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Oriental motor

NEW PRODUCTS

RoHS RoHS-Compliant

Closed Loop Stepping Motor and Driver Package

αSTEP
AS Series
ASC Series



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RoHS RoHS-Compliant

Closed Loop Stepping Motor and Driver Package

αSTEP AS Series

The αSTEP is an innovative stepping motor unit that adopts a closed-loop control to eliminate misstep. In the αSTEP, the user friendliness of a stepping motor is combined with a range of new functions for improved reliability of your equipment.

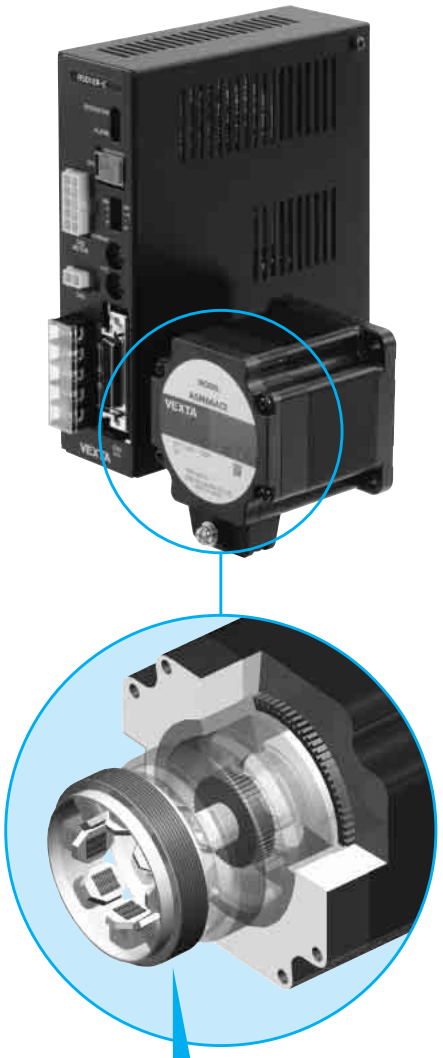


Features

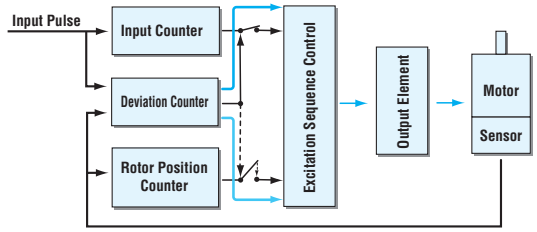
●Thanks to Closed Loop Control, There is No Loss of Synchronism

αSTEP does not lose synchronism even when subjected to abrupt load fluctuation or acceleration.
A newly developed rotor position detection sensor constantly monitors the motor movement. If synchronism is about to be lost, closed loop control is used, so there is no need to worry about loss of steps. When the successive overload is given, αSTEP outputs an alarm signal. The reliability of αSTEP is as high as that of a servo motor.

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

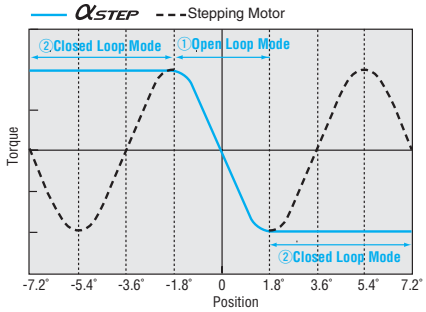


◇αSTEP Control Diagram



Normal (Positioning Deviation is less than ± 1.8˚)
Motor runs in open loop mode like a stepping motor.
If Motor Missteps (Positioning Deviation is ±1.8˚ or more)
Control switches to closed loop mode to prevent loss of synchronism.

◇αSTEP Angle-Torque Characteristics



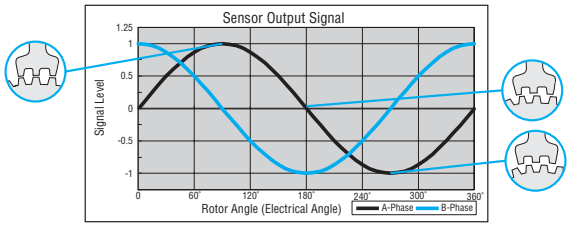
①If the positioning deviation is less than ±1.8˚, the motor runs in open loop mode like a stepping motor.
②If the positioning deviation is ±1.8˚ or more, the motor runs in closed loop mode and the position is corrected by exciting the motor windings to generate maximum torque based on the rotor position.

◇The Newly Developed Sensor to Detect Rotor's Position

The newly developed 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

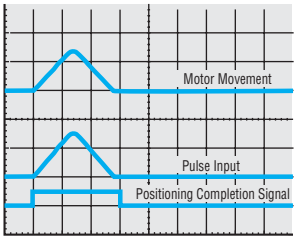
- This structure can be made small and thin, so the overall size of the motor can be reduced.
- High resolution
- This structure does not use electronic parts, so it is not affected by heat or vibration.



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●High Response

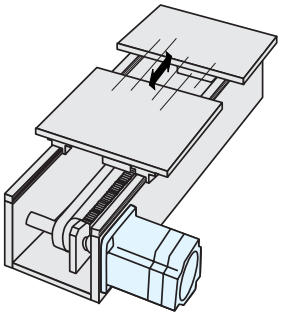
Like conventional stepping motors, αSTEP operates in synchronism with command pulses. This makes possible short stroke positioning in a short time.



Measurement Condition:
Feed 1/5 rotation
Load inertia 250×10^{-7} kg·m² (J)
(1.365 oz-in²)

●No Gain Tuning

Gain tuning for servo motors is critical, troublesome and time-consuming. Since the αSTEP operates like a stepping motor, there are no gain tuning requirements. Low rigidity applications, such as a belt and pulley system, are ideal for αSTEP.

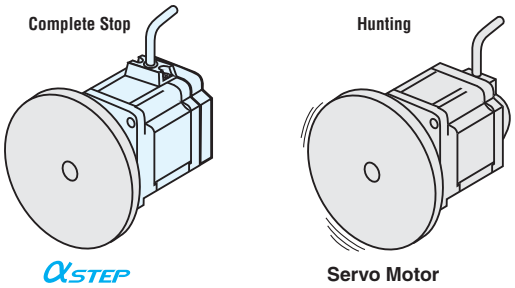


●The αSTEP Complies with International Safety Standards

The **AS** Series is recognized with the UL/CSA standards and conforms to EN standard. [The **AS46** [the motor frame size of 42 mm (1.65 in.)] is recognized with the UL standard and conforms to EN standard.] The CE marking certifies compliance with the EMC and Low Voltage Directives.

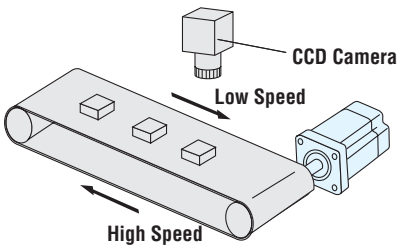
●No Hunting

Since αSTEP is a stepping motor, it has no hunting problem. Therefore, when it stops, its position is completely stable and does not fluctuate. αSTEP is ideal for applications in which vibration would be a problem.



●Low Vibration at Low Speed

The driver employs advanced technology that produces smoothness comparable to a microstepping 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. αSTEP provides resolution as low as 0.036˚ per step without any damping mechanism or other mechanical device.



αSTEP 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

αSTEP 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 20 m (65.6 ft.) [10 m (32.8 ft.) for flexible extension cable], so the motor and the driver can be installed in locations far apart.

● A Full Lineup Including Geared Types and IP65 Rated Motor Type

The geared types enable driving of large inertial loads and positioning at higher accuracy, while the IP65 rated motor type provides ingress protection against dust and water.
The αSTEP offers a wide range of models meeting the needs of various applications.



Standard Type IP65 Rated Motor
✻A dedicated motor cable for IP65 rated motor (sold separately) is needed to connect the IP65 rated motor and driver.

●Improved Motor

· Protective Earth Terminal
[Excluding motors with a frame size of 42 mm (1.65 in.)]



· Twice the Motor Life (compared with a conventional model)
The life of a motor is affected by its bearing.
The αSTEP achieves approx. twice the life of a conventional motor by adopting a modified bearing.
[Available only with the standard type and standard electromagnetic-brake type with a frame size of 60 or 85 mm (2.36 or 3.35 in.).]

●RoHS RoHS-Compliant

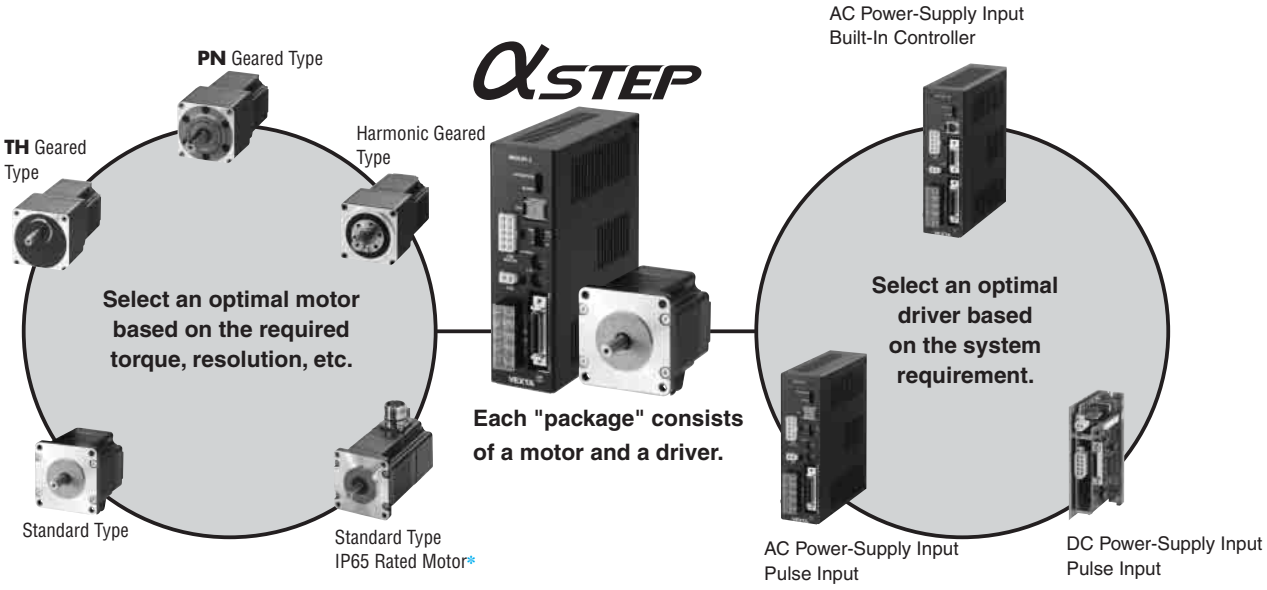
The αSTEP conforms to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium.

RoHS (Restriction of Hazardous Substances) Directive:
Directive on restriction of the use of certain hazardous substances in electrical and electronic equipment (2002/95/EC). The RoHS Directive prohibits the use of six chemical substances in electrical and electronic products sold in the E.U. member countries on or after July 1, 2006. The six controlled substances are: lead, hexavalent chromium, cadmium, mercury and two specific brominated flame-retardants (PBB and PBDE).

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A Full Lineup of α_{STEP} Series

You are sure to find a unit that perfectly matches the needs of your specific application.



Motors equipped with an electromagnetic brake are also available.
(An electromagnetic brake is not available on certain types.)

*A dedicated IP65 motor cable (sold separately) is needed to connect the IP65 rated motor and driver.

