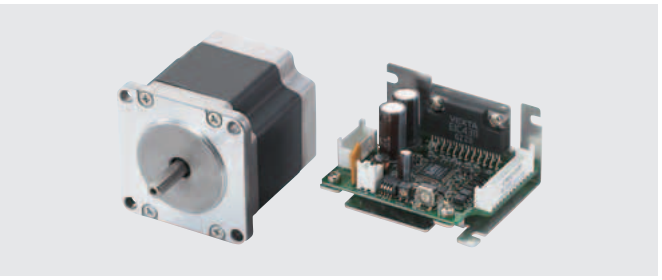
CMK Series

●Additional Information●
Technical reference ➜ Page G-1

The **CMK** Series is a motor and driver package consisting of a 0.9°/1.8° Stepping Motor and a compact 24 VDC input microstep driver, allowing for a reduction in the size of your equipment and in vibration.

RoHS



Features

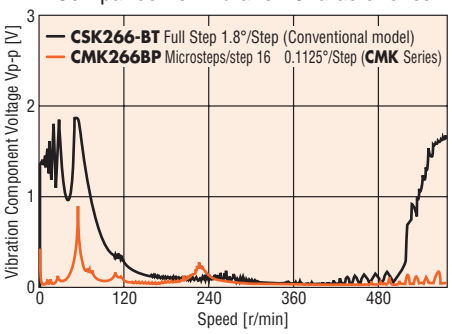
●Achieving Low Vibration and Noise in a Microstep Drive

The newly designed DC board-level microstepping driver is compact and lightweight. The 1.8° 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.

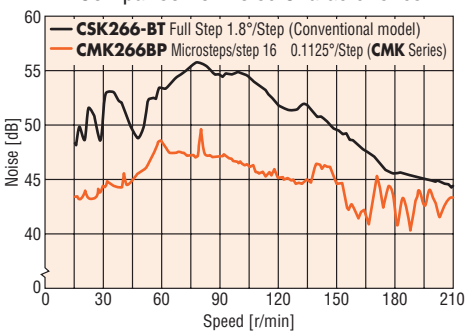
Microsteps/Step	Resolution	Step Angle
1	200	1.8°
2	400	0.9°
4	800	0.45°
8	1600	0.225°
16	3200	0.1125°

(At basic step angle of 1.8°/step)

Comparison of Vibration Characteristics



Comparison of Noise Characteristics



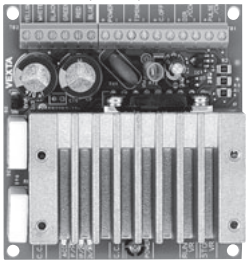
●Full Range of Driver Functions

- 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)

●One of the Smallest Microstep Drivers in the Industry

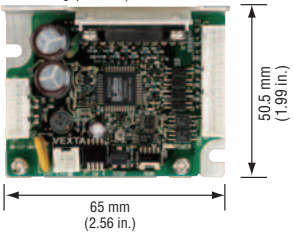
The **CMK** Series driver is one of the smallest, lightest microstep drivers in the industry. The driver is 62% lighter and has 41% less install area (based on horizontal installation) compared to our conventional model. This product contributes to downsizing of your equipment.

Mass: 130 g (0.29 lb.)



Conventional Model (CSD2120-T)

Mass: 50 g (0.11 lb.)



New Product (CMD21□□P)

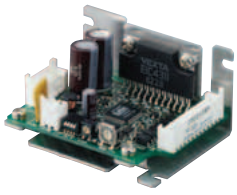
Comparison with a conventional driver

◇Mass: **62**% less

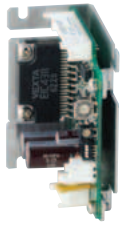
◇Install area: **41**% less (based on horizontal installation)

◇Volume: **41**% less [the conventional driver includes a 5 mm (0.2 in.) spacer for installation.]

◇Easy-to-Install Heat Sink Shape



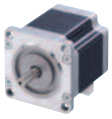
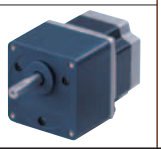
Horizontal Installation



Vertical Installation

Lineup of Motors

□42 mm (□1.65 in.): indicates a motor frame size of 42 mm (1.65 in.).

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
Step Angle 0.9° Standard Type*	A 0.9° standard type offers 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.						
Step Angle 1.8° High-Torque Type*	A high-torque motor has higher torque of approx. 1.5 times compared with the conventional standard type motor.						
Step Angle 1.8° 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.						

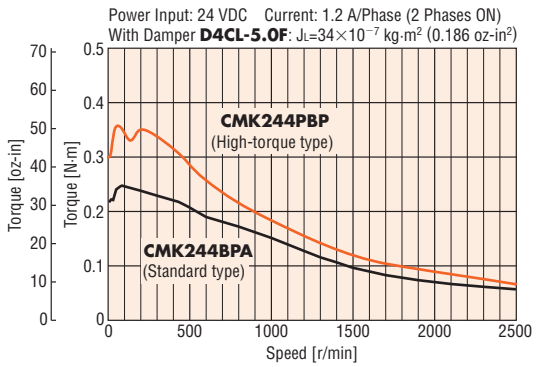
*Motor with an encoder is also available.

◇High-Torque Type

• High-Torque

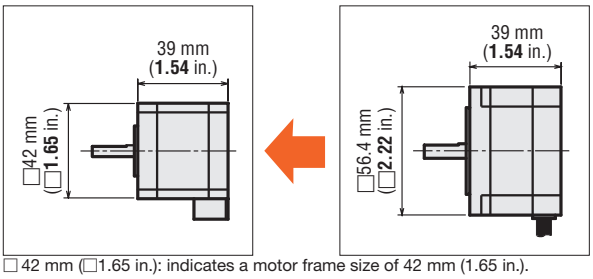
The high-torque type adopts new technology and design. The motor produces approximately 50% higher torque than a conventional stepping motor of the same size.

Comparison of Speed – Torque Characteristics



• Compact Size

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.



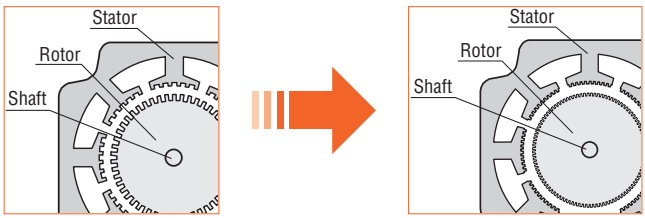
□ 42 mm (□1.65 in.): indicates a motor frame size of 42 mm (1.65 in.).

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 high-torque type is connected using a connector – a connection method everyone is familiar with.

◇Step Angle 0.9˚ Standard Type

The basic step angle is 0.9˚, which is half that of the step angle 1.8˚ standard type. 400 steps per rotation is possible. This motor achieves high resolution, low vibration and improved stopping accuracy.

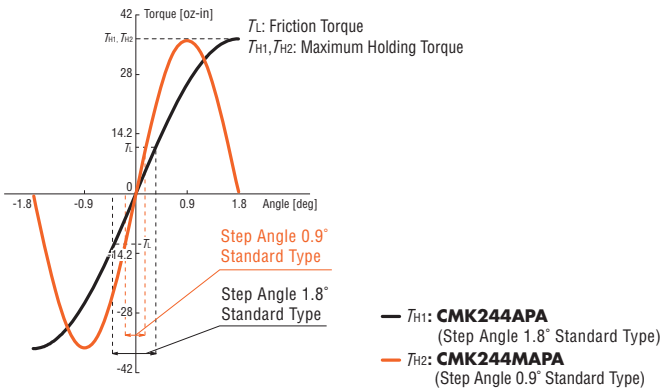


Step Angle 1.8˚
Standard Type (50 teeth)

Step Angle 0.9˚
Standard Type (100 teeth)

The small basic step angle allows the torque to increase sharply while minimizing the negative effect of friction load.

Comparison of Angle – Torque Characteristics



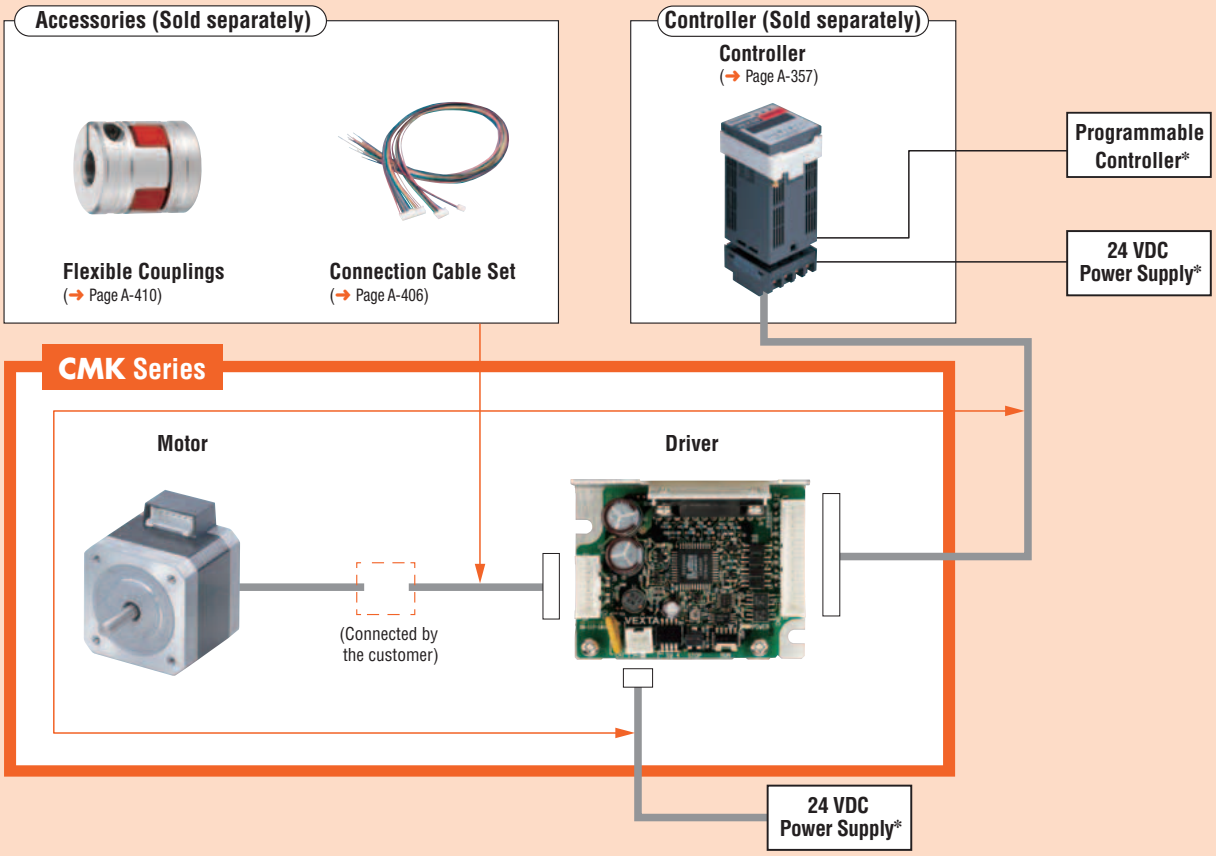
●Encoder Option Available

200 or 400 pulse/rev, 2 or 3 channel, TTL.

Motor rotations can be detected by taking in encoder output signals into a programmable controller (not supplied).

