA	39 (1.54)	—	0.27 (0.59)	B082U
CMK244MAPA	PK244MAA			0.3 (0.66)	
CMK244BPA	PK244-01BA	47 (1.85)	54 (2.13)	0.27 (0.59)	B083U
CMK244MBPA	PK244MBA			0.3 (0.66)	
CMK245APA	PK245-01AA	47 (1.85)	—	0.35 (0.77)	B083U
CMK245MAPA	PK245MAA			0.37 (0.81)	
CMK245BPA	PK245-01BA	47 (1.85)	62 (2.44)	0.35 (0.77)	B083U
CMK245MBPA	PK245MBA			0.37 (0.81)	



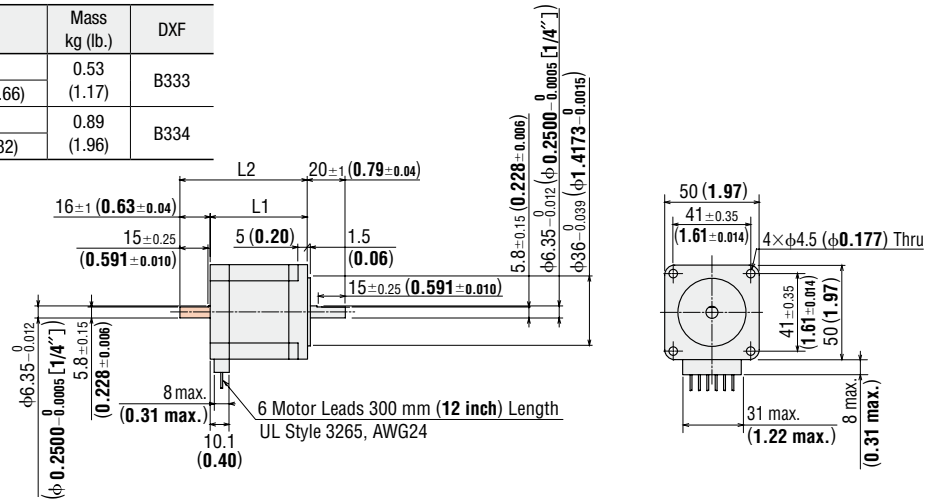
*The length of machining on double shaft model is $15 \pm 0.25 (0.591 \pm 0.010)$.

● These dimensions are for double shaft models. For single shaft models, ignore the shaded (■) areas.

◇ Standard Type

5 50 mm (1.97 in.)

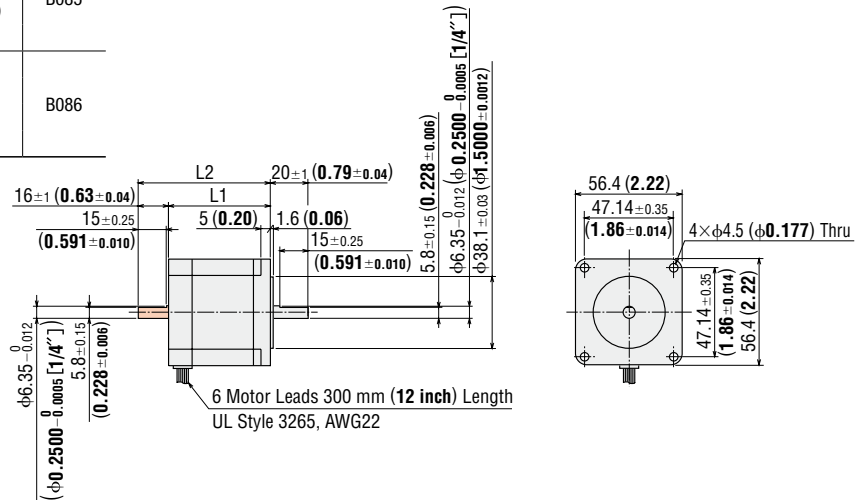
Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
CMK256AP	PK256-02A	51.5 (2.03)	—	0.53 (1.17)	B333
CMK256BP	PK256-02B		67.5 (2.66)		
CMK258AP	PK258-02A	81 (3.19)	—	0.89 (1.96)	
CMK258BP	PK258-02B		97 (3.82)		



◇ High-Resolution Type, Standard Type

6 56.4 mm (2.22 in.)

Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
CMK264AP	PK264-02A	39 (1.54)	—	0.45 (0.99)	B084
CMK264MAP	PK264MA				
CMK264BP	PK264-02B		55 (2.17)		
CMK264MBP	PK264MB				
CMK266AP	PK266-02A	54 (2.13)	—	0.7 (1.54)	B085
CMK266MAP	PK266MA				
CMK266BP	PK266-02B		70 (2.76)		
CMK266MBP	PK266MB				
CMK268AP	PK268-02A	76 (2.99)	—	1.0 (2.2)	B086
CMK268MAP	PK268MA				
CMK268BP	PK268-02B		92 (3.62)		
CMK268MBP	PK268MB				



● These dimensions are for double shaft models. For single shaft models, ignore the shaded (■) areas.

◇ SH Geared Type

7 □ 28 mm (□ 1.10 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
CMK223AP-SG □	PK223PA-SG □	7.2, 9, 10, 18, 36	0.16 (0.35)	B335
CMK223BP-SG □	PK223PB-SG □			

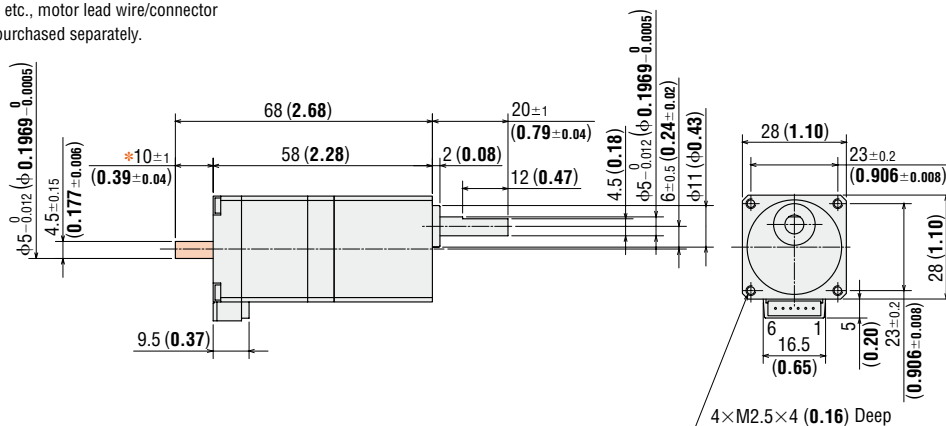
● Enter the gear ratio in the box (□) within the model name.

Motor lead wire/connector assembly of 0.6 m (2 ft.) is included with the package. UL Style 3265, AWG24

If you are purchasing only a motor for maintenance purpose, etc., motor lead wire/connector assembly and connector will not be supplied. They must be purchased separately.

→ Page 30

- Screws (Included)
M2.5 Length 8 mm (0.31 in.) ... 4 Pieces
- Applicable Connector
Connector housing: 51065-0600 (MOLEX)
Contact: 50212-8100 (MOLEX)
Crimp tool: 57176-5000 (MOLEX)



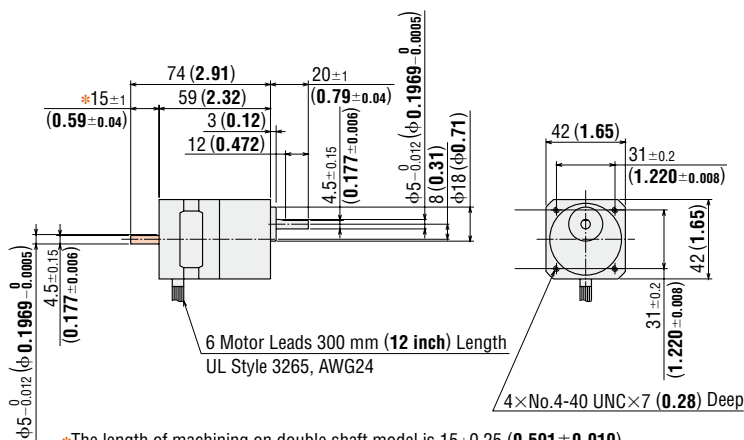
*The length of machining on double shaft model is 10±0.25 (0.394±0.010).

8 □ 42 mm (□ 1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
CMK243APA-SG □	PK243A1A-SG □	3.6, 7.2, 9, 10, 18, 36	0.35 (0.77)	B091U
CMK243BPA-SG □	PK243B1A-SG □			

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

- Screws (Included)
No.4-40 UNC 10 mm (0.39 in.)



*The length of machining on double shaft model is 15±0.25 (0.591±0.010).

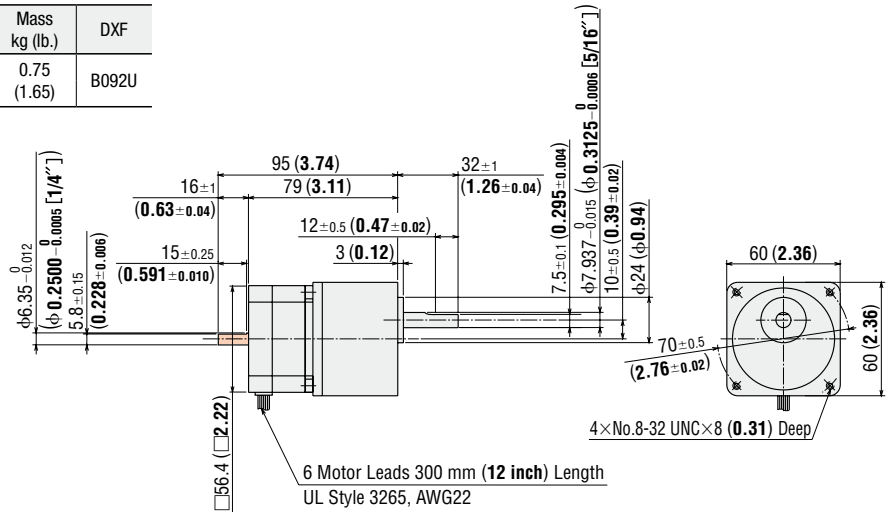
● These dimensions are for double shaft models. For single shaft models, ignore the shaded (□) areas.

9 60 mm (2.36 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
CMK264APA-SG <input type="checkbox"/>	PK264A2A-SG <input type="checkbox"/>	3.6, 7.2, 9, 10,	0.75	B092U
CMK264BPA-SG <input type="checkbox"/>	PK264B2A-SG <input type="checkbox"/>	18, 36	(1.65)	

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

● Screws (Included)
No.8-32 UNC 15.8 mm (0.62 in.)

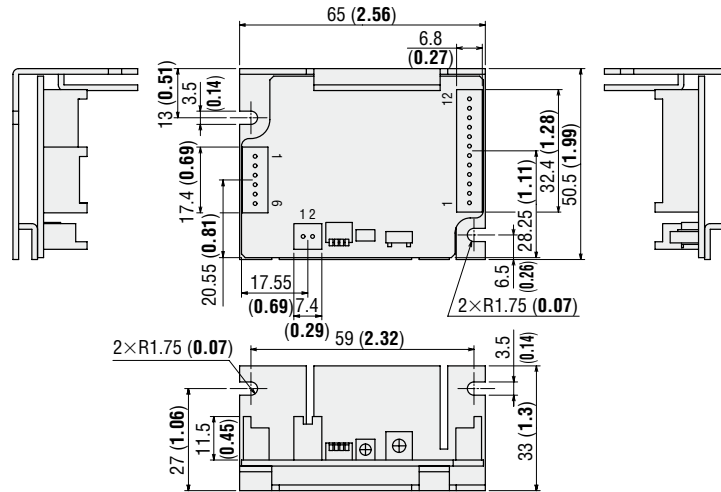


● This dimension is for double shaft models. For single shaft models, ignore the shaded () areas.

● Driver

10 Driver Model: CMD2109P, CMD2112P, CMD2120P

Mass: 0.05 kg (0.11 lb.) **DXF** B441



- Connector Housing (Included)
51103-0200 (MOLEX)
51103-1200 (MOLEX)
51103-0600 (MOLEX)
- Contact (Included)
50351-8100 (MOLEX)

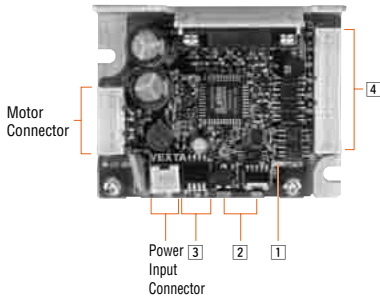
Note:

● Use the included connector for power supply, signal and motor. When assembling the connectors, use the hand-operated crimp tool [57295-5000 (MOLEX)]. The crimp tool is not included with the package. It must be purchased separately.

Driver lead wire set crimped with connector (sold separately) is available. → Page 30

Connection and Operation

Names and Functions of Driver Parts



1 Power Input Display

Color	Function	When Activated
Green	Power supply indication	Lights when power is on.

2 Current Adjustment Switch

Indication	Switch Name	Function
RUN	Motor run current switch	For adjusting the motor running current
STOP	Motor stop current potentiometer	For adjusting the current at motor standstill

3 Function Select Switch

Indication	Switch Name	Function
1	Pulse input mode switch	Switches between 1-pulse input and 2-pulse input.
2, 3, 4	Step angle setting switch	These switches can be set to the desired resolution from the five resolution levels.

Step Angle Setting Switch

SW-2	SW-3	SW-4	Microstep/Step	Resolution	Step Angle
OFF	OFF	OFF	1	200	1.8°
OFF	OFF	ON	2	400	0.9°
OFF	ON	OFF	4	800	0.45°
OFF	ON	ON	8	1600	0.225°
ON	OFF	OFF	16	3200	0.1125°

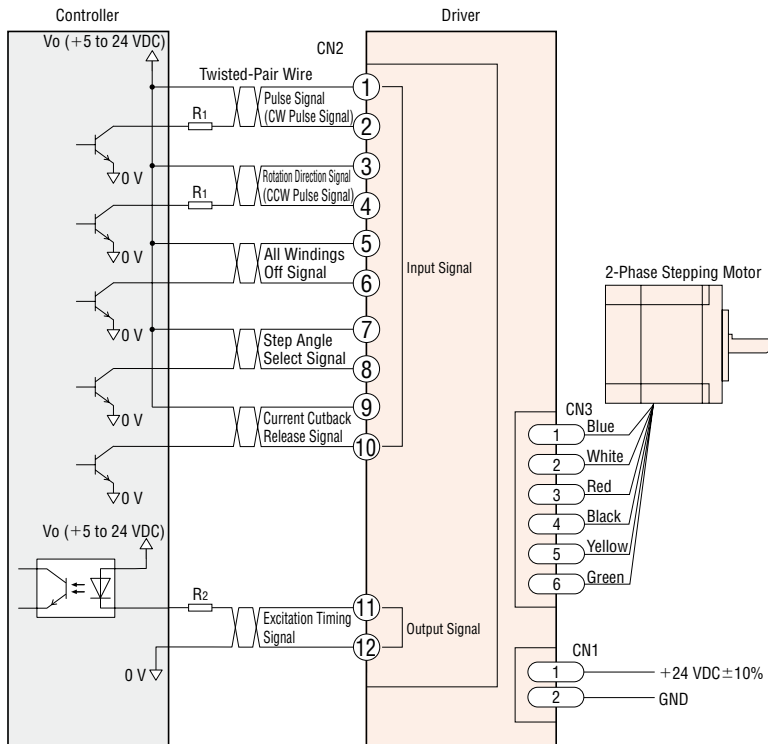
Notes:

- Use of any setting other than the combinations listed in the table will automatically set the microstep to "1" and the motor will operate at the basic step angle.
- The step angle is calculated by dividing the basic step angle by the number of microsteps. The above figures are based on a basic step angle of 1.8°.
- With the high-resolution type, the basic step angle and resolution are 0.9° and 400 respectively.
- The step angle set with the step angle setting switches will become effective when the "Step Angle Select" (CS) signal input is OFF.
- Do not change the CS (step angle select) signal input or step angle setting switches while the motor is operating. It may cause the motor to misstep and stop. Change the step angle setting switches, when the "Step Angle Select" signal input is OFF and the "Excitation Timing" signal output is ON.

4 Input/Output Signal

Indication	Input/Output	Pin No.	Signal Name	Function
CN2	Input signal	1	Pulse signal (CW pulse signal)	Operation command pulse signal (The motor will rotate in the CW direction when in 2-pulse input mode.)
		2		
		3	Rotation direction signal (CCW pulse signal)	Rotation direction signal Photocoupler OFF: CCW, Photocoupler ON: CW (The motor will rotate in the CCW direction when in 2-pulse input mode.)
		4		
		5	All windings off signal	Cuts the output current to the motor and allows the motor shafts to be rotated by external force.
		6		
		7	Step angle select signal	The motor will operate at the basic step angle regardless of the settings of the step angle setting switches.
		8		
		9	Automatic current cutback release signal	This signal is used to disable the automatic current cutback function.
		10		
Output signal		11	Excitation timing signal	Outputs signals when the excitation sequence is at STEP "0."
		12		

● Connection Diagrams



◇ Input Signal Connection

● Pulse (CW) Signal/Rotation Direction (CCW) Signal
Signals can be connected directly when 5 VDC is supplied. When the voltage exceeds 5 VDC, connect an external resistor (R_1) to keep input current at 20 mA or less. When 5 VDC or more is supplied without the external resistor, the internal components get damaged.

Example: If the voltage is 24 VDC, connect a resistor (R_1) of 1.5 to 2.2 k Ω and 0.5 W or more.

● All Windings Off Signal/Step Angle Select Signal/Automatic Current Cutback Release Signal

Signals can be connected directly when 5 to 24 VDC is supplied.

◇ Output Signal Connection

Use the output signal at 24 VDC or less and 10 mA or less. If these specifications are exceeded, the internal components may get damaged. Check the specification of the connected equipment. If the current exceeds 10 mA, connect an external resistor R_2 .

◇ Power Supply

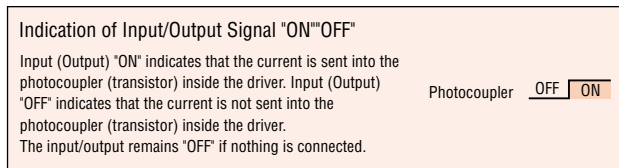
Use a power supply that can supply sufficient input current. When power supply capacity is insufficient, a decrease in motor output can cause the following malfunctions:

- Motor does not rotate properly at high-speed.
- Slow motor startup and stopping

◇ Notes on Wiring

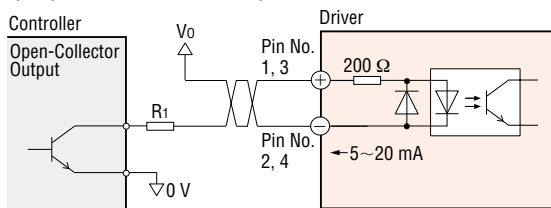
- Use twisted-pair wires of AWG24 to 22 (0.2 to 0.3 mm²) and 2 m (6.6 ft.) or less in length for the signal lines.
- Note that as the length of the pulse signal line increases, the maximum transmission frequency decreases.
- Use wires of AWG22 (0.3 mm²) for power supply lines. When assembling the connectors, use the hand-operated crimp tool or driver lead wire set crimped with connector (sold separately). The crimp tool is not included with the package. It must be purchased separately.
- Signal lines should be kept at least 2 cm (0.79 in.) away from power lines (power supply lines and motor lines). Do not run the signal lines in the same duct as power lines or bundle them together.
- If noise generated by the motor cable or power supply cable causes a problem, try shielding the cables or insert ferrite cores.
- Incorrect connection of DC power input will lead to driver (circuit) damage. Make sure that the polarity is correct before turning power on.

● Description of Input/Output Signals



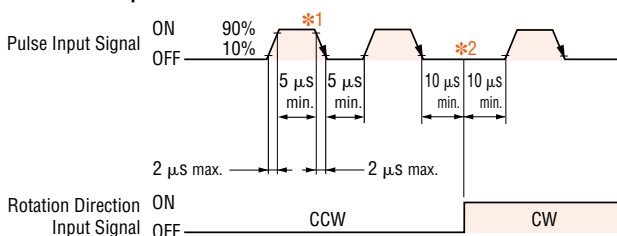
Pulse (CW) and Rotation Direction (CCW) Input Signal

◇ Input Circuit and Sample Connection

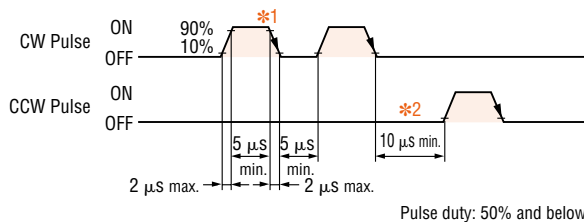


◇ Pulse Waveform Characteristics

● 1-Pulse Input Mode



● 2-Pulse Input Mode



*1 The shaded area indicates when the photocoupler diode is ON. The motor moves when the photocoupler state changes from ON to OFF.

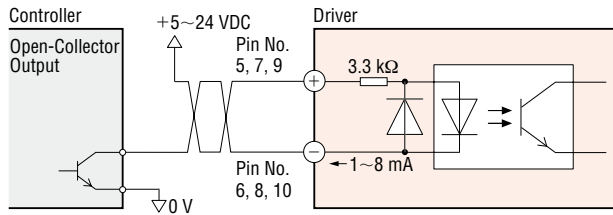
*2 The minimum interval time when changing rotation direction 10 μ s is shown as a response time of circuit. This value varies greatly depending on the motor type and load inertia.

◇ Pulse Signal Characteristics

- Keep the "Pulse" signal at the "photocoupler OFF" state when no pulses are being input.
- In 1-pulse input mode, leave the "Pulse" signal at rest ("OFF") when changing rotation directions.
- In 2-pulse input mode, do not input a CW pulse and CCW pulse simultaneously.

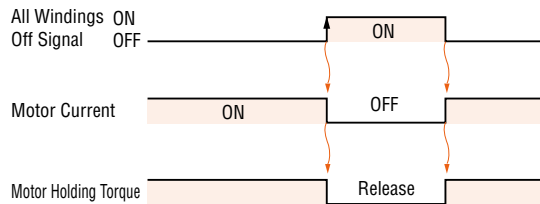
All Windings Off (AWO)/Step Angle Select (CS)/Automatic Current Cutback Release (ACDOFF) Input Signal

◇ Input Circuit and Sample Connection



◇ All Windings Off (AWO) Input Signal

- Inputting this signal puts the motor in a non-excitation (free) state.
- This signal is used when moving the motor by external force or perform positioning manually. The photocoupler must be "OFF" when operating the motor.



The shaded area indicates that the motor provides holding torque in proportion to standstill current set by STOP potentiometer.

- Switching the "All Windings Off" signal from "photocoupler ON" to "photocoupler OFF" does not alter the excitation sequence. When the motor shaft is manually adjusted with the "All Windings Off" signal input, the shaft will shift up to $\pm 3.6^\circ$ (geared type: $\pm 3.6^\circ$ /gear ratio) from the position set after the "All Windings Off" signal is released.

◇ Step Angle Select (CS) Input Signal

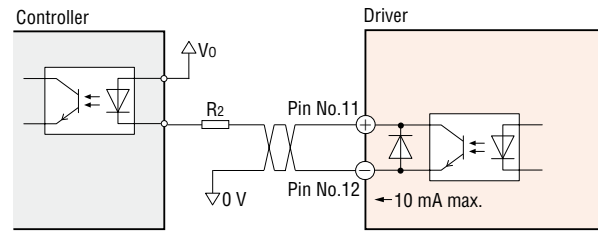
- When this signal input is "ON," the motor will operate at the basic step angle regardless of the settings of the step angle setting switches. When the signal input is "OFF," the motor will operate at the step angle set with the step angle setting switches.
- To change the step angle, do so when the "Excitation Timing" signal output is "ON" and the motor is at standstill.

◇ Automatic Current Cutback Release (ACDOFF) Input Signal

- When this signal is in the "photocoupler ON" state, the automatic current cutback function is disabled. When this signal is in the "photocoupler OFF" state, the automatic current cutback function will be activated after the motor stops (after approx. 100 ms).
- The photocoupler must be "OFF" when the motor is operating.

Excitation Timing (TIM) Output Signal

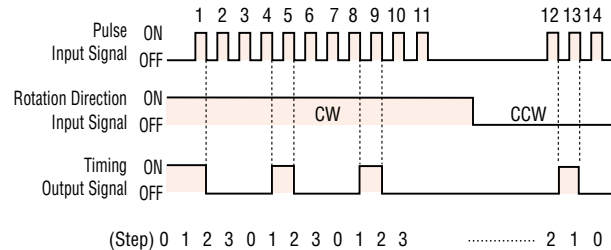
◇ Output Circuit and Sample Connection



- The "Excitation Timing" signal is output when the motor excitation is in the initial stage (step "0").
- The "Excitation Timing" signal is output simultaneously with a pulse input each time the excitation sequence returns to step "0." The excitation sequence will complete one cycle for every 7.2° (3.6° for high-resolution type) rotation of the motor output shaft. Microstep/step 1: Signal is output once every 4 pulses. Microstep/step 4: Signal is output once every 16 pulses.

Timing chart at 1.8° /step (microstep/step 1)

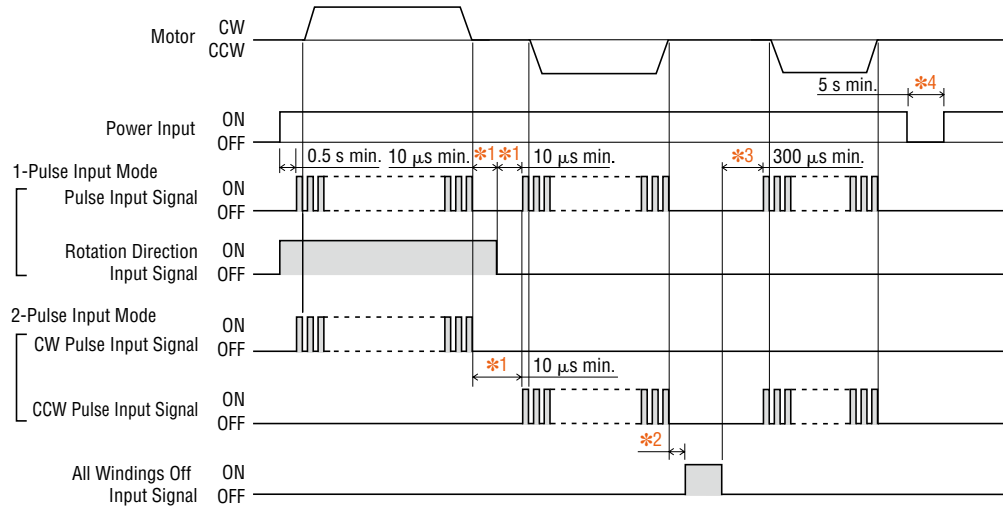
* When connected as shown in the sample connection, the signal will be "photocoupler ON" at step "0."



Notes:

- When power is turned on, the excitation sequence is reset to step "0" and the "Excitation Timing" signal will be output.
- When operating the motor using the "Excitation Timing" signal output, make sure the motor output shaft stops at an integral multiple of 7.2° (3.6° for high-resolution type).

● Timing Chart



The section indicates that the photocoupler diode is emitting light.

- *1 The minimum switching time to change rotation direction signal (1-pulse input mode), and switching time to change CW, CCW pulse (2-pulse input mode) 10 μs is shown as a response time of circuit. The motor may need more time.
- *2 Depends on load inertia, load torque and starting frequency.
- *3 Never input a pulse signal immediately after switching the "All Windings Off" signal to "photocoupler OFF." The motor may not start.
- *4 Wait at least five seconds before turning on the power again.

■ List of Motor and Driver Combinations

Model names for motor and driver combinations are shown below.

Type	Model	Motor Model	Driver Model	
High-Torque Type	CMK223PAP	PK223PA*	CMD2109P	
	CMK223PBP	PK223PB*		
	CMK224PAP	PK224PA*		
	CMK224PBP	PK224PB*		
	CMK225PAP	PK225PA*		
	CMK225PBP	PK225PB*		
	High-Torque Type	CMK233PAP	PK233PA*	CMD2112P
		CMK233PBP	PK233PB*	
		CMK235PAP	PK235PA*	
		CMK235PBP	PK235PB*	
		CMK244PAP	PK244PA*	
		CMK244PBP	PK244PB*	
		CMK246PAP	PK246PA*	
		CMK246PBP	PK246PB*	
High-Resolution Type	CMK243MAPA	PK243MAA	CMD2109P	
	CMK243MBPA	PK243MBA		
	CMK244MAPA	PK244MAA	CMD2112P	
	CMK244MBPA	PK244MBA		
	CMK245MAPA	PK245MAA		
	CMK245MBPA	PK245MBA		
	High-Resolution Type	CMK264MAP	PK264MA	CMD2120P
		CMK264MBP	PK264MB	
		CMK266MAP	PK266MA	
		CMK266MBP	PK266MB	
CMK268MAP		PK268MA		
CMK268MBP		PK268MB		
Standard Type	CMK243APA	PK243-01AA	CMD2109P	
	CMK243BPA	PK243-01BA		
	CMK244APA	PK244-01AA	CMD2112P	
	CMK244BPA	PK244-01BA		
	CMK245APA	PK245-01AA		
	CMK245BPA	PK245-01BA		
	Standard Type	CMK256AP	PK256-02A	CMD2120P
		CMK256BP	PK256-02B	
		CMK258AP	PK258-02A	
		CMK258BP	PK258-02B	
		CMK264AP	PK264-02A	
		CMK264BP	PK264-02B	
		CMK266AP	PK266-02A	
		CMK266BP	PK266-02B	
CMK268AP		PK268-02A		
CMK268BP		PK268-02B		

Type	Model	Motor Model	Driver Model	
SH Geared Type	CMK223AP-SG7.2	PK223PA-SG7.2*	CMD2109P	
	CMK223BP-SG7.2	PK223PB-SG7.2*		
	CMK223AP-SG9	PK223PA-SG9*		
	CMK223BP-SG9	PK223PB-SG9*		
	CMK223AP-SG10	PK223PA-SG10*		
	CMK223BP-SG10	PK223PB-SG10*		
	CMK223AP-SG18	PK223PA-SG18*		
	CMK223BP-SG18	PK223PB-SG18*		
	CMK223AP-SG36	PK223PA-SG36*		
	CMK223BP-SG36	PK223PB-SG36*		
	SH Geared Type	CMK243APA-SG3.6	PK243A1A-SG3.6	CMD2109P
		CMK243BPA-SG3.6	PK243B1A-SG3.6	
		CMK243APA-SG7.2	PK243A1A-SG7.2	
		CMK243BPA-SG7.2	PK243B1A-SG7.2	
		CMK243APA-SG9	PK243A1A-SG9	
		CMK243BPA-SG9	PK243B1A-SG9	
		CMK243APA-SG10	PK243A1A-SG10	
		CMK243BPA-SG10	PK243B1A-SG10	
		CMK243APA-SG18	PK243A1A-SG18	
		CMK243BPA-SG18	PK243B1A-SG18	
SH Geared Type	CMK264APA-SG3.6	PK264A2A-SG3.6	CMD2120P	
	CMK264BPA-SG3.6	PK264B2A-SG3.6		
	CMK264APA-SG7.2	PK264A2A-SG7.2		
	CMK264BPA-SG7.2	PK264B2A-SG7.2		
	CMK264APA-SG9	PK264A2A-SG9		
	CMK264BPA-SG9	PK264B2A-SG9		
	CMK264APA-SG10	PK264A2A-SG10		
	CMK264BPA-SG10	PK264B2A-SG10		
	CMK264APA-SG18	PK264A2A-SG18		
	CMK264BPA-SG18	PK264B2A-SG18		

- * If you are purchasing only a motor for maintenance purpose, etc., motor lead wire/connector assembly and connector will not be supplied. They must be purchased separately. An accessory motor lead wire/connector assembly is available.

→ Page 30

Accessories (Sold separately)

Motor Mounting Brackets RoHS

Mounting brackets are convenient for installation and securing a stepping motor and geared stepping motor.



Product Line

High-Torque Type, High-Resolution Type, Standard Type

Material: Aluminum alloy

Model	Applicable Product
PAFOP	CMK24 □ P □ P
PALOPA	CMK24 □ M □ PA CMK24 □□ PA
PAL2P-2	CMK26 □ M □ P CMK26 □□ P

- Enter the motor case length in the box (□) within the model name. Enter **A** (single shaft) or **B** (double shaft) in the box (□) within the model name.
- The mounting bracket base is built with holes large enough to allow for alignment adjustments in the horizontal direction.
- These mounting brackets can be perfectly fitted to the pilot of the stepping motors. (Except for **PALOPA**)

Note:

- They cannot be used with geared stepping motors.

SH Geared Type

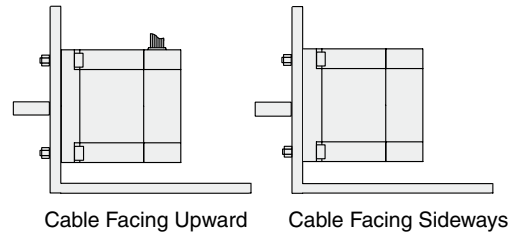
Material: Aluminum alloy

Model	Applicable Product
SOLOA-A	CMK243 □ PA-SG □
SOL2A-A	CMK264 □ PA-SG □

- Enter **A** (single shaft) or **B** (double shaft) in the box (□) within the model name. Enter the gear ratio in the box (□) within the model name.
- The mounting bracket base is built with holes large enough to allow for alignment adjustments in the horizontal direction.
- No screws are supplied for installing. Provide appropriate screws separately.

Motor Installation Direction

The motor cable comes out at right angles to the motor. Orient the motor so that the cable faces either upward or sideways.

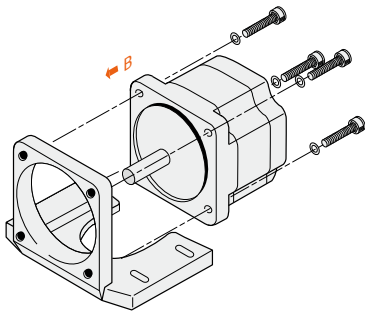


Cable Facing Upward

Cable Facing Sideways

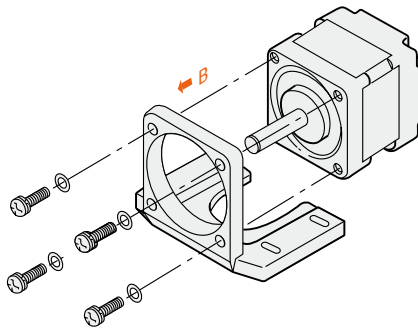
Installation of the Motor

1 PAL2P-2



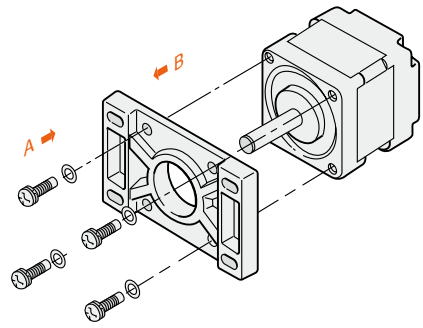
- ① Use the screws provided to secure the motor to the mounting bracket.
- ② Attach the motor from the direction shown by the arrow (B).

2 PALOPA, SOLOA-A, SOL2A-A



- ① Use the screws provided to secure the motor to the mounting bracket. (No screws are supplied for **SOLOA-A** and **SOL2A-A**. Provide appropriate screws separately.)
- ② Attach the motor from the direction shown by the arrow (B).

3 PAFOP



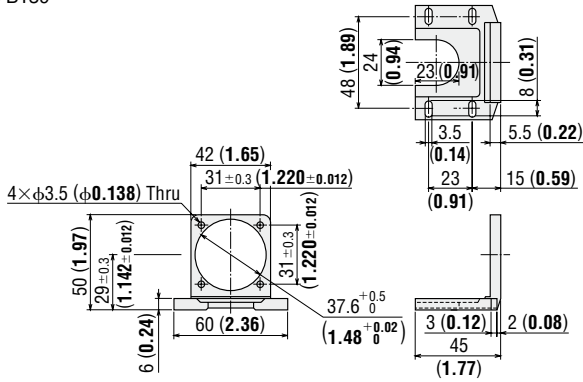
- ① Use the screws provided to secure the motor to the mounting bracket.
- ② Attach the motor from the direction shown by either arrow (A) or arrow (B).

Dimensions Unit = mm (inch)

PALOPA

Mass: 35 g (1.24 oz.)

DXF B139

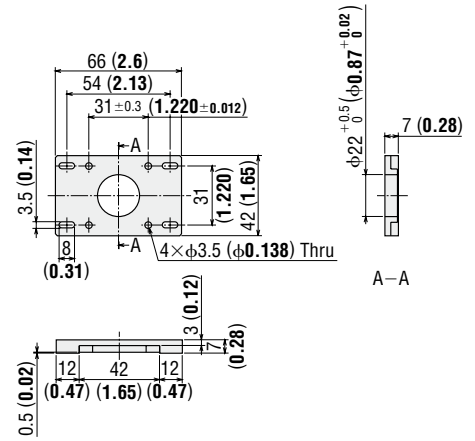


- Screws (Included)
No. 4-40 UNC ... 4 Pieces

PAFOP

Mass: 30 g (1.06 oz.)

DXF B140

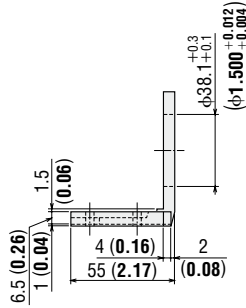
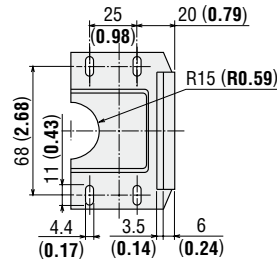


- Screws (Included)
M3 Length 7 mm (0.28 in.) ... 4 Pieces

PAL2P-2

Mass: 110 g (3.9 oz.)

DXF B144

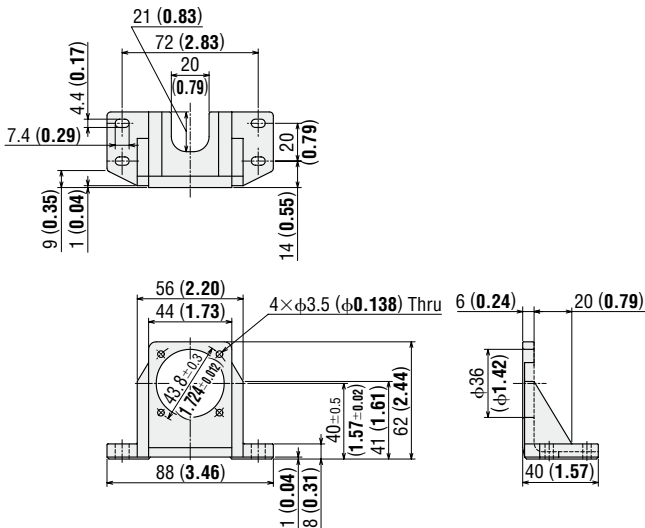


- Screws (Included)
M4 Length 12 mm (0.47 in.) ... 4 Pieces

SOLOA-A

Mass: 85 g (3 oz.)

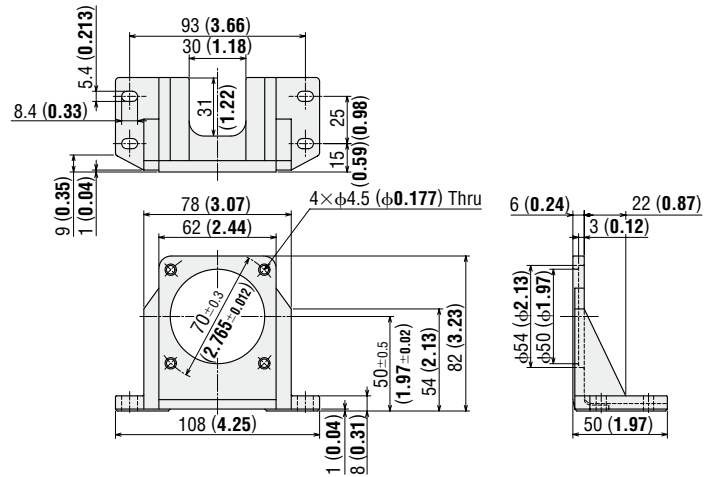
DXF B266



SOL2A-A

Mass: 120 g (4.2 oz.)

DXF B268



Flexible Couplings RoHS

A flexible coupling ideal for your motor is available. Once you have decided on a motor and/or gear, you can select the recommended coupling easily. All motor shaft diameters of stepping motor packages are available (including geared motors).



■ Features of MCS Couplings

This three-piece coupling adopts an aluminum alloy hub and a resin spider. The simple construction ensures that the high torque generated by a geared motor can be transmitted reliably. The proper elasticity of the spider suppresses motor vibration.

- High strength (usable for geared motor) has been realized.
- The resin spider (material: polyurethane) controls the vibration generated by the motor.
- No backlash

■ Product Number Code

MCS 30 08 12

- ① ② ③ ④

①	MCS Couplings
②	Outer Diameter of Coupling
③	Inner Diameter d1 (Smaller side) [F04 represents φ6.35 mm (φ0.25 in.)]
④	Inner Diameter d2 (Larger side) [F04 represents φ6.35 mm (φ0.25 in.)]

■ Product Line

Model
MCS14 <input type="checkbox"/>
MCS20 <input type="checkbox"/>
MCS30 <input type="checkbox"/>

- Enter the inner diameter of coupling in the box () within the model name.

■ Coupling Selection Table

Model	Gear Ratio	Motor Shaft Diameter mm (in.)	Type	Driven Shaft Diameter mm (in.)						
				φ4 (φ0.1575)	φ5 (φ0.1969)	φ6 (φ0.2362)	φ6.35 (φ0.25)	φ8 (φ0.315)	φ10 (φ0.3937)	φ12 (φ0.4724)
CMK22 <input type="checkbox"/> P <input type="checkbox"/> P CMK23 <input type="checkbox"/> P <input type="checkbox"/> P CMK244 P <input type="checkbox"/> P CMK24 <input type="checkbox"/> PA CMK24 <input type="checkbox"/> M <input type="checkbox"/> PA	-	φ5 (φ0.1969)	MCS14	●	●	●				
CMK223 <input type="checkbox"/> P-SG <input type="checkbox"/>	7.2, 9, 10, 18, 36									
CMK243 <input type="checkbox"/> PA-SG <input type="checkbox"/>	3.6, 7.2, 9, 10, 18, 36									
CMK246 P <input type="checkbox"/> P	-	φ5 (φ0.1969)	MCS20		●	●	●	●		
CMK256 <input type="checkbox"/> P CMK264 <input type="checkbox"/> P CMK266 <input type="checkbox"/> P CMK264M <input type="checkbox"/> P CMK266M <input type="checkbox"/> P	-	φ6.35 (φ0.25)			●	●	●	●	●	
CMK258 <input type="checkbox"/> P CMK268 <input type="checkbox"/> P CMK268M <input type="checkbox"/> P	-	φ6.35 (φ0.25)		MCS30			●	●	●	●

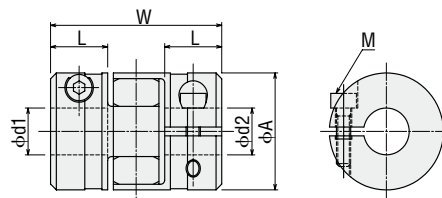
- Enter **A** (single shaft) or **B** (double shaft) in the box () within the model name.
- Enter the motor case length in the box () within the model name.
- Enter the gear ratio in the box () within the model name.