Characteristics Comparison for Motors and Geared Motors

Motor Type / Geared Type	Features	Permissible Torque Maximum Torque [N·m (lb-in)]	Backlash [min]	Basic Resolution [deg/step]	Output Shaft Speed [r/min]
Standard 	· Basic model of α_{STEP} motor and driver system	Maximum Holding Torque 4 (35)	——	0.36	4000
Standard Type IP65 Rated Motor 	· The IP65 rated motor offering ingress protection against dust and water.	Maximum Holding Torque 4 (35)	——	0.36	4000
Low backlash **TH Geared** (Parallel Shaft) 	· A wide variety of low gear ratio, high-speed operation · Gear ratio: 3.6:1, 7.2:1, 10:1, 20:1, 30:1	12 (106)	45	0.012	500
Non-backlash **PN Geared** (Planetary) 	· High speed (low gear ratio), high positioning precision · High permissible/maximum torque · Wide variety of gear ratios for selecting the desired step angle. (resolution) · Centered output shaft · Gear ratio: 5:1, 7.2:1, 10:1, 25:1, 36:1, 50:1	Permissible Torque 37 (320) Maximum Torque 60 (530)	3	0.0072	600
Non-backlash **Harmonic Geared** (Harmonic Drive) 	· High positioning precision · High permissible/maximum torque · High gear ratio, high resolution · Centered output shaft · Gear ratio: 50:1, 100:1	Permissible Torque 37 (320) Maximum Torque 55 (480)	0	0.0036	70

Note:

●The values shown above must be used as reference. These values vary depending on the frame size and gear ratio.

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●Each series offers various motor frame sizes in accordance with the motor type and power supply voltage, as shown below.
[□42 (□1.65): indicates a motor frame size of 42 mm (1.65 in.).]

	Power Supply Voltage	Standard Type	Standard Type IP65 Rated Motor	**TH** Geared Type	**PN** Geared Type	Harmonic Geared Type
AC Input **AS** Series Pulse Input Package	Single-Phase 100-115 VAC	□42 (□1.65) □60 (□2.36) □85 (□3.35)	□60 (□2.36) □85 (□3.35)	□42 (□1.65) □60 (□2.36) □90 (□3.54)	□42 (□1.65) □60 (□2.36) □90 (□3.54)	□42 (□1.65) □60 (□2.36) □90 (□3.54)
	Single-Phase 200-230 VAC	□60 (□2.36) □85 (□3.35)	□60 (□2.36) □85 (□3.35)	□60 (□2.36) □90 (□3.54)	□60 (□2.36) □90 (□3.54)	□60 (□2.36) □90 (□3.54)
Built-In Controller Package	Three-Phase 200-230 VAC	□60 (□2.36) □85 (□3.35)	□60 (□2.36) □85 (□3.35)	□60 (□2.36) □90 (□3.54)	□60 (□2.36) □90 (□3.54)	□60 (□2.36) □90 (□3.54)
DC Input **ASC** Series Pulse Input Package	24 VDC	□28 (□1.10) □42 (□1.65) □60 (□2.36)	—	□28 (□1.10) □42 (□1.65) □60 (□2.36)	□28 (□1.10) □42 (□1.65) □60 (□2.36)	□28 (□1.10) □42 (□1.65) □60 (□2.36)

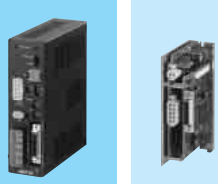
● : A pulse input package and a built-in controller package are available.
White background: A pulse input package is available.
●All the packages can be available motor with electromagnetic brake. [Except for the standard type IP65 rated motor and **ASC** Series with a motor frame size of 28 mm (1.10 in.).]

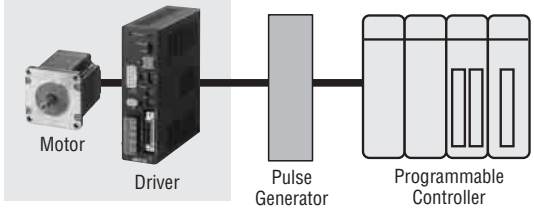
Two Types of Drivers

AC Input | DC Input

Pulse Input

Various motor controls can be performed using a pulse generator provided by the user.

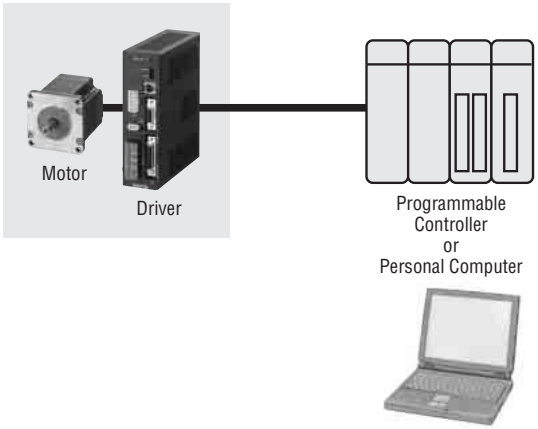




Built-In Controller

The built-in pulse generation function allows the motor to be driven via a directly connected programmable controller. Since no separate pulse generator is required, the drivers of this type save space, simplify wiring, and also allow the number of axes to be increased with ease.



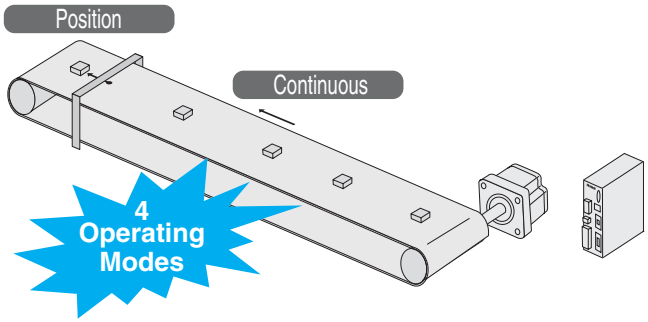


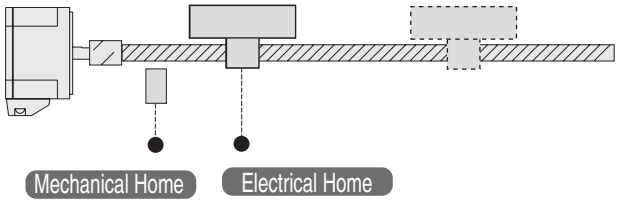
Features of Built-In Controller Package

The built-in controller driver has an integrated controller which ensures a simple, efficient solution for stepping motor applications.
Intelligent, integrated, and ideal for technology's increasing demand on motion control, the built-in controller is computer-programmable via an RS-232C connection.



Operating Modes

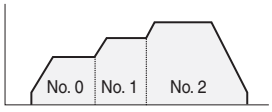




Linked Motion Capability



Single Motion

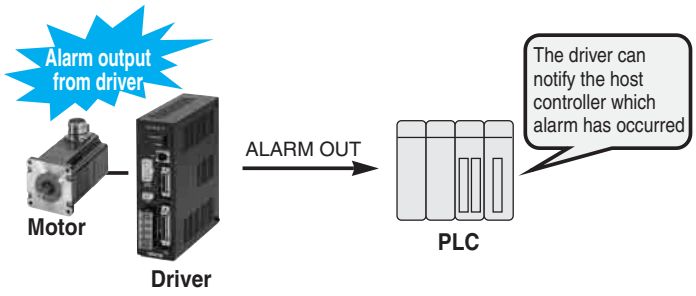


Linked Motion

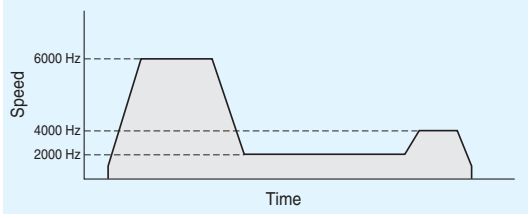
When a START signal is received motions 0, 1 and 2 are executed without stopping between each one.

Alarm Functions

The driver can flash LEDs to indicate which alarm has occurred.

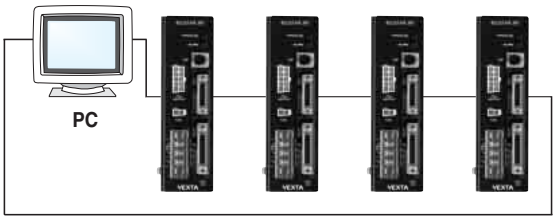


Speed Change on the Fly



The running speed of the motor can be changed while the motor is in motion.

Daisy Chain



Up to 36 units can be daisy chained via customer supplied cable.

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Position Control
- Incremental mode (relative distance specification)/Absolute mode (absolute position specification)
- Linked operation (a maximum of four motion profiles may be linked)
- Data range (in pulses): −8 388 608 to +8 388 607
- Operating speed: 10 Hz to 500 kHz (set in 1 Hz increments)

Four Operation Modes
1. Positioning
2. Mechanical home seeking (+LS, −LS, HOMELS)
3. Continuous
4. Electrical home seeking

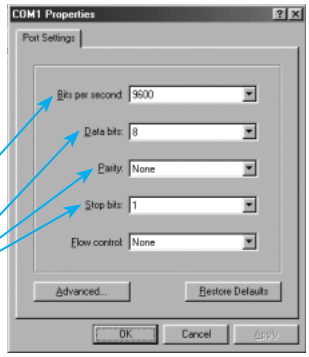
General Inputs/Outputs
- 8 Programmable Inputs
- 8 Programmable Outputs

Daisy Chain Capability
- Up to 36 units can be daisy chained with unique device ID's

Communication
- ASCII based commands
- Conforms to RS-232C communication specifications
- Start-stop asynchronous transmission method
- Transmission speed: 9600 bps
- Data length: 8 bits, 1 stop bit, no parity
  Protocol: TTY (CR+LF)
- Modular 4-pin connector

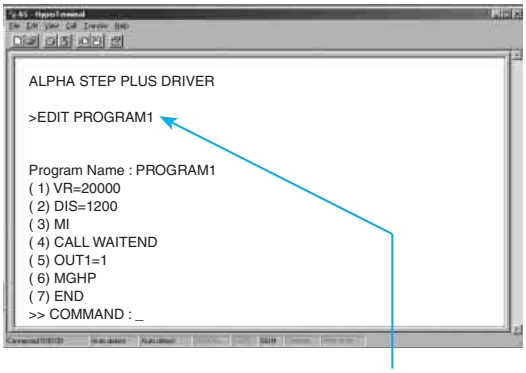
Program Memory
- Maximum number of programs: 14 (including STARTUP)
- Maximum lines per program: 64
- Commands per line: 1
- Program variables: 26 (A to Z)

Built-In Functions
- Selectable motor-resolution
- Run and stop current values
- Speed-filter set value
- Motor rotation direction
- Emergency stop
- Sensor logic
- Over-travel limits
- Software over-travel
- Alarm history
- Syntax checking
- Display values
- Incremental moves
- I/O status



Using Windows HyperTerminal®, programming the built-in controller driver is a simple task.

Example: "PROGRAM1"



PROGRAM1 Definition
- Operating Speed: 20000 Hz
- Move Distance: 1200 pulses
- Call a subroutine that waits for the motor to stop before moving on to the next command
- Turn On Output #1
- Seek the Mechanical Home Position in the Positive Direction
- End of Program

Safety Standards and CE Marking

Model	Standards	Certification Body	Standards File No.	CE Marking
Motor	UL 1004 UL 2111 CSA C22.2 No.100*1 CSA C22.2 No.77*1	UL	E64199	Low Voltage Directives EMC Directives
	EN 60950-1 EN 60034-1 EN 60034-5 IEC 60664-1	Conform to EN Standards		
Driver	UL 508C*2 CSA C22.2 No.14	UL	E171462	
	EN 60950-1*3 EN 50178	Conform to EN Standards		

- When the system is approved under various safety standards, the model names on the motor and driver nameplates are the approved model names.

