# (RoHS) RoHS-Compliant Closed Loop Stepping Motor and Driver Package **XSTEP ASC Series**

The  $\mathcal{X}_{STEP}$  utilizes our unique closed loop control. This is a motor and driver package product offering the user-friendliness of a stepping motor combined with improved response and reliability. Additional Information echnical reference → Page F-1 Safety standards → Page G-2

CHU'S CE

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



○ *Qstep* Angle – Torque Characteristics

*Aster* ---Stepping Motor

# Features

#### Incorporating Our Unique Closed Loop Control

This product uses our closed loop control to maintain positioning operation even during abrupt load fluctuations and accelerations. The rotor position detection sensor monitors the rotation. When an overload condition is detected, it will instantaneously regain control using the closed loop mode.

When an overload condition continues it will output an alarm signal, thereby providing reliability equal to that of a servo motor.

#### *Ostep* is designed as a "package" consisting of a motor and a driver.



#### 



Normal (Positioning deviation is less than ±1.8') Motor runs in open loop mode like a stepping motor

During Overload Condition (Positioning deviation is  $\pm 1.8^{\circ}$  or more) The closed loop mode is engaged to maintain the positioning operation.  $\diamondsuit$ The Sensor to Detect Rotor's Position

-7.2° -5.4° -3.6° -1.8°

Torque

The  $\alpha_{\text{step}}$  rotor position detection sensor uses the change in inductance caused by change in the distance between the stator teeth and the teeth on the sensor rotor to detect rotor position.

0 Position

(D)If the positioning deviation is less than ±1.8°, the motor runs in open loop mode like a stepping motor.
 (2)If the positioning deviation is ±1.8° or more, the motor runs in closed loop mode and the position is corrected by exciting the motor windings to generate maximum torque based on the rotor

1.8° 3.6° 5.4° 7.2°

#### Features

- This structure can be made small and thin, so the overall size of the motor can be reduced.
- High resolution
- This structure does not use electronic parts, so it is not affected by heat or vibration.



# **Stepping Motors**

Accessories

Installatio

# High Response

Like conventional stepping motors,  $\mathcal{C}_{STEP}$  operates in synchronism with command pulses. This makes possible short stroke positioning in a short time.



Measurement Condition: Feed 1/5 rotation Load inertia  $250 \times 10^{-7} \text{ kg} \cdot \text{m}^2 \text{ (J)}$  (1.365 oz-in<sup>2</sup>)

# No Gain Tuning

Gain tuning for servo motors is critical, troublesome and timeconsuming. Since the  $\mathcal{A}_{STEP}$  operates like a stepping motor, there are no gain tuning requirements.  $\mathcal{A}_{STEP}$  is ideal for low rigidity applications, such as belt and pulley systems.



# The *X*<sub>STEP</sub> Complies with Major Safety Standards

The **ASC** Series is recognized by the UL/CSA Standards and conforms to EN Standards. The CE Marking certifies compliance with the EMC Directives.

# No Hunting

Since  $\alpha_{\text{STEP}}$  is a stepping motor, it has no hunting problem. Therefore, when it stops, its position is completely stable and does not fluctuate.  $\alpha_{\text{STEP}}$  is ideal for applications in which hunting would be a problem.



# Low Vibration at Low Speed

The driver employs advanced technology that produces smoothness comparable to a microstep driver. Its vibration level is incredibly low, even when operating in the low speed range. When frequent changes from low to high (or vice versa) speed operations are required, the use of the Resolution Select Function solves the problem. *Qstep* provides resolution as high as 0.036° per step without any damping mechanism or other mechanical device.



OCSTEP is well-suited to applications where smooth movement or stability is required, such as where a camera is used to monitor the quality of a product.

# Motor/Driver Connection with a Single Cable

 $\mathcal{X}_{\text{STEP}}$  requires only one cable for connection between the motor and the driver. Wiring is much simpler compared with conventional servo motors requiring two cables, one for motor and the other for encoder. The cable can be extended to a maximum of 10 m (32.8 ft.) (including flexible extension cable), so the motor and the driver can be installed in locations far apart.

# RoHS RoHS-Compliant

The *Qstep* conforms to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium. ● Details of RoHS Directive → Page G-38

# System Configuration

#### Standard Type

An example of a single-axis system configuration with the EMP400 Series controller.



Product Name	Overview	Page
Controller	This controller outputs pulse commands that determine the rotation amount and rotating speed.	C-269
Motor Mounting Brackets	Dedicated mounting bracket for the motor.	C-312
Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	C-302
Extension Cables	Cable for extending the wiring distance between the motor and driver [1 to 10 m (3.3 to 32.8 ft.)].	0.007
Flexible Extension Cables	Cable offering flexibility, used to extend the wiring distance between the motor and driver [1 to 10 m (3.3 to 32.8 ft.)].	6-297
Driver Cables General-Purpose Type	General-purpose cable for connecting the driver and controller [1 m, 2 m (3.3 ft., 6.6 ft.)].	C-300
Connector – Terminal Block Conversion Unit	Set of terminal block and cable (CC36T1) for connecting the driver and controller [1 m (3.3 ft.)].	C-301
Driver Cables EMP Series Dedicated Type	Dedicated cable with connector for connecting the driver and EMP Series controller [1 m, 2 m (3.3 ft., 6.6 ft.)].	C-300
Connector – Terminal Block Conversion Unit	Set of terminal block and cable ( <b>CC50T1</b> ) for connecting the <b>EMP</b> Series controller and host controller [1 m (3.3 ft.)].	C-318
	Product Name Controller Motor Mounting Brackets Flexible Couplings Extension Cables Flexible Extension Cables Driver Cables General-Purpose Type Connector – Terminal Block Conversion Unit Driver Cables <b>EMP</b> Series Dedicated Type Connector – Terminal Block Conversion Unit	Product NameOverviewControllerThis controller outputs pulse commands that determine the rotation amount and rotating speed.Motor Mounting BracketsDedicated mounting bracket for the motor.Flexible CouplingsCoupling that connects the motor shaft to the driven shaft.Extension CablesCable for extending the wiring distance between the motor and driver [1 to 10 m (3.3 to 32.8 ft.)].Flexible Extension CablesCable offering flexibility, used to extend the wiring distance between the motor and driver [1 to 10 m (3.3 to 32.8 ft.)].Driver Cables General-Purpose TypeGeneral-purpose cable for connecting the driver and controller [1 m, 2 m (3.3 ft., 6.6 ft.)].Connector - Terminal Block Conversion UnitSet of terminal block and cable (CC36T1) for connecting the driver and controller [1 m, 2 m (3.3 ft., 6.6 ft.)].Connector - Terminal Block Conversion UnitSet of terminal block and cable (CC50T1) for connecting the EMP Series controller [1 m, 2 m (3.3 ft.)].Connector - Terminal Block Conversion UnitSet of terminal block and cable (CC50T1) for connecting the EMP Series controller [1 m (3.3 ft.)].

#### •Example of System Configuration

ASC66AK	•	EMP401-1	CC03AIP	PAL2P-5A	MCS300808	CC01EMP4	CC50T1
<b>CASTEP ASC</b> Series	+	Controller	Extension Cable [3 m (9.8 ft.)]	Motor Mounting Bracket	Flexible Coupling	Driver Cable <b>EMP</b> Series Dedicated Type [1 m (3.3 ft.)]	Connecter – Terminal Block Conversion Unit [1 m (3.3 ft.)]
		(oold separately)					

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

**Stepping Motors** 

# System Configuration

#### Standard Type with Electromagnetic Brake

An example of a single-axis system configuration with the EMP400 Series controller.



Example of System	em Configuration (Sold separately)		(Sold separately)				
<b><i>Q</i>STEP ASC</b> Series	Extension Cable for Electromagnetic Brake Motor [3 m (9.8 ft.)]	+	Controller	Motor Mounting Bracket	Flexible Coupling	Driver Cable <b>EMP</b> Series Dedicated Type [1 m (3.3 ft.)]	Connecter – Terminal Block Conversion Unit [1 m (3.3 ft.)]
ASC66MK	CC03AIPM	•	EMP401-1	PAL2P-5A	MCS300808	CC01EMP4	CC50T1

(8) Connector – Terminal Block Conversion Unit Set of terminal block and cable (CC50T1) for connecting the EMP Series controller and host controller [1 m (3.3 ft.)]