System Configuration

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



●Example of System Configuration

CMK Series	+	Sold Separately				
		Controller	Motor Mounting Bracket	Flexible Coupling	Clean Damper	Connection Cable Set [0.6 m (2 ft.)]
CMK244PBP		SG8030J-U	PAL0PA	MCS140506	D4CL-5.0F	LCS01CMK2

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

✻ Not supplied

Product Number Code

Standard Type, High-Torque Type

CMK 2 4 3 M A P A

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Series	**CMK**: **CMK** Series
②	**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**: Step Angle 1.8˚ High-Torque Type **M**: Step Angle 0.9˚ Standard Type Blank: Step Angle 1.8˚ Standard Type
⑥	Shaft Type	**A**: Single Shaft **B**: Double Shaft
⑦	Signal I/O Mode of Driver	**P**: Photocoupler
⑧	U.S.A. Version	

Standard Type, High-Torque Type with Encoder

CMK 2 4 3 M A P A - R 1 5

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

①	Series	**CMK**: **CMK** Series
②	**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**: Step Angle 1.8˚ High-Torque Type **M**: Step Angle 0.9˚ Standard Type Blank: Step Angle 1.8˚ Standard Type
⑥	Shaft Type	**A**: Single Shaft
⑦	Signal I/O Mode of Driver	**P**: Photocoupler
⑧	U.S.A. Version	
⑨	EncoderVersion	
⑩	Encoder Output	**1**: 2-Channel A, B **2**: 3-Channel A, B, I
⑪	Encoder Resolution	**5**: 200P/R **6**: 400P/R

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**: 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 of Driver	**P**: Photocoupler
⑦	U.S.A. Version	
⑧	Gearhead Type	**SG**: **SH** Geared Type
⑨	Gear Ratio	

SH Geared Type with Encoder

CMK 2 4 3 P A R 1 5 S 10

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

①	Series	**CMK**: **CMK** Series
②	**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	Signal I/O Mode of Driver	**P**: Photocoupler
⑥	U.S.A. Version	
⑦	EncoderVersion	
⑧	Encoder Output	**1**: 2-Channel A, B **2**: 3-Channel A, B, I
⑨	Encoder Resolution	**5**: 200P/R **6**: 400P/R
⑩	Gearhead Type	**S**: **SH** Geared Type
⑪	Gear Ratio	

Product Line

Step Angle 0.9° Standard Type

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

Step Angle 0.9° Standard Type with Encoder

Model	
CMK243MAPA-R15	CMK243MAPA-R16
CMK243MAPA-R25	CMK243MAPA-R26
CMK244MAPA-R15	CMK244MAPA-R16
CMK244MAPA-R25	CMK244MAPA-R26
CMK245MAPA-R15	CMK245MAPA-R16
CMK245MAPA-R25	CMK245MAPA-R26
CMK264MAP-R15	CMK264MAP-R16
CMK264MAP-R25	CMK264MAP-R26
CMK266MAP-R15	CMK266MAP-R16
CMK266MAP-R25	CMK266MAP-R26
CMK268MAP-R15	CMK268MAP-R16
CMK268MAP-R25	CMK268MAP-R26

Step Angle 1.8° High-Torque Type

Model (Single shaft)	Model (Double shaft)
CMK223PAP	CMK223PBP
CMK224PAP	CMK224PBP
CMK225PAP	CMK225PBP
CMK233PAP	CMK233PBP
CMK235PAP	CMK235PBP
CMK244PAP	CMK244PBP
CMK246PAP	CMK246PBP
CMK264PAPA	CMK264PBPA
CMK266PAPA	CMK266PBPA
CMK268PAPA	CMK268PBPA

Step Angle 1.8° High-Torque Type with Encoder

Model	
CMK223PAP-R15	–
CMK224PAP-R15	–
CMK225PAP-R15	–
CMK233PAP-R15	CMK233PAP-R16
CMK233PAP-R25	CMK233PAP-R26
CMK235PAP-R15	CMK235PAP-R16
CMK235PAP-R25	CMK235PAP-R26
CMK244PAP-R15	CMK244PAP-R16
CMK244PAP-R25	CMK244PAP-R26
CMK246PAP-R15	CMK246PAP-R16
CMK246PAP-R25	CMK246PAP-R26
CMK264PAPA-R15	CMK264PAPA-R16
CMK264PAPA-R25	CMK264PAPA-R26
CMK266PAPA-R15	CMK266PAPA-R16
CMK266PAPA-R25	CMK266PAPA-R26
CMK268PAPA-R15	CMK268PAPA-R16
CMK268PAPA-R25	CMK268PAPA-R26

Step Angle 1.8° Standard Type

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

Step Angle 1.8° Standard Type with Encoder

Model	
CMK243APA-R15	CMK243APA-R16
CMK243APA-R25	CMK243APA-R26
CMK244APA-R15	CMK244APA-R16
CMK244APA-R25	CMK244APA-R26
CMK245APA-R15	CMK245APA-R16
CMK245APA-R25	CMK245APA-R26
CMK256AP-R15	CMK256AP-R16
CMK256AP-R25	CMK256AP-R26
CMK258AP-R15	CMK258AP-R16
CMK258AP-R25	CMK258AP-R26
CMK264AP-R15	CMK264AP-R16
CMK264AP-R25	CMK264AP-R26
CMK266AP-R15	CMK266AP-R16
CMK266AP-R25	CMK266AP-R26
CMK268AP-R15	CMK268AP-R16
CMK268AP-R25	CMK268AP-R26

The following items are included each product.
Motor, Driver, Driver Connector, Connection Cable*, Operating Manual
*Only for Step Angle 1.8° High-Torque Type

●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

The following items are included each product.
Motor, Driver, Driver Connector, Connection Cable*, Mounting Screws for Motor, Operating Manual
*Only for connector-coupled motor

●SH Geared Type with Encoder

Model	
CMK223PR15S7.2	–
CMK223PR15S9	–
CMK223PR15S10	–
CMK223PR15S18	–
CMK223PR15S36	–
CMK243PAR15S3.6	CMK243PAR16S3.6
CMK243PAR25S3.6	CMK243PAR26S3.6
CMK243PAR15S7.2	CMK243PAR16S7.2
CMK243PAR25S7.2	CMK243PAR26S7.2
CMK243PAR15S9	CMK243PAR16S9
CMK243PAR25S9	CMK243PAR26S9
CMK243PAR15S10	CMK243PAR16S10
CMK243PAR25S10	CMK243PAR26S10
CMK243PAR15S18	CMK243PAR16S18
CMK243PAR25S18	CMK243PAR26S18
CMK243PAR15S36	CMK243PAR16S36
CMK243PAR25S36	CMK243PAR26S36
CMK264PAR15S3.6	CMK264PAR16S3.6
CMK264PAR25S3.6	CMK264PAR26S3.6
CMK264PAR15S7.2	CMK264PAR16S7.2
CMK264PAR25S7.2	CMK264PAR26S7.2
CMK264PAR15S9	CMK264PAR16S9
CMK264PAR25S9	CMK264PAR26S9
CMK264PAR15S10	CMK264PAR16S10
CMK264PAR25S10	CMK264PAR26S10
CMK264PAR15S18	CMK264PAR16S18
CMK264PAR25S18	CMK264PAR26S18
CMK264PAR15S36	CMK264PAR16S36
CMK264PAR25S36	CMK264PAR26S36

Step Angle 0.9° Motor Frame Size 42 mm (1.65 in.), 56.4 mm (2.22 in.)

Standard Type

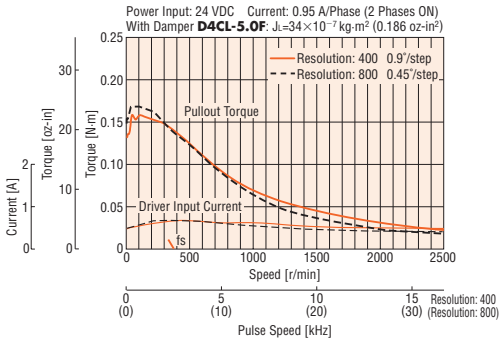
Specifications RoHS

Model	Single Shaft	CMK243MAPA	CMK244MAPA	CMK245MAPA	CMK264MAP	CMK266MAP	CMK268MAP
	Double Shaft	CMK243MBPA	CMK244MBPA	CMK245MBPA	CMK264MBP	CMK266MBP	CMK268MBP
	With Encoder	CMK243MAPA-R□	CMK244MAPA-R□	CMK245MAPA-R□	CMK264MAP-R□	CMK266MAP-R□	CMK268MAP-R□
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)
Holding Torque at Motor Standstill	Power ON N·m (oz-in)	0.064 (9.0)	0.1 (14.2)	0.12 (17.0)	0.14 (19.8)	0.36 (51)	0.54 (76)
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					

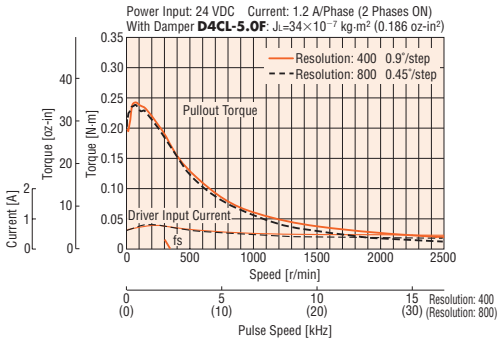
● Enter the encoder code (**15**, **16**, **25** or **26**) in the box (□) within the model name.

Speed – Torque Characteristics

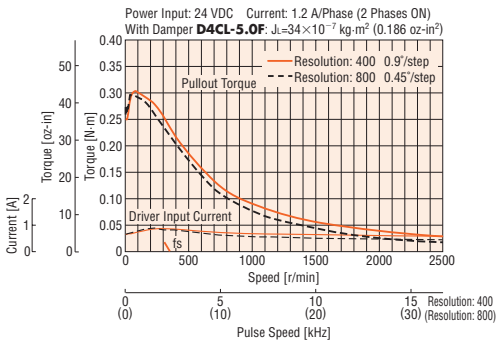
CMK243



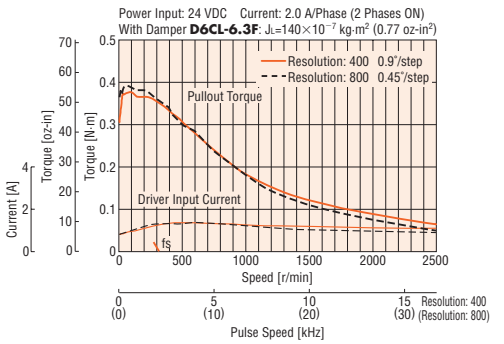
CMK244



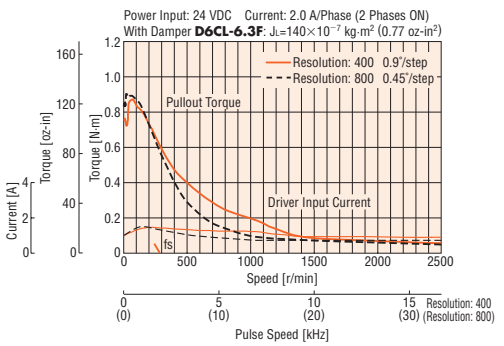
CMK245



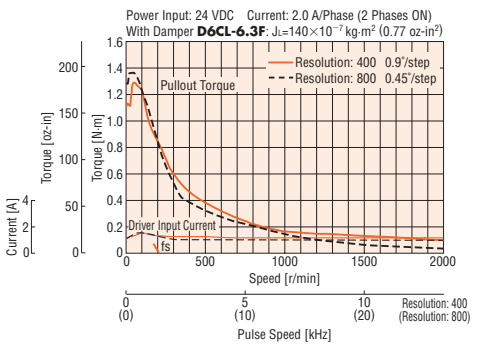
CMK264



CMK266



CMK268



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

Note

● Pay attention to heat dissipation from the 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).