List of Motor and Driver Combinations ➜ Pages 46 and 47

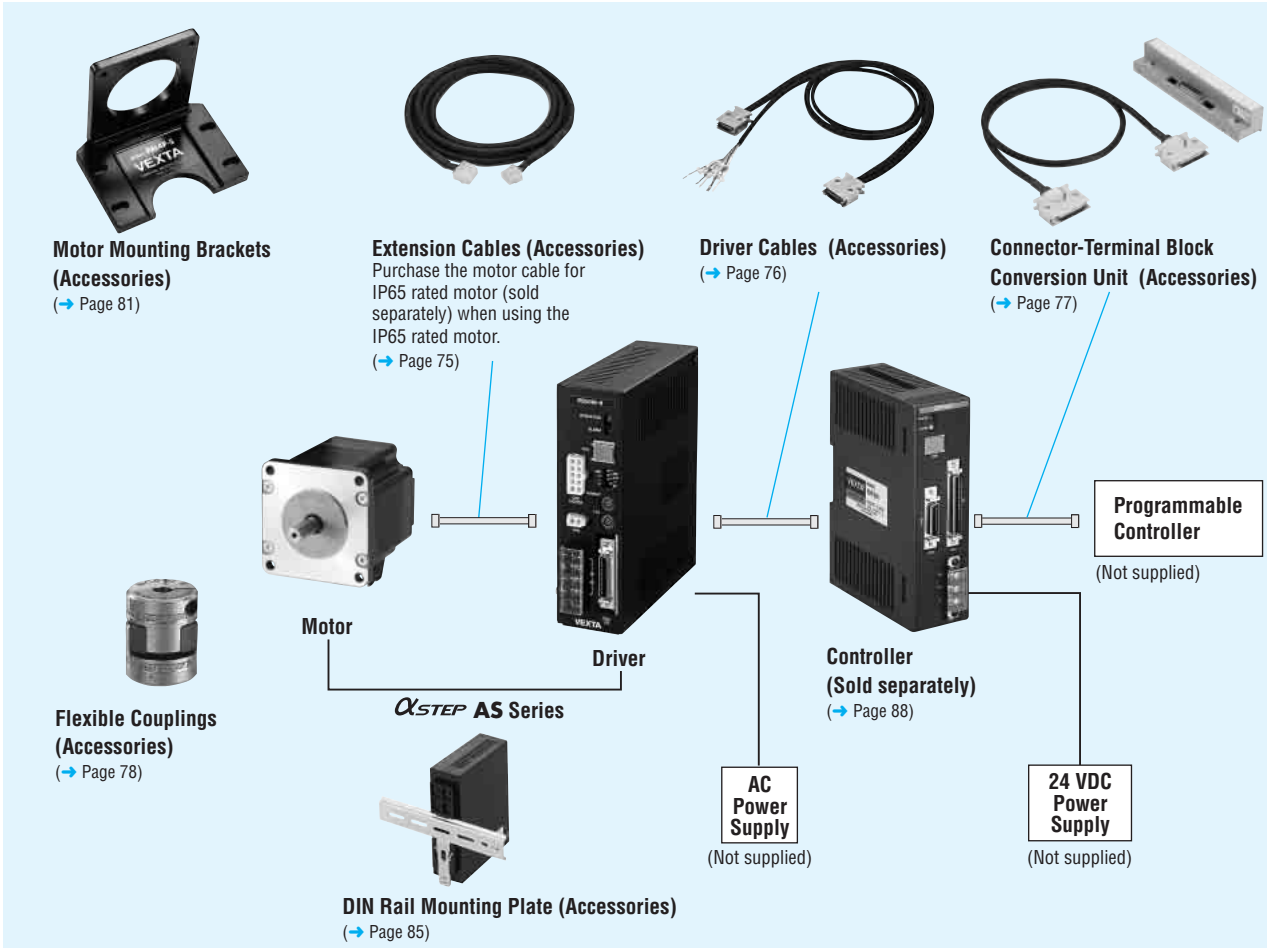
- The EMC value changes according to the wiring and layout. Therefore, the final EMC level must be checked with the motor/driver incorporated in the user's equipment.

*1 Except for **AS46** [Motor Frame Size 42 mm (1.65 in.)]
*2 Maximum Ambient Temperature for UL
Pulse Input: +50°C (+122°F), Built-In Controller: +40°C (+104°F)
*3 EN 60950-1 (Certified Pulse Input only)

System Configuration

Pulse Input Package

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



●Example of System Configuration

◎ : Required under this system.
○ : Selectable according to necessity. Oriental Motor provides.

(Body)	(Sold separately)						
αSTEP AS Series	Controller	Extension Cable [3 m (9.8 ft.)]	Motor Mounting Bracket	Flexible Coupling	DIN Rail Mounting Plate	Driver Cable [1 m (3.3 ft.)]	Connector-Terminal Block Conversion Unit
AS66AAE	EMP401-1	CC03AIP	PAL2P-5A	MCS300808	PADP01	CC01EMP4	CC50T1
	◎	◎	○	○	○	○	○

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

Extension Cables

Pulse Input Package

Extension cables are not included with αSTEP products. When using the αSTEP stepping motor and driver more than 0.4 m (1.31 ft.) apart from each other, use an extension cable (sold separately).

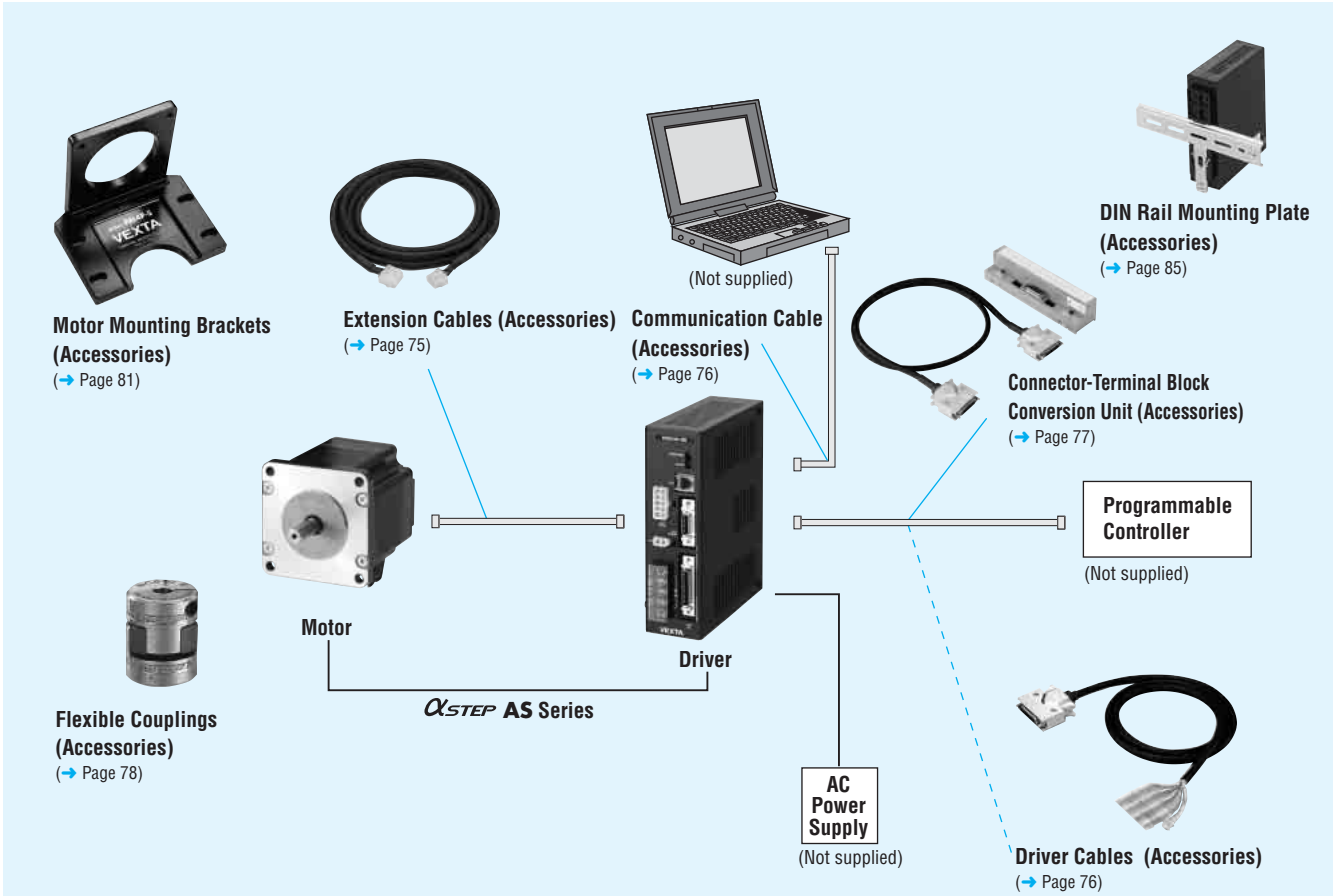
●Electromagnetic brake motor models [except motor frame size 42 mm (1.65 ft.)] must use an extension cable for electromagnetic brake motor (sold separately). For electromagnetic brake motor with motor frame size □42 mm (□1.65 in.), use an extension cable for standard motor.
➜ Page 75

Motor Cable for IP65 Rated Motor

Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver. ➜ Page 75

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●Built-In Controller Package



●Example of System Configuration

◎ : Required under this system.
○ : Selectable according to necessity. Oriental Motor provides.

(Body)	(Sold separately)					
αSTEP AS Series	Extension Cable [3 m (9.8 ft.)]	Motor Mounting Bracket	Flexible Coupling	DIN Rail Mounting Plate	Connector-Terminal Block Conversion Unit	
AS66AAEP	CC03AIP	PAL2P-5A	MCS300808	PADP01	CC20T1	CC36T1
	◎	○	○	○	○	

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

■Extension Cables

●Built-In Controller Package

Extension cables are not included with αSTEP products. When using the αSTEP stepping motor and driver more than 0.4 m (1.31 ft.) apart from each other, use an extension cable (sold separately).

●Electromagnetic brake motor models [except motor frame size 42 mm (1.65 in.)] must use an extension cable for electromagnetic brake motor (sold separately). For electromagnetic brake motor with motor frame size □42 mm (□1.65 in.), use an extension cable for standard motor.
➜ Page 75

■Motor Cable for IP65 Rated Motor

Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver. ➜ Page 75

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Product Number Code

Standard Type

AS 6 6 A A E P

① ② ③ ④ ⑤ ⑥ ⑦

①	Series **AS**: **AS** Series
②	Motor Frame Size **4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.) **9**: 85 mm (3.35 in.)
③	Motor Case Length
④	Motor Type **A**: Standard (Single Shaft) **M**: Electromagnetic Brake Type
⑤	Power Supply Voltage **A**: Single-Phase 100-115 VAC **C**: Single-Phase 200-230 VAC **S**: Three-Phase 200-230 VAC
⑥	Motor Classification
⑦	Driver Type **P**: Built-In Controller Package **Blank**: Pulse Input Package

Standard Type IP65 Rated Motor

AS 6 6 A A T P

① ② ③ ④ ⑤ ⑥ ⑦

①	Series **AS**: **AS** Series
②	Motor Frame Size **6**: 60 mm (2.36 in.) **9**: 85 mm (3.35 in.)
③	Motor Case Length
④	Motor Shaft Type **A**: Single Shaft
⑤	Power Supply Voltage **A**: Single-Phase 100-115 VAC **C**: Single-Phase 200-230 VAC **S**: Three-Phase 200-230 VAC
⑥	Motor Classification
⑦	Driver Type **P**: Built-In Controller Package **Blank**: Pulse Input Package

Geared Type

AS 6 6 A C E P - N 50

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

AS 4 6 A A P 2 - H 100

① ② ③ ④ ⑤ ⑦ ⑩ ⑧ ⑨

①	Series **AS**: **AS** Series
②	Motor Frame Size **4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.) **9**: 90 mm (3.54 in.)
③	Motor Case Length
④	Motor Type **A**: Standard (Single Shaft) **M**: Electromagnetic Brake Type
⑤	Power Supply Voltage **A**: Single-Phase 100-115 VAC **C**: Single-Phase 200-230 VAC **S**: Three-Phase 200-230 VAC
⑥	Motor Classification
⑦	Driver Type **P**: Built-In Controller Package **Blank**: Pulse Input Package
⑧	Gearhead Type **T**: **TH** Geared Type **N**: **PN** Geared Type **H**: Harmonic Geared Type
⑨	Gear Ratio
⑩	Reference Number

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Product Line

The product names below are all for single shaft types, but there are also double shaft models available for all products except for those with electromagnetic brakes or IP65 rated motor. Contact the nearest Oriental Motor office for further information on the double shaft models.

Pulse Input Package

◇Standard Type

Power Supply Voltage	Model (Single Shaft)	
Single-Phase 100-115 VAC	**AS46AA**	
	AS66AAE	NEW
	AS69AAE	NEW
	AS98AAE	NEW
	AS911AAE	NEW
Single-Phase 200-230 VAC	**AS66ACE**	NEW
	AS69ACE	NEW
	AS98ACE	NEW
	AS911ACE	NEW
Three-Phase 200-230 VAC	**AS66ASE**	NEW
	AS69ASE	NEW
	AS98ASE	NEW
	AS911ASE	NEW

◇Standard Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)	
Single-Phase 100-115 VAC	**AS46MA**	
	AS66MAE	NEW
	AS69MAE	NEW
	AS98MAE	NEW
Single-Phase 200-230 VAC	**AS66MCE**	NEW
	AS69MCE	NEW
	AS98MCE	NEW
Three-Phase 200-230 VAC	**AS66MSE**	NEW
	AS69MSE	NEW
	AS98MSE	NEW

◇Standard Type IP65 Rated Motor

Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.

Motor Cable for IP65 Rated Motor ➜ Page 75

Power Supply Voltage	Model (Single Shaft)	
Single-Phase 100-115 VAC	**AS66AAT**	NEW
	AS69AAT	NEW
	AS98AAT	NEW
	AS911AAT	NEW
Single-Phase 200-230 VAC	**AS66ACT**	NEW
	AS69ACT	NEW
	AS98ACT	NEW
	AS911ACT	NEW
Three-Phase 200-230 VAC	**AS66AST**	NEW
	AS69AST	NEW
	AS98AST	NEW
	AS911AST	NEW

◇TH Geared Type

Power Supply Voltage	Model (Single Shaft)	
Single-Phase 100-115 VAC	**AS46AA-T3.6**	
	AS46AA-T7.2	
	AS46AA-T10	
	AS46AA-T20	
	AS46AA-T30	
	AS66AAE-T3.6	NEW
	AS66AAE-T7.2	NEW
	AS66AAE-T10	NEW
	AS66AAE-T20	NEW
	AS66AAE-T30	NEW
	AS98AAE-T3.6	NEW
	AS98AAE-T7.2	NEW
	AS98AAE-T10	NEW
	AS98AAE-T20	NEW
	AS98AAE-T30	NEW
Single-Phase 200-230 VAC	**AS66ACE-T3.6**	NEW
	AS66ACE-T7.2	NEW
	AS66ACE-T10	NEW
	AS66ACE-T20	NEW
	AS66ACE-T30	NEW
	AS98ACE-T3.6	NEW
	AS98ACE-T7.2	NEW
	AS98ACE-T10	NEW
	AS98ACE-T20	NEW
	AS98ACE-T30	NEW
Three-Phase 200-230 VAC	**AS66ASE-T3.6**	NEW
	AS66ASE-T7.2	NEW
	AS66ASE-T10	NEW
	AS66ASE-T20	NEW
	AS66ASE-T30	NEW
	AS98ASE-T3.6	NEW
	AS98ASE-T7.2	NEW
	AS98ASE-T10	NEW
	AS98ASE-T20	NEW
	AS98ASE-T30	NEW

◇TH Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)	
Single-Phase 100-115 VAC	**AS46MA-T3.6**	
	AS46MA-T7.2	
	AS46MA-T10	
	AS46MA-T20	
	AS46MA-T30	
	AS66MAE-T3.6	NEW
	AS66MAE-T7.2	NEW
	AS66MAE-T10	NEW
	AS66MAE-T20	NEW
	AS66MAE-T30	NEW
	AS98MAE-T3.6	NEW
	AS98MAE-T7.2	NEW
	AS98MAE-T10	NEW
	AS98MAE-T20	NEW
	AS98MAE-T30	NEW
Single-Phase 200-230 VAC	**AS66MCE-T3.6**	NEW
	AS66MCE-T7.2	NEW
	AS66MCE-T10	NEW
	AS66MCE-T20	NEW
	AS66MCE-T30	NEW
	AS98MCE-T3.6	NEW
	AS98MCE-T7.2	NEW
	AS98MCE-T10	NEW
	AS98MCE-T20	NEW
	AS98MCE-T30	NEW
Three-Phase 200-230 VAC	**AS66MSE-T3.6**	NEW
	AS66MSE-T7.2	NEW
	AS66MSE-T10	NEW
	AS66MSE-T20	NEW
	AS66MSE-T30	NEW
	AS98MSE-T3.6	NEW
	AS98MSE-T7.2	NEW
	AS98MSE-T10	NEW
	AS98MSE-T20	NEW
	AS98MSE-T30	NEW

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◇PN Geared Type

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	AS46AA-N7.2
	AS46AA-N10
	AS66AAE-N5 NEW
	AS66AAE-N7.2 NEW
	AS66AAE-N10 NEW
	AS66AAE-N25 NEW
	AS66AAE-N36 NEW
	AS66AAE-N50 NEW
	AS98AAE-N5 NEW
	AS98AAE-N7.2 NEW
	AS98AAE-N10 NEW
	AS98AAE-N25 NEW
	AS98AAE-N36 NEW
	AS98AAE-N50 NEW
Single-Phase 200-230 VAC	AS66ACE-N5 NEW
	AS66ACE-N7.2 NEW
	AS66ACE-N10 NEW
	AS66ACE-N25 NEW
	AS66ACE-N36 NEW
	AS66ACE-N50 NEW
	AS98ACE-N5 NEW
	AS98ACE-N7.2 NEW
	AS98ACE-N10 NEW
	AS98ACE-N25 NEW
	AS98ACE-N36 NEW
	AS98ACE-N50 NEW
Three-Phase 200-230 VAC	AS66ASE-N5 NEW
	AS66ASE-N7.2 NEW
	AS66ASE-N10 NEW
	AS66ASE-N25 NEW
	AS66ASE-N36 NEW
	AS66ASE-N50 NEW
	AS98ASE-N5 NEW
	AS98ASE-N7.2 NEW
	AS98ASE-N10 NEW
	AS98ASE-N25 NEW
	AS98ASE-N36 NEW
	AS98ASE-N50 NEW

◇PN Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	AS46MA-N7.2
	AS46MA-N10
	AS66MAE-N5 NEW
	AS66MAE-N7.2 NEW
	AS66MAE-N10 NEW
	AS66MAE-N25 NEW
	AS66MAE-N36 NEW
	AS66MAE-N50 NEW
	AS98MAE-N5 NEW
	AS98MAE-N7.2 NEW
	AS98MAE-N10 NEW
	AS98MAE-N25 NEW
	AS98MAE-N36 NEW
	AS98MAE-N50 NEW
Single-Phase 200-230 VAC	AS66MCE-N5 NEW
	AS66MCE-N7.2 NEW
	AS66MCE-N10 NEW
	AS66MCE-N25 NEW
	AS66MCE-N36 NEW
	AS66MCE-N50 NEW
	AS98MCE-N5 NEW
	AS98MCE-N7.2 NEW
	AS98MCE-N10 NEW
	AS98MCE-N25 NEW
	AS98MCE-N36 NEW
	AS98MCE-N50 NEW
Three-Phase 200-230 VAC	AS66MSE-N5 NEW
	AS66MSE-N7.2 NEW
	AS66MSE-N10 NEW
	AS66MSE-N25 NEW
	AS66MSE-N36 NEW
	AS66MSE-N50 NEW
	AS98MSE-N5 NEW
	AS98MSE-N7.2 NEW
	AS98MSE-N10 NEW
	AS98MSE-N25 NEW
	AS98MSE-N36 NEW
	AS98MSE-N50 NEW

◇Harmonic Geared Type

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	AS46AA2-H50
	AS46AA2-H100
	AS66AAE-H50 NEW
	AS66AAE-H100 NEW
	AS98AAE-H50 NEW
	AS98AAE-H100 NEW
Single-Phase 200-230 VAC	AS66ACE-H50 NEW
	AS66ACE-H100 NEW
	AS98ACE-H50 NEW
	AS98ACE-H100 NEW
Three-Phase 200-230 VAC	AS66ASE-H50 NEW
	AS66ASE-H100 NEW
	AS98ASE-H50 NEW
	AS98ASE-H100 NEW

◇Harmonic Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	AS46MA2-H50
	AS46MA2-H100
	AS66MAE-H50 NEW
	AS66MAE-H100 NEW
	AS98MAE-H50 NEW
	AS98MAE-H100 NEW
Single-Phase 200-230 VAC	AS66MCE-H50 NEW
	AS66MCE-H100 NEW
	AS98MCE-H50 NEW
	AS98MCE-H100 NEW
Three-Phase 200-230 VAC	AS66MSE-H50 NEW
	AS66MSE-H100 NEW
	AS98MSE-H50 NEW
	AS98MSE-H100 NEW

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●Built-In Controller Package

◇Standard Type

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	**AS46AAP**
	AS66AAEP NEW
	AS69AAEP NEW
	AS98AAEP NEW
	AS911AAEP NEW
Single-Phase 200-230 VAC	**AS66ACEP** NEW
	AS69ACEP NEW
	AS98ACEP NEW
	AS911ACEP NEW
Three-Phase 200-230 VAC	**AS66ASEP** NEW
	AS69ASEP NEW
	AS98ASEP NEW
	AS911ASEP NEW

◇Standard Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	**AS46MAP**
	AS66MAEP NEW
	AS69MAEP NEW
	AS98MAEP NEW
Single-Phase 200-230 VAC	**AS66MCEP** NEW
	AS69MCEP NEW
	AS98MCEP NEW
Three-Phase 200-230 VAC	**AS66MSEP** NEW
	AS69MSEP NEW
	AS98MSEP NEW

◇Standard Type IP65 Rated Motor

Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.

Motor Cable for IP65 Rated Motor ➜ Page 75

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	**AS66AATP** NEW
	AS69AATP NEW
	AS98AATP NEW
	AS911AATP NEW
Single-Phase 200-230 VAC	**AS66ACTP** NEW
	AS69ACTP NEW
	AS98ACTP NEW
	AS911ACTP NEW
Three-Phase 200-230 VAC	**AS66ASTP** NEW
	AS69ASTP NEW
	AS98ASTP NEW
	AS911ASTP NEW

◇TH Geared Type

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	**AS46AAP-T3.6**
	AS46AAP-T7.2
	AS46AAP-T10
	AS46AAP-T20
	AS46AAP-T30
	AS66AAEP-T3.6 NEW
	AS66AAEP-T7.2 NEW
	AS66AAEP-T10 NEW
	AS66AAEP-T20 NEW
	AS66AAEP-T30 NEW
	AS98AAEP-T3.6 NEW
	AS98AAEP-T7.2 NEW
	AS98AAEP-T10 NEW
	AS98AAEP-T20 NEW
	AS98AAEP-T30 NEW
Single-Phase 200-230 VAC	**AS66ACEP-T3.6** NEW
	AS66ACEP-T7.2 NEW
	AS66ACEP-T10 NEW
	AS66ACEP-T20 NEW
	AS66ACEP-T30 NEW
	AS98ACEP-T3.6 NEW
	AS98ACEP-T7.2 NEW
	AS98ACEP-T10 NEW
	AS98ACEP-T20 NEW
	AS98ACEP-T30 NEW
Three-Phase 200-230 VAC	**AS66ASEP-T3.6** NEW
	AS66ASEP-T7.2 NEW
	AS66ASEP-T10 NEW
	AS66ASEP-T20 NEW
	AS66ASEP-T30 NEW
	AS98ASEP-T3.6 NEW
	AS98ASEP-T7.2 NEW
	AS98ASEP-T10 NEW
	AS98ASEP-T20 NEW
	AS98ASEP-T30 NEW

◇TH Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	**AS46MAP-T3.6**
	AS46MAP-T7.2
	AS46MAP-T10
	AS46MAP-T20
	AS46MAP-T30
	AS66MAEP-T3.6 NEW
	AS66MAEP-T7.2 NEW
	AS66MAEP-T10 NEW
	AS66MAEP-T20 NEW
	AS66MAEP-T30 NEW
	AS98MAEP-T3.6 NEW
	AS98MAEP-T7.2 NEW
	AS98MAEP-T10 NEW
	AS98MAEP-T20 NEW
	AS98MAEP-T30 NEW
Single-Phase 200-230 VAC	**AS66MCEP-T3.6** NEW
	AS66MCEP-T7.2 NEW
	AS66MCEP-T10 NEW
	AS66MCEP-T20 NEW
	AS66MCEP-T30 NEW
	AS98MCEP-T3.6 NEW
	AS98MCEP-T7.2 NEW
	AS98MCEP-T10 NEW
	AS98MCEP-T20 NEW
	AS98MCEP-T30 NEW
Three-Phase 200-230 VAC	**AS66MSEP-T3.6** NEW
	AS66MSEP-T7.2 NEW
	AS66MSEP-T10 NEW
	AS66MSEP-T20 NEW
	AS66MSEP-T30 NEW
	AS98MSEP-T3.6 NEW
	AS98MSEP-T7.2 NEW
	AS98MSEP-T10 NEW
	AS98MSEP-T20 NEW
	AS98MSEP-T30 NEW

◇PN Geared Type

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	AS46AAP-N7.2
	AS46AAP-N10
	AS66AAEP-N5 NEW
	AS66AAEP-N7.2 NEW
	AS66AAEP-N10 NEW
	AS66AAEP-N25 NEW
	AS66AAEP-N36 NEW
	AS66AAEP-N50 NEW
	AS98AAEP-N5 NEW
	AS98AAEP-N7.2 NEW
	AS98AAEP-N10 NEW
	AS98AAEP-N25 NEW
	AS98AAEP-N36 NEW
	AS98AAEP-N50 NEW
Single-Phase 200-230 VAC	AS66ACEP-N5 NEW
	AS66ACEP-N7.2 NEW
	AS66ACEP-N10 NEW
	AS66ACEP-N25 NEW
	AS66ACEP-N36 NEW
	AS66ACEP-N50 NEW
	AS98ACEP-N5 NEW
	AS98ACEP-N7.2 NEW
	AS98ACEP-N10 NEW
	AS98ACEP-N25 NEW
	AS98ACEP-N36 NEW
	AS98ACEP-N50 NEW
Three-Phase 200-230 VAC	AS66ASEP-N5 NEW
	AS66ASEP-N7.2 NEW
	AS66ASEP-N10 NEW
	AS66ASEP-N25 NEW
	AS66ASEP-N36 NEW
	AS66ASEP-N50 NEW
	AS98ASEP-N5 NEW
	AS98ASEP-N7.2 NEW
	AS98ASEP-N10 NEW
	AS98ASEP-N25 NEW
	AS98ASEP-N36 NEW
	AS98ASEP-N50 NEW

◇PN Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	AS46MAP-N7.2
	AS46MAP-N10
	AS66MAEP-N5 NEW
	AS66MAEP-N7.2 NEW
	AS66MAEP-N10 NEW
	AS66MAEP-N25 NEW
	AS66MAEP-N36 NEW
	AS66MAEP-N50 NEW
	AS98MAEP-N5 NEW
	AS98MAEP-N7.2 NEW
	AS98MAEP-N10 NEW
	AS98MAEP-N25 NEW
	AS98MAEP-N36 NEW
	AS98MAEP-N50 NEW
Single-Phase 200-230 VAC	AS66MCEP-N5 NEW
	AS66MCEP-N7.2 NEW
	AS66MCEP-N10 NEW
	AS66MCEP-N25 NEW
	AS66MCEP-N36 NEW
	AS66MCEP-N50 NEW
	AS98MCEP-N5 NEW
	AS98MCEP-N7.2 NEW
	AS98MCEP-N10 NEW
	AS98MCEP-N25 NEW
	AS98MCEP-N36 NEW
	AS98MCEP-N50 NEW
Three-Phase 200-230 VAC	AS66MSEP-N5 NEW
	AS66MSEP-N7.2 NEW
	AS66MSEP-N10 NEW
	AS66MSEP-N25 NEW
	AS66MSEP-N36 NEW
	AS66MSEP-N50 NEW
	AS98MSEP-N5 NEW
	AS98MSEP-N7.2 NEW
	AS98MSEP-N10 NEW
	AS98MSEP-N25 NEW
	AS98MSEP-N36 NEW
	AS98MSEP-N50 NEW

◇Harmonic Geared Type

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	AS46AAP2-H50
	AS46AAP2-H100
	AS66AAEP-H50 NEW
	AS66AAEP-H100 NEW
	AS98AAEP-H50 NEW
	AS98AAEP-H100 NEW
Single-Phase 200-230 VAC	AS66ACEP-H50 NEW
	AS66ACEP-H100 NEW
	AS98ACEP-H50 NEW
	AS98ACEP-H100 NEW
Three-Phase 200-230 VAC	AS66ASEP-H50 NEW
	AS66ASEP-H100 NEW
	AS98ASEP-H50 NEW
	AS98ASEP-H100 NEW

◇Harmonic Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)
Single-Phase 100-115 VAC	AS46MAP2-H50
	AS46MAP2-H100
	AS66MAEP-H50 NEW
	AS66MAEP-H100 NEW
	AS98MAEP-H50 NEW
	AS98MAEP-H100 NEW
Single-Phase 200-230 VAC	AS66MCEP-H50 NEW
	AS66MCEP-H100 NEW
	AS98MCEP-H50 NEW
	AS98MCEP-H100 NEW
Three-Phase 200-230 VAC	AS66MSEP-H50 NEW
	AS66MSEP-H100 NEW
	AS98MSEP-H50 NEW
	AS98MSEP-H100 NEW

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Standard Type Motor Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.), 85 mm (3.35 in.)

Specifications RoHS

cULus CE ●With the **AS46** type, only the driver conforms to the CSA standard.

Model	Pulse Input Package	Standard	**AS46AA**	**AS66A□E**	**AS69A□E**	**AS98A□E**	**AS911A□E**
		Electromagnetic Brake	**AS46MA**	**AS66M□E**	**AS69M□E**	**AS98M□E**	–
	Built-In Controller Package	Standard	**AS46AAP**	**AS66A□EP**	**AS69A□EP**	**AS98A□EP**	**AS911A□EP**
		Electromagnetic Brake	**AS46MAP**	**AS66M□EP**	**AS69M□EP**	**AS98M□EP**	–
Maximum Holding Torque		N·m (oz-in)	0.3 (42)	1.2 (170)	2 (280)		4 (560)
Rotor Inertia		J: kg·m^2 (oz-in^2)	68×10^{-7} (0.37) [83×10^{-7} (0.45)]*1	405×10^{-7} (2.2) [564×10^{-7} (3.1)]*1	802×10^{-7} (4.4) [961×10^{-7} (5.3)]*1	1400×10^{-7} (7.7) [1560×10^{-7} (8.5)]*1	2710×10^{-7} (14.8)
Resolution*2		Resolution Setting: 1000 P/R	0.36°/Pulse				
Power Source	Voltage-Frequency		Single-Phase 100-115 VAC −15%～+10% 50/60 Hz	Single-Phase 100-115 VAC −15%～+10% 50/60 Hz			
				Single-Phase 200-230 VAC −15%～+10% 50/60 Hz			
				Three-Phase 200-230 VAC −15%～+10% 50/60 Hz			
	Maximum Input Current A	Single-Phase 100-115 VAC	3.3	5	6.4	6	6.5
		Single-Phase 200-230 VAC	–	3	3.9	3.5	4.5
		Three-Phase 200-230 VAC	–	1.5	2.2	1.9	2.4
Electromagnetic Brake*3		Type	Active when 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)	1 (142)		–
Mass		Motor kg (lb.)	0.5 (1.1) [0.6 (1.3)]*1	0.85 (1.9) [1.1 (2.4)]*1	1.4 (3.1) [1.65 (3.6)]*1	1.8 (4.0) [2.2 (4.8)]*1	3 (6.6)
		Driver kg (lb.)	0.8 (1.8)				
Dimension No.	Motor		1	2		3	
	Driver	Pulse Input	15				
		Built-In Controller	16				

How to Read Specifications Table ➜ Page 73

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

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

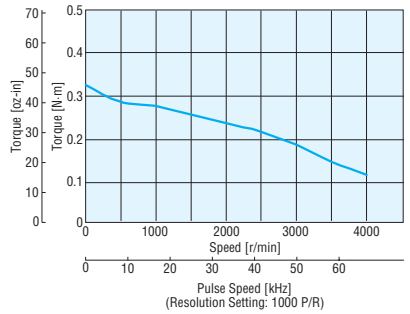
*2 Pulse Input Package: The resolution can be set to any one of 500 P/R, 1000 P/R, 5000 P/R, or 10000 P/R with the resolution select switch or resolution select switching signals.
Resolution Select Switch ➜ Page 36
Built-In Controller Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for complicated braking. Also, a separate 24 VDC±5%, 0.3 A minimum (**AS46**: 0.1 A minimum) power supply is required for the electromagnetic brakes.

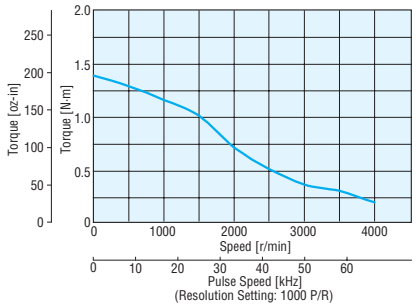
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

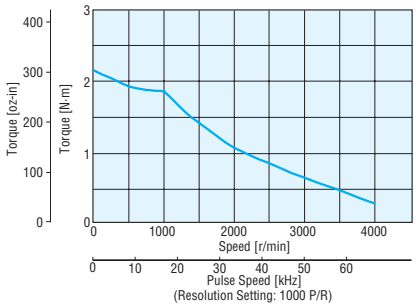
AS46□A/AS46□AP



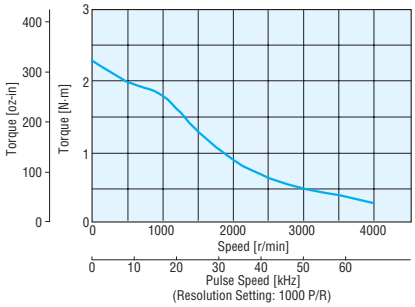
AS66□□E/AS66□□EP



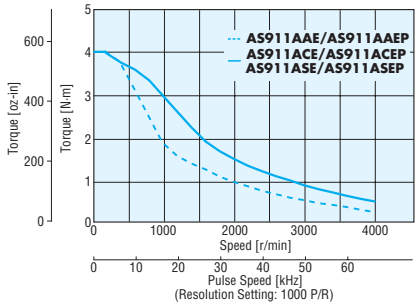
AS69□□E/AS69□□EP



AS98□□E/AS98□□EP



AS911A□E/AS911A□EP



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

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (■) within the model name.

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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

Standard Type IP65 Rated Motor Motor Frame Size 60 mm (2.36 in.), 85 mm (3.35 in.)

Specifications RoHS

Model	Pulse Input Package	Standard	AS66A□T	AS69A□T	AS98A□T	AS911A□T
	Built-In Controller Package	Standard	AS66A□TP	AS69A□TP	AS98A□TP	AS911A□TP
Maximum Holding Torque		N·m (oz-in)	1.2 (170)	2 (280)		4 (560)
Rotor Inertia		J: kg·m^2 (oz-in^2)	405×10^{-7} (2.2)	802×10^{-7} (4.4)	1400×10^{-7} (7.7)	2710×10^{-7} (14.8)
Resolution*1	Resolution Setting: 1000 P/R		0.36°/Pulse			
Power Source	Voltage-Frequency		Single-Phase 100-115 VAC −15%~+10% 50/60 Hz			
			Single-Phase 200-230 VAC −15%~+10% 50/60 Hz			
			Three-Phase 200-230 VAC −15%~+10% 50/60 Hz			
	Maximum Input Current A	Single-Phase 100-115 VAC	5	6.4	6	6.5
		Single-Phase 200-230 VAC	3	3.9	3.5	4.5
		Three-Phase 200-230 VAC	1.5	2.2	1.9	2.4
Degree of Protection			Motor: IP65*2 Driver: IP10			
Mass		Motor kg (lb.)	1 (2.2)	1.5 (3.3)	2.2 (4.8)	3.3 (7.3)
		Driver kg (lb.)	0.8 (1.8)			
Dimension No.	Motor		4		5	
	Driver	Pulse Input	15			
		Built-In Controller	16			

How to Read Specifications Table ➜ Page 73

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

*1 Pulse Input Package: 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 switching signals.
Resolution Select Switch ➜ Page 36
Built-In Controller Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

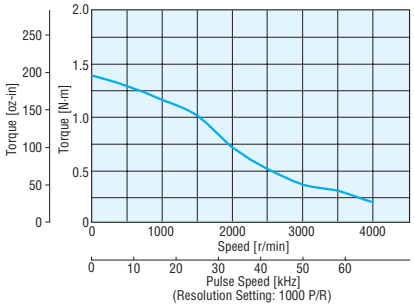
*2 Excluding the gap between the shaft and the flange.

●Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver. ➜ Page 75

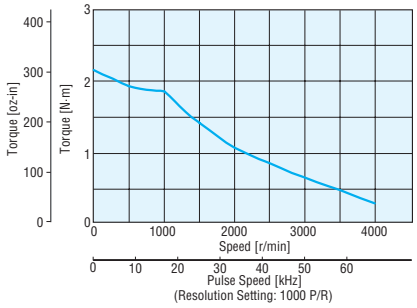
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

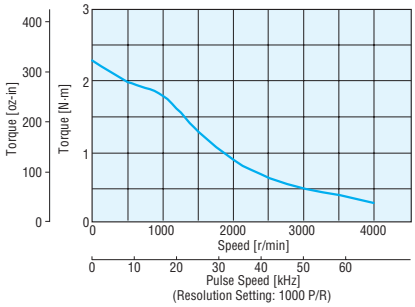
AS66A□T/AS66A□TP



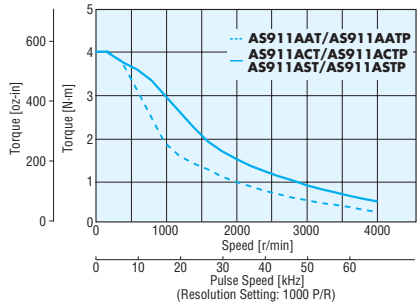
AS69A□T/AS69A□TP



AS98A□T/AS98A□TP



AS911A□T/AS911A□TP



●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

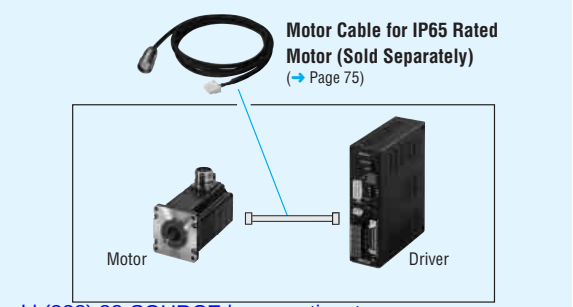
Notes:

●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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

Requirement for Motor Cable for IP65 Rated Motor (Sold Separately)

Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.
The IP65 rated motor cannot be driven unless the dedicated motor cable is used.



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

Specifications RoHS

cULus CE ●With the **AS46** type, only the driver conforms to the CSA standard.

Model							
Pulse Input Package	Standard	**AS46AA-T3.6**	**AS46AA-T7.2**	**AS46AA-T10**	**AS46AA-T20**	**AS46AA-T30**
	Electromagnetic Brake	**AS46MA-T3.6**	**AS46MA-T7.2**	**AS46MA-T10**	**AS46MA-T20**	**AS46MA-T30**
Built-In Controller Package	Standard	**AS46AAP-T3.6**	**AS46AAP-T7.2**	**AS46AAP-T10**	**AS46AAP-T20**	**AS46AAP-T30**
	Electromagnetic Brake	**AS46MAP-T3.6**	**AS46MAP-T7.2**	**AS46MAP-T10**	**AS46MAP-T20**	**AS46MAP-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·m^2 (oz-in^2)		68×10^{-7} (0.37) [83×10^{-7} (0.45)]*1				
Backlash arc minute (degrees)		45 (0.75°)	25 (0.417°)	25 (0.417°)	15 (0.25°)	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-Frequency	Single-Phase 100-115 VAC −15%～+10% 50/60 Hz				
	Maximum Input Current A Single-Phase 100-115 VAC	3.3				
Electromagnetic Brake*3	Type	Active when 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.)	0.8 (1.8)				
Dimension No.	Motor	6				
	Driver Pulse Input	15				
	Driver Built-In Controller	16				

How to Read Specifications Table ➜ Page 73

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

*2 Pulse Input Package: 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 switching signals.

Resolution Select Switch ➜ Page 36

Built-In Controller Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

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

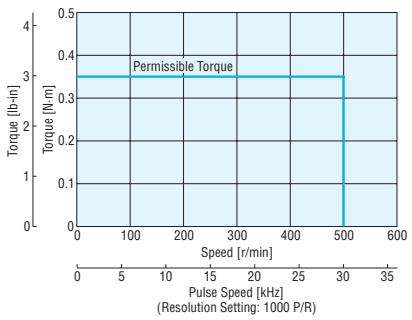
Note:

●Direction of rotation of the motor and that of the gear output shaft are the same for unit type with reduction ratio 3.6:1, 7.2:1 and 10:1. It is opposite for 20:1 and 30:1 ratio type.

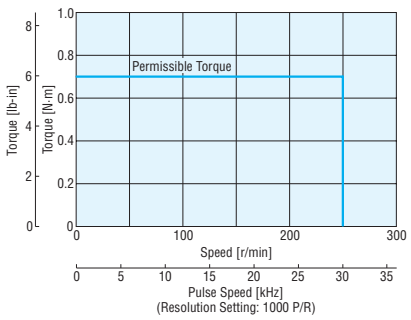
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

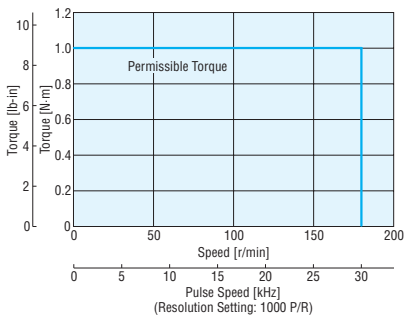
AS46□A-T3.6/AS46□AP-T3.6



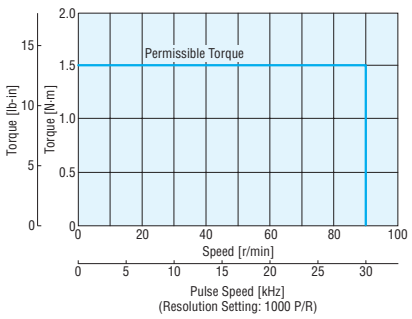
AS46□A-T7.2/AS46□AP-T7.2



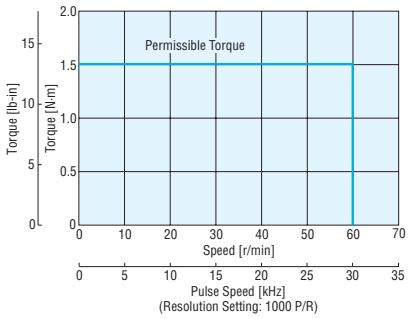
AS46□A-T10/AS46□AP-T10



AS46□A-T20/AS46□AP-T20



AS46□A-T30/AS46□AP-T30



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

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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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

Specifications RoHS

Model	Pulse Input Package	Standard	**AS66A□E-T3.6**	**AS66A□E-T7.2**	**AS66A□E-T10**	**AS66A□E-T20**	**AS66A□E-T30**
		Electromagnetic Brake	**AS66M□E-T3.6**	**AS66M□E-T7.2**	**AS66M□E-T10**	**AS66M□E-T20**	**AS66M□E-T30**
	Built-In Controller Package	Standard	**AS66A□EP-T3.6**	**AS66A□EP-T7.2**	**AS66A□EP-T10**	**AS66A□EP-T20**	**AS66A□EP-T30**
		Electromagnetic Brake	**AS66M□EP-T3.6**	**AS66M□EP-T7.2**	**AS66M□EP-T10**	**AS66M□EP-T20**	**AS66M□EP-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-Frequency		Single-Phase 100-115 VAC −15%~+10% 50/60 Hz				
			Single-Phase 200-230 VAC −15%~+10% 50/60 Hz				
			Three-Phase 200-230 VAC −15%~+10% 50/60 Hz				
	Maximum Input Current A	Single-Phase 100-115 VAC	5				
		Single-Phase 200-230 VAC	3				
		Three-Phase 200-230 VAC	1.5				
Electromagnetic Brake*3		Type	Active when 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.)	0.8 (1.8)				
Dimension No.	Motor		7				
	Driver	Pulse Input	15				
		Built-In Controller	16				

How to Read Specifications Table ➜ Page 73

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

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

*2 Pulse Input Package: 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 switching signals.

Resolution Select Switch ➜ Page 36

Built-In Controller Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

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

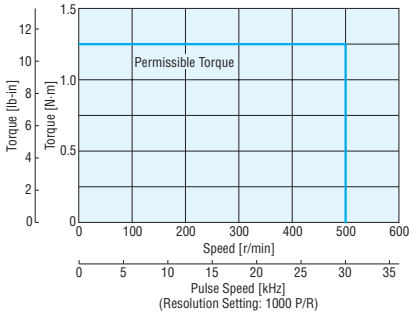
Note:

●Direction of rotation of the motor and that of the gear output shaft are the same for unit type with reduction ratio 3.6:1, 7.2:1 and 10:1. It is opposite for 20:1 and 30:1 ratio type.

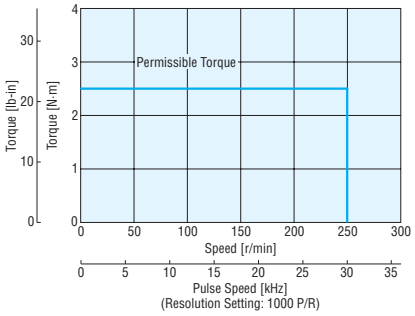
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

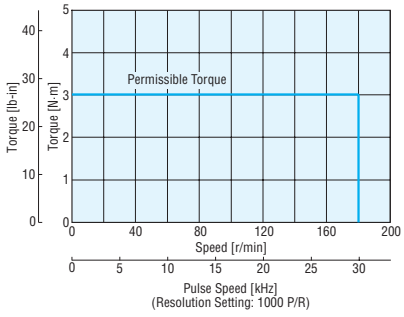
AS66□□E-T3.6/AS66□□EP-T3.6



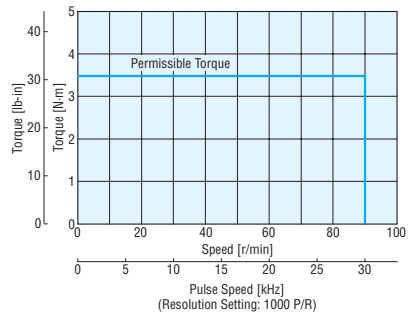
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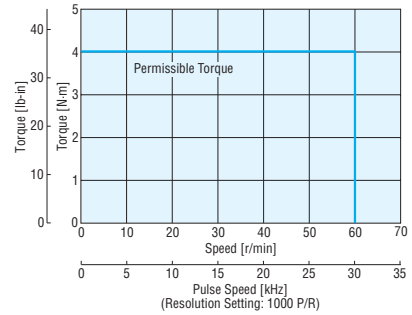
AS66□□E-T10/AS66□□EP-T10



AS66□□E-T20/AS66□□EP-T20



AS66□□E-T30/AS66□□EP-T30



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

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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TH Geared Type Motor Frame Size 90 mm (3.54 in.)

Specifications RoHS

Model	Pulse Input Package	Standard	AS98A□E-T3.6	AS98A□E-T7.2	AS98A□E-T10	AS98A□E-T20	AS98A□E-T30
		Electromagnetic Brake	AS98M□E-T3.6	AS98M□E-T7.2	AS98M□E-T10	AS98M□E-T20	AS98M□E-T30
	Built-In Controller Package	Standard	AS98A□EP-T3.6	AS98A□EP-T7.2	AS98A□EP-T10	AS98A□EP-T20	AS98A□EP-T30
		Electromagnetic Brake	AS98M□EP-T3.6	AS98M□EP-T7.2	AS98M□EP-T10	AS98M□EP-T20	AS98M□EP-T30
Maximum Holding Torque		N·m (lb-in)	4.5 (39)	9 (79)		12 (106)	
Rotor Inertia		J: kg·m^2 (oz-in^2)	1400×10^{-7} (7.7) [1560×10^{-7} (8.5)]*1				
Backlash		arc minute (degrees)	25 (0.417°)	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)	4.5 (39)	9 (79)		12 (106)	
Power Source	Voltage-Frequency		Single-Phase 100-115 VAC −15%～+10% 50/60 Hz				
			Single-Phase 200-230 VAC −15%～+10% 50/60 Hz				
			Three-Phase 200-230 VAC −15%～+10% 50/60 Hz				
	Maximum Input Current A	Single-Phase 100-115 VAC	6				
		Single-Phase 200-230 VAC	3.5				
		Three-Phase 200-230 VAC	1.9				
Electromagnetic Brake*3		Type	Active when 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)	2.25 (19.9)	4.5 (39)		6 (53)	
Mass		Motor kg (lb.)	3 (6.6) [3.4 (7.5)]*1				
		Driver kg (lb.)	0.8 (1.8)				
Dimension No.	Motor		8				
	Driver	Pulse Input	15				
		Built-In Controller	16				

How to Read Specifications Table ➔ Page 73

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

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

*2 Pulse Input Package: 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 switching signals.

Resolution Select Switch ➔ Page 36

Built-In Controller Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

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

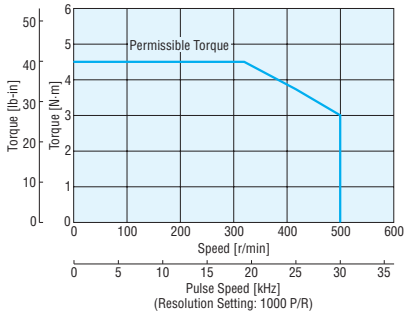
Note:

●Direction of rotation of the motor and that of the gear output shaft are the same for unit type with reduction ratio 3.6:1, 7.2:1 and 10:1. It is opposite for 20:1 and 30:1 ratio type.

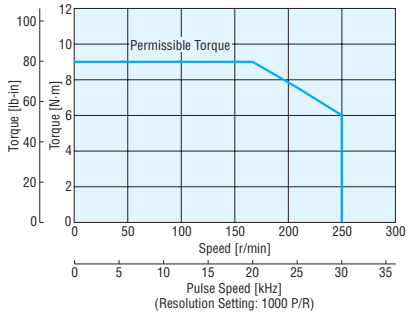
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➔ Page 73

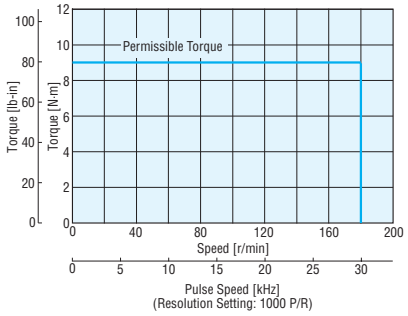
AS98□□E-T3.6/AS98□□EP-T3.6



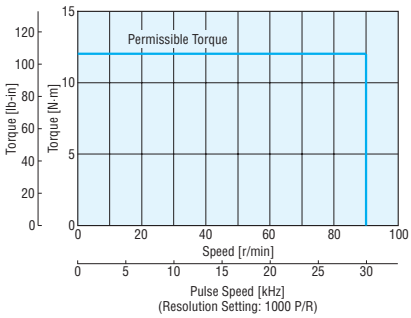
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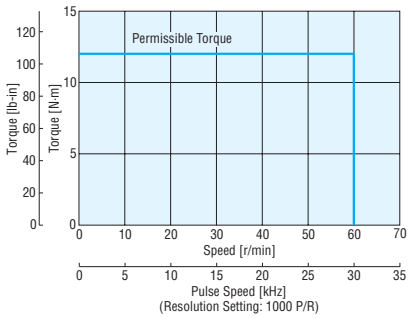
AS98□□E-T10/AS98□□EP-T10



AS98□□E-T20/AS98□□EP-T20



AS98□□E-T30/AS98□□EP-T30



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

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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

Specifications RoHS

●With the **AS46** type, only the driver conforms to the CSA standard.

Model					
Pulse Input Package	Standard		**AS46AA-N7.2**	**AS46AA-N10**
	Electromagnetic Brake		**AS46MA-N7.2**	**AS46MA-N10**
Built-In Controller Package	Standard		**AS46AAP-N7.2**	**AS46AAP-N10**
	Electromagnetic Brake		**AS46MAP-N7.2**	**AS46MAP-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} (0.45)]*1	
Backlash		arc minute (degrees)	2 (0.034°)	
Angle Error		arc minute (degrees)	6 (0.1°)	
Permissible Speed Range		r/min	0～416	0～300
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-Frequency		Single-Phase 100-115 VAC −15%～+10% 50/60 Hz	
	Maximum Input Current A	Single-Phase 100-115 VAC	3.3	
Electromagnetic Brake*4		Type	Active when 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.)	0.8 (1.8)	
Dimension No.	Motor		9	
	Driver	Pulse Input	15	
		Built-In Controller	16	

How to Read Specifications Table ➜ Page 73

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

*2 Pulse Input Package: 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 switching signals.

Resolution Select Switch ➜ Page 36

Built-In Controller Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

*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 for complicated braking. Also, a separate 24 VDC±5%, 0.1 A minimum power supply is required for the electromagnetic brakes.

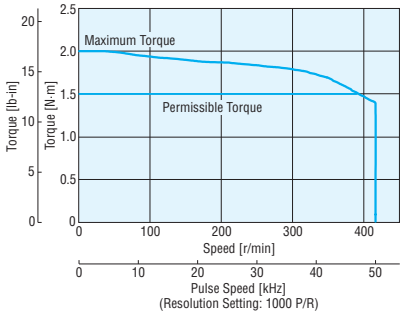
Note:

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

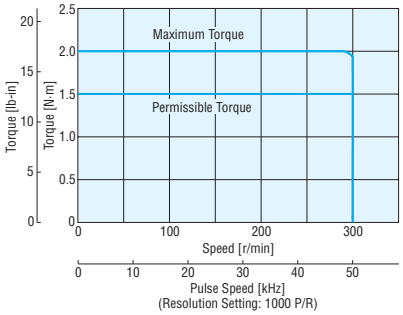
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

AS46□A-N7.2/AS46□AP-N7.2



AS46□A-N10/AS46□AP-N10



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

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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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

Specifications RoHS

Model								
Pulse Input Package	Standard	AS66A□E-N5	AS66A□E-N7.2	AS66A□E-N10	AS66A□E-N25	AS66A□E-N36	AS66A□E-N50
	Electromagnetic Brake	AS66M□E-N5	AS66M□E-N7.2	AS66M□E-N10	AS66M□E-N25	AS66M□E-N36	AS66M□E-N50
Built-In Controller Package	Standard	AS66A□EP-N5	AS66A□EP-N7.2	AS66A□EP-N10	AS66A□EP-N25	AS66A□EP-N36	AS66A□EP-N50
	Electromagnetic Brake	AS66M□EP-N5	AS66M□EP-N7.2	AS66M□EP-N10	AS66M□EP-N25	AS66M□EP-N36	AS66M□EP-N50
Maximum Holding Torque	N·m (lb-in)	3.5 (30)	4 (35)	5 (44)	8 (70)		
Rotor Inertia	J: kg·m^2 (oz-in^2)	405×10^{-7} (2.2) [564×10^{-7} (3.1)]*1					
Backlash	arc minute (degrees)	2 (0.034˚)			3 (0.05˚)		
Angle Error	arc minute (degrees)	5 (0.084˚)					
Permissible Speed Range	r/min	0~600	0~416	0~300	0~120	0~83	0~60
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 (141)	20 (177)	
Power Source	Voltage-Frequency	Single-Phase 100-115 VAC −15%~+10% 50/60 Hz					
		Single-Phase 200-230 VAC −15%~+10% 50/60 Hz					
		Three-Phase 200-230 VAC −15%~+10% 50/60 Hz					
	Maximum Input Current A: Single-Phase 100-115 VAC	5					
	Maximum Input Current A: Single-Phase 200-230 VAC	3					
	Maximum Input Current A: Three-Phase 200-230 VAC	1.5					
Electromagnetic Brake*4	Type	Active when 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.)	0.8 (1.8)					
Dimension No.	Motor	10					
	Driver: Pulse Input	15					
	Driver: Built-In Controller	16					

How to Read Specifications Table ➔ Page 73

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

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

*2 Pulse Input Package: 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 switching signals.
Resolution Select Switch ➔ Page 36
Built-In Controller Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

*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 for complicated braking. Also, a separate 24 VDC±5%, 0.3 A minimum power supply is required for the electromagnetic brakes.

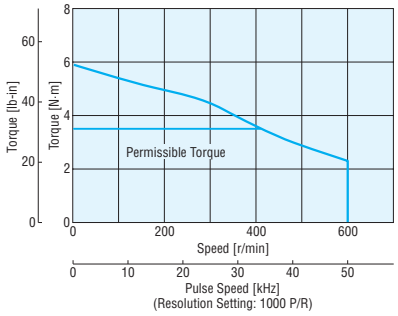
Note:

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

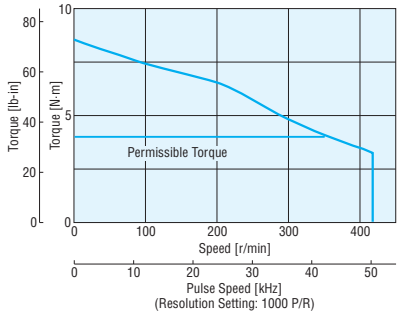
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➔ Page 73

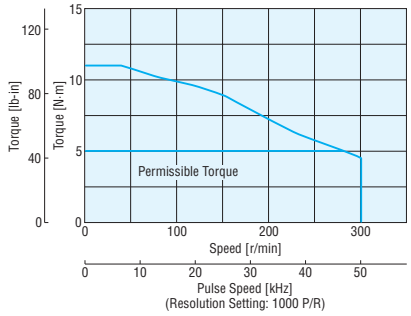
AS66□□E-N5/AS66□□EP-N5



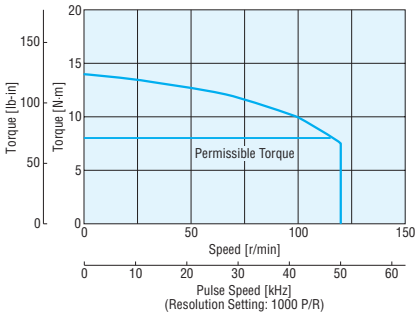
AS66□□E-N7.2/AS66□□EP-N7.2



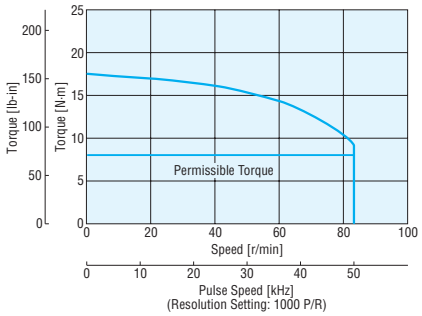
AS66□□E-N10/AS66□□EP-N10



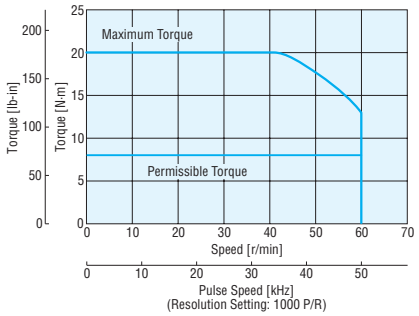
AS66□□E-N25/AS66□□EP-N25



AS66□□E-N36/AS66□□EP-N36



AS66□□E-N50/AS66□□EP-N50



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

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (■) within the model name.

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.]

●When using the motor with th1e dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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PN Geared Type Motor Frame Size 90 mm (3.54 in.)

Specifications RoHS

Model	Pulse Input Package	Standard	AS98A□E-N5	AS98A□E-N7.2	AS98A□E-N10	AS98A□E-N25	AS98A□E-N36	AS98A□E-N50
		Electromagnetic Brake	AS98M□E-N5	AS98M□E-N7.2	AS98M□E-N10	AS98M□E-N25	AS98M□E-N36	AS98M□E-N50
	Built-In Controller Package	Standard	AS98A□EP-N5	AS98A□EP-N7.2	AS98A□EP-N10	AS98A□EP-N25	AS98A□EP-N36	AS98A□EP-N50
		Electromagnetic Brake	AS98M□EP-N5	AS98M□EP-N7.2	AS98M□EP-N10	AS98M□EP-N25	AS98M□EP-N36	AS98M□EP-N50
Maximum Holding Torque		N·m (lb-in)	10 (88)	14 (123)	20 (177)	37 (320)		
Rotor Inertia		J: kg·m² (oz-in²)	1400×10⁻⁷ (7.7) [1560×10⁻⁷ (8.5)]*1					
Backlash		arc minute (degrees)	2 (0.034°)			3 (0.05°)		
Angle Error		arc minute (degrees)	4 (0.067°)					
Permissible Speed Range		r/min	0~600	0~416	0~300	0~120	0~83	0~60
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)	10 (88)	14 (123)	20 (177)	37 (320)		
Maximum Torque*3		N·m (lb-in)	28 (240)	35 (300)		56 (490)	60 (530)	
Power Source	Voltage-Frequency		Single-Phase 100-115 VAC −15%~+10% 50/60 Hz					
			Single-Phase 200-230 VAC −15%~+10% 50/60 Hz					
			Three-Phase 200-230 VAC −15%~+10% 50/60 Hz					
	Maximum Input Current A	Single-Phase 100-115 VAC	6					
		Single-Phase 200-230 VAC	3.5					
		Three-Phase 200-230 VAC	1.9					
Electromagnetic Brake*4		Type	Active when 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)	4.5 (39)	6.45 (57)	9 (79)	18.5 (163)		
Mass		Motor kg (lb.)	4 (8.8) [4.4 (9.7)]*1			4.7 (10) [5.1 (11)]*1		
		Driver kg (lb.)	0.8 (1.8)					
Dimension No.	Motor		11					
	Driver	Pulse Input	15					
		Built-In Controller	16					

How to Read Specifications Table ➜ Page 73

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

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

*2 Pulse Input Package: 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 switching signals.
Resolution Select Switch ➜ Page 36
Built-In Controller Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

*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 for complicated braking. Also, a separate 24 VDC±5%, 0.3 A minimum power supply is required for the electromagnetic brakes.

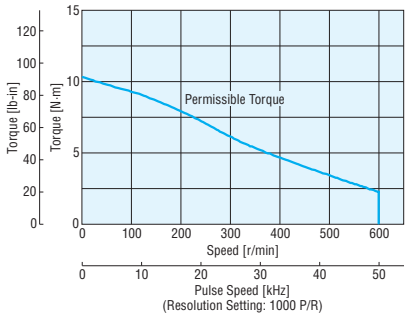
Note:

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

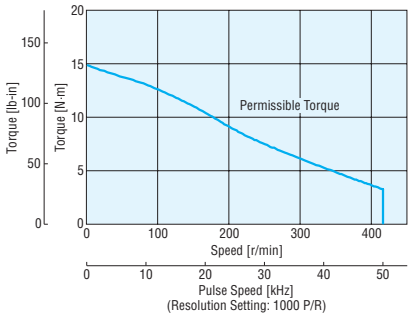
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

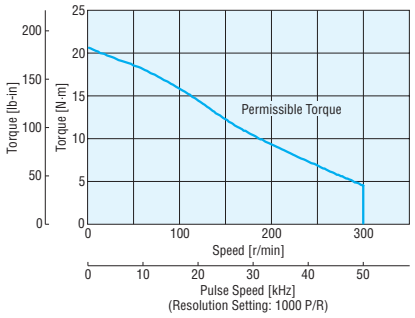
AS98□□E-N5/AS98□□EP-N5



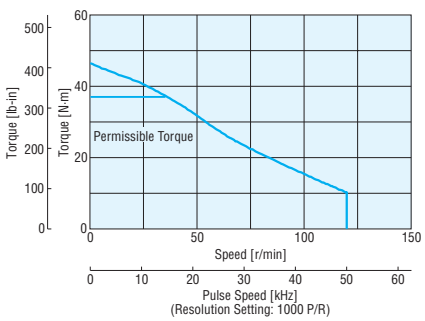
AS98□□E-N7.2/AS98□□EP-N7.2



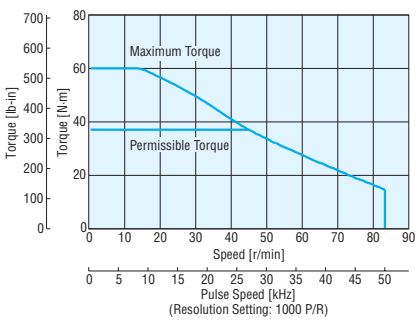
AS98□□E-N10/AS98□□EP-N10



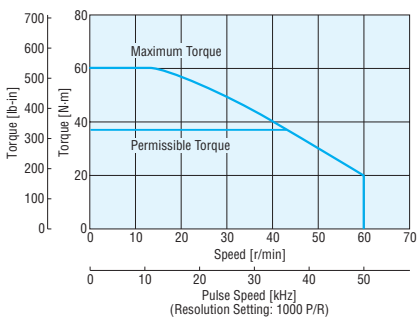
AS98□□E-N25/AS98□□EP-N25



AS98□□E-N36/AS98□□EP-N36



AS98□□E-N50/AS98□□EP-N50



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

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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Harmonic Geared Type Motor Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.), 90 mm (3.54 in.)

Specifications RoHS

cULus CE ●With the **AS46** type, only the driver conforms to the CSA standard.

Model								
Pulse Input Package	Standard	**AS46AA2-H50**	**AS46AA2-H100**	**AS66A□E-H50**	**AS66A□E-H100**	**AS98A□E-H50**	**AS98A□E-H100**
	Electromagnetic Brake	**AS46MA2-H50**	**AS46MA2-H100**	**AS66M□E-H50**	**AS66M□E-H100**	**AS98M□E-H50**	**AS98M□E-H100**
Built-In Controller Package	Standard	**AS46AAP2-H50**	**AS46AAP2-H100**	**AS66A□EP-H50**	**AS66A□EP-H100**	**AS98A□EP-H50**	**AS98A□EP-H100**
	Electromagnetic Brake	**AS46MAP2-H50**	**AS46MAP2-H100**	**AS66M□EP-H50**	**AS66M□EP-H100**	**AS98M□EP-H50**	**AS98M□EP-H100**
Maximum Holding Torque	N·m (lb-in)	3.5 (30)	5 (44)	5.5 (48)	8 (70)	25 (220)	37 (320)
Rotor Inertia	J: kg·m² (oz-in²)	85×10^{-7} (0.46) [100×10^{-7} (0.55)]*1		440×10^{-7} (2.4) [599×10^{-7} (3.3)]*1		1600×10^{-7} (8.8) [1759×10^{-7} (9.6)]*1	
Permissible Speed Range	r/min	0~70	0~35	0~70	0~35	0~70	0~35
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)	3.5 (30)	5 (44)	5.5 (48)	8 (70)	25 (220)	37 (320)
Maximum Torque	N·m (lb-in)	8.3 (73)	11 (97)	18 (159)	28 (240)	35 (300)	55 (480)
Lost Motion (Load Torque)	arc minute	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)	1.5 max. (±1.2 N·m)	
Power Source	Voltage-Frequency	Single-Phase 100-115 VAC −15%~+10% 50/60 Hz		Single-Phase 100-115 VAC −15%~+10% 50/60 Hz			
				Single-Phase 200-230 VAC −15%~+10% 50/60 Hz			
				Three-Phase 200-230 VAC −15%~+10% 50/60 Hz			
	Maximum Input Current A: Single-Phase 100-115 VAC	3.3		5		6	
	Maximum Input Current A: Single-Phase 200-230 VAC	–		3		3.5	
	Maximum Input Current A: Three-Phase 200-230 VAC	–		1.5		1.9	
Electromagnetic Brake*3	Type	Active when 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)	12.5 (110)	18.5 (163)
Mass	Motor kg (lb.)	0.7 (1.5) [0.8 (1.8)]*1		1.4 (3.1) [1.65 (3.6)]*1		3.9 (8.6) [4.3 (9.5)]*1	
	Driver kg (lb.)	0.8 (1.8)					
Dimension No.	Motor	12		13		14	
	Driver: Pulse Input	15					
	Driver: Built-In Controller	16					

How to Read Specifications Table ➔ Page 73

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

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

*2 Pulse Input Package: 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 switching signals.
Resolution Select Switch ➔ Page 36
Built-In Controller Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for complicated braking. Also, a separate 24 VDC±5%, 0.3 A minimum (**AS46**: 0.1 A minimum) power supply is required for the electromagnetic brakes.

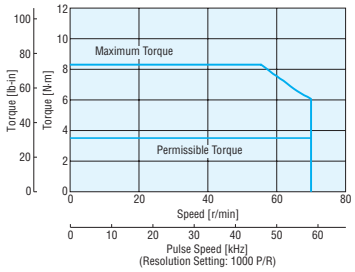
Note:

●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.

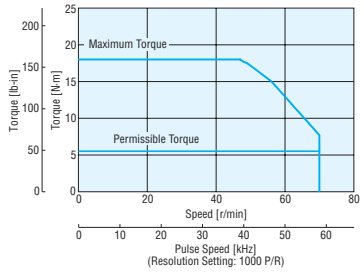
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➔ Page 73

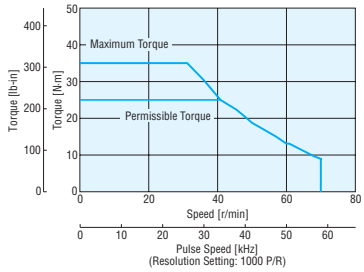
AS46□A2-H50/AS46□AP2-H50



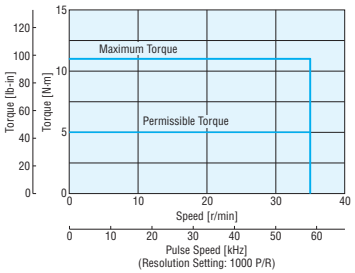
AS66□□E-H50/AS66□□EP-H50



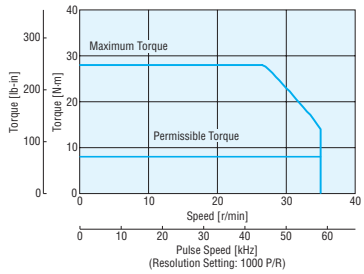
AS98□□E-H50/AS98□□EP-H50



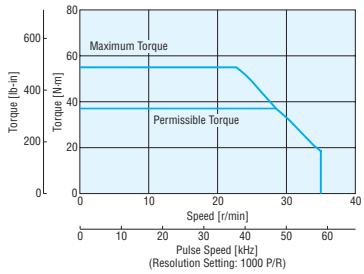
AS46□A2-H100/AS46□AP2-H100



AS66□□E-H100/AS66□□EP-H100



AS98□□E-H100/AS98□□EP-H100



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

●Enter the power supply voltage **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC) in the box (□) within the model name.

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.]

●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).

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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Driver Specifications

	Pulse Input Package	Built-In Controller Package
Speed and Positioning Control Command	Pulse input	Stored program
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 stops automatically.	
	Overheat, Overload, Overvoltage, Speeed error, Overcurrent, Overspeed, EEPROM data error, Sensor error, System error	Stack overflow, Memory read error, Program reference error, Compilation error, Operation result overflow, Parameter out-of-range error, Divide by zero, General I/O definition error, PC command execution error, Overheat protection, Overload protection, Overspeed error, Overvoltage protection, Excessive position deviation, Overcurrent protection, Emergency stop, Incorrect limit-sensor logic, Reverse limit-sensor connection, Mechanical home seeking error, Overtravel, Software overtravel, Emergency stop, Invalid operation data, Resolver sensor error, Initial rotor revolution error, NVRAM 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 setting	Photocoupler input, Control input: 24 VDC, Input resistance 4.7 kΩ (X0-X7, START, E-STOP, HOMELS, +LS, −LS, SENSOR)
Output Signals	Photocoupler output, Open-collector output External use condition: 30 VDC maximum, 15 mA maximum (Positioning completion signal, Alarm signal) Transistor, Open-collector output External use condition: 30 VDC maximum, 15 mA maximum (Timing signal, Feedback pulse ASG · BSG signal) Line driver output: Equivalent of 26C31 (Timing signal, Feedback pulse ASG · BSG signal)	Photocoupler, Open-collector output External use condition: 30 VDC maximum, 4~8 mA (Y0~Y7, ALM) Line driver output: Equivalent of 26C31 (ASG · BSG Signal)
User Program	–	Maximum number of programs: 14 programs (Including STARTUP program) Maximum lines per program: 64 lines Maximum commands per 1 line: 1 command (Single state) Maximum program variables: 26 variables (A~Z)
Positioning Control	–	Incremental (relative distance specification) mode/Absolute (absolute position specification) mode One-shot operation/Linked operation (A maