(RoHS) **RoHS-Compliant**

Closed Loop Stepping Motor and Driver Package

αSTEP ASC Series
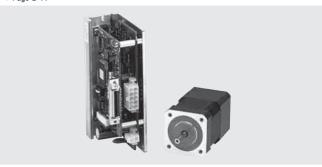
The αSTEP utilizes our unique closed loop control. This is a motor and driver package product offering the user-friendliness of a stepping motor combined with improved response and reliability.

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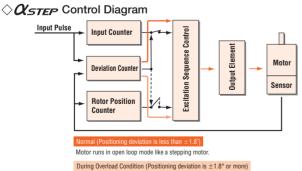➜ Page G-11

■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.
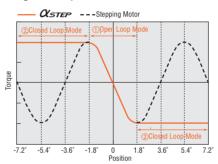
αSTEP is designed as a "package" consisting of a motor and a driver.

Sensor detects rotor position

◇ αSTEP Control Diagram

Input Pulse → Input Counter

Deviation Counter

Rotor Position Counter

Excitation Sequence Control

Output Element

Motor

Sensor

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

During Overload Condition (Positioning deviation is ±1.8° or more)
The closed loop mode is engaged to maintain the positioning operation.

◇ αSTEP Angle – Torque Characteristics

— αSTEP   - - - Stepping Motor

②Closed Loop Mode   ①Open Loop Mode

②Closed Loop Mode

Torque

Position

-7.2˚ -5.4˚ -3.6˚ -1.8˚ 0 1.8˚ 3.6˚ 5.4˚ 7.2˚
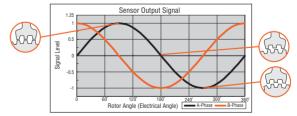
① If the positioning deviation is less than ±1.8˚, the motor runs in open loop mode like a stepping motor.
② If the positioning deviation is ±1.8˚ or more, the motor runs in closed loop mode and the position is corrected by exciting the motor windings to generate maximum torque based on the rotor position.

◇ The Sensor to Detect Rotor's Position

The αSTEP 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.

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.

Sensor Output Signal

Signal Level

1.25
1
0.5
0
-0.5
-1

0   60˚   120˚   180˚   240˚   300˚   360˚
Rotor Angle (Electrical Angle)   ▬ A-Phase ▬ B-Phase

Features C-62 / System Configuration C-64 / Product Line C-66

Stepping Motors

Introduction

αSTEP AS
AC Input

αSTEP ASC
DC Input

5-Phase Microstep RK
AC Input

2-Phase Full/Half UMK

5-Phase Microstep CRK

2-Phase Microstep RBK
DC Input

2-Phase Microstep CMK

2-Phase PK/PV
Without Encoder

2-Phase PK
With Encoder

EMP400
Controllers

SG8030J

Accessories

Installation

● **High Response**
Like conventional stepping motors, α*STEP* operates in synchronism with command pulses. This makes possible short stroke positioning in a short time.
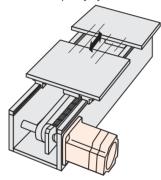
Motor Movement

Pulse Input

Positioning Completion Signal

Measurement Condition: Feed 1/5 rotation

Load inertia 250×10^{-7} kg·m² (J)
$(1.365$ oz-in²$)$

● **No Gain Tuning**
Gain tuning for servo motors is critical, troublesome and time-consuming. Since the α*STEP* operates like a stepping motor, there are no gain tuning requirements. α*STEP* is ideal for low rigidity applications, such as belt and pulley systems.
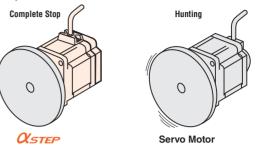
● **The α*STEP* Complies with Major Safety Standards**
The **ASC** Series is recognized by the UL/CSA Standards and conforms to EN Standards. The CE Marking certifies compliance with the EMC Directives.
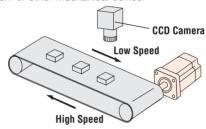
● **No Hunting**
Since α*STEP* is a stepping motor, it has no hunting problem. Therefore, when it stops, its position is completely stable and does not fluctuate. α*STEP* is ideal for applications in which hunting would be a problem.

Complete Stop   Hunting

α*STEP*   **Servo Motor**

● **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. α*STEP* provides resolution as high as 0.036˚ per step without any damping mechanism or other mechanical device.

CCD Camera

Low Speed

High Speed

α*STEP* 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**
α*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.
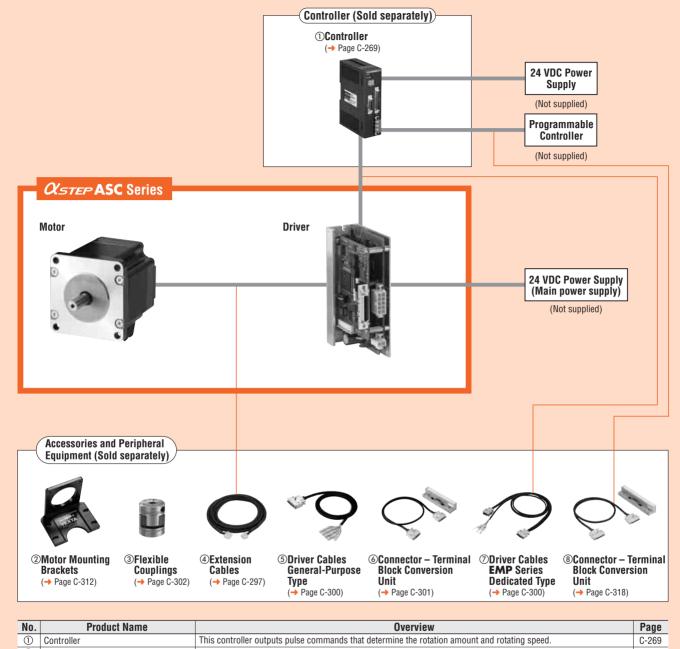
● (RoHS) **RoHS-Compliant**
The α*STEP* conforms to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium.
● Details of RoHS Directive ➜ Page G-38

■ System Configuration

● Standard Type

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

Controller (Sold separately)

①Controller
(➜ Page C-269)

24 VDC Power Supply
(Not supplied)

Programmable Controller
(Not supplied)

αSTEP ASC Series

Motor

Driver

24 VDC Power Supply (Main power supply)
(Not supplied)

Accessories and Peripheral Equipment (Sold separately)

②Motor Mounting Brackets
(➜ Page C-312)

③Flexible Couplings
(➜ Page C-302)