Step Angle 1.8° Motor Frame Size 28 mm (1.10 in.)

High-Torque Type

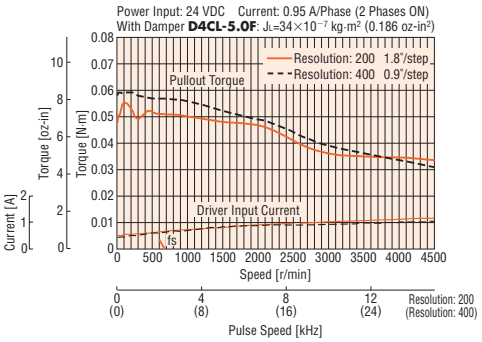
Specifications RoHS

Model		CMK223PAP	CMK224PAP	CMK225PAP
	Single Shaft			
	Double Shaft	CMK223PBP	CMK224PBP	CMK225PBP
	With Encoder	CMK223PAP-R15	CMK224PAP-R15	CMK225PAP-R15
Maximum Holding Torque	N·m (oz-in)	0.05 (7.1)	0.075 (10.6)	0.09 (12.7)
Holding Torque at Motor Standstill	Power ON N·m (oz-in)	0.02 (2.8)	0.03 (4.2)	0.036 (5.1)
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		

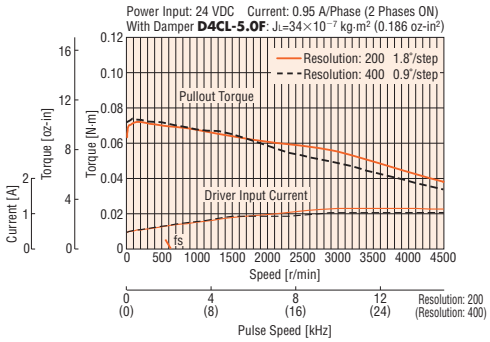
● A connection cable [0.6 m (2 ft.)] is included with the connector-coupled motor and driver package.

Speed – Torque Characteristics

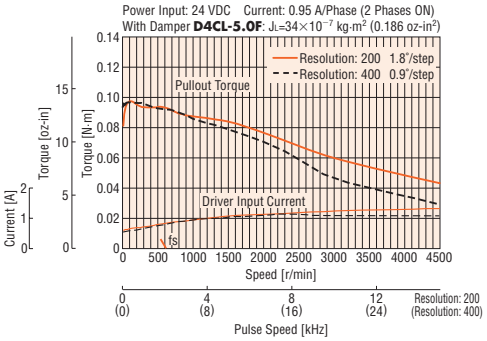
CMK223



CMK224



CMK225



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

Note

● Pay attention to heat dissipation from the 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).

Step Angle 1.8° Motor Frame Size 35 mm (1.38 in.), 42 mm (1.65 in.)

High-Torque Type

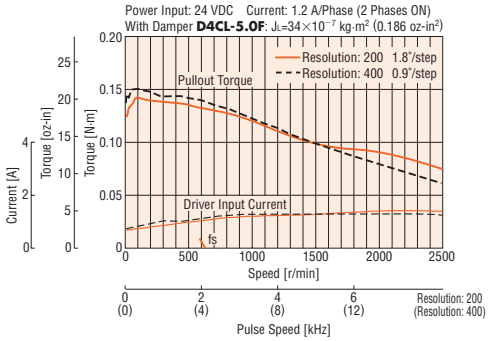
Specifications RoHS

Model		CMK233PAP	CMK235PAP	CMK244PAP	CMK246PAP
	Single Shaft	CMK233PAP	CMK235PAP	CMK244PAP	CMK246PAP
	Double Shaft	CMK233PBP	CMK235PBP	CMK244PBP	CMK246PBP
	With Encoder	CMK233PAP-R□	CMK235PAP-R□	CMK244PAP-R□	CMK246PAP-R□
Maximum Holding Torque	N·m (oz-in)	0.16 (22)	0.3 (42)	0.39 (55)	0.75 (106)
Holding Torque at Motor Standstill	Power ON N·m (oz-in)	0.064 (9.0)	0.12 (17)	0.15 (21)	0.3 (42)
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			

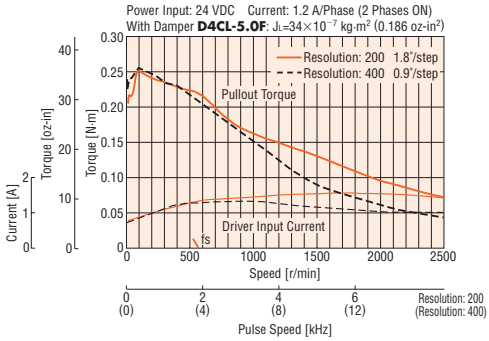
- A connection cable [0.6 m (2 ft.)] is included with the connector-coupled motor and driver package.
- Enter the encoder code (**15**, **16**, **25** or **26**) in the box (□) within the model name.

Speed – Torque Characteristics

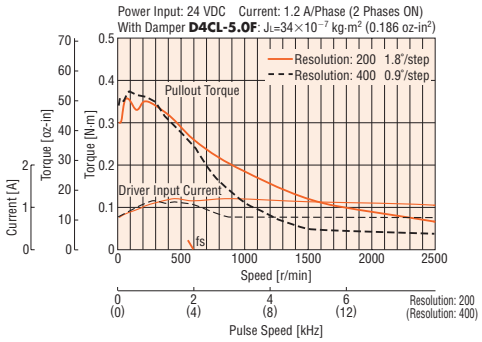
CMK233



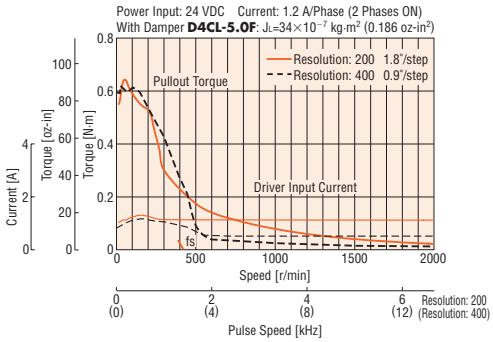
CMK235



CMK244



CMK246



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

Note

- Pay attention to heat dissipation from the 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).

Step Angle 1.8° Motor Frame Size 56.4 mm (2.22 in.)

High-Torque Type

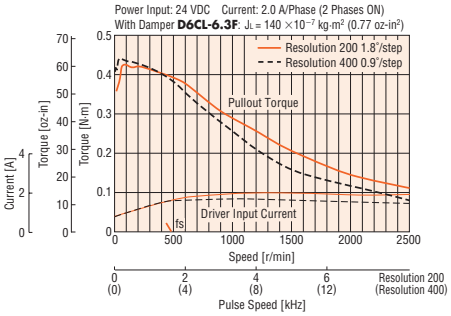
Specifications RoHS

Model		CMK264PAPA	CMK266PAPA	CMK268PAPA
	Single Shaft	CMK264PAPA	CMK266PAPA	CMK268PAPA
	Double Shaft	CMK264PBPA	CMK266PBPA	CMK268PBPA
	With Encoder	CMK264PAPA-R□	CMK266PAPA-R□	CMK268PAPA-R□
Maximum Holding Torque	N·m (oz-in)	0.46 (65)	0.99 (140)	1.73 (240)
Holding Torque at Motor Standstill	Power ON N·m (oz-in)	0.18 (25)	0.39 (55)	0.69 (97)
Rotor Inertia	J: kg·m^2 (oz-in^2)	120×10^{-7} (0.66)	290×10^{-7} (1.59)	490×10^{-7} (2.7)
Rated Current	A/Phase	2		
Basic Step Angle		1.8°		
Power Source		24 VDC±10% 2.9 A		
Excitation Mode		Microstep		

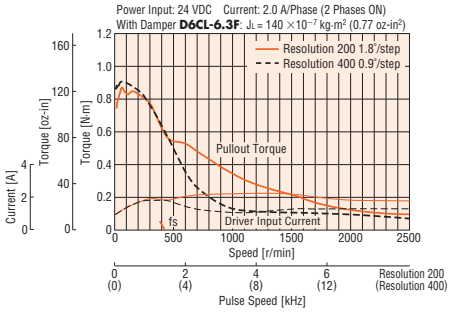
- A connection cable [0.6 m (2 ft.)] is included with the connector-coupled motor and driver package.
- Enter the encoder code (**15**, **16**, **25** or **26**) in the box (□) within the model name.

Speed – Torque Characteristics

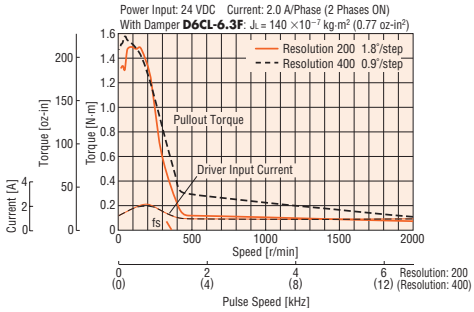
CMK264



CMK266



CMK268



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

Note

- Pay attention to heat dissipation from the 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).

Step Angle 1.8° Motor Frame Size 42 mm (1.65 in.), 50 mm (1.97 in.)

Standard Type

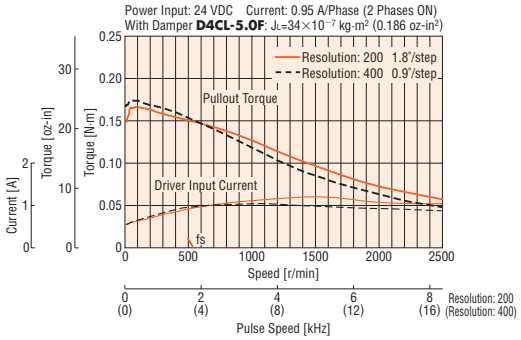
Specifications RoHS

Model	Single Shaft	CMK243APA	CMK244APA	CMK245APA	CMK256AP	CMK258AP
	Double Shaft	CMK243BPA	CMK244BPA	CMK245BPA	CMK256BP	CMK258BP
	With Encoder	CMK243APA-R□	CMK244APA-R□	CMK245APA-R□	CMK256AP-R□	CMK258AP-R□
Maximum Holding Torque	N·m (oz-in)	0.16 (22)	0.26 (36)	0.32 (45)	0.56 (79)	1.2 (170)
Holding Torque at Motor Standstill	Power ON N·m (oz-in)	0.064 (9.0)	0.1 (14.2)	0.12 (17.0)	0.22 (31)	0.48 (68)
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		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				

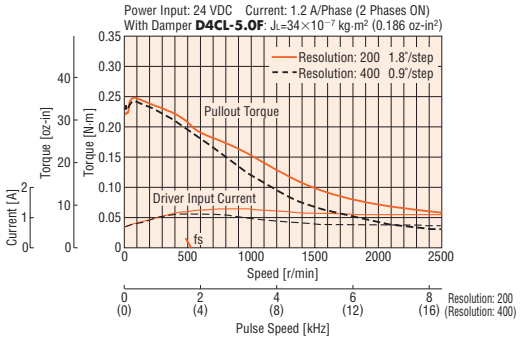
● Enter the encoder code (**15**, **16**, **25** or **26**) in the box (□) within the model name.