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

Driver Cables EMP Series Dedicated Type Dedicated cable for connecting the driver and EMP Series controller [1 m, 2 m (3.3 ft., 6.6 ft.)].

Installation

C-300

C-318

Product Number Code						
ASC	6	6	A	Κ	- T	3.6
1	2	3	4	5	6	7

1	Series	ASC: ASC Series
2	Motor Frame Size	<b>3</b> : 28 mm (1.10 in.) <b>4</b> : 42 mm (1.65 in.) <b>6</b> : 60 mm (2.36 in.)
3	Motor Case Length	
4	Motor Type	A: Standard (Single shaft) M: Electromagnetic Brake Type
5	Power Supply Voltage	<b>K</b> : 24 VDC
0	Gearhead Type	Blank: Standard Type <b>T</b> : <b>TH</b> Geared Type
0		N: PN Geared Type H: Harmonic Geared Type
0	Gear Ratio	

# Product Line

The product names below are all for single shaft types, but there are also double shaft types available for all products except for those with electromagnetic brakes. Please contact the nearest Oriental Motor sales office for further information on the double shaft types.

#### ♦ Standard Type

**○TH** Geared Type

Power Supply Voltage

24 VDC

-		
	Power Supply Voltage	Model (Single shaft)
		ASC34AK
	24.VDC	ASC36AK
	24 000	ASC46AK
		ASC66AK

Model (Single shaft) ASC34AK-T7.2 ASC34AK-T10 ASC34AK-T20 ASC34AK-T30 ASC46AK-T3.6 ASC46AK-T7.2 ASC46AK-T10

ASC46AK-T20 ASC46AK-T30 ASC66AK-T3.6 ASC66AK-T7.2

ASC66AK-T10 ASC66AK-T20 ASC66AK-T30

#### ♦ Standard Type with Electromagnetic Brake

Power Supply Voltage	Model (Single shaft)
24 \/DC	ASC46MK
24 000	ASC66MK

Extension cables for electromagnetic brake motor → Page C-297

#### ♦ TH Geared Type with Electromagnetic Brake

Power Supply Voltage Model (Single shaft) ASC46MK-T3.6 ASC46MK-T7.2		
ASC46MK-T3.6 ASC46MK-T7.2	Power Supply Voltage	Model (Single shaft)
24 VDC 25 C66MK-T30 25 C66MK-T	24 VDC	ASC46MK-T3.6 ASC46MK-T7.2 ASC46MK-T10 ASC46MK-T20 ASC46MK-T30 ASC66MK-T3.6 ASC66MK-T3.6 ASC66MK-T10 ASC66MK-T20 ASC66MK-T30

Extension cables for electromagnetic brake motor -> Page C-297

#### ◇PN Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single shaft)
	ASC46MK-N7.2
	ASC40MK-NTU
	ASC66MK-N5
24 \/DC	ASC66MK-N7.2
24 VDC	ASC66MK-N10
	ASC66MK-N25
	ASC66MK-N36
	ASC66MK-N50

Extension cables for electromagnetic brake motor -> Page C-297

#### ♦ Harmonic Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single shaft)
24 VDC	ASC46MK-H50
	ASC46MK-H100
	ASC66MK-H50
	ASC66MK-H100

Extension cables for electromagnetic brake motor → Page C-297

● Electromagnetic brake models except frame size □42 mm (□1.65 in.) must use an extension cable or flexible cable for an electromagnetic brake motor. The frame size 242 mm (21.65 in.) models can use a standard extension cable even for electromagnetic brake motor models.

• Extension Cables for

**CC03AIPM** CC05AIPM CC07AIPM CC10AIPM

#### Flexible Extension Cables for

Electromagn	etic Brake Motor	Electromagne	tic Brake Motor
Model	Length m (ft.)	Model	Length m (ft.)
CC01AIPM	1 (3.3)	CC01SARM2	1 (3.3)
CC02AIPM	2 (6.6)	CC02SARM2	2 (6.6)

ength m (ft.)	Model	Length m (ft.)
1 (3.3)	CC01SARM2	1 (3.3)
2 (6.6)	CC02SARM2	2 (6.6)
3 (9.8)	CC03SARM2	3 (9.8)
5 (16.4)	CC05SARM2	5 (16.4)
7 (23)	CC07SARM2	7 (23)
10 (32.8)	CC10SARM2	10 (32.8)

## ◇PN Geared Type Power Supply Voltage

Power Supply Voltage	Model (Single shaft)
	ASC34AK-N5 ASC34AK-N7.2 ASC34AK-N10
	ASC46AK-N7.2 ASC46AK-N10
24 VDC	ASC66AK-N5
	ASC66AK-N10
	ASC66AK-N25
	ASC66AK-N36
	ASC66AK-N50

#### ♦ Harmonic Geared Type

Power Supply Voltage	Model (Single shaft)
	ASC34AK-H50
	ASC34AK-H100
	ASC46AK-H50
24 VDG	ASC46AK-H100
	ASC66AK-H50
	ASC66AK-H100

The following items are included in each product.

Motor, Parallel Key\*1, Surge Suppressor\*2, Driver, Connector for Input/Output Signal,

Power Connector, Operating Manual \*1 Only for the products with a key slot on the output shaft

\*2 Only for electromagnetic brake type

# Standard Type Motor Frame Size 28 mm (1.10 in.), 42 mm (1.65 in.), 60 mm (2.36 in.)

# Specifications (RoHS)

Madal	Standa	ard		ASC34AK	ASC36AK	ASC46AK	ASC66AK
woder	Electro	magnetic Brake		-	-	ASC46MK	ASC66MK
Maximum Ho	Iding Tor	que	N·m (oz-in)	0.055 (7.8)	0.12 (17)	0.3 (42)	1 (142)
Rotor Inertia	J		kg·m² (oz-in²)	11×10 <sup>-7</sup> (0.06)	27×10 <sup>-7</sup> (0.148)	68×10 <sup>-7</sup> (0.37) [83×10 <sup>-7</sup> (0.45)]*1	405×10 <sup>-7</sup> (2.2) [564×10 <sup>-7</sup> (3.1)]*1
Resolution*2		Resolution Sett	ting: 1000 P/R		0.3	6°/Pulse	·
Power		Voltage			24 VI	DC±10%	
Source		Maximum Input	t Current A	1	1.1	1.7	3.7
		Туре		-	-	Active when the power is off	
Flootromogn	otio	Power Supply Input		-	-	24 VDC±5%	
Brake <sup>®</sup>	euc	Power Consumption W		-	-	2	6
Drake		Excitation Curre	ent A	-	-	0.08	0.25
	Static	Static Friction Torque N·m (oz-in)		-	-	0.15 (21)	0.6 (85)
Maaa		Motor	kg (lb.)	0.15 (0.33)	0.22 (0.48)	0.5 (1.1) [0.6 (1.3)]*1	0.85 (1.9) [1.1 (2.4)]*1
IVIASS		Driver kg (lb.)		0.25 (0.55)		·	
Dimension No.	0	Motor		[	1	2	3
	υ.	Driver			[	13	

How to read specifications table → Page C-11 Extension cables for electromagnetic brake motor → Page C-297

\*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

\*2 The resolution can be set to any one of 500 P/R, 1000 P/R, 5000 P/R, or 10000 P/R with the resolution select switch or resolution select signals. Resolution select switch → Page C-83

\*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used to stop the motor. Also, a separate 24 VDC±5%, 0.3 A minimum (ASC46: 0.1 A minimum) power supply is required for the electromagnetic brakes

# Speed – Torque Characteristics How to read speed – torque characteristics → Page C-12



#### ASC46AK/ASC46MK





#### ASC66AK/ASC66MK



#### Notes:

 Pay attention to heat dissipation from motor and driver. In particular, remember that the motor will produce a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F). [Under 75°C (167°F) is required to comply with UL or CSA Standards as the motor is recognized as insulation Class A.]