④Extension Cables
(➜ Page C-297)

⑤Driver Cables General-Purpose Type
(➜ Page C-300)

⑥Connector – Terminal Block Conversion Unit
(➜ Page C-301)

⑦Driver Cables EMP Series Dedicated Type
(➜ Page C-300)

⑧Connector – Terminal Block Conversion Unit
(➜ Page C-318)

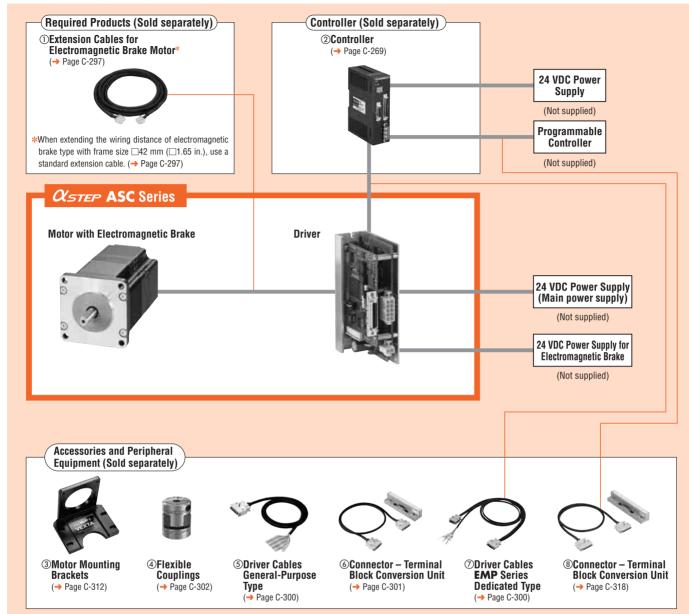| No.	Product Name	Overview	Page
①	Controller	This controller outputs pulse commands that determine the rotation amount and rotating speed.	C-269
②	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	C-312
③	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	C-302
④	Extension Cables	Cable for extending the wiring distance between the motor and driver [1 to 10 m (3.3 to 32.8 ft.)].	C-297
	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.)].	
⑤	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
⑥	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
⑦	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
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.)].	C-318

●Example of System Configuration
(Sold separately)

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

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

■System Configuration

●Standard Type with Electromagnetic Brake

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

Required Products (Sold separately)

①**Extension Cables for Electromagnetic Brake Motor**∗
(➜ Page C-297)

∗When extending the wiring distance of electromagnetic brake type with frame size □42 mm (□1.65 in.), use a standard extension cable. (➜ Page C-297)

Controller (Sold separately)

②**Controller**
(➜ Page C-269)

24 VDC Power Supply
(Not supplied)

Programmable Controller
(Not supplied)

𝜶STEP ASC Series

Motor with Electromagnetic Brake

Driver

24 VDC Power Supply (Main power supply)
(Not supplied)

24 VDC Power Supply for Electromagnetic Brake
(Not supplied)

Accessories and Peripheral Equipment (Sold separately)

③**Motor Mounting Brackets**
(➜ Page C-312)

④**Flexible Couplings**
(➜ Page C-302)

⑤**Driver Cables General-Purpose Type**
(➜ Page C-300)

⑥**Connector – Terminal Block Conversion Unit**
(➜ Page C-301)

⑦**Driver Cables EMP Series Dedicated Type**
(➜ Page C-300)

⑧**Connector – Terminal Block Conversion Unit**
(➜ Page C-318)

No.	Product Name	Overview	Page
①	Extension Cables for Electromagnetic Brake Motor	Dedicated cable for connecting the electromagnetic brake motor and driver [1 to 20 m (3.3 to 65.6 ft.)]. Be sure to purchase this cable.	C-297
	Flexible Extension Cables for Electromagnetic Brake Motor	Dedicated cable offering flexibility, used to connect the electromagnetic brake motor and driver [1 to 10 m (3.3 to 32.8 ft.)]. Be sure to purchase this cable.	
②	Controller	This controller outputs pulse commands that determine the rotation amount and rotating speed.	C-269
③	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	C-312
④	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	C-302
⑤	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
⑥	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
⑦	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.)].	C-300
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.)].	C-318

●Example of System Configuration

(Sold separately)

𝜶STEP ASC Series	Extension Cable for Electromagnetic Brake Motor [3 m (9.8 ft.)]
ASC66MK	**CC03AIPM**

+

(Sold separately)

Controller	Motor Mounting Bracket	Flexible Coupling	Driver Cable EMP Series Dedicated Type [1 m (3.3 ft.)]	Connecter – Terminal Block Conversion Unit [1 m (3.3 ft.)]
EMP401-1	**PAL2P-5A**	**MCS300808**	**CC01EMP4**	**CC50T1**

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

Specifications, Characteristics C-67 / Dimensions C-76 / Connection and Operation C-83 / Motor and Driver Combinations C-87

Introduction

𝜶STEP AS AC Input

𝜶STEP ASC DC Input

5-Phase Microstep RK AC Input

2-Phase Full/Half UMK

5-Phase Microstep CRK

2-Phase Microstep RBK DC Input

2-Phase Microstep CMK

2-Phase PK/PV Without Encoder

2-Phase PK With Encoder

EMP400 Controllers

SG8030J

Accessories

Installation

■Product Number Code

ASC 6 6 A K - T 3.6
  ①   ② ③ ④ ⑤   ⑥ ⑦

①	Series	**ASC**: ASC Series
②	Motor Frame Size	**3**: 28 mm (1.10 in.) **4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.)
③	Motor Case Length	
④	Motor Type	**A**: Standard (Single shaft) **M**: Electromagnetic Brake Type
⑤	Power Supply Voltage	**K**: 24 VDC
⑥	Gearhead Type	Blank: Standard Type **T**: TH Geared Type **N**: PN Geared Type **H**: Harmonic Geared Type
⑦	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

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

◇**TH** Geared Type

Power Supply Voltage	Model (Single shaft)
24 VDC	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

◇**PN** Geared Type

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

◇Harmonic Geared Type

Power Supply Voltage	Model (Single shaft)
24 VDC	ASC34AK-H50 ASC34AK-H100 ASC46AK-H50 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 with Electromagnetic Brake

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

Extension cables for electromagnetic brake motor ➜ Page C-297

◇**TH** Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single shaft)
24 VDC	ASC46MK-T3.6 ASC46MK-T7.2 ASC46MK-T10 ASC46MK-T20 ASC46MK-T30 ASC66MK-T3.6 ASC66MK-T7.2 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)
24 VDC	ASC46MK-N7.2 ASC46MK-N10 ASC66MK-N5 ASC66MK-N7.2 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 □42 mm (□1.65 in.) models can use a standard extension cable even for electromagnetic brake motor models.