Speed – Torque Characteristics

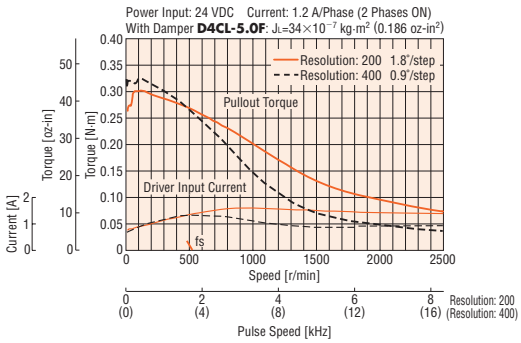
CMK243



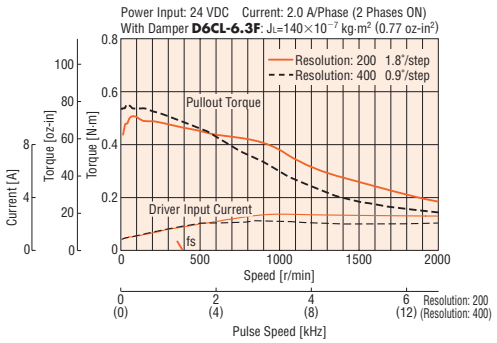
CMK244



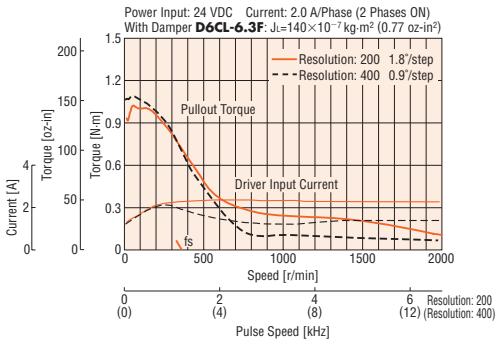
CMK245



CMK256



CMK258



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

Note

● Pay attention to heat dissipation from the 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).

Step Angle 1.8° Motor Frame Size 56.4 mm (2.22 in.)

Standard Type

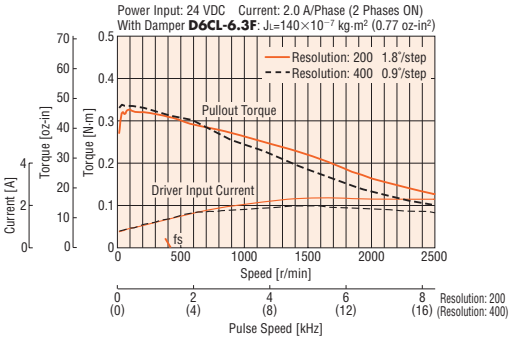
Specifications RoHS

Model	Single Shaft	CMK264AP	CMK266AP	CMK268AP
	Double Shaft	CMK264BP	CMK266BP	CMK268BP
	With Encoder	CMK264AP-R□	CMK266AP-R□	CMK268AP-R□
Maximum Holding Torque	N·m (oz-in)	0.36 (51)	0.82 (116)	1.35 (191)
Holding Torque at Motor Standstill	Power ON N·m (oz-in)	0.14 (19.8)	0.32 (45)	0.54 (76)
Rotor Inertia	J: kg·m^2 (oz-in^2)	120×10^{-7} (0.66)	30×10^{-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		

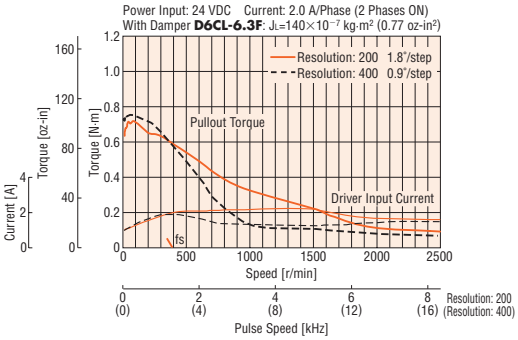
● Enter the encoder code (**15**, **16**, **25** or **26**) in the box (□) within the model name.

Speed – Torque Characteristics

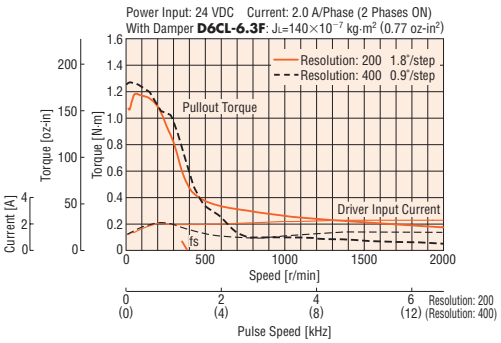
CMK264



CMK266



CMK268



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

Note

● Pay attention to heat dissipation from the 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).

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

Specifications RoHS

Model						
	Single Shaft	CMK223AP-SG7.2	CMK223AP-SG9	CMK223AP-SG10	CMK223AP-SG18	CMK223AP-SG36
	Double Shaft	CMK223BP-SG7.2	CMK223BP-SG9	CMK223BP-SG10	CMK223BP-SG18	CMK223BP-SG36
	With Encoder	CMK223PR15S7.2	CMK223PR15S9	CMK223PR15S10	CMK223PR15S18	CMK223PR15S36
Maximum Holding Torque	N·m (oz-in)	0.3 (42)			0.4 (56)	
Holding Torque at Motor Standstill	Power ON N·m (oz-in)	0.14 (19.8)	0.20 (28)	0.22 (31)	0.39 (55)	0.40 (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	9	10	18	36
Permissible Torque	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				

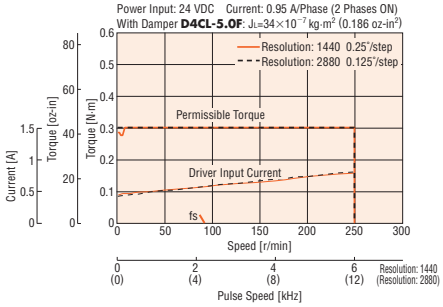
✻A connection cable [0.6 m (2 ft.)] is included with the connector-coupled motor and driver package.

Notes

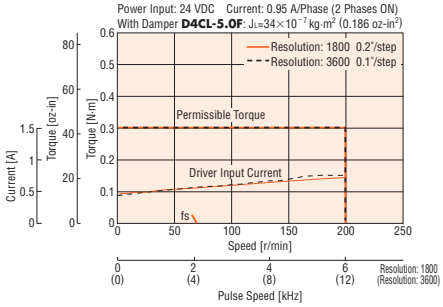
- Backlash value is approximately 1 to 2°.
- Direction of rotation of the motor and that of the gear output shaft are the same for gear ratios 7.2 and 36. It is the opposite for 9, 10 and 18 gear ratios.

Speed – Torque Characteristics

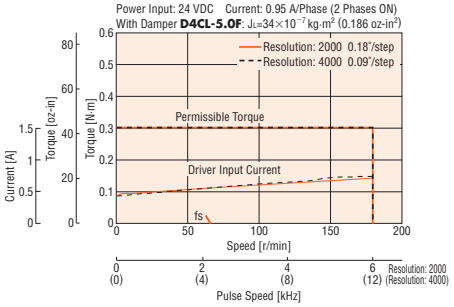
CMK223 Gear Ratio **7.2**



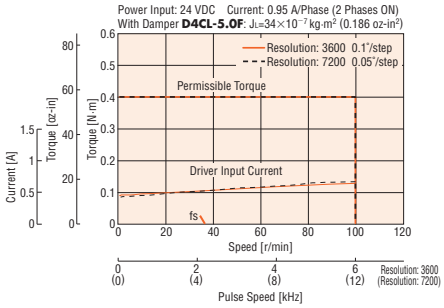
CMK223 Gear Ratio **9**



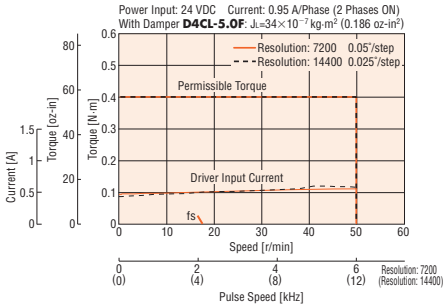
CMK223 Gear Ratio **10**



CMK223 Gear Ratio **18**



CMK223 Gear Ratio **36**



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

Note

- Pay attention to heat dissipation from the 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).

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
	With Encoder	CMK243PAR□S3.6	CMK243PAR□S7.2	CMK243PAR□S9	CMK243PAR□S10	CMK243PAR□S18	CMK243PAR□S36
Maximum Holding Torque	N·m (lb-in)	0.2 (1.77)	0.4 (3.5)	0.5 (4.4)	0.56 (4.9)	0.8 (7)	
Holding Torque at Motor Standstill	Power ON 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·m² (oz-in²)	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	7.2	9	10	18	36
Permissible Torque	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					

● Enter the encoder code (**15**, **16**, **25** or **26**) in the box (□) within the model name.

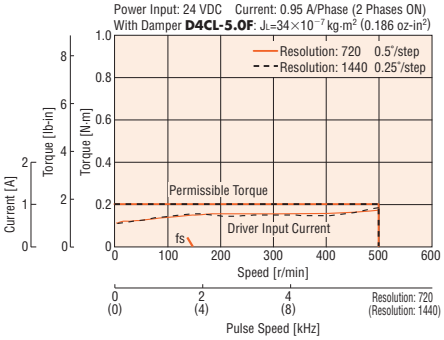
Notes

● Backlash value is approximately 1 to 2°.

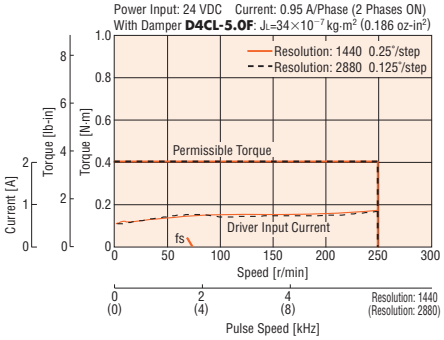
● Direction of rotation of the motor and that of the gear output shaft are the same for gear ratios 3.6, 7.2, 9 and 10. It is the opposite for 18 and 36 gear ratios.