• The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

**Stepping Motors** 

Accessories

Installation

Controllers

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

# Specifications (RoHS)

# c**FL**°us CE

Model	Standard	ASC34AK-T7.2	ASC34AK-T10	ASC34AK-T20	ASC34AK-T30	
Maximum Holding Tore	que N·m (oz-in)	0.2 (28)	0.3 (42)	0.4 (56)	0.5 (71)	
Rotor Inertia J	kg·m² (oz-in²)		11×10	-7 (0.06)		
Backlash	arc minute (degrees)		60	(1°)		
Permissible Speed Rai	nge r/min	0~416	0~300	0~150	0~100	
Gear Ratio		7.2:1	10:1	20:1	30:1	
Resolution*	Resolution Setting: 1000 P/R	0.05°/Pulse	0.036°/Pulse	0.018°/Pulse	0.012°/Pulse	
Permissible Torque	N·m (oz-in)	0.2 (28)	0.3 (42)	0.4 (56)	0.5 (71)	
Power	Voltage		24 VDC	±10%		
Source	Maximum Input Current A		1			
Maaa	Motor kg (lb.)		0.21	(0.46)		
IVId55	Driver kg (lb.)		0.25 (0.55)			
Dimonsion No.	Motor	4				
	Driver		1	3		

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\* The resolution can be set to any one of 500 P/R, 1000 P/R, 5000 P/R, or 10000 P/R with the resolution select switch or resolution select signals. Resolution select switch → Page C-83

#### Note:

• Direction of rotation of the motor and that of the gear output shaft are the same for the gear ratios 20:1 and 30:1. It is opposite for 7.2:1 and 10:1 gear ratios.

# ■ Speed – Torque Characteristics How to read speed – torque characteristics → Page C-12

#### ASC34AK-T7.2



#### ASC34AK-T20









#### Notes:

• Pay attention to heat dissipation from motor and driver. In particular, remember that the motor will produce a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F). [Under 75°C (167°F) is required to comply with UL or CSA Standards as the motor is recognized as insulation Class A.]

• The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%

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

# Specifications (RoHS)

	a								
Model	Standar	ď		ASC46AK-T3.6	ASC46AK-T7.2	ASC46AK-T10	ASC46AK-T20	ASC46AK-T30	
Model	Electror	nagnetic Brake		ASC46MK-T3.6	ASC46MK-T7.2	ASC46MK-T10	ASC46MK-T20	ASC46MK-T30	
Maximum Hol	ding Toro	lue	N·m (lb-in)	0.35 (3)	0.7 (6.1)	1 (8.8)	1.5 (	13.2)	
Rotor Inertia J	J		kg·m² (oz-in²)		68	×10 <sup>-7</sup> (0.37) [83×10 <sup>-7</sup> (0.45	i)]*1		
Backlash		arc mir	nute (degrees)	45 (0.75°)	25 (0	.417°)	15 (0	).25°)	
Permissible Sp	peed Rar	ige	r/min	0~500	0~250	0~180	0~90	0~60	
Gear Ratio				3.6:1	7.2:1	10:1	20:1	30:1	
Resolution*2		Resolution Sett	ting: 1000 P/R	0.1°/Pulse	0.05°/Pulse	0.036°/Pulse	0.018°/Pulse	0.012°/Pulse	
Permissible To	orque		N·m (lb-in)	0.35 (3)	0.7 (6.1)	1 (8.8)	1.5 (13.2)		
Power	Voltage				24 VDC±10%				
Source	Maximum Input Current A					1.7			
		Туре		Active when the power is off					
Flootromogno	tio	Power Supply In	nput	24 VDC±5%					
Brake*3	lic	Power Consum	ption W		2				
		Excitation Curre	ent A			0.08			
	Static F	riction Torque	N·m (lb-in)	0.17 (1.5)	0.35 (3)	0.5 (4.4)	0.75	(6.6)	
Mass		Motor	kg (lb.)	0.65 (1.4) [0.75 (1.7)]*1					
Wass		Driver	kg (lb.)	0.25 (0.55)					
Dimension No.		Motor				5			
Dimension No.	Driver				13				

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\*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

\*2 The resolution can be set to any one of 500 P/R, 1000 P/R, 5000 P/R, or 10000 P/R with the resolution select switch or resolution select signals.

Resolution select switch -> Page C-83

\*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used to stop the motor. Also, a separate 24 VDC±5%, 0.1 A minimum power supply is required for the electromagnetic brakes.

#### Note:

• Direction of rotation of the motor and that of the gear output shaft are the same for the gear ratios 3.6:1, 7.2:1 and 10:1. It is opposite for 20:1 and 30:1 gear ratios.

#### ■ Speed – Torque Characteristics How to read speed – torque characteristics → Page C-12

## ASC46AK-T3.6/ASC46MK-T3.6



# ASC46AK-T7.2/ASC46MK-T7.2



# ASC46AK-T10/ASC46MK-T10



#### ASC46AK-T20/ASC46MK-T20







## Notes:

• Pay attention to heat dissipation from motor and driver. In particular, remember that the motor will produce a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F). [Under 75°C (167°F) is required to comply with UL or CSA Standards as the motor is recognized as insulation Class A.]

• The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%

Introduction

AC Input

2-Phase PK/PV thout Encode

With Encode

Controllers

2-Phase

**EMP400** 

SG8030J

Accessories

Installation

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

# Specifications (RoHS)

# c**₩**us C€

	Standar	d		ASC66AK-T3.6	ASC66AK-T7.2	ASC66AK-T10	ASC66AK-T20	ASC66AK-T30	
Model	Electromagnetic Brake			ASC66MK-T3.6	ASC66MK-T7.2	ASC66MK-T10	ASC66MK-T20	ASC66MK-T30	
Maximum Holdi	ng Torque		N·m (lb-in)	1.25 (11)	2.5 (22)	3 (26)	3.5 (30)	4 (35)	
Rotor Inertia J			kg·m² (oz-in²)		405	×10 <sup>-7</sup> (2.2) [564×10 <sup>-7</sup> (3.1	)]*1		
Backlash		arc min	ute (degrees)	35 (0.584°)	15 (0	).25°)	10 (0	.167°)	
Permissible Spe	ed Range		r/min	0~500	0~250	0~180	0~90	0~60	
Gear Ratio				3.6:1	7.2:1	10:1	20:1	30:1	
Resolution*2		Resolution Sett	ing: 1000 P/R	0.1°/Pulse	0.05°/Pulse	0.036°/Pulse	0.018°/Pulse	0.012°/Pulse	
Permissible Toro	que	N⋅m (lb-in)		1.25 (11)	2.5 (22)	3 (26)	3.5 (30)	4 (35)	
Power		Voltage		24 VDC±10%					
Source		Maximum Input	Current A			3.7			
		Туре		Active when the power is off					
Electromognotic		Power Supply In	iput	24 VDC±5%					
Brake*3	,	Power Consump	otion W	6					
Diano		Excitation Curre	nt A			0.25			
	Static F	riction Torque	N·m (lb-in)	0.62 (5.4)	1.25 (11)	1.5 (13.2)	1.75 (15.4)	2 (17.7)	
Maga		Motor	kg (lb.)	1.25 (2.8) [1.5 (3.3)]*1					
IVId55		Driver kg (lb.)		0.25 (0.55)					
Dimonoion No		Motor		6					
Dimension No.	Driver		13						

How to read specifications table → Page C-11 Extension cables for electromagnetic brake motor → Page C-297

\*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

\*2 The resolution can be set to any one of 500 P/R, 1000 P/R, 5000 P/R, or 10000 P/R with the resolution select switch or resolution select signals.

Resolution select switch → Page C-83

\*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used to stop the motor. Also, a separate 24 VDC±5%, 0.3 A minimum power supply is required for the electromagnetic brakes.

#### Note:

• Direction of rotation of the motor and that of the gear output shaft are the same for the gear ratios 3.6:1, 7.2:1 and 10:1. It is opposite for 20:1 and 30:1 gear ratios.

# ■ Speed – Torque Characteristics How to read speed – torque characteristics → Page C-12

#### ASC66AK-T3.6/ASC66MK-T3.6



#### ASC66AK-T20/ASC66MK-T20



#### 

ASC66AK-T7.2/ASC66MK-T7.2

#### ASC66AK-T30/ASC66MK-T30



#### ASC66AK-T10/ASC66MK-T10



Notes:

• Pay attention to heat dissipation from motor and driver. In particular, remember that the motor will produce a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F). [Under 75°C (167°F) is required to comply with UL or CSA Standards as the motor is recognized as insulation Class A.]