• Extension Cables for Electromagnetic Brake Motor

Model	Length 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)

• Flexible Extension Cables for Electromagnetic Brake Motor

Model	Length 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)

Features C-62 / System Configuration C-64 / Product Line C-66

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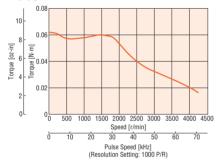
■Specifications (RoHS)

Model		ASC34AK	ASC36AK	ASC46AK	ASC66AK
	Standard	ASC34AK	ASC36AK	ASC46AK	ASC66AK
	Electromagnetic Brake	–	–	ASC46MK	ASC66MK
Maximum Holding Torque　　　　　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^{-7} (0.06)	27×10^{-7} (0.148)	68×10^{-7} (0.37) [83×10^{-7} (0.45)][*1]	405×10^{-7} (2.2) [564×10^{-7} (3.1)][*1]
Resolution[*2]	Resolution Setting: 1000 P/R	0.36°/Pulse			
Power Source	Voltage	24 VDC±10%			
	Maximum Input Current　　A	1	1.1	1.7	3.7
Electromagnetic Brake[*3]	Type	–	–	Active when the power is off	
	Power Supply Input	–	–	24 VDC±5%	
	Power Consumption　　W	–	–	2	6
	Excitation Current　　A	–	–	0.08	0.25
	Static Friction Torque　　N·m (oz-in)	–	–	0.15 (21)	0.6 (85)
Mass	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]
	Driver　　kg (lb.)	0.25 (0.55)			
Dimension No.	Motor	①		②	③
	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.
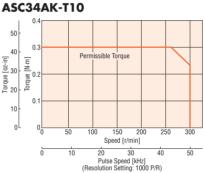
＊2 The resolution can be set to any one of 500 P/R, 1000 P/R, 5000 P/R, or 10000 P/R with the resolution select switch or resolution select signals.
Resolution select switch → Page C-83

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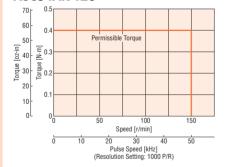
■Speed – Torque Characteristics How to read speed – torque characteristics → Page C-12

ASC34AK

ASC36AK

ASC46AK/ASC46MK

ASC66AK/ASC66MK
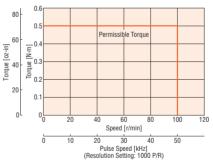

Notes:

● 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℃ (212℉). [Under 75℃ (167℉) 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%.

Side tabs:
Introduction
αSTEP AS AC Input
αSTEP ASC DC Input
5-Phase Microstep RK AC Input
2-Phase Full/Half UMK
5-Phase Microstep CRK
2-Phase Microstep RBK DC Input
2-Phase Microstep CMK
2-Phase PK/PV Without Encoder
2-Phase PK With Encoder
EMP400
SG8030J Controllers
Accessories
Installation

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

■Specifications (RoHS)

_c**Ⓤ**_{US} **C E**

Model	Standard	ASC34AK-T7.2	ASC34AK-T10	ASC34AK-T20	ASC34AK-T30
Maximum Holding Torque	N·m (oz-in)	0.2 (28)	0.3 (42)	0.4 (56)	0.5 (71)
Rotor Inertia J	kg·m^2 (oz-in^2)		11×10^{-7} (0.06)		
Backlash	arc minute (degrees)		60 (1˚)		
Permissible Speed Range	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 Source	Voltage		24 VDC±10%		
	Maximum Input Current A		1		
Mass	Motor kg (lb.)		0.21 (0.46)		
	Driver kg (lb.)		0.25 (0.55)		
Dimension No.	Motor		④		
	Driver		⑬		

How to read specifications table ➜ Page C-11

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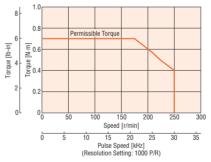● Direction of rotation of the motor and that of the gear output shaft are the same for the gear ratios 20:1 and 30:1. It is opposite for 7.2:1 and 10:1 gear ratios.

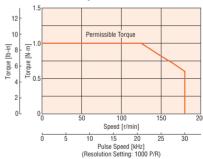## ■Speed – Torque Characteristics How to read speed – torque characteristics ➜ Page C-12

ASC34AK-T7.2

ASC34AK-T10

ASC34AK-T20

ASC34AK-T30

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%.

Features C-62 / System Configuration C-64 / Product Line C-66

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

■Specifications (RoHS)

Model	Standard	ASC46AK-T3.6	ASC46AK-T7.2	ASC46AK-T10	ASC46AK-T20	ASC46AK-T30
	Electromagnetic Brake	ASC46MK-T3.6	ASC46MK-T7.2	ASC46MK-T10	ASC46MK-T20	ASC46MK-T30
Maximum Holding Torque N·m (lb-in)		0.35 (3)	0.7 (6.1)	1 (8.8)	1.5 (13.2)	
Rotor Inertia J kg·m² (oz-in²)		68×10^{-7} (0.37) [83×10^{-7} (0.45)][*1]				
Backlash arc minute (degrees)		45 (0.75˚)	25 (0.417˚)		15 (0.25˚)	
Permissible Speed 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 Setting: 1000 P/R	0.1˚/Pulse	0.05˚/Pulse	0.036˚/Pulse	0.018˚/Pulse	0.012˚/Pulse
Permissible Torque N·m (lb-in)		0.35 (3)	0.7 (6.1)	1 (8.8)	1.5 (13.2)	
Power Source	Voltage	24 VDC±10%				
	Maximum Input Current A	1.7				
Electromagnetic Brake[*3]	Type	Active when the power is off				
	Power Supply Input	24 VDC±5%				
	Power Consumption W	2				
	Excitation Current A	0.08				
	Static Friction 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]				
	Driver kg (lb.)	0.25 (0.55)				
Dimension No.	Motor	⑤				
	Driver	⑬				

How to read specifications table ➡ 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.
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
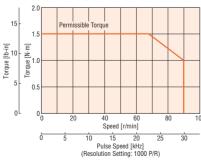
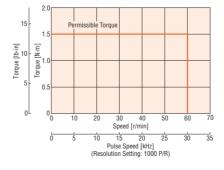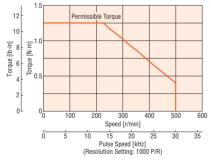### ASC46AK-T3.6/ASC46MK-T3.6

ASC46AK-T7.2/ASC46MK-T7.2

ASC46AK-T10/ASC46MK-T10

ASC46AK-T20/ASC46MK-T20

ASC46AK-T30/ASC46MK-T30

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 60 mm (2.36 in.)