Speed – Torque Characteristics

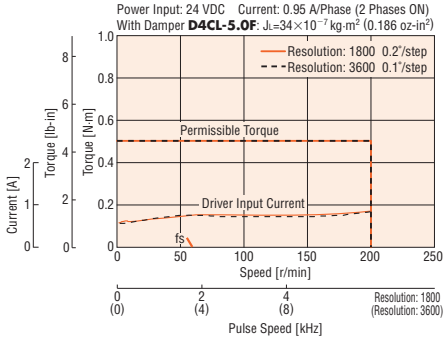
CMK243 Gear Ratio 3.6



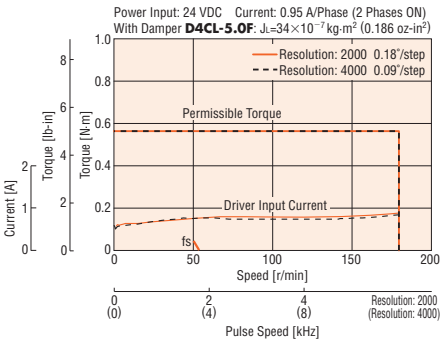
CMK243 Gear Ratio 7.2



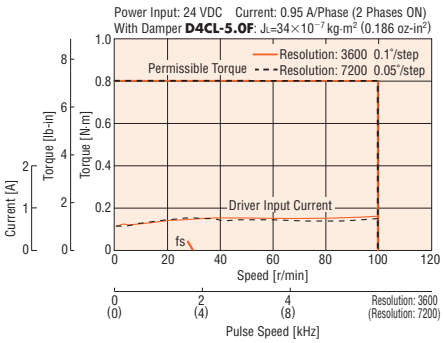
CMK243 Gear Ratio 9



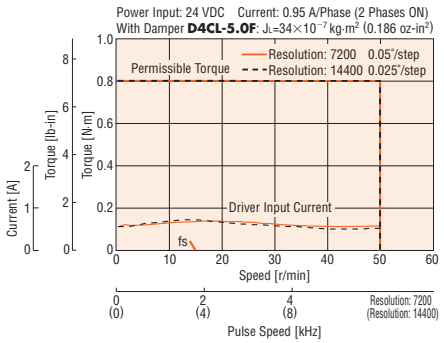
CMK243 Gear Ratio 10



CMK243 Gear Ratio 18



CMK243 Gear Ratio 36



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

Note

● Pay attention to heat dissipation from the 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).

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
	With Encoder	CMK264PAR□S3.6	CMK264PAR□S7.2	CMK264PAR□S9	CMK264PAR□S10	CMK264PAR□S18	CMK264PAR□S36
Maximum Holding Torque	N·m (lb-in)	1 (8.8)	2 (17.7)	2.5 (22)	2.7 (23)	3 (26)	4 (35)
Holding Torque at Motor Standstill	Power ON N·m (lb-in)	0.56 (4.9)	1.1 (9.7)	1.4 (12.3)	1.5 (13.2)	3 (26)	4 (35)
Rotor Inertia	J: kg·m² (oz-in²)	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	7.2	9	10	18	36
Permissible Torque	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					

● Enter the encoder code (**15**, **16**, **25** or **26**) in the box (□) within the model name.

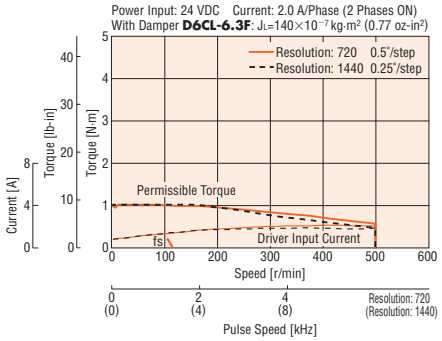
Notes

● Backlash value is approximately 1 to 2°.

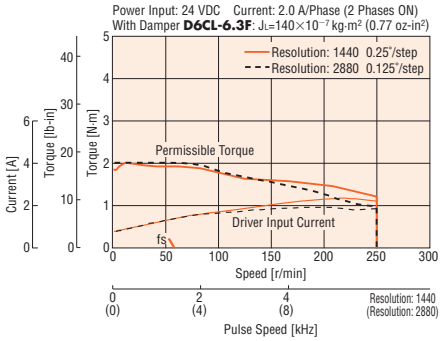
● Direction of rotation of the motor and that of the gear output shaft are the same for gear ratios 3.6, 7.2, 9 and 10. It is the opposite for 18 and 36 gear ratios.

Speed – Torque Characteristics

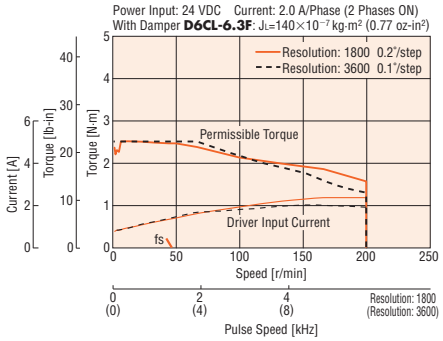
CMK264 Gear Ratio 3.6



CMK264 Gear Ratio 7.2



CMK264 Gear Ratio 9



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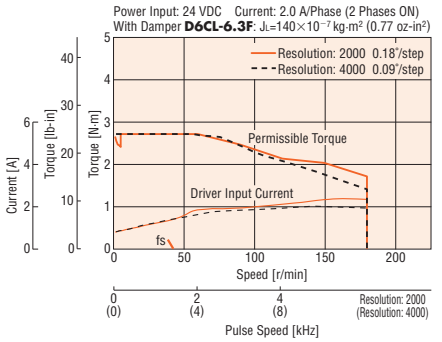
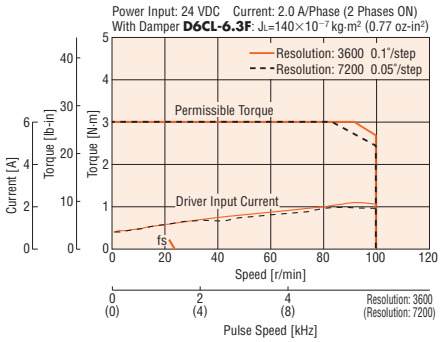
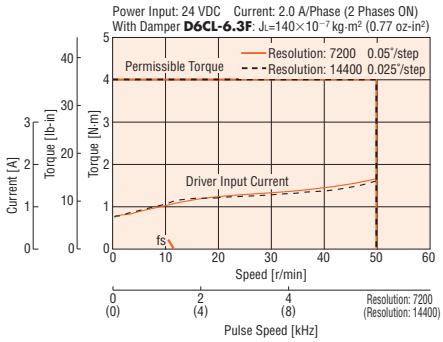


CMK264 Gear Ratio 18



CMK264 Gear Ratio 36



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

Note

● Pay attention to heat dissipation from the 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).

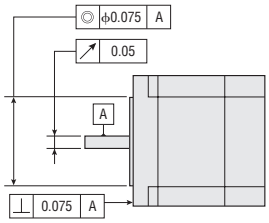
Driver Specifications

Input Signals	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 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, Photocoupler ON: CW, Photocoupler OFF: CCW (CCW 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 Motor moves one step when the pulse input is switched from photocoupler 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 manually. When in the "photocoupler OFF" state, the current is supplied to the motor.
	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 msec).
Output Signal	Output Mode	Photocoupler, Open-collector output External use condition: 24 VDC maximum, 10 mA maximum
	Excitation Timing Signal	The signal is output every time the excitation sequence returns to the initial stage "0." (Photocoupler: ON) •Step Angle 1.8° High-torque type, Step Angle 1.8° standard type 1.8°/step [Microsteps/step: 1 (Resolution: 200)]: Signal is output every 4 pulses 0.45°/step [Microsteps/step: 4 (Resolution: 800)]: Signal is output every 16 pulses •Step Angle 0.9° Standard Type 0.9°/step [Microsteps/step: 1 (Resolution: 400)]: Signal is output every 4 pulses 0.225°/step [Microsteps/step: 4 (Resolution: 1600)]: Signal is output every 16 pulses •**SH** geared type (gear ratio 18) 0.1°/step [Microsteps/step: 1 (Resolution: 3600)]: Signal is output every 4 pulses 0.025°/step [Microsteps/step: 4 (Resolution: 14400)]: Signal is output every 16 pulses
Functions		Automatic current cutback, Step angle select, Pulse input mode switch, All windings off, Excitation timing
Cooling Method		Natural ventilation

General Specifications

Item		Motor	Driver
Thermal Class		130 (B)	–
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 kVAC at 50 Hz or 60 Hz applied between the windings and the case for 1 minute under normal ambient temperature and humidity. [0.5 kVAC for models with frame size 42 mm (1.65 in.) or smaller]	–
Operating Environment	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 is 80°C (144°F) or less measured by the resistance change method. (at rated voltage, at standstill, two phases energized)	–
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

→ Page A-14

Encoder Specifications

→ Page A-17

Dimensions Unit = mm (in.)

The dimensions of a motor with an encoder can be found on page A-19 or at www.orientalmotor.com.

Motor

◇Step Angle 1.8° High-Torque Type

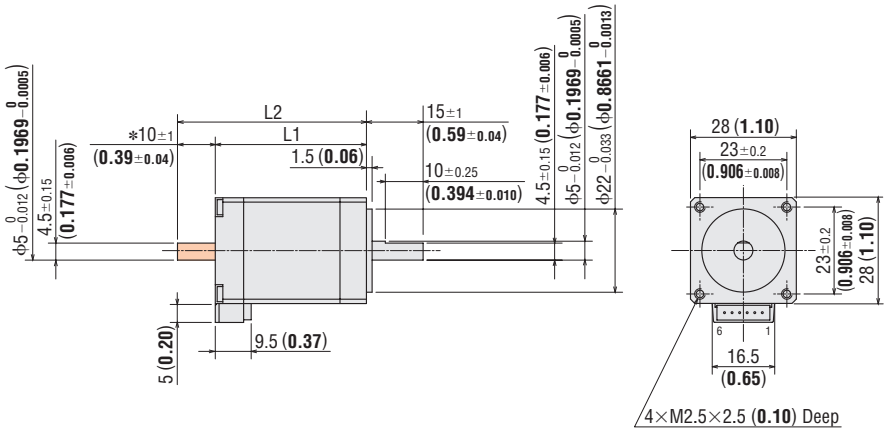
Motor Frame Size 28 mm (1.10 in.)

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

A connection cable of 0.6 m (2 ft.) is included with the package. UL Style 3265, AWG24
If you are purchasing only a motor for maintenance purposes, etc., the connection cable and connector will not be supplied. They must be purchased separately.

➜ Page A-406

- Applicable Connector
  Connector housing: 51065-0600 (MOLEX)
  Contact: 50212-8100 (MOLEX)
  Crimp tool: 57176-5000 (MOLEX)



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

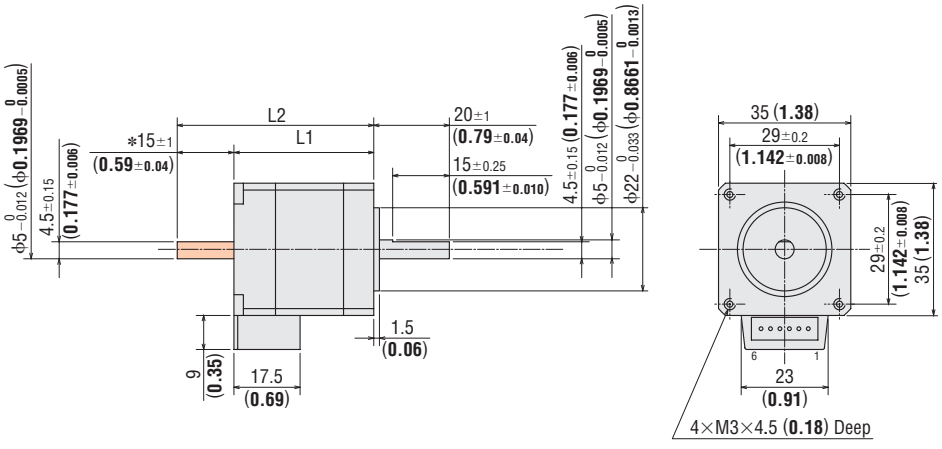
Motor Frame Size 35 mm (1.38 in.)

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

A connection cable of 0.6 m (2 ft.) is included with the package. UL Style 3265, AWG24
If you are purchasing only a motor for maintenance purposes, etc., the connection cable and connector will not be supplied. They must be purchased separately.

➜ Page A-406

- Applicable Connector
  Connector housing: 51103-0600 (MOLEX)
  Contact: 50351-8100 (MOLEX)
  Crimp tool: 57295-5000 (MOLEX)



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

- These dimensions are for the double shaft models. For the single shaft models, ignore the orange (▭) areas.
- The dimensions of a motor with an encoder can be found on page A-19 or at www.orientalmotor.com.

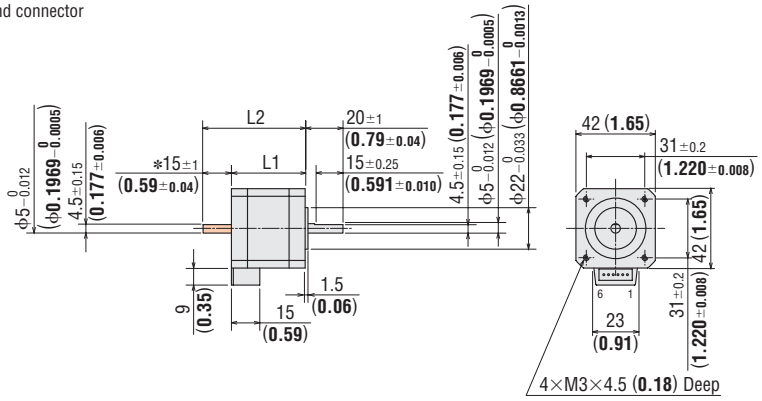
Motor Frame Size 42 mm (1.65 in.)

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

A connection cable of 0.6 m (2 ft.) is included with the package. UL Style 3265, AWG24
If you are purchasing only a motor for maintenance purposes, etc., the connection cable and connector will not be supplied. They must be purchased separately.

➜ Page A-406

● Applicable Connector
Connector housing: 51103-0600 (MOLEX)
Contact: 50351-8100 (MOLEX)
Crimp tool: 57295-5000 (MOLEX)



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

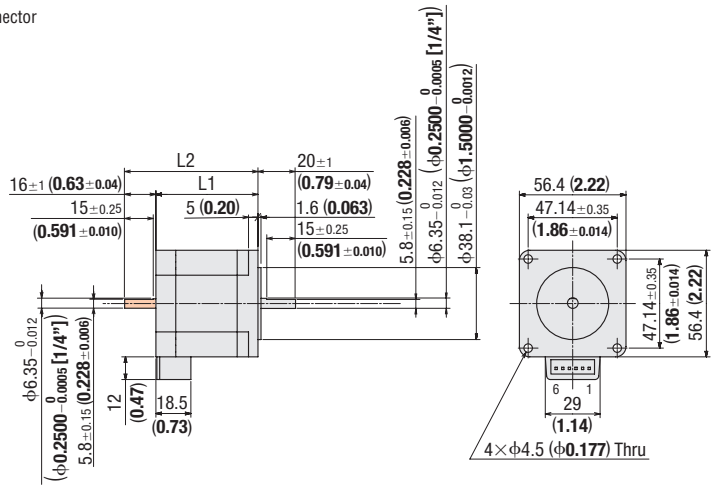
Motor Frame Size 56.4 mm (2.22 in.)

Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
CMK264PAPA	PK264PAA	39 (1.54)	–	0.46 (1.01)	B443U
CMK264PBPA	PK264PBA		55 (2.17)		
CMK266PAPA	PK266PAA	54 (2.13)	–	0.73 (1.61)	B444U
CMK266PBPA	PK266PBA		70 (2.76)		
CMK268PAPA	PK268PAA	76 (2.99)	–	1.1 (2.42)	B445U
CMK268PBPA	PK268PBA		92 (3.62)		

A connection cable of 0.6 m (2 ft.) is included with the package. UL Style 3265, AWG24
If you are purchasing only a motor for maintenance purposes, etc., the connection cable and connector will not be supplied. They must be purchased separately.

➜ Page A-406

● Applicable Connector for Motor:
Connector housing: 51067-0600 (MOLEX)
Contact: 50217-9101 (MOLEX)
Crimp tool: 57189-5000 (MOLEX) or 57190-5000 (MOLEX)

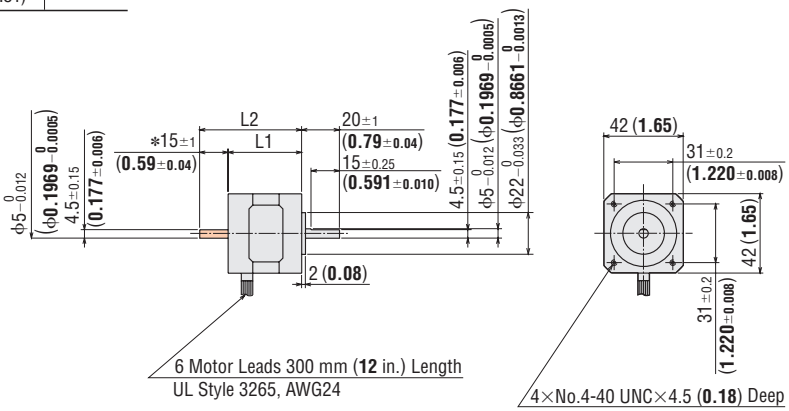


● These dimensions are for the double shaft models. For the single shaft models, ignore the orange (▭) areas.
● The dimensions of a motor with an encoder can be found on page A-19 or at www.orientalmotor.com.

◇Step Angle 0.9° Standard Type, Step Angle 1.8° Standard Type

Motor Frame Size 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		48 (1.89)	0.21 (0.46)	
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		54 (2.13)	0.27 (0.59)	
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		62 (2.44)	0.35 (0.77)	
CMK245MBPA	PK245MBA			0.37 (0.81)	

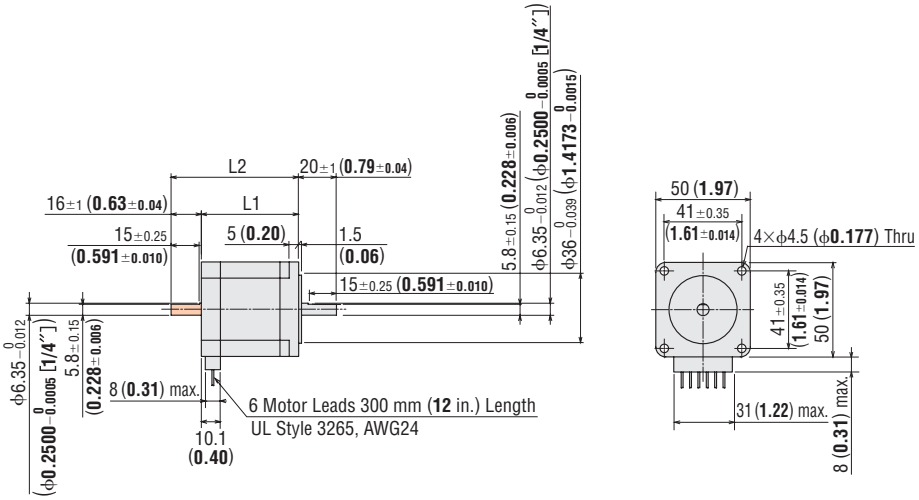


∗The length of machining on the double shaft model is 15±0.25 (0.591±0.010).

◇Step Angle 1.8° Standard Type

Motor Frame Size 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)	B334
CMK258BP	PK258-02B		97 (3.82)		

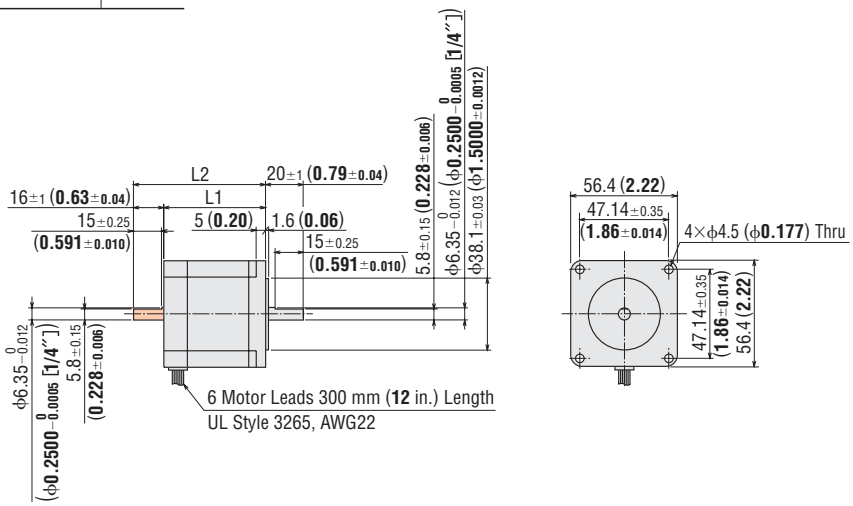


- These dimensions are for the double shaft models. For the single shaft models, ignore the orange ( ) areas.
- The dimensions of a motor with an encoder can be found on page A-19 or at www.orientalmotor.com.

◇Step Angle 0.9° and 1.8° Standard Type

Motor Frame Size 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				



◇SH Geared Type

Motor Frame Size 28 mm (1.10 in.)

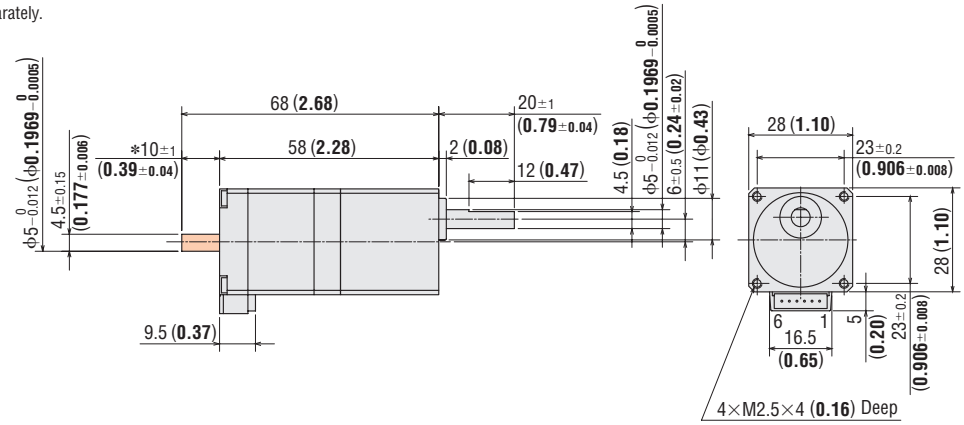
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
CMK223AP-SG□	PK223PA-SG□	**7.2**, **9**, **10**, **18**, **36**	0.16 (0.35)	B335
CMK223BP-SG□	PK223PB-SG□			

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

A connection cable of 0.6 m (2 ft.) is included with the package. UL Style 3265, AWG24
If you are purchasing only a motor for maintenance purposes, etc., the connection cable and connector will not be supplied. They must be purchased separately.

→ Page A-406

- 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 the double shaft model is 10±0.25 (0.394±0.010).