Specifications

Model	Dimensions							Normal Torque N · m (lb-in)	Mass g (oz.)	Moment of Inertia kg · m ² (oz-in ²)	Static Torsion Spring Constant N · m/rad (lb-in/rad)	Permissible Eccentricity mm (in.)	Permissible Declination deg	Permissible End Play mm (in.)
	Outer Diameter φA mm (in.)	Length W mm (in.)	Axis Hole Diameter d1 H7 mm (in.)	Axis Hole Diameter d2 H7 mm (in.)	Key Slot Tolerance b/t mm (in.)	L mm (in.)	Screw Used M							
MCS140405	14 (0.551)	22 (0.87)	4 (0.1575)	5 (0.1969)	-	7 (0.28)	M2	2.0 (17.7)	6.7 (0.24)	0.184×10 ⁻⁶ (0.01)	22.9 (200)	0.06 (0.0024)	0.9	+0.6 0 (+0.024 0)
MCS140505			5 (0.1969)	5 (0.1969)										
MCS140506			5 (0.1969)	6 (0.2362)										
MCS200505	20 (0.787)	30 (1.18)	5 (0.1969)	5 (0.1969)	-	10 (0.39)	M2.5	5.0 (44)	19.8 (0.7)	1.059×10 ⁻⁶ (0.058)	51.6 (450)	0.08 (0.0031)	0.9	+0.8 0 (+0.031 0)
MCS200506			5 (0.1969)	6 (0.2362)										
MCS2005F04			5 (0.1969)	6.35 (0.25)										
MCS200508			5 (0.1969)	8 (0.315)										
MCS2006F04			6 (0.2362)	6.35 (0.25)										
MCS200608			6 (0.2362)	8 (0.315)										
MCS20F04F04			6.35 (0.25)	6.35 (0.25)										
MCS20F0408			6.35 (0.25)	8 (0.315)										
MCS20F0410			6.35 (0.25)	10 (0.3937)										
MCS200808			8 (0.315)	8 (0.315)										
MCS200810			8 (0.315)	10 (0.3937)										
MCS3006F04	30 (1.181)	35 (1.38)	6 (0.2362)	6.35 (0.25)	-	11 (0.43)	M3	12.5 (110)	44.6 (1.57)	6.057×10 ⁻⁶ (0.33)	171.9 (1500)	0.09 (0.0035)	0.9	+1.0 0 (+0.039 0)
MCS300608			6 (0.2362)	8 (0.315)										
MCS30F04F04			6.35 (0.25)	6.35 (0.25)										
MCS30F0408			6.35 (0.25)	8 (0.315)										
MCS30F0410			6.35 (0.25)	10 (0.3937)										
MCS300808			8 (0.315)	8 (0.315)										
MCS300810			8 (0.315)	10 (0.3937)										
MCS300812			8 (0.315)	12 (0.4724)										

Dimensions

MCS14	Mass: 6.7 g (0.24 oz.)
MCS20	Mass: 19.8 g (0.7 oz.)
MCS30	Mass: 44.6 g (1.57 oz.)

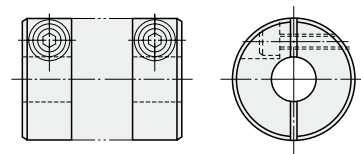


Mounting to a Shaft

Clamp Type

Clamp couplings use the tightening force of the screw to compress the shaft hole diameter and thereby fasten the coupling to the shaft. This does not damage the shaft and is easy to mount and remove. The following table shows the screw tightening torque. We recommend use of a torque wrench to fasten the coupling.

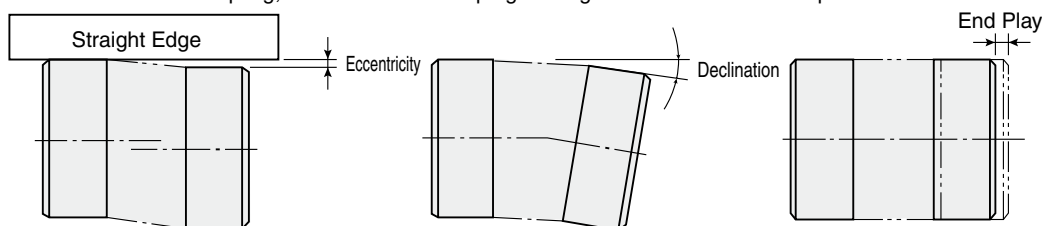
Type		MCS14	MCS20	MCS30
Tightening Torque	N·m (oz-in)	0.37 (52)	0.76 (107)	1.34 (190)



Alignment Adjustment

Flexible couplings tolerate misalignment of the axis center and transfer rotational angle and torque, but produce vibration when the permissible value for misalignment is exceeded. This can dramatically shorten the coupling's service life. This requires alignment adjustment.

Misalignment of the axis center includes eccentricity (parallel error of both centers), declination (angular error of both centers) and end play (shaft movement in the axial direction). To keep misalignment within the permissible value, always check and adjust the alignment. To increase the service life of the coupling, we recommend keeping misalignment below 1/3 of the permissible value.



Notes:

- When misalignment exceeds the permissible value or excessive torque is applied, the coupling's shape will deform, and service life is shortened.
- When the coupling emits a metallic sound during operation, stop operation immediately and ensure there is no misalignment, axis interference or loose screws.
- When load changes are large, apply an adhesive to the coupling set screw to prevent the coupling screw from loosening.

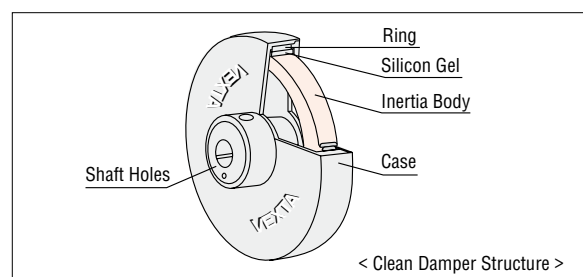
Clean Dampers RoHS

Mechanical dampers suppress stepping motor vibration and improve high-speed performance. An inertia body and silicon gel are hermetically sealed in a plastic case.



Features

- Excellent vibration absorption
The doughnut-shaped internal inertia body and silicon gel absorb vibration. This feature enables a stable damping effect.
- Since there is no frictional dust as in conventional magnetic dampers, it can be used in environments where higher degrees of cleanliness is needed.
- High reliability
- It holds up well in harsh environments and changes little with age because the silicon gel and plastic case used are heat resistant.
- Machine part is sealed hermetically in a plastic case. This ensures safety and doesn't generate noise.



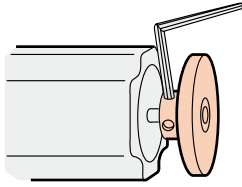
Product Line

Model	Moment of Inertia kg·m ² (oz·in ²)	Mass g (lb.)	Applicable Product
D4CL-5.0F	34×10 ⁻⁷ (0.186)	24 (0.053)	CMK22□PBP CMK23□PBP CMK24□PBP CMK24□MBPA CMK24□BPA CMK223BP-SG■ CMK243BPA-SG■
D6CL-6.3F	140×10 ⁻⁷ (0.77)	62 (0.136)	CMK26□MBP CMK25□BP CMK26□BP CMK264BPA-SG■

Ambient Temperature: -20 to +80°C (-4 to +176°F)

- Enter the motor case length in the box (□) within the model name.
Enter the gear ratio in the box (■) within the model name.

Installation of the Clean Damper



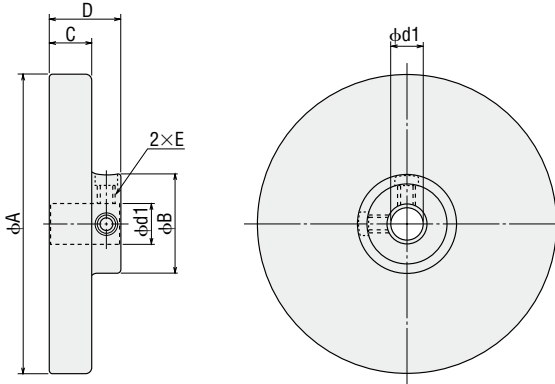
Point the mounting screws of the clean damper toward the motor case, fasten to the shaft and tighten the damper's mounting screws (2 places) with an allen wrench to secure it to the shaft.

Type	D4CL-5.0F	D6CL-6.3F	
Tightening Torque	N-m (oz-in)	0.4 (56)	1.5 (210)

Notes:

- There are mounting screws with hexagonal holes in two damper locations, so tighten them both before running the motor.
- The damper rotates at the same speed as the motor shaft, so do not touch it while the motor is running.

Dimensions Unit = mm (inch)



Model	$\phi d1$	ϕA	ϕB	C	D	E
D4CL-5.0F	$5^{+0.018}_0$ (0.1969 ^{+0.0007})	$\phi 36 \pm 0.5$ ($\phi 1.42 \pm 0.02$)	$\phi 13 \pm 0.5$ ($\phi 0.51 \pm 0.02$)	9 ± 0.3 (0.354 \pm 0.012)	15 ± 0.5 (0.591 \pm 0.02)	M3
D6CL-6.3F	$6.35^{+0.022}_0$ (0.2500 ^{+0.0009})	$\phi 44.5 \pm 0.5$ ($\phi 1.75 \pm 0.02$)	$\phi 20 \pm 0.5$ ($\phi 0.79 \pm 0.02$)	15 ± 0.3 (0.591 \pm 0.012)	22 ± 0.5 (0.87 \pm 0.02)	M4

Cables

Driver Lead Wire Set (RoHS)



As an accessory for DC input drivers, lead wires with a connector are available. Crimping is not necessary, and the connection with the motor, power supply, input/output signal is also easy. The driver lead wire set includes three lead wire/connector assemblies (for motor, power supply and input/output signals).

Motor Lead Wire/Connector Assembly (RoHS)



These lead wires with connectors are available for connection with the motor, eliminating the need for assembling a connector. [A motor lead wire/connector assembly of 0.6 m (2 ft.) is included with the motor and driver package for the connector-coupled types.]

Product Line

Model	Applicable Driver	Length m (ft.)
LCS01CMK2	CMD2109P	0.6 (2)
	CMD2112P	
	CMD2120P	

Product Line

Model	Applicable Product	Applicable Motor	Length m (ft.)
LC2U06A	CMK22 □P□P	PK22□P□	0.6 (2)
LC2U10A	CMK223 □P-SG□	PK223P□-SG□	1 (3.3)
LC2U06B	CMK23 □P□P	PK23□P□	0.6 (2)
LC2U10B	CMK24 □P□P	PK24□P□	1 (3.3)

- Enter the motor case length in the box (□) within the model name.
- Enter **A** (single shaft) or **B** (double shaft) in the box (□) within the model name.
- Enter the gear ratio in the box (□) within the model name.

Controllers (Sold separately)

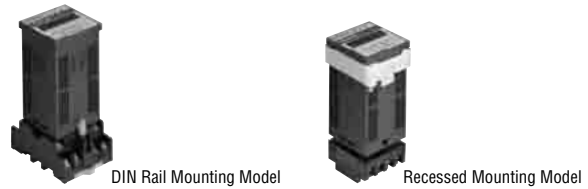
Controller for Stepping Motors

SG8030J RoHS

■ Features

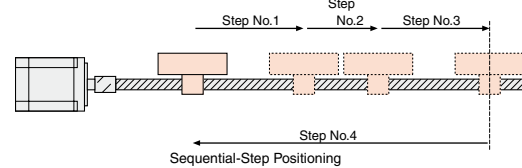
All operations including data setting can easily be performed using the four touch pads on the top panel. In addition, the number of signal lines is reduced to a minimum for easy connection.

- Jerk limiting control function to suppress vibration during motor operation
- Supporting sequential-step positioning operation and external signal operation
- Maximum oscillation frequency: 200 kHz
- 1-pulse/2-pulse output mode switching



■ Product Line

Type	Model
DIN Rail Mounting Model	SG8030J-D
Recessed Mounting Model	SG8030J-U



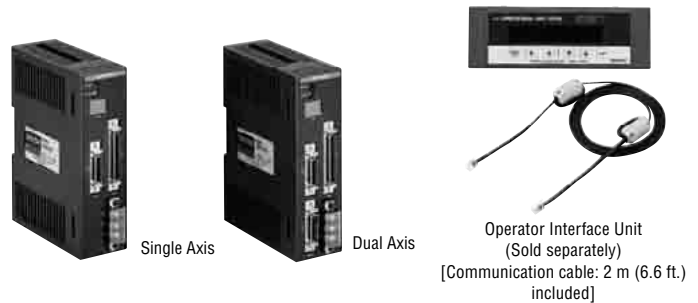
Stored Program Controller

EMP400 Series RoHS

■ Features

In addition to the superior oscillation function reflecting Oriental Motor's wealth of expertise in motor design and manufacturing, the **EMP** Series also provides the I/O control function and the sequence function that allows for programming of a series of operation.

- Allowing the input of 32 sequence programs
- Various operation patterns
- Teaching function
You can adjust the travel amount via teaching or monitor the current position, using an accessory operator interface unit **OP300**.
- No need for dedicated software



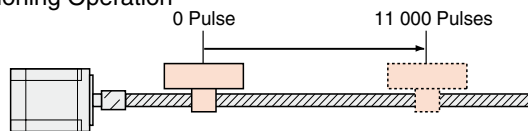
■ Product Line

Model	Number of Axis	Connector
EMP401-1	Single Axis	Without connectors
EMP401-2		With connectors
EMP402-1	Dual Axis	Without connectors
EMP402-2		With connectors

● Operator Interface Unit **OP300**

■ Sample Program

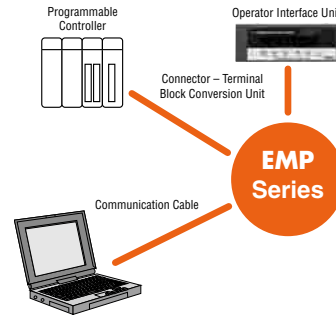
Positioning Operation



- [1] VS1_500 ; Starting speed 500 Hz
- [2] V1_1000 ; Operating speed 1000 Hz
- [3] T1_30.0 ; Acceleration/deceleration rate 30.0 ms/kHz
- [4] D1_+11000 ; Travel amount 11 000 pulses in CW direction
- [5] INC1 ; Execute relative positioning operation

■ Accessories (Sold separately)

We have a range of accessory cables that allow for easy connection between the **EMP400** Series and peripherals, as well as an operator interface unit used for teaching operation.



● Operator Interface Unit **OP300** (RoHS)

You can set the travel amount via teaching or monitor the current position.

● Used for the **EMP** Series

Use the included cable [length: 2 m (6.6 ft.)] for connection with the **EMP** Series.



● Communication Cable **FC04W5** (RoHS)

A communication cable [length 5 m (16.4 ft.)] for connecting the **EMP** Series to a PC. A D-sub, 9-pin (female) connector is attached on the PC end of the communication cable.



● Connector - Terminal Block Conversion Unit **CC50T1** (RoHS)

A conversion unit that connects a half-pitch connector of the **EMP** Series using a terminal block [cable length: 1 m (3.3 ft.)].

- With a signal name plate for easy, one-glance identification of driver signal names
- DIN-rail mountable
- Cable length: 1 m (3.3 ft.)



This product is manufactured at a plant certified with the international standards **ISO 9001** (for quality assurance) and **ISO 14001** (for systems of environmental management).

Specifications are subject to change without notice.
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