■Specifications ⓇoHS   c🆄Lus CE

Model	Standard	ASC66AK-T3.6	ASC66AK-T7.2	ASC66AK-T10	ASC66AK-T20	ASC66AK-T30
	Electromagnetic Brake	ASC66MK-T3.6	ASC66MK-T7.2	ASC66MK-T10	ASC66MK-T20	ASC66MK-T30
Maximum Holding 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^{-7} (2.2) [564×10^{-7} (3.1)][1]				
Backlash arc minute (degrees)		35 (0.584°)	15 (0.25°)		10 (0.167°)	
Permissible Speed 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 Setting: 1000 P/R		0.1°/Pulse	0.05°/Pulse	0.036°/Pulse	0.018°/Pulse	0.012°/Pulse
Permissible Torque N·m (lb-in)		1.25 (11)	2.5 (22)	3 (26)	3.5 (30)	4 (35)
Power Source	Voltage	24 VDC±10%				
	Maximum Input Current A	3.7				
Electromagnetic Brake[3]	Type	Active when the power is off				
	Power Supply Input	24 VDC±5%				
	Power Consumption W	6				
	Excitation Current A	0.25				
	Static Friction Torque N·m (lb-in)	0.62 (5.4)	1.25 (11)	1.5 (13.2)	1.75 (15.4)	2 (17.7)
Mass	Motor kg (lb.)	1.25 (2.8) [1.5 (3.3)][1]				
	Driver kg (lb.)	0.25 (0.55)				
Dimension No.	Motor	6				
	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.
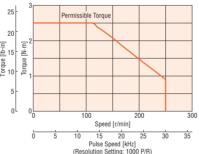
Note:
● Direction of rotation of the motor and that of the gear output shaft are the same for the gear ratios 3.6:1, 7.2:1 and 10:1. It is opposite for 20:1 and 30:1 gear ratios.

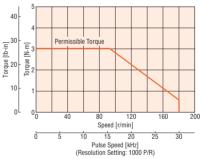## ■Speed – Torque Characteristics   How to read speed – torque characteristics ➜ Page C-12
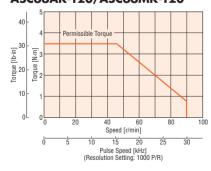
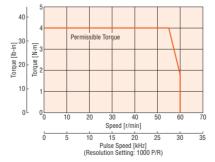### ASC66AK-T3.6/ASC66MK-T3.6

ASC66AK-T7.2/ASC66MK-T7.2

ASC66AK-T10/ASC66MK-T10

ASC66AK-T20/ASC66MK-T20

ASC66AK-T30/ASC66MK-T30

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%.

Features C-62 / System Configuration C-64 / Product Line C-66

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^{-7} (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 Source	Voltage	24 VDC±10%		
	Maximum Input Current A	1		
Mass	Motor kg (lb.)	0.28 (0.62)		
	Driver kg (lb.)	0.25 (0.55)		
Dimension No.	Motor	⑦		
	Driver	⑬		

How to read specifications table ➡ Page C-11

＊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.

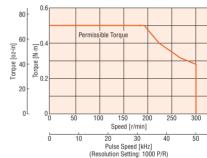## ■Speed – Torque Characteristics   How to read speed – torque characteristics ➡ Page C-12

ASC34AK-N5

ASC34AK-N7.2

ASC34AK-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 42 mm (1.65 in.)

■Specifications (RoHS)

c$\mathbf{W}$us CE

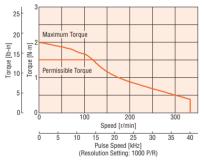| Model		Standard	ASC46AK-N7.2	ASC46AK-N10
		Electromagnetic Brake	ASC46MK-N7.2	ASC46MK-N10
Maximum Holding Torque		N·m (lb-in)	1.5 (13.2)	
Rotor Inertia J		kg·m^2 (oz-in^2)	68×10^{-7} (0.37) [83×10^{-7} (0.454)][*1]	
Backlash		arc minute (degrees)	2 (0.034˚)	
Angular Transmission Error		arc minute (degrees)	6 (0.1˚)	
Permissible Speed Range		r/min	0～333	0～240
Gear Ratio			7.2:1	10:1
Resolution[*2]		Resolution Setting: 1000 P/R	0.05˚/Pulse	0.036˚/Pulse
Permissible Torque		N·m (lb-in)	1.5 (13.2)	
Maximum Torque[*3]		N·m (lb-in)	2 (17.7)	
Power Source	Voltage		24 VDC±10%	
	Maximum Input Current	A	1.7	
Electromagnetic Brake[*4]	Type		Active when the power is off	
	Power Supply Input		24 VDC±5%	
	Power Consumption	W	2	
	Excitation Current	A	0.08	
	Static Friction Torque	N·m (lb-in)	0.75 (6.6)	
Mass	Motor	kg (lb.)	0.71 (1.6) [0.81 (1.8)][*1]	
	Driver	kg (lb.)	0.25 (0.55)	
Dimension No.	Motor		8	
	Driver		13	

How to read specifications table ➜ 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.
Resolution select switch ➜ Page C-83

∗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.
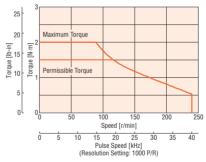
Note:
● Direction of rotation of the motor shaft and that of the gear output shaft are the same.

■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%.

Introduction

αSTEP AS / AC Input

αSTEP ASC / DC Input

5-Phase Microstep RK / AC Input

2-Phase Full/Half UMK

5-Phase Microstep CRK

2-Phase Microstep RBK / DC Input

2-Phase Microstep CMK

2-Phase PK/PV / Without Encoder

2-Phase PK / With Encoder

EMP400 / Controllers

SG8030J

Accessories

Installation

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

■ Specifications (RoHS)

Model	Standard	ASC66AK-N5	ASC66AK-N7.2	ASC66AK-N10	ASC66AK-N25	ASC66AK-N36	ASC66AK-N50
	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)	$405×10^{-7}$ (2.2) $[564×10^{-7}$ (3.1)][*1]					
Backlash	arc minute (degrees)	2 (0.034˚)			3 (0.05˚)		
Angular Transmission Error	arc minute (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 Setting: 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 Source	Voltage	24 VDC±10%					
	Maximum Input Current A	3.7					
Electromagnetic Brake[*4]	Type	Active when the power is off					
	Power Supply Input	24 VDC±5%					
	Power Consumption W	6					
	Excitation Current A	0.25					
	Static Friction Torque N·m (lb-in)	1.75 (15.4)	2 (17.7)	2.5 (22)	4 (35)		
Mass	Motor kg (lb.)	1.5 (3.3) [1.75 (3.9)][*1]			1.7 (3.7) [1.95 (4.3)][*1]		
	Driver kg (lb.)	0.25 (0.55)					
Dimension No.	Motor	9					
	Driver	13					

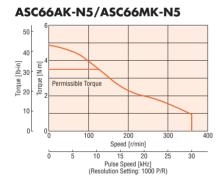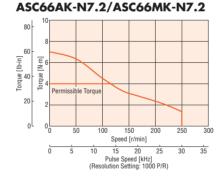How to read specifications table ➜ Page C-11   Extension cables for electromagnetic brake motor ➜ Page C-297

＊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 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.
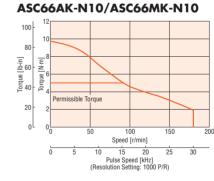
Note:
● Direction of rotation of the motor shaft and that of the gear output shaft are the same.

■ Speed – Torque Characteristics   How to read speed – torque characteristics ➜ Page C-12
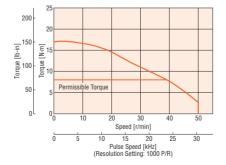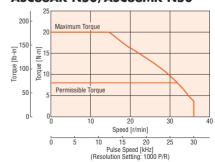
ASC66AK-N5/ASC66MK-N5

ASC66AK-N7.2/ASC66MK-N7.2

ASC66AK-N10/ASC66MK-N10

ASC66AK-N25/ASC66MK-N25

ASC66AK-N36/ASC66MK-N36

ASC66AK-N50/ASC66MK-N50

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%.

Specifications, Characteristics C-67 / Dimensions C-76 / Connection and Operation C-83 / Motor and Driver Combinations C-87

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

■Specifications (RoHS)

Model		ASC34AK-H50	ASC34AK-H100	ASC46AK-H50	ASC46AK-H100	ASC66AK-H50	ASC66AK-H100
	Standard	ASC34AK-H50	ASC34AK-H100	ASC46AK-H50	ASC46AK-H100	ASC66AK-H50	ASC66AK-H100
	Electromagnetic Brake	–	–	ASC46MK-H50	ASC46MK-H100	ASC66MK-H50	ASC66MK-H100
Maximum Holding 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 kg·m² (oz-in²)		14×10^{-7} (0.077)		85×10^{-7} (0.46) [100×10^{-7} (0.55)]*1		440×10^{-7} (2.4) [599×10^{-7} (3.3)]*1	
Permissible Speed 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 Setting: 1000 P/R		0.0072°/Pulse	0.0036°/Pulse	0.0072°/Pulse	0.0036°/Pulse	0.0072°/Pulse	0.0036°/Pulse
Permissible Torque N·m (lb-in)		1.5 (13.2)	2 (17.7)	3.5 (30)	5 (44)	5.5 (48)	8 (70)
Maximum Torque N·m (lb-in)		2 (17.7)	2.8 (24)	8.3 (73)	11 (97)	18 (159)	28 (240)
Lost Motion (Load Torque) 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)
Power Source	Voltage	24 VDC±10%					
	Maximum Input Current A	1		1.7		3.7	
Electromagnetic Brake*3	Type	–		Active when the power is off			
	Power Supply Input	–		24 VDC±5%			
	Power Consumption W	–		2		6	
	Excitation Current A	–		0.08		0.25	
	Static Friction 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	
	Driver kg (lb.)	0.25 (0.55)					
Dimension No.	Motor	10		11		12	
	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.
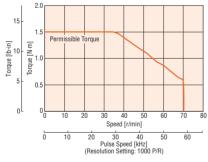Resolution select switch → Page C-83

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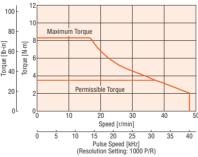
Note:
● The inertia represents a sum of the inertia of the harmonic gear converted to a motor shaft value, and the rotor inertia. Direction of rotation of the motor shaft and that of the gear output shaft are the opposite.

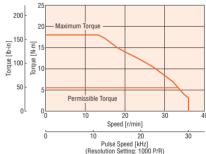## ■Speed – Torque Characteristics   How to read speed – torque characteristics → Page C-12

ASC34AK-H50
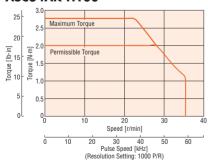

ASC46AK-H50/ASC46MK-H50
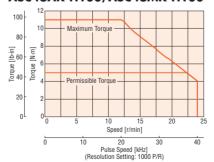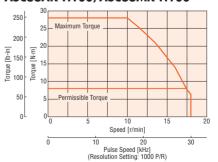

ASC66AK-H50/ASC66MK-H50

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%.

Features C-62 / System Configuration C-64 / Product Line C-66

■ 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 (221˚F) by UL/CSA Standards]	–
Insulation Resistance		100 MΩ or more when 500 VDC megger is applied between the following places: · Case – Motor and sensor windings · Case – Electromagnetic brake windings	100 MΩ or more when 500 VDC megger is applied between the following places: · Heat sink – Power input terminal
Dielectric Strength		Sufficient to withstand the following for 1 minute: · Case – Motor and sensor windings　　0.5 kVAC 50 Hz or 60 Hz · Case – Electromagnetic brake windings　1.0 kVAC 50 Hz or 60 Hz	Sufficient to withstand the following for 1 minute: · Heat sink – Power input terminal　　0.5 kVAC 50 Hz or 60 Hz
Operating Environment	Ambient Temperature	0～+50˚C (+32～+122˚F) (non-freezing): Standard type, **TH**, **PN** geared type 0～+40˚C (+32～+104˚F) (non-freezing): Harmonic geared type	0～+40˚C (+32～+104˚F) (non-freezing)
	Ambient Humidity	85% or less (non-condensing)	
	Atmosphere	No corrosive gases, dust, water or oil	
Stop Position Accuracy		±5 arc minutes (±0.084˚)	–
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 Indicator Reading): The total dial gauge reading when the measurement section is rotated one revolution centered on the reference axis center.

Note:
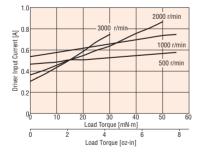● Do not measure insulation resistance or perform the dielectric strength test while the motor and driver are connected.
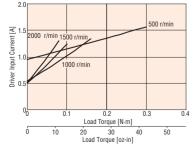
■ Load Torque – Driver Input Current Characteristics

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.

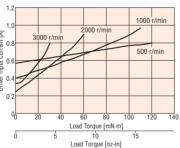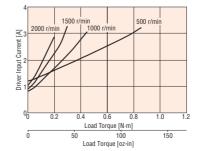Motor shaft speed [r/min] = Gear output shaft speed×Gear ratio

$$\text{Motor shaft torque [N·m (oz-in)]} = \frac{\text{Gear output shaft torque}}{\text{Gear ratio}}$$

ASC34

ASC36

ASC46

ASC66

Specifications, Characteristics C-67 / Dimensions C-76 / Connection and Operation C-83 / Motor and Driver Combinations C-87

■ Permissible Overhung Load and Permissible Thrust Load

Unit = N (lb.)

Type	Model	Gear Ratio	Permissible Overhung Load					Permissible Thrust Load
			Distance from Shaft End					
			0 mm (0 in.)	5 mm (0.2 in.)	10 mm (0.39 in.)	15 sym (0.59 in.)	20 mm (0.79 in.)	
Standard Type	**ASC34AK** **ASC36AK**	–	25 (5.6)	34 (7.6)	52 (11.7)	–	–	The permissible thrust load shall be no greater than the motor mass.
	ASC46□K		20 (4.5)	25 (5.6)	34 (7.6)	52 (11.7)	–	
	ASC66□K		63 (14.1)	75 (16.8)	95 (21)	130 (29)	190 (42)	
TH Geared Type	**ASC34AK-T□**	**7.2, 10, 20, 30**	15 (3.3)	17 (3.8)	20 (4.5)	23 (5.1)	–	10 (2.2)
	ASC46□K-T□	**3.6, 7.2, 10, 20, 30**	10 (2.2)	14 (3.1)	20 (4.5)	30 (6.7)	–	15 (3.3)
	ASC66□K-T□		70 (15)	80 (18)	100 (22)	120 (27)	150 (33)	40 (9)
PN Geared Type	**ASC34AK-N□**	**5, 7.2, 10**	45 (10.1)	60 (13.5)	80 (18)	100 (22)	–	20 (4.5)
	ASC46□K-N□	**7.2, 10**	100 (22)	120 (27)	150 (33)	190 (42)	–	100 (22)
	ASC66□K-N5	**5**	200 (45)	220 (49)	250 (56)	280 (63)	320 (72)	
	ASC66□K-N□	**7.2, 10**	250 (56)	270 (60)	300 (67)	340 (76)	390 (87)	
		25, 36, 50	330 (74)	360 (81)	400 (90)	450 (101)	520 (117)	
Harmonic Geared Type	**ASC34AK-H□**	**50, 100**	140 (31)	160 (36)	200 (45)	240 (54)	–	
	ASC46□K-H□		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.
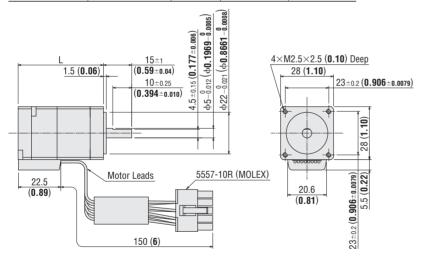 Enter the gear ratio in the box (□) within the model name.
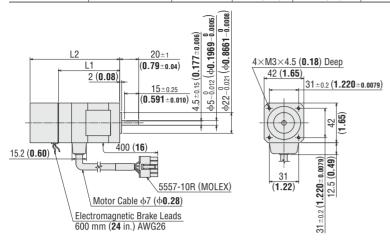
■ Dimensions Unit = mm (in.)

● Motor

◇ Standard Type

1 □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

4×M3×4.5 (**0.18**) Deep
5557-10R (MOLEX)
Motor Cable φ7 (φ**0.28**)
Electromagnetic Brake Leads
600 mm (**24** in.) AWG26

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

4×φ4.5 (φ**0.177**) Thru
5557-10R (MOLEX)
Motor Cable φ7 (φ**0.28**)
A – A

Specifications, Characteristics C-67 / Dimensions C-76 / Connection and Operation C-83 / Motor and Driver Combinations C-87

C-77

◇**TH** Geared Type

4 □28 mm (□1.10 in.)

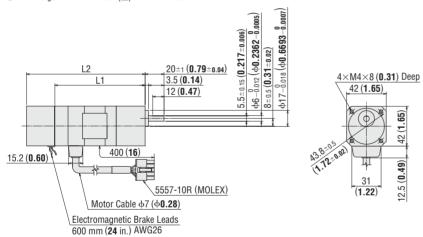| Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
ASC34AK-T□	ASM34AK-T□	**7.2**, **10**, **20**, **30**	0.21 (0.46)	B357

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

5 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
ASC46AK-T□	ASM46AK-T□	**3.6**, **7.2**, **10**, **20**, **30**	95.4 (3.76)	–	0.65 (1.4)	B199
ASC46MK-T□	ASM46MK-T□		–	125.4 (4.94)	0.75 (1.7)	B200

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

Features C-62 / System Configuration C-64 / Product Line C-66

⑥ □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
ASC66AK-T□	ASM66AK-T□	**3.6**, **7.2**, **10**, **20**, **30**	108.6 (4.28)	–	1.25 (2.8)	B201
ASC66MK-T□	ASM66MK-T□		–	143.6 (5.65)	1.5 (3.3)	B202

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

◇ **PN** Geared Type

⑦ □28 mm (□1.10 in.)

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

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

Specifications, Characteristics C-67 / Dimensions C-76 / Connection and Operation C-83 / Motor and Driver Combinations C-87

◇**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□		–	126.9 (5.00)	0.81 (1.8)	B307

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

Parallel Key (Included)   A – A

⑨ □60 mm (□**2.36** in.)

Model	Motor Model	Gear Ratio	L1	L2	Mass kg (lb.)	DXF
ASC66AK-N□	ASM66AK-N□	**5**, **7.2**, **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**, **7.2**, **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 (□) within the model name.

Parallel Key (Included)   A – A

Introduction

αSTEP AS AC Input

αSTEP ASC DC Input

5-Phase Microstep RK AC Input

2-Phase Full/Half UMK

5-Phase Microstep CRK

2-Phase Microstep RBK DC Input

2-Phase Microstep CMK

Without Encoder PK/PV

With Encoder 2-Phase PK

EMP400 Controllers

SG8030J

Accessories

Installation

◇Harmonic Geared Type

⑩ □28 mm (□1.10 in.)