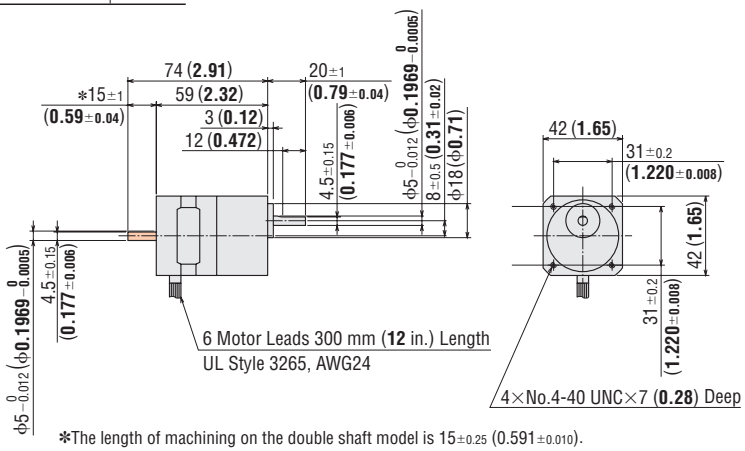
- These dimensions are for the double shaft models. For the single shaft models, ignore the orange (▭) areas.
- The dimensions of a motor with an encoder can be found on page A-19 or at www.orientalmotor.com.

Motor Frame Size 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 Length 10 mm (0.39 in.) ··· 4 pieces



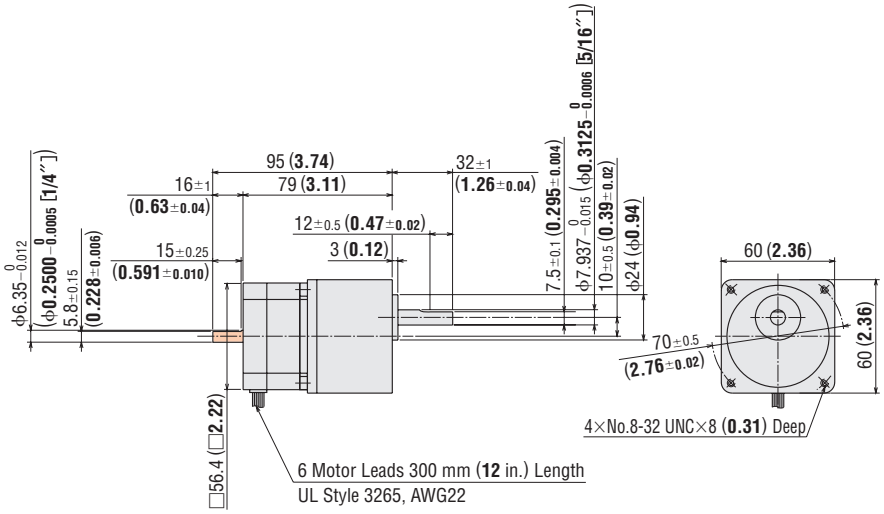
∗The length of machining on the double shaft model is 15±0.25 (0.591±0.010).

Motor Frame Size 60 mm (2.36 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
CMK264APA-SG☐	PK264A2A-SG☐	**3.6**, **7.2**, **9**, **10**, **18**, **36**	0.75 (1.65)	B092U
CMK264BPA-SG☐	PK264B2A-SG☐			

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

● Screws (Included)
No.8-32 UNC Length 15.8 mm (0.62 in.) ··· 4 pieces



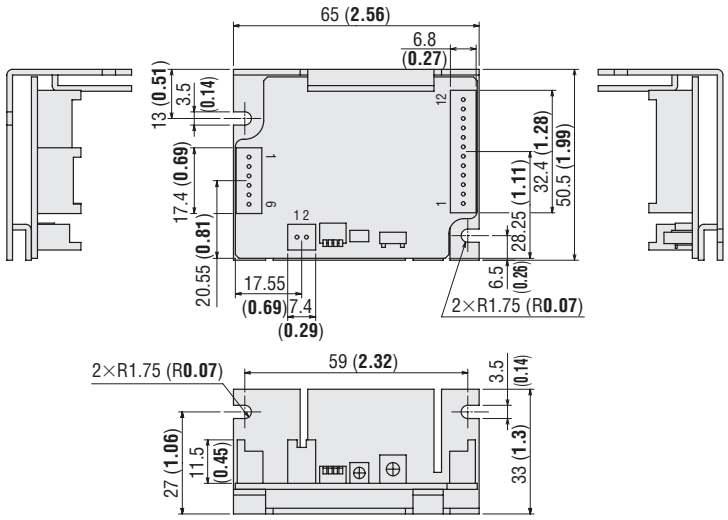
● These dimensions are for the double shaft models. For the single shaft models, ignore the orange (▭) areas.
● The dimensions of a motor with an encoder can be found on page A-19 or at www.orientalmotor.com.

Driver

CMD2109P, CMD2112P, CMD2120P

Mass: 0.05 kg (0.11 lb.)

DXF B441



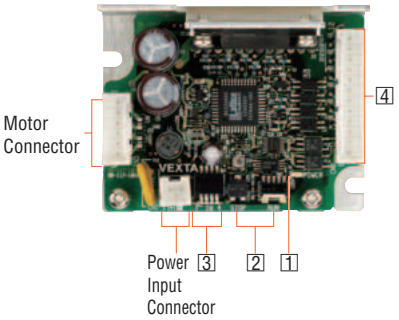
- Connector Housing (Included)
  - 51103-0200 (MOLEX)
  - 51103-1200 (MOLEX)
  - 51103-0600 (MOLEX)
- Contact (Included)
  - 50351-8100 (MOLEX)

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.
  Connection cable set crimped with connector is available (sold separately). ➜ Page A-406

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 Switches

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

3 Function Select Switches

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 Switches

SW-2	SW-3	SW-4	Microsteps/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

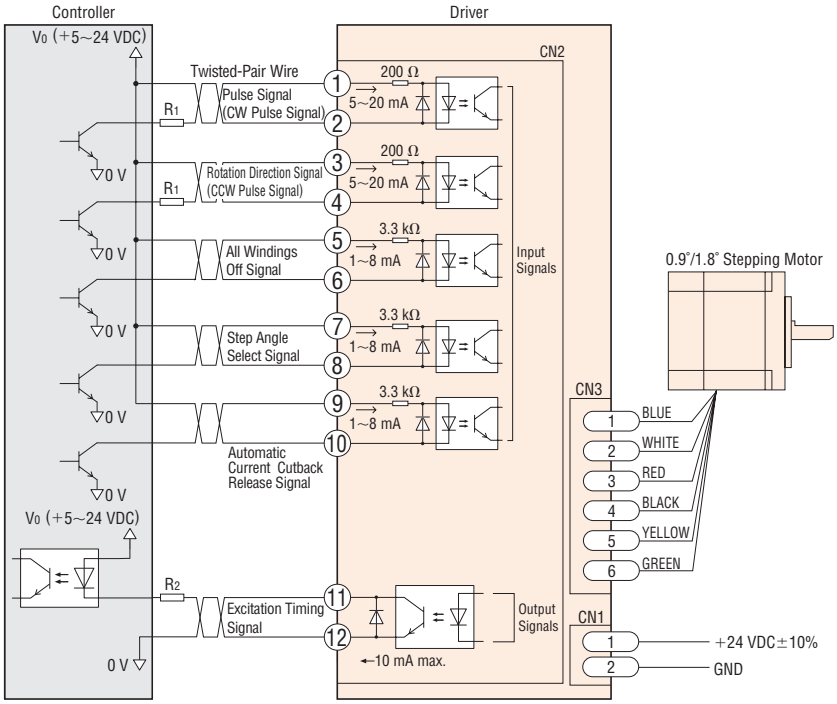
- Use of any setting other than the combinations listed in the table will automatically set the microstep to "1" and the motor will operate at the basic step angle.
- The step angle is calculated by dividing the basic step angle by the number of microsteps. The above figures are based on a basic step angle of 1.8°.
- With the step angle 0.9° standard type, the resolution is 400 (microsteps/step 1).
- If you are using a geared type, the step angle divided by the gear ratio becomes the actual step angle.
- 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 "Step Angle Select" (CS) 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" (CS) signal input is OFF and the "Excitation Timing" (TIM) signal output is ON.

4 Input/Output Signals

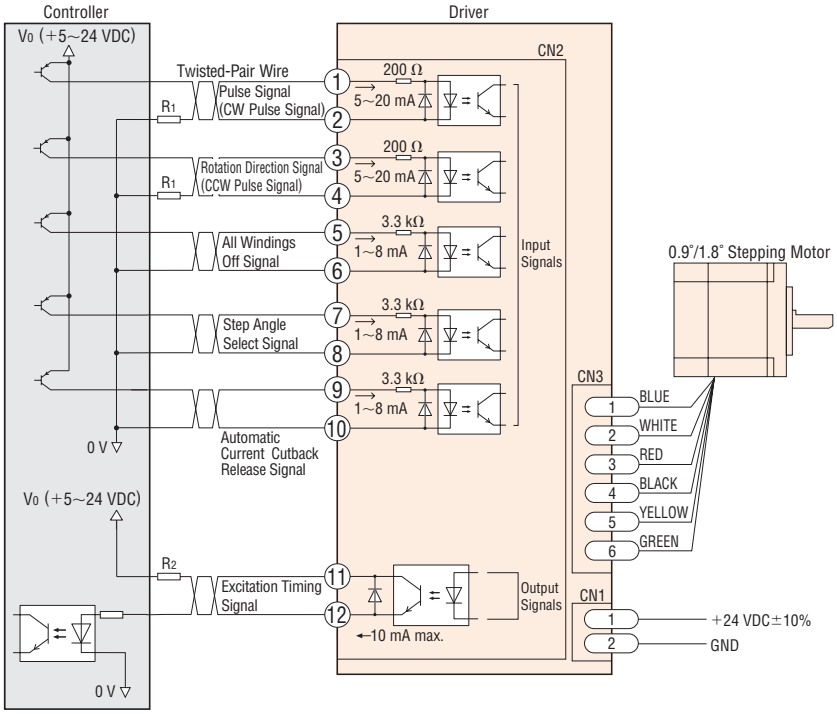
Indication	Input/ Output	Pin No.	Signal Name	Function
CN2	Input	1	Pulse signal (CW pulse signal)	Operation command pulse signal (The motor will rotate in the CW direction when in 2-pulse input mode.)
		2		
		3	Rotation direction signal (CCW pulse signal)	Rotation direction signal Photocoupler ON: CW, Photocoupler OFF: CCW (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 manually.
		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	11	Excitation timing signal	Outputs signals when the excitation sequence is at STEP "0."
		12		

●Connection Diagram

◇Current Sink Output Circuit



◇Current Source Output Circuit



◇Input/Output Signals Connection

Input Signal

- Pulse (CW) Signal, Rotation Direction (CCW) Signal
  Signals can be connected directly when 5 VDC is supplied. If the signals are used at a voltage exceeding 5 VDC, be sure to provide an external resistor to prevent the current exceeding 20 mA from flowing.
  Example: If the voltage is 24 VDC, connect a resistor (R_1) of 1.5 to 2.2 kV 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

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. When the current is above 10 mA, connect an external resistor R_2.

- Use twisted-pair wires of AWG24~22 and keep wiring as short as possible [within 2 m (6.6 ft.)].
- Note that as the length of the pulse signal line increases, the maximum transmission frequency decreases.
  Technical reference ➜ Page G-44
- Provide a minimum distance of 20 mm (0.79 in.) between the signal lines and power lines (AC lines, motor lines and other large-current circuits). Do not run the signal lines in the same duct as power lines or bundle them with power lines.

◇Power Supply Connection

- Use wires of AWG22 or thicker for power supply lines.
- Incorrect connection of DC power input will lead to driver damage. Make sure that the polarity is correct before turning power on.