• The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%

# **PN Geared Type** Motor Frame Size 28 mm (1.10 in.)

# Specifications (RoHS)

Model	Standard	ASC34AK-N5	ASC34AK-N7.2	ASC34AK-N10		
Maximum Holding Torque	N·m (oz-in)	0.2 (28)	0.3 (42)	0.5 (71)		
Rotor Inertia J	kg·m² (oz-in²)		11×10 <sup>-7</sup> (0.06)			
Backlash	arc minute (degrees)		3 (0.05°)			
Angular Transmission Error	arc minute (degrees)		6 (0.1°)			
Permissible Speed Range	r/min	0~600	0~416	0~300		
Gear Ratio		5:1	7.2:1	10:1		
Resolution*1	Resolution Setting: 1000 P/R	0.072°/Pulse	0.05°/Pulse	0.036°/Pulse		
Permissible Torque	N·m (oz-in)	0.2 (28)	0.3 (42)	0.5 (71)		
Maximum Torque*2	N·m (oz-in)		0.5 (71)			
Power	Voltage		24 VDC±10%			
Source	Maximum Input Current A		1			
Maaa	Motor kg (lb.)		0.28 (0.62)	0.28 (0.62)		
IVId55	Driver kg (lb.)	0.25 (0.55)				
Dimonsion No.	Motor		7			
Dimension No.	Driver		13			

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\*1 The resolution can be set to any one of 500 P/R, 1000 P/R, 5000 P/R, or 10000 P/R with the resolution select switch or resolution select signals. Resolution select switch → Page C-83

\*2 The value of maximum torque is for gear. For output torque for geared motor, refer to the speed - torque characteristics.

Note:

• Direction of rotation of the motor shaft and that of the gear output shaft are the same.

# ■Speed – Torque Characteristics How to read speed – torque characteristics → Page C-12



#### Notes:

• Pay attention to heat dissipation from motor and driver. In particular, remember that the motor will produce a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F). [Under 75°C (167°F) is required to comply with UL or CSA Standards as the motor is recognized as insulation Class A.]

• The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

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

# Specifications (RoHS)

•		-		01200 4 4		
Madal	Standard		ASC46AK-N7.2	ASC46AK-N10		
woder	Electromagnetic Brake		ASC46MK-N7.2	ASC46MK-N10		
Maximum Holding	Torque	N·m (lb-in)	1.5	(13.2)		
Rotor Inertia J		kg·m² (oz-in²)	68×10 <sup>-7</sup> (0.37) [8	33×10 <sup>-7</sup> (0.454)]*1		
Backlash	arc	minute (degrees)	2 (0	.034°)		
Angular Transmiss	ion Error arc	minute (degrees)	6 (	0.1°)		
Permissible Speed	l Range	r/min	0~333	0~240		
Gear Ratio			7.2:1	10:1		
Resolution*2	Resolution S	Setting: 1000 P/R	0.05°/Pulse	0.036°/Pulse		
Permissible Torque	9	N·m (lb-in)	1.5 (13.2)			
Maximum Torque*3		N·m (lb-in)	2 (*	17.7)		
Power	Voltage		24 VD	C±10%		
Source	Maximum In	put Current A	1.7			
	Туре		Active when the power is off			
Flootromognatio	Power Suppl	y Input	24 VD	C±5%		
Brake*4	Power Consu	umption W		2		
Dratto	Excitation Cu	urrent A	0	08		
	Static Friction Torque	N·m (lb-in)	0.75	ō (6.6)		
Maga	Motor	kg (lb.)	0.71 (1.6) [	0.81 (1.8)]*1		
Wass	Driver	kg (lb.)	0.25	(0.55)		
Dimension No.	Motor		[	8		
Dimension No.	Driver		13			

How to read specifications table  $\rightarrow$  Page C-11

\*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

\*2 The resolution can be set to any one of 500 P/R, 1000 P/R, 5000 P/R, or 10000 P/R with the resolution select switch or resolution select signals.

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\*3 The value of maximum torque is for gear. For output torque for geared motor, refer to the speed – torque characteristics.

\*4 The electromagnetic brakes are for holding the position when the power is off. They cannot be used to stop the motor. Also, a separate 24 VDC±5%, 0.1 A minimum power supply is required for the electromagnetic brakes.

#### Note:

• Direction of rotation of the motor shaft and that of the gear output shaft are the same.

# ■ Speed – Torque Characteristics How to read speed – torque characteristics → Page C-12

#### ASC46AK-N7.2/ASC46MK-N7.2



#### ASC46AK-N10/ASC46MK-N10



#### Notes:

• Pay attention to heat dissipation from motor and driver. In particular, remember that the motor will produce a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F). [Under 75°C (167°F) is required to comply with UL or CSA Standards as the motor is recognized as insulation Class A.]

• The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

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

# Specifications (RoHS)

-								
Madal	Standard		ASC66AK-N5	ASC66AK-N7.2	ASC66AK-N10	ASC66AK-N25	ASC66AK-N36	ASC66AK-N50
wodei	Electromagnetic Brake		ASC66MK-N5	ASC66MK-N7.2	ASC66MK-N10	ASC66MK-N25	ASC66MK-N36	ASC66MK-N50
Maximum Holding	Torque	N·m (lb-in)	3.5 (30)	4 (35)	5 (44)		8 (70)	
Rotor Inertia J		kg·m² (oz-in²)			405×10 <sup>-7</sup> (2.2) [	564×10 <sup>-7</sup> (3.1)] <sup>*1</sup>		
Backlash	arc m	inute (degrees)		2 (0.034°)			3 (0.05°)	
Angular Transmiss	ion Error arc m	inute (degrees)			5 (0.	084°)		
Permissible Speed	Range	r/min	0~360	0~250	0~180	0~72	0~50	0~36
Gear Ratio			5:1	7.2:1	10:1	25:1	36:1	50:1
Resolution*2	Resolution Se	tting: 1000 P/R	0.072°/Pulse	0.05°/Pulse	0.036°/Pulse	0.0144°/Pulse	0.01°/Pulse	0.0072°/Pulse
Permissible Torque	)	N·m (lb-in)	3.5 (30)	4 (35)	5 (44)	8 (70)		
Maximum Torque*	3	N·m (lb-in)	7 (61)	9 (79)	11 (97)	16 (140) 20 (170)		
Power	Voltage		24 VDC±10%					
Source	Maximum Inp	ut Current A	3.7					
	Туре		Active when the power is off					
Flootromognatio	Power Supply	Input	24 VDC±5%					
Brake <sup>*4</sup>	Power Consu	mption W	6					
Brake	Excitation Cu	rrent A	0.25					
	Static Friction Torque	N·m (lb-in)	1.75 (15.4)	2 (17.7)	2.5 (22)		4 (35)	
Maga	Motor	kg (lb.)	1.5 (3.3) [1.75 (3.9)]*1 1.7 (3.7) [1.95 (4.3)]*1					
IVIDSS	Driver	kg (lb.)	0.25 (0.55)					
Dimonoion No	Motor					9		
Dimension No.	Driver			13				

How to read specifications table  $\rightarrow$  Page C-11 Extension cables for electromagnetic brake motor  $\rightarrow$  Page C-297

\*1 The values inside the brackets [] represent the specification for the electromagnetic brake type

\*2 The resolution can be set to any one of 500 P/R, 1000 P/R, 5000 P/R, or 10000 P/R with the resolution select switch or resolution select signals.

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\*3 The value of maximum torque is for gear. For output torque for geared motor, refer to the speed - torque characteristics.

\*4 The electromagnetic brakes are for holding the position when the power is off. They cannot be used to stop the motor. Also, a separate 24 VDC±5%. 0.3 A minimum power supply is required for the electromagnetic brakes.

#### Note

Direction of rotation of the motor shaft and that of the gear output shaft are the same.