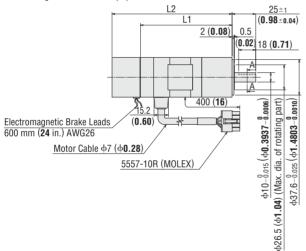| Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
ASC34AK-H□	ASM34AK-H□	**50**, **100**	0.25 (0.55)	B289

● Enter the gear ratio in the 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□			126.9 (5.00)	0.8 (1.8)	B309

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

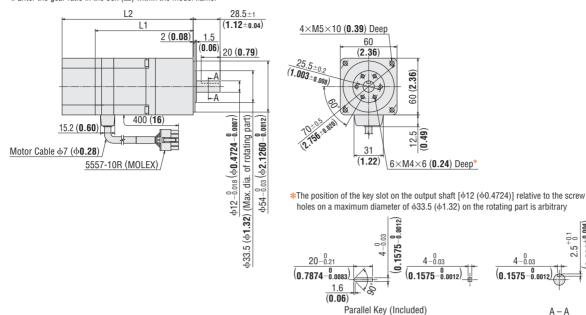✱The position of the key slot on the output shaft [φ10 (φ0.3937)] relative to the screw holes on a maximum diameter of φ26.5 (φ1.04) on the rotating part is arbitrary.

Parallel Key (Included)

A – A

Specifications, Characteristics C-67 / Dimensions C-76 / Connection and Operation C-83 / Motor and Driver Combinations C-87

◇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□		–	138.6 (5.46)	1.65 (3.6)	B311

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

＊The position of the key slot on the output shaft [φ12 (φ0.4724)] relative to the screw holes on a maximum diameter of φ33.5 (φ1.32) on the rotating part is arbitrary
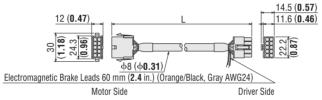
Parallel Key (Included)

A – A

● 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.

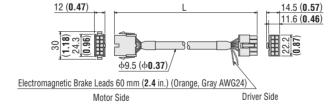Extension cables for electromagnetic brake motor ➜ Page C-297

● 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)

Electromagnetic Brake Leads 60 mm (**2.4** in.) (Orange/Black, Gray AWG24)
Motor Side   Driver Side

● Flexible Extension Cables for Electromagnetic Brake Motor

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)

Electromagnetic Brake Leads 60 mm (**2.4** in.) (Orange, Gray AWG24)
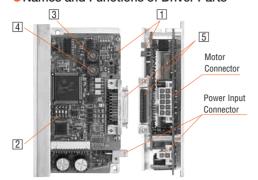Motor Side   Driver Side

● 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)

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

■Connection and Operation

●Names and Functions of Driver Parts

Motor Connector

Power Input Connector

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	Blinks when protective functions are activated.

◇Alarm

Blink Count	Function	When Activated
2	Overload	The motor has been operated continuously over 5 seconds under a load 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] [×1] → 1000 P/R (0.36°/step) [1000] [×10] → 10000 P/R (0.036°/step) [500] [×1] → 500 P/R (0.72°/step) [500] [×10] → 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

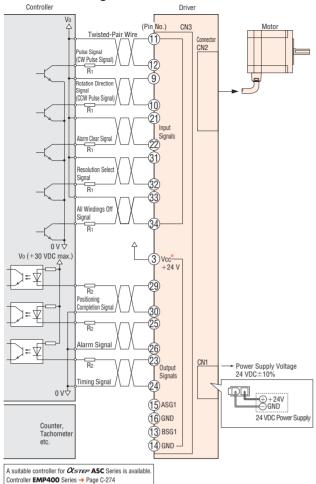| Indication	Switch Name	Function	
V.FIL	Velocity Filter Adjustment Switch	This switch is used to make adjustments when a smooth start-stop or smooth motion at low speed is required (a maximum of 16 settings).	Set to "0" · The difference in characteristics mode by the velocity filter. Set to "F" Motor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

⑤ Input/Output Signals (36 pins)

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

Description of input/output signals ➡ Page C-85
＊Signal name in parentheses represents the setting in 2-pulse input mode.

αSTEP AS AC Input
αSTEP ASC DC Input
5-Phase Microstep RK AC Input
2-Phase Full/Half UMK
5-Phase Microstep CRK
2-Phase Microstep RBK DC Input
2-Phase Microstep CMK
2-Phase PK/PV Without Encoder
2-Phase PK With Encoder
EMP400 Controllers
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C-83

● Connection Diagram

Controller   Driver

V₀

(Pin No.) CN3   Motor

Twisted-Pair Wire ⑪   Connector CN2

Pulse Signal (CW Pulse Signal) ⑫
R₁
⑨

Rotation Direction Signal (CCW Pulse Signal) ⑩
R₁
㉑   Input Signals

Alarm Clear Signal ㉒
R₁
㉛

Resolution Select Signal ㉜
R₁
㉝

All Windings Off Signal ㉞
R₁

0 V
V₀ (+30 VDC max.)

③ Vcc *
+24 V

㉙

R₂ Positioning Completion Signal ㉚
㉕
R₂

Alarm Signal ㉖
R₂
㉓   Output Signals   CN1   Power Supply Voltage 24 VDC±10%

Timing Signal ㉔

0 V

⑮ ASG1
⑯ GND   +24V
⑬ BSG1   GND
⑭ GND   24 VDC Power Supply

Counter, Tachometer etc.

A suitable controller for αstep **ASC** Series is available.

◇ 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 (R_1) of 1.5 to 2.2 kΩ 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.
＊Check the connection on page C-85 when using a 24 VDC power supply for control signals.

◇ 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 ±5% 0.3 A minimum (**ASC46**: 0.1 A minimum) and therefore must be independent of the driver's power supply for signal control.
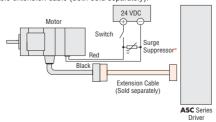
Notes:
● Applying a voltage that exceeds the specifications will cause the electromagnetic brake to generate a great deal of heat, resulting in motor temperature rises and possible damage to the motor. Conversely, if voltage is too low, the electromagnetic brake may not release.
● To protect the switch 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.
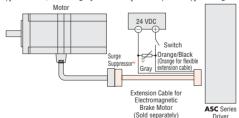● When using as a CE certified part, use a dedicated DC power supply for electromagnetic brake.
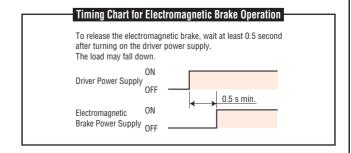
(1) **ASC46**
The electromagnetic brake leads are linked to the connector on the motor [600 mm (23.6 in.)]. When connecting with the DC power supply, connect the red spiral lead wire to +24 V, and the black lead wire to the ground (GND). Use the extension cable or the flexible extension cable (both sold separately).