◇Extension of Motor Cable

- Use a wire of AWG22 or thicker.

◇General

- A separate hand crimp tool is required to crimp the included connector and lead wire. The accessory driver cable set (sold separately) comes with all lead wires already crimped.
- If noise generated by the motor cable or power supply cable causes a problem with the specific wiring or layout, shield the cable or use ferrite cores.

List of Motor and Driver Combinations

Type	Model	Motor Model	Driver Model
Step Angle 0.9° Standard Type	**CMK243M□PA**	PK243M□A	CMD2109P
	CMK244M□PA	PK244M□A	CMD2112P
	CMK245M□PA	PK245M□A	
	CMK264M□P	PK264M□	CMD2120P
	CMK266M□P	PK266M□	
	CMK268M□P	PK268M□	
Step Angle 0.9° Standard Type with Encoder	**CMK243MAPA-R15**	PK243MAAR15	CMD2109P
	CMK243MAPA-R16	PK243MAAR16	
	CMK243MAPA-R25	PK243MAAR25	
	CMK243MAPA-R26	PK243MAAR26	
	CMK244MAPA-R15	PK244MAAR15	CMD2112P
	CMK244MAPA-R16	PK244MAAR16	
	CMK244MAPA-R25	PK244MAAR25	
	CMK244MAPA-R26	PK244MAAR26	
	CMK245MAPA-R15	PK245MAAR15	
	CMK245MAPA-R16	PK245MAAR16	
	CMK245MAPA-R25	PK245MAAR25	
	CMK245MAPA-R26	PK245MAAR26	
	CMK264MAP-R15	PK264MAR15	CMD2120P
	CMK264MAP-R16	PK264MAR16	
	CMK264MAP-R25	PK264MAR25	
	CMK264MAP-R26	PK264MAR26	
	CMK266MAP-R15	PK266MAR15	
	CMK266MAP-R16	PK266MAR16	
	CMK266MAP-R25	PK266MAR25	
	CMK266MAP-R26	PK266MAR26	
	CMK268MAP-R15	PK268MAR15	
	CMK268MAP-R16	PK268MAR16	
	CMK268MAP-R25	PK268MAR25	
	CMK268MAP-R26	PK268MAR26	
Step Angle 1.8° High-Torque Type	**CMK223P□P**	PK223P□*	CMD2109P
	CMK224P□P	PK224P□*	
	CMK225P□P	PK225P□*	
	CMK233P□P	PK233P□*	CMD2112P
	CMK235P□P	PK235P□*	
	CMK244P□P	PK244P□*	
	CMK246P□P	PK246P□*	
	CMK264P□PA	PK264P□A*	CMD2120P
	CMK266P□PA	PK266P□A*	
	CMK268P□PA	PK268P□A*	
Step Angle 1.8° High-Torque Type with Encoder	**CMK223PAP-R15**	PK223PAR15	CMD2109P
	CMK224PAP-R15	PK224PAR15	
	CMK225PAP-R15	PK225PAR15	
	CMK233PAP-R15	PK233PAR15	CMD2112P
	CMK233PAP-R16	PK233PAR16	
	CMK233PAP-R25	PK233PAR25	
	CMK233PAP-R26	PK233PAR26	
	CMK235PAP-R15	PK235PAR15	
	CMK235PAP-R16	PK235PAR16	
	CMK235PAP-R25	PK235PAR25	
	CMK235PAP-R26	PK235PAR26	
	CMK244PAP-R15	PK244PAR15	
	CMK244PAP-R16	PK244PAR16	
	CMK244PAP-R25	PK244PAR25	
	CMK244PAP-R26	PK244PAR26	
	CMK246PAP-R15	PK246PAR15	
	CMK246PAP-R16	PK246PAR16	
	CMK246PAP-R25	PK246PAR25	
	CMK246PAP-R26	PK246PAR26	
	CMK264PAPA-R15	PK264PAAR15	CMD2120P
	CMK264PAPA-R16	PK264PAAR16	
	CMK264PAPA-R25	PK264PAAR25	
	CMK264PAPA-R26	PK264PAAR26	
	CMK266PAPA-R15	PK266PAAR15	
	CMK266PAPA-R16	PK266PAAR16	
	CMK266PAPA-R25	PK266PAAR25	
	CMK266PAPA-R26	PK266PAAR26	
	CMK268PAPA-R15	PK268PAAR15	
	CMK268PAPA-R16	PK268PAAR16	
	CMK268PAPA-R25	PK268PAAR25	
	CMK268PAPA-R26	PK268PAAR26	

Type	Model	Motor Model	Driver Model
Step Angle 1.8° Standard Type	**CMK243□PA**	PK243-01□A	CMD2109P
	CMK244□PA	PK244-01□A	CMD2112P
	CMK245□PA	PK245-01□A	
	CMK256□P	PK256-02□	CMD2120P
	CMK258□P	PK258-02□	
	CMK264□P	PK264-02□	
	CMK266□P	PK266-02□	
	CMK268□P	PK268-02□	
Step Angle 1.8° Standard Type with Encoder	**CMK243APA-R15**	PK243-01AAR15	CMD2109P
	CMK243APA-R16	PK243-01AAR16	
	CMK243APA-R25	PK243-01AAR25	
	CMK243APA-R26	PK243-01AAR26	
	CMK244APA-R15	PK244-01AAR15	CMD2112P
	CMK244APA-R16	PK244-01AAR16	
	CMK244APA-R25	PK244-01AAR25	
	CMK244APA-R26	PK244-01AAR26	
	CMK245APA-R15	PK245-01AAR15	
	CMK245APA-R16	PK245-01AAR16	
	CMK245APA-R25	PK245-01AAR25	
	CMK245APA-R26	PK245-01AAR26	
	CMK256AP-R15	PK256-02AR15	CMD2120P
	CMK256AP-R16	PK256-02AR16	
	CMK256AP-R25	PK256-02AR25	
	CMK256AP-R26	PK256-02AR26	
	CMK258AP-R15	PK258-02AR15	
	CMK258AP-R16	PK258-02AR16	
	CMK258AP-R25	PK258-02AR25	
	CMK258AP-R26	PK258-02AR26	
	CMK264AP-R15	PK264-02AR15	
	CMK264AP-R16	PK264-02AR16	
	CMK264AP-R25	PK264-02AR25	
	CMK264AP-R26	PK264-02AR26	
	CMK266AP-R15	PK266-02AR15	
	CMK266AP-R16	PK266-02AR16	
	CMK266AP-R25	PK266-02AR25	
	CMK266AP-R26	PK266-02AR26	
	CMK268AP-R15	PK268-02AR15	
	CMK268AP-R16	PK268-02AR16	
	CMK268AP-R25	PK268-02AR25	
	CMK268AP-R26	PK268-02AR26	

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

✻ If you are purchasing only a motor for maintenance purpose, etc., a connection cable will not be supplied. They must be purchased separately.
They are available as accessories.

Connection Cable ➜ Page A-406

Type	Model	Motor Model	Driver Model
SH Geared Type	**CMK223□P-SG7.2**	PK223P□-SG7.2*	CMD2109P
	CMK223□P-SG9	PK223P□-SG9*	
	CMK223□P-SG10	PK223P□-SG10*	
	CMK223□P-SG18	PK223P□-SG18*	
	CMK223□P-SG36	PK223P□-SG36*	
	CMK243□PA-SG3.6	PK243□1A-SG3.6	
	CMK243□PA-SG7.2	PK243□1A-SG7.2	
	CMK243□PA-SG9	PK243□1A-SG9	
	CMK243□PA-SG10	PK243□1A-SG10	
	CMK243□PA-SG18	PK243□1A-SG18	
	CMK243□PA-SG36	PK243□1A-SG36	
	CMK264□PA-SG3.6	PK264□2A-SG3.6	CMD2120P
	CMK264□PA-SG7.2	PK264□2A-SG7.2	
	CMK264□PA-SG9	PK264□2A-SG9	
	CMK264□PA-SG10	PK264□2A-SG10	
	CMK264□PA-SG18	PK264□2A-SG18	
	CMK264□PA-SG36	PK264□2A-SG36	
SH Geared Type with Encoder	**CMK223PR15S7.2**	PK223PAR15S7.2	CMD2109P
	CMK223PR15S9	PK223PAR15S9	
	CMK223PR15S10	PK223PAR15S10	
	CMK223PR15S18	PK223PAR15S18	
	CMK223PR15S36	PK223PAR15S36	
	CMK243PAR15S3.6	PK243A1AR15S3.6	
	CMK243PAR16S3.6	PK243A1AR16S3.6	
	CMK243PAR25S3.6	PK243A1AR25S3.6	
	CMK243PAR26S3.6	PK243A1AR26S3.6	
	CMK243PAR15S7.2	PK243A1AR15S7.2	
	CMK243PAR16S7.2	PK243A1AR16S7.2	
	CMK243PAR25S7.2	PK243A1AR25S7.2	
	CMK243PAR26S7.2	PK243A1AR26S7.2	
	CMK243PAR15S9	PK243A1AR15S9	
	CMK243PAR16S9	PK243A1AR16S9	
	CMK243PAR25S9	PK243A1AR25S9	
	CMK243PAR26S9	PK243A1AR26S9	
	CMK243PAR15S10	PK243A1AR15S10	
	CMK243PAR16S10	PK243A1AR16S10	
	CMK243PAR25S10	PK243A1AR25S10	
	CMK243PAR26S10	PK243A1AR26S10	
	CMK243PAR15S18	PK243A1AR15S18	
	CMK243PAR16S18	PK243A1AR16S18	
	CMK243PAR25S18	PK243A1AR25S18	
	CMK243PAR26S18	PK243A1AR26S18	
	CMK243PAR15S36	PK243A1AR15S36	
	CMK243PAR16S36	PK243A1AR16S36	
	CMK243PAR25S36	PK243A1AR25S36	
	CMK243PAR26S36	PK243A1AR26S36	
	CMK264PAR15S3.6	PK264A2AR15S3.6	CMD2120P
	CMK264PAR16S3.6	PK264A2AR16S3.6	
	CMK264PAR25S3.6	PK264A2AR25S3.6	
	CMK264PAR26S3.6	PK264A2AR26S3.6	
	CMK264PAR15S7.2	PK264A2AR15S7.2	
	CMK264PAR16S7.2	PK264A2AR16S7.2	
	CMK264PAR25S7.2	PK264A2AR25S7.2	
	CMK264PAR26S7.2	PK264A2AR26S7.2	
	CMK264PAR15S9	PK264A2AR15S9	
	CMK264PAR16S9	PK264A2AR16S9	
	CMK264PAR25S9	PK264A2AR25S9	
	CMK264PAR26S9	PK264A2AR26S9	
	CMK264PAR15S10	PK264A2AR15S10	
	CMK264PAR16S10	PK264A2AR16S10	
	CMK264PAR25S10	PK264A2AR25S10	
	CMK264PAR26S10	PK264A2AR26S10	
	CMK264PAR15S18	PK264A2AR15S18	
	CMK264PAR16S18	PK264A2AR16S18	
	CMK264PAR25S18	PK264A2AR25S18	
	CMK264PAR26S18	PK264A2AR26S18	
	CMK264PAR15S36	PK264A2AR15S36	
	CMK264PAR16S36	PK264A2AR16S36	
	CMK264PAR25S36	PK264A2AR25S36	
	CMK264PAR26S36	PK264A2AR26S36	

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Connection Cable ➜ Page A-406