# ■ Speed – Torque Characteristics How to read speed – torque characteristics → Page C-12

# ASC66AK-N5/ASC66MK-N5



ASC66AK-N25/ASC66MK-N25

Speed [r/min]

Pulse Speed [kHz] (Resolution Setting: 1000 P/R)

20

15

Permissible

5 10

#### ASC66AK-N7.2/ASC66MK-N7.2





#### ASC66AK-N10/ASC66MK-N10



#### ASC66AK-N50/ASC66MK-N50



#### Notes:

120

100

Torque [lb-in] 09 08 Torque [N·m]

40

20

ŏ

• Pay attention to heat dissipation from motor and driver. In particular, remember that the motor will produce a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F) [Under 75°C (167°F) is required to comply with UL or CSA Standards as the motor is recognized as insulation Class A.]

• The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

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# Harmonic Geared Type Motor Frame Size 28 mm (1.10 in.), 42 mm (1.65 in.), 60 mm (2.36 in.)

# Specifications (RoHS)

Madal	Standard	d		ASC34AK-H50	ASC34AK-H100	ASC46AK-H50	ASC46AK-H100	ASC66AK-H50	ASC66AK-H100	
Elect		nagnetic Brake		-	-	ASC46MK-H50	ASC46MK-H100	ASC66MK-H50	ASC66MK-H100	
Maximum Holdin	g Torque		N·m (lb-in)	1.5 (13.2)	2 (17.7)	3.5 (30)	5 (44)	5.5 (48)	8 (70)	
Rotor Inertia J		ł	kg·m² (oz-in²)	14×10-	<sup>-7</sup> (0.077)	85×10 <sup>-7</sup> (0.46) [1	00×10 <sup>-7</sup> (0.55)]*1	440×10 <sup>-7</sup> (2.4) [	599×10 <sup>-7</sup> (3.3)]*1	
Permissible Spee	ed Range		r/min	0~70	0~35	0~48	0~24	0~36	0~18	
Gear Ratio				50:1	100:1	50:1	100:1	50:1	100:1	
Resolution*2		Resolution Setti	ing: 1000 P/R	0.0072°/Pulse	0.0036°/Pulse	0.0072°/Pulse	0.0036°/Pulse	0.0072°/Pulse	0.0036°/Pulse	
Permissible Torqu	ue		N·m (lb-in)	1.5 (13.2)	2 (17.7)	3.5 (30)	5 (44)	5.5 (48)	8 (70)	
Maximum Torque	9		N·m (lb-in)	2 (17.7)	2.8 (24)	8.3 (73)	11 (97)	18 (159)	28 (240)	
Lost Motion			arc minute	3 max. (+0.06 N·m)	3 max. (+0.08 N·m)	1.5 max. (+0.16 N·m)	1.5 max. (+0.2 N·m)	0.7 max. (+0.28 N·m)	0.7 max. (+0.39 N·m)	
Powor		Voltage				24 VDC+10%		(=0.201011)	(20.00 11 11)	
Source		Maximum Input	Current A		1	1	7	2	7	
oouree				I		I	./	Jo powor io off	nowor is off	
		Type			- Active when the					
Electromagnetic		Power Supply In	put	_			24 VD0	C±5%		
Brake*3		Power Consump	otion W		_	2			6	
		Excitation Curren	nt A	-	-	0.	08	0.	25	
	Static F	riction Torque	N·m (lb-in)	-	-	1.75 (15.4)	2.5 (22)	2.75 (24)	4 (35)	
Mass		Motor	kg (lb.)	0.25	(0.55)	0.7 (1.5) [	0.8 (1.8)]*1	1.4 (3.1) [1	.65 (3.6)]*1	
Mass		Driver	kg (lb.)			0.25	(0.55)			
Dimension No.		Motor		1	0	[	1	1	2	
Dimension No.		Driver		13						

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\*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

\*2 The resolution can be set to any one of 500 P/R, 1000 P/R, 5000 P/R, or 10000 P/R with the resolution select switch or resolution select signals.

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\*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used to stop the motor. Also, a separate 24 VDC±5%, 0.3 A minimum (ASC46: 0.1 A minimum) power supply is required for the electromagnetic brakes.

#### Note:

• The inertia represents a sum of the inertia of the harmonic gear converted to a motor shaft value, and the rotor inertia. Direction of rotation of the motor shaft and that of the gear output shaft are the opposite.

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#### ASC34AK-H50



## ASC46AK-H50/ASC46MK-H50



# ASC66AK-H50/ASC66MK-H50



#### ASC34AK-H100



#### ASC46AK-H100/ASC46MK-H100



#### ASC66AK-H100/ASC66MK-H100



#### Notes:

• Pay attention to heat dissipation from motor and driver. In particular, remember that the motor will produce a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C (212°F). [Under 75°C (167°F) is required to comply with UL or CSA Standards as the motor is recognized as insulation Class A.]

In order to prevent fatigue of the gear grease in the harmonic gear, keep the temperature of the gear case under 70°C (158°F).
 The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

• The univer's automatic current curback function at motor standstin reduces maximum noting torque by approximately 50

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# **Driver Specifications**

Speed and Positioning Control Command	Pulse input
Maximum Input Pulse Frequency	250 kHz (When the pulse duty is 50%)
Protective Functions	When the protective functions are activated, an alarm signal is output and the motor will coast to a stop. Overload, Overvoltage, Speed error, Overspeed, EEPROM data error, Sensor error, System error
Input Signals	Photocoupler input, Input resistance: 220 Ω, Input current: 7~20 mA Pulse (CW pulse) signal [Negative logic pulse input], Rotation direction (CCW pulse) signal [Negative logic pulse input], All windings off, Alarm clear, Resolution select
Output Signals	Photocoupler, Open-collector output External use condition: 30 VDC maximum, 15 mA maximum (Positioning completion signal, Alarm signal, Timing signal) Transistor, Open-collector output External use condition: 30 VDC maximum, 15 mA maximum [Quadrature (ASG/BSG) signal]

# General Specifications

This is the value after rated operation at normal ambient temperature and humidity.

Item		Motor		Driver		
Insulation Class		Class B [130°C (266°F)][Recognized as Class A 105°C (22	21°F) by UL/CSA Standards]	-		
Insulation Resistance		100 M $\Omega$ or more when 500 VDC megger is applied bet $\cdot$ Case – Motor and sensor windings $\cdot$ Case – Electromagnetic brake windings	ween the following places:	100 $M\Omega$ or more when 500 VDC megger is applied between the following places: $\cdot$ Heat sink – Power input terminal		
Dielectric Strength		Sufficient to withstand the following for 1 minute: · Case – Motor and sensor windings · Case – Electromagnetic brake windings	0.5 kVAC 50 Hz or 60 Hz 1.0 kVAC 50 Hz or 60 Hz	0 Hz Sufficient to withstand the following for 1 minute: 0 Hz · Heat sink – Power input terminal 0.5 kVAC 50		
Operating Environment	Ambient Temperature	$0\!\sim\!+50^\circ\text{C}$ $(+32\!\sim\!+122^\circ\text{F})$ (non-freezing): Standard ty $0\!\sim\!+40^\circ\text{C}$ $(+32\!\sim\!+104^\circ\text{F})$ (non-freezing): Han	vpe, <b>TH</b> , <b>PN</b> geared type monic geared type	$0 \sim +40^{\circ}$ C (+32 $\sim$ +104 $^{\circ}$ F) (non-freezing)		
LINITOTITICIT	Ambient Humidity		85% or less (no	on-condensing)		
	Atmosphere		No corrosive gases	, dust, water or oil		
Stop Position A	Accuracy	$\pm 5 \text{ arc minutes } (\pm 0.084^{\circ})$		-		
Shaft Runout		0.05 mm (0.002 in.) T.I.R.*		-		
Concentricity		0.075 mm (0.003 in.) T.I.R.*		-		
Perpendicularity		0.075 mm (0.003 in.) T.I.R.*		-		
*T.I.R. (Total I	ndicator Readin	g): The total dial gauge reading when the measurement se	ection is rotated one revolution	on centered on the reference		

\*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.

# Load Torque – Driver Input Current Characteristics

This is the relationship between the load torque and driver input current at each speed when the motor is operated. From these characteristics, the current capacity required when used for multiple axes can be estimated. For geared motors convert to torque and speed at the motor shaft.