Motor 24 VDC Switch Surge Suppressor＊ Red Black Extension Cable (Sold separately) **ASC** Series Driver

(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).
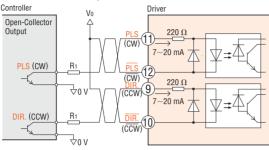

Motor 24 VDC Switch Surge Suppressor＊ Orange/Black (Orange for flexible extension cable) Gray Extension Cable for Electromagnetic Brake Motor (Sold separately) **ASC** Series Driver

Timing Chart for Electromagnetic Brake Operation

To release the electromagnetic brake, wait at least 0.5 second after turning on the driver power supply.
The load may fall down.

Driver Power Supply ON / OFF
0.5 s min.
Electromagnetic Brake Power Supply ON / OFF

Stepping Motors

Introduction

AC Input αSTEP AS

DC Input αSTEP ASC

5-Phase Microstep RK AC Input

2-Phase Full/Half UMK

5-Phase Microstep CRK

2-Phase Microstep RBK DC Input

2-Phase Microstep CMK

2-Phase PK/PV Without Encoder

2-Phase PK With Encoder

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● **Description of Input/Output Signals**

Indication of Input/Output Signal "ON""OFF"

Input (Output) "ON" indicates that the current is sent into the photocoupler (transistor) inside the driver. Input (Output) "OFF" indicates that the current is not sent into the photocoupler (transistor) inside the driver.
The input/output remains "OFF" if nothing is connected.

Photocoupler OFF ON

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

◇**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 V_0 is 5 VDC. When the voltage exceeds 5 VDC, connect the external resistor R_1 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**
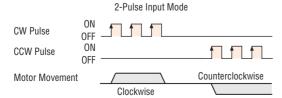
● **1-Pulse Input Mode**

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
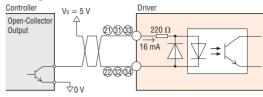Photocoupler "OFF": Counterclockwise

● **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.
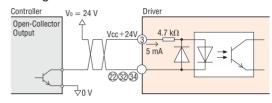

All Windings Off (C.OFF) Input Signal
Resolution Select (×10) Input Signal
Alarm Clear (ACL) Input Signal
◇**Input Circuit and Sample Connection**
● **When Using 5 VDC**

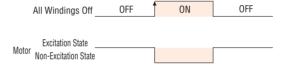● **When Using 24 VDC**

◇**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.

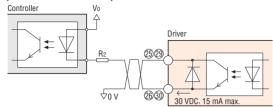◇**Alarm Clear (ACL) Input Signal**
Pin No. ㉑, ㉒

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.
· EEPROM data error · System error

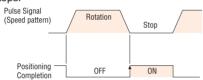## Positioning Completion (END) Output Signal
Alarm (ALARM) Output Signal
◇Output Circuit and Sample Connection

◇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 ±1.8° from the command position, approximately 2 msec after the pulse input stops.

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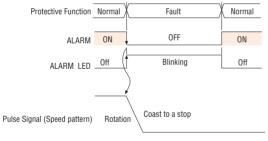● The "Positioning Completion" signal blinks during operation with a pulse input frequency of 500 Hz or less.

◇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.
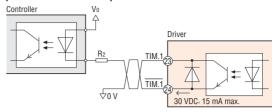

Note:
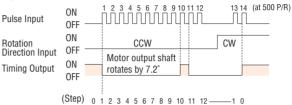● The "Alarm" output uses positive logic (normally closed), all other outputs use negative logic (normally open).

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.
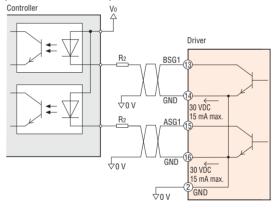

Note:
● A precise "Timing" signal cannot be obtained when the speed of the pulse input frequency is over 500 Hz.

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.
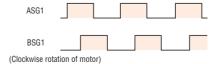[Example: Resolution select switch (1000 P/R) → Output pulse number for each motor rotation (1000).]
The phase difference between A and B is 90° in electrical angle.

Notes:
● The pulse output accuracy is, regardless of resolution, within ±0.36° (repetition accuracy: within ±0.09°).
● 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

(Clockwise rotation of motor)

Features C-62 / System Configuration C-64 / Product Line C-66

■List of Motor and Driver Combinations

Model names for motor and driver combinations are shown below.

Type	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
TH Geared Type	**ASC34AK-T7.2**	ASM34AK-T7.2	ASD10C-K
	ASC34AK-T10	ASM34AK-T10	
	ASC34AK-T20	ASM34AK-T20	
	ASC34AK-T30	ASM34AK-T30	
	ASC46□K-T3.6	ASM46□K-T3.6	ASD18B-K
	ASC46□K-T7.2	ASM46□K-T7.2	
	ASC46□K-T10	ASM46□K-T10	
	ASC46□K-T20	ASM46□K-T20	
	ASC46□K-T30	ASM46□K-T30	
	ASC66□K-T3.6	ASM66□K-T3.6	ASD36B-K
	ASC66□K-T7.2	ASM66□K-T7.2	
	ASC66□K-T10	ASM66□K-T10	
	ASC66□K-T20	ASM66□K-T20	
	ASC66□K-T30	ASM66□K-T30	

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

Type	Model	Motor Model	Driver Model
PN Geared Type	**ASC34AK-N5**	ASM34AK-N5	ASD10A-K
	ASC34AK-N7.2	ASM34AK-N7.2	
	ASC34AK-N10	ASM34AK-N10	
	ASC46□K-N7.2	ASM46□K-N7.2	ASD18A-K
	ASC46□K-N10	ASM46□K-N10	
	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	ASD36B-K
	ASC66□K-N36	ASM66□K-N36	
	ASC66□K-N50	ASM66□K-N50	
Harmonic Geared Type	**ASC34AK-H50**	ASM34AK-H50	ASD10C-K
	ASC34AK-H100	ASM34AK-H100	
	ASC46□K-H50	ASM46□K-H50	ASD18A-K
	ASC46□K-H100	ASM46□K-H100	
	ASC66□K-H50	ASM66□K-H50	ASD36B-K
	ASC66□K-H100	ASM66□K-H100	

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