8

Motor shaft speed [r/min] = Gear output shaft speed × Gear ratio

Gear output shaft torque Motor shaft torque [N·m (oz-in)] =

Gear ratio

L 0.075 A

∕ 0.05

A -Π









ASC66





# Permissible Overhung Load and Permissible Thrust Load

					Deumineihle				
Туре	Model	Gear Ratio		Di	stance from Shaft E	Ind		Permissible	
			0 mm (0 in.)	5 mm (0.2 in.)	10 mm (0.39 in.)	15 mm (0.59 in.)	20 mm (0.79 in.)	Thiust Load	
	ASC34AK		25 (5.6)	34 (7.6)	52 (11 7)	_	_	The normalization through	
Standard Type	ASC36AK		23 (3.0)	34 (7.0)	52 (11.7)		_	load shall be no greater	
Standard Type -	ASC46 K	] –	20 (4.5)	25 (5.6)	34 (7.6)	52 (11.7)	-	than the motor mass	
	ASC66 K		63 (14.1)	75 (16.8)	95 (21)	130 (29)	190 (42)		
	ASC34AK-T	7.2, 10, 20, 30	15 (3.3)	17 (3.8)	20 (4.5)	23 (5.1)	-	10 (2.2)	
<b>TH</b> Geared Type	ASC46 K-T	<b>3.6</b> , <b>7.2</b> , <b>10</b> ,	10 (2.2)	14 (3.1)	20 (4.5)	30 (6.7)	-	15 (3.3)	
	ASC66 K-T	20, 30	70 (15)	80 (18)	100 (22)	120 (27)	150 (33)	40 (9)	
	ASC34AK-N	5, <b>7.2</b> , 10	45 (10.1)	60 (13.5)	80 (18)	100 (22)	-	20 (4.5)	
	ASC46 K-N	<b>7.2</b> , 10	100 (22)	120 (27)	150 (33)	190 (42)	-		
PN Geared Type	ASC66 K-N5	5	200 (45)	220 (49)	250 (56)	280 (63)	320 (72)		
		<b>7.2</b> , 10	250 (56)	270 (60)	300 (67)	340 (76)	390 (87)	100 (22)	
	AJCOO_K-N_	25, 36, 50	330 (74)	360 (81)	400 (90)	450 (101)	520 (117)		
	ASC34AK-H		140 (31)	160 (36)	200 (45)	240 (54)	-		
Harmonic Geared Type	ASC46 K-H	50, 100	180 (40)	220 (49)	270 (60)	360 (81)	510 (114)	220 (49)	
	ASC66 K-H	]	320 (72)	370 (83)	440 (99)	550 (123)	720 (162)	450 (101)	

● Enter A (standard) or M (electromagnetic brake) in the box (□) within the model name. Enter the gear ratio in the box (□) within the model name.

# **Dimensions** Unit = mm (in.)

#### Motor

# ♦ Standard Type

## □ □28 mm (□1.10 in.)

Model	Motor Model	L	Mass kg (lb.)	DXF
ASC34AK	ASM34AK	45 (1.77)	0.15 (0.33)	B274
ASC36AK	ASM36AK	65 (2.56)	0.22 (0.48)	B275



#### 2 42 mm (1.65 in.)

Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
ASC46AK	ASM46AK	64.9 (2.56)	-	0.5 (1.1)	B192
ASC46MK	ASM46MK	-	94.9 (3.74)	0.6 (1.3)	B193



3 □60 mm (□2.36 in.)

Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
ASC66AK	ASM66AK	63.6 (2.50)	-	0.85 (1.9)	B194
ASC66MK	ASM66MK	-	98.6 (3.88)	1.1 (2.4)	B195



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# $\diamondsuit$ **TH** Geared Type

# 4 28 mm (21.10 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
ASC34AK-T	ASM34AK-T	<b>7.2</b> , 10, 20, 30	0.21 (0.46)	B357



#### 5 42 mm (1.65 in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
ASC46AK-T	ASM46AK-T	2 6 7 0 10 00 20	95.4 (3.76)	-	0.65 (1.4)	B199
ASC46MK-T	ASM46MK-T	3.0, 7.2, 10, 20, 30	-	125.4 (4.94)	0.75 (1.7)	B200

• Enter the gear ratio in the box  $(\Box)$  within the model name.



#### 6 6 60 mm (2.36 in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
ASC66AK-T	ASM66AK-T□	2 6 7 0 10 00 20	108.6 (4.28)	-	1.25 (2.8)	B201
ASC66MK-T	ASM66MK-T	3.0, 7.2, 10, 20, 30	-	143.6 (5.65)	1.5 (3.3)	B202

• Enter the gear ratio in the box  $(\Box)$  within the model name.





#### ◇PN Geared Type

7 28 mm (21.10 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
ASC34AK-N	ASM34AK-N□	5, <b>7.2</b> , 10	0.28 (0.62)	B358

• Enter the gear ratio in the box  $(\Box)$  within the model name.



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# ◇PN Geared Type

# 8 🗆 42 mm (🗆 1.65 in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
ASC46AK-N	ASM46AK-N□	7 2 10	96.9 (3.81)	-	0.71 (1.6)	B306
ASC46MK-N	ASM46MK-N	7.2, 10	-	126.9 (5.00)	0.81 (1.8)	B307

 $\bullet$  Enter the gear ratio in the box ( ) within the model name.



Parallel Key (Included)

A - A

#### ᠑ □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
ASC66AK-N	ASM66AK-N	5, <b>7.2</b> , 10	107.6 (4.24)	-	1.5 (3.3)	B226
		25, 36, 50	123.6 (4.87)	-	1.7 (3.7)	B228
ASC66MK-N	ASM66MK-N□	5, <b>7.2</b> , 10	-	142.6 (5.61)	1.75 (3.9)	B227
		25, 36, 50	-	158.6 (6.24)	1.95 (4.3)	B229

• Enter the gear ratio in the box  $(\Box)$  within the model name.



#### $\diamondsuit {\sf Harmonic}$ Geared Type

#### 10 28 mm (**1.10** in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
ASC34AK-H	ASM34AK-H□	50, 100	0.25 (0.55)	B289

 $\bullet$  Enter the gear ratio in the box ( $\Box$ ) within the model name.



#### 11 🗆 42 mm (🗆 1.65 in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
ASC46AK-H	ASM46AK-H□	50 100	96.9 (3.81)	-	0.7 (1.5)	B308
ASC46MK-H	ASM46MK-H	30,100	-	126.9 (5.00)	0.8 (1.8)	B309

• Enter the gear ratio in the box  $(\Box)$  within the model name.





The position of the key slot on the output shaft [\u03c610 (\u03c60.3937)] relative to the screw holes on a maximum diameter of \u03c626.5 (\u03c61.04) on the rotating part is arbitrary.



Installation

# ♦ Harmonic Geared Type

# 12 60 mm (2.36 in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
ASC66AK-H	ASM66AK-H🗆	50 100	103.6 (4.08)	-	1.4 (3.1)	B310
ASC66MK-H	ASM66MK-H	50, 100	-	138.6 (5.46)	1.65 (3.6)	B311

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



• Electromagnetic brake models except frame size 42 mm (1.65 in.) must use an extension cable or flexible extension cable for the electromagnetic brake motor.

> φ9.5 (φ**0.37**) Electromagnetic Brake Leads 60 mm (2.4 in.) (Orange, Gray AWG24)

Extension cables for electromagnetic brake motor -> Page C-297

#### • Extension Cables for Electromagnetic Brake Motor

Model	Length: L m (ft.)	
CC01AIPM	1 (3.3)	
CC02AIPM	2 (6.6)	
CC03AIPM	3 (9.8)	
CC05AIPM	5 (16.4)	
CC07AIPM	7 (23)	
CC10AIPM	10 (32.8)	



14.5 (0.57) 11.6 (**0.46**)

87

Driver Side

#### • Flexible Extension Cables for Electromagnetic Brake Motor

12 (**0.47**)

Sec.

Model	Length: L m (ft.)	
CC01SARM2	1 (3.3)	
CC02SARM2	2 (6.6)	
CC03SARM2	3 (9.8)	
CC05SARM2	5 (16.4)	
CC07SARM2	7 (23)	
CC10SARM2	10 (32.8)	

#### Driver

#### 13 Common to All Types

ASD10□-K, ASD18□-K, ASD36□-K Mass: 0.25 kg (0.55 lb.) **DXF** B198



 Control I/O Connector (Included) Cover Assembly: 54331-1361 (MOLEX) Connector: 54306-3619 (MOLEX)

-860 2.5

2

Power Input Connector (Included) Connector: 5557-02R (MOLEX) Crimp Terminal: 5556TL (MOLEX)

# Connection and Operation

# Names and Functions of Driver Parts



#### 1 Signal Monitor Display

#### ◇LED Indicators

Indication	Color	Function	When Activated
LED1	Green	Power Supply Indication	Lights when power is on.
LED2 Red Alarm Indication		Alarm Indication	Blinks when protective functions are activated.

# ⇔Alarm

$\sim$ / dam			
Blink Count	Function	When Activated	
2	2 Overload The motor has been operated continuously over 5 seconds exceeding the maximum torque.		
3	Overvoltage	The primary voltage of the driver's inverter has exceeded the allowable level.	
4	Speed Error	The motor cannot accurately follow at the indicated pulse speed.	
6	Overspeed	The motor shaft velocity exceeds 5000 r/min. (Except geared type)	
7	EEPROM Data Error	A motor control parameter has been damaged.	
8	Sensor Error	The power has been turned on without the motor cable connected to the driver.	
Lights (No blinking)	System Error	The driver has fatal error.	

#### 2 Function Switches

Indication	Switch Name	Function
1000/500 ×1/×10	Resolution Select Switch	This function is for selecting the motor resolution. For each geared type, the resolution of gear output shaft is 1/gear ratio. [1000] [ $\times$ 1] $\rightarrow$ 1000 P/R (0.36°/step) [1000] [ $\times$ 10] $\rightarrow$ 10000 P/R (0.036°/step) [500] [ $\times$ 1] $\rightarrow$ 500 P/R (0.72°/step) [500] [ $\times$ 10] $\rightarrow$ 5000 P/R (0.072°/step)
1P/2P	Pulse Input Mode Switch	The settings of this switch are compatible with the following two types of pulse input modes: "1P" for the 1-pulse input mode, "2P" for the 2-pulse input mode.

#### Notes:

Always turn the power off before switching resolution or pulse input, and turn it ON again after you have made the change.
 If the resolution select switch is set to [×10], it cannot control the resolution selected by the input signal. It is always [×10].

#### **3 Current Adjustment Switch**

Indication	Switch Name	Function
CURRENT	Current Adjustment Switch	The motor running current can be lowered to suppress temperature rise in the motor and driver, or lower operating current in order to allow a margin for motor torque (a maximum of 16 settings).

#### 4 Velocity Filter Adjustment Switch

Indication	Switch Name	Function		
V.FIL	Velocity Filter Adjustment Switch	This switch is used to make adjustments when a smooth start-stop or smooth motion at low speed is required (a maximum of 16 settings).	Set to "0" The difference in characteristics mode by the velocity filter.	

### 5 Input/Output Signals (36 pins)

Indication	Input/Output	Pin. No	Signal	Signal Name	
	External	2	GND	Power Supply for	
	power input	3	Vcc+24V	Signal Control	
		9	DIR. (CCW)	Rotation Direction	
	Input	10	DIR. (CCW)	(CCW Pulse)*	
	Input	11	PLS (CW)	Dulas (CW Dulas)*	
		12	PLS (CW)	Pulse (GW Pulse)	
		13	BSG1	Quadrature BSG Output	
	Output	14	GND	(Open-collector)	
	Output	15	ASG1	Quadrature ASG Output	
		16	GND	(Open-collector)	
0110	Input	21	ACL	Alarm Clear	
0113		22	ACL		
	Output	23	TIM.1	Timing	
		24	TIM.1	(Open-collector)	
		25	ALARM	Alorm	
		26	ALARM	Alam	
		29	END	Positioning	
		30	END	Completion	
		31	×10	Pagelution Coloct	
	Input	32	×10	nesolution Select	
	input	33	C.OFF	All Windingo Off	
		34	C.OFF	All windings off	
CN3	Output Input Output Input	13         14         15         16         21         22         23         24         25         26         29         30         31         32         33         34	BSG1           GND           ASG1           GND           ACL           ALARM           END           END           ×10           ×10           C.OFF           C.OFF	Quadrature BSG Ou         (Open-collector)         Quadrature ASG Ou         (Open-collector)         Alarm Clear         Timing         (Open-collector)         Alarm         Positioning         Completion         Resolution Select         All Windings Off	

Description of input/output signals → Page C-85

\* Signal name in parentheses represents the setting in 2-pulse input mode.

AC Inpu

2-Phase PK/PV

Accessories

Installation

# Connection Diagram



#### ◇Input Signal Connection

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. Internal components will be damaged if a voltage exceeding 5 VDC is supplied directly without using an external resistor.

Example: If the voltage is 24 VDC, connect a resistor (R1) of 1.5 to 2.2  $k\Omega$  and 0.5 W or more.

#### Output Signal Connection

Use output signals at 30 VDC or less and 15 mA or less.

If these specifications are exceeded, the internal components may be damaged.

Check the specification of the connected equipment.

#### ◇Notes on Wiring

- Use multi-core, twisted-pair shielded wires of AWG28 or thicker for the control I/O signal lines (CN3), 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 F-54
- When it is necessary to extend the wiring distance between the motor and driver more than 0.4 m (1.31 ft.) [0.15 m (0.5 ft.) or more: ASC34 and ASC36 types], the accessory extension cable or flexible extension cable must be used. Electromagnetic brake motor models [except motor frame size 42 mm (1.65 in.)] must use an electromagnetic brake extension cable or flexible extension cable (sold separately). The frame size 42 mm (1.65 in.) models can use a standard extension cable even for electromagnetic brake motor models. Extension cables for electromagnetic brake motor → Page C-297
- The range of wire for the power connector (CN1) is AWG24 to 18. Use wire of AWG20 or thicker for the power line.
- Provide a minimum distance of 300 mm (1 ft.) between the control I/O signal lines and power lines (AC lines, motor lines and other large-current circuits).
- Do not run the control I/O signal lines in the same duct as power lines or bundle them with power lines.
- The customer must furnish the cables for power supply lines and control I/O signal lines.
   Use included connector for connection of power supply.
- To install the pins, be sure to use the specified crimping tool made by MOLEX 57026-5000 (for UL 1007) or 57027-5000 (for UL 1015).

## Connecting the Electromagnetic Brake to a Power Supply -

Connect the electromagnetic brake to the power supply using a cable of at least AWG24. The power supply input to the electromagnetic brake is 24 VDC  $\pm 5\%$  0.3 A minimum (**ASC46**: 0.1 A minimum) and therefore must be independent of the driver's power supply for signal control.

#### Notes:

- Applying a voltage that exceeds the specifications will cause the electromagnetic brake to generate a great deal of heat, resulting in motor temperature rises and possible damage to the motor. Conversely, if voltage is too low, the electromagnetic brake may not release.
- To protect the switch contacts and prevent noise, always connect the surge suppressor.\*
   (\*The surge suppressor is included with electromagnetic brake motors.)
- To prevent noise, use a dedicated power supply for electromagnetic brake.
- Correct polarity (+ and -) must be ensured when connecting the electromagnetic brake leads of ASC Series to the DC power supply. If polarity is incorrect, the electromagnetic brake will not operate properly.
- When using as a CE certified part, use a dedicated DC power supply for electromagnetic brake.
- (1) **ASC46**
- The electromagnetic brake leads are linked to the connector on the motor [600 mm (23.6 in.)]. When connecting with the DC power supply, connect the red spiral lead wire to +24 V, and the black lead wire to the ground (GND). Use the extension cable or the flexible extension cable (both sold separately).



#### (2) **ASC66**

The electromagnetic brake leads are linked to the connector on the driver connection side of extension cable for electromagnetic brake motor (sold separately). Be sure to use the accessory (sold separately) extension cable or flexible extension cable. Connect the orange/black spiral lead wire (orange for flexible extension cable) [60 mm (2.36 in.)] to +24 V, and the gray lead wire [60 mm (2.36 in.)] to the ground (GND).



# Stepping Motors

SG8030J

Accessories

Installation

# Description of Input/Output Signals



## PLS (CW) and DIR. (CCW) Input Signal

#### $\bigcirc$ Input Circuit and Sample Connection



• The colored characters indicate signals under the 1-pulse input mode, while the black characters indicate signals under the 2-pulse input mode.

#### Note:

 The external resistor is not needed when Vo is 5 VDC. When the voltage exceeds 5 VDC, connect the external resistor R<sub>1</sub> to keep input current at 20 mA or less. When 5 VDC or more is applied without the external resistor, the internal components may get damaged.

#### ◇Pulse Waveform Characteristics



• For pulse signals, use input pulse waveforms like those shown in the figure above.

#### ◇Pulse Input Modes

#### • 1-Pulse Input Mode

The 1-pulse input mode uses "Pulse" (PLS) and "Rotation Direction" (DIR.) signals. CW is selected by inputting DIR. signal at low level (with the input photocoupler ON), CCW by inputting at high level (with input photocoupler OFF).

Rotation Direction Signals Photocoupler "ON": Clockwise

Photocoupler "OFF": Counterclockwise 1-Pulse Input Mode



#### • 2-Pulse Input Mode

The 2-pulse input mode uses "CW" and "CCW" pulses. When "CW" pulses are input, the motor's output shaft rotates clockwise when the motor is viewed facing the shaft; when "CCW" pulses are input, the shaft rotates counterclockwise.



All Windings Off (C.OFF) Input Signal Resolution Select (×10) Input Signal Alarm Clear (ACL) Input Signal

◇Input Circuit and Sample Connection

#### When Using 5 VDC



#### When Using 24 VDC



#### ◇All Windings Off (C.OFF) Input Signal Pin No. 33. 34

This controller power supply offers a choice of either 5 VDC or 24 VDC. Inputting the "All Windings Off" (C.OFF) signal puts the motor in a non-excitation (free) state. It is used when turning the motor shaft externally or when positioning manually. This signal clears the deviation counter.



#### Resolution Select (×10) Input Signal Pin No. (31), (32)

This controller power supply offers a choice of either 5 VDC or 24 VDC. Inputting this signal when 1000 P/R or 500 P/R is selected as resolution via the function switch will increase the resolution ten times to 10000 P/R or 5000 P/R.

#### Note:

 While the resolution select switch is set to 10000 P/R or 5000 P/R, input of this signal will not change the resolution.

## $\bigcirc$ Alarm Clear (ACL) Input Signal

Pin No. (1), (2)

This controller power supply offers a choice of either 5 VDC or 24 VDC. This signal is used for canceling the alarm without turning off power to the driver when a protective function has been activated.

#### Note:

 The following alarm cannot be cleared. To cancel the alarm, first resolve the cause and check for safety, and then turn power on again.

 $\cdot$  EEPROM data error  $\ \cdot$  System error

# Positioning Completion (END) Output Signal Alarm (ALARM) Output Signal

# $\diamondsuit$ Output Circuit and Sample Connection



#### Positioning Completion (END) Output Signal Pin No. 29, 30

#### Circuits for use with 30 VDC, 15 mA maximum.

This signal is output at the photocoupler ON state when positioning is completed. This signal is output when the rotor position is less than  $\pm 1.8^{\circ}$  from the command position, approximately 2 msec after the pulse input stops.



#### Note:

 The "Positioning Completion" signal blinks during operation with a pulse input frequency of 500 Hz or less.

#### ◇Alarm (ALARM) Output Signal

#### Pin No. 25, 26

Circuits for use with 30 VDC, 15 mA maximum. The photocoupler turns OFF when one of the driver's protective functions has been activated. When an abnormality such as an overload or overvoltage is detected, the "Alarm" signal will be output, the driver's LED indicator (ALARM) blinks, and the motor stops (non-excitation state).

To cancel the alarm, first resolve the cause and check for safety, and then input an "Alarm Clear" (ACL) signal or reset power. Once power has been turned off, wait at least five seconds before turning it on again.



#### Note:

 The "Alarm" output uses positive logic (normally closed), all other outputs use negative logic (normally open).

#### Timing (TIM.1) Output Signal

Output Circuit and Sample Connection



Circuits for use with 30 VDC, 15 mA maximum. When the "Timing" signal is output, the transistor turns ON. This signal is used to detect the home position with greater precision. The number of pulses of this signal is 50 pulses per one motor shaft rotation.



Note:

 A precise "Timing" signal cannot be obtained when the speed of the pulse input frequency is over 500 Hz.

#### Quadrature (ASG1/BSG1) Output Signal

#### Output Circuit and Sample Connection



Circuits for use with 30 VDC, 15 mA maximum.

A counter or similar device can be connected to monitor the position of the motor. The pulse resolution is the same as the motor resolution at the time of power-on.

[Example: Resolution select switch (1000 P/R)  $\rightarrow$  Output pulse number for each motor rotation (1000).]

The phase difference between A and B is 90° in electrical angle. Notes:

 $\bullet$  The pulse output accuracy is, regardless of resolution, within  $\pm 0.36^\circ$  (repetition accuracy: within  $\pm 0.09^\circ$ ).

- ${\ensuremath{\bullet}}$  This signal is only for position verification when the motor has stopped. There is a
- 1 msec (maximum) time lag between real rotor motion and the output signals.

#### ◇Pulse Waveform Characteristics



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AC Input

2-Phase PK/PV ithout Encode

With Encode 2-Phase PK

Controllers

EMP400

SG8030J

Accessories

Installation

Туре	Model	Motor Model	Driver Model
Standard Type	ASC34AK	ASM34AK	ASD10A-K
	ASC36AK	ASM36AK	ASD10B-K
	ASC46□K	ASM46□K	ASD18A-K
	ASC66 K	ASM66□K	ASD36A-K
	ASC34AK-T7.2	ASM34AK-T7.2	
	ASC34AK-T10	ASM34AK-T10	
	ASC34AK-T20	ASM34AK-T20	ASDTUC-K
	ASC34AK-T30	ASM34AK-T30	
	ASC46 K-T3.6	ASM46□K-T3.6	
	ASC46 K-T7.2	ASM46 K-T7.2	
	ASC46 K-T10	ASM460K-T10	ASD18B-K
In dealed type	ASC46 K-T20	ASM46 K-T20	
	ASC46 K-T30	ASM46 <sup>K-T30</sup>	
	ASC66 K-T3.6	ASM66_K-T3.6	
	ASC66 K-T7.2	ASM66 <sup>K-T7.2</sup>	
	ASC66 K-T10	ASM66CK-T10	ASD36B-K
	ASC66 K-T20	ASM66 K-T20	
	ASC66 K-T30	ASM66CK-T30	

Туре	Model	Motor Model	Driver Model	
	ASC34AK-N5	ASM34AK-N5		
	ASC34AK-N7.2	ASM34AK-N7.2	ASD10A-K	
	ASC34AK-N10	ASM34AK-N10		
	ASC46 K-N7.2	ASM46□K-N7.2		
	ASC46 K-N10	ASM46□K-N10	AJDIOA-K	
<b>PN</b> Geared Type	ASC66 K-N5	ASM66□K-N5	ASD36A-K	
	ASC66 K-N7.2	ASM66□K-N7.2		
	ASC66 K-N10	ASM66□K-N10		
	ASC66 K-N25	ASM66 K-N25		
	ASC66 K-N36	ASM66⊡K-N36	ASD36B-K	
	ASC66 K-N50	ASM66□K-N50		
	ASC34AK-H50	ASM34AK-H50		
Harmonic Geared Type	ASC34AK-H100	ASM34AK-H100	ASDIUC-K	
	ASC46 K-H50	ASM46 K-H50	ASD184-K	
	ASC46CK-H100	ASM46□K-H100	ASDIGAN	
	ASC66 K-H50	ASM66 K-H50	ASD34B-K	
	ASC66 K-H100	ASM66□K-H100	ASDSOB-N	

Model names for motor and driver combinations are shown below.

• Enter **A** (standard) or **M** (electromagnetic brake) in the box (
) within the model name.

• Enter **A** (standard) or **M** (electromagnetic brake) in the box (
) within the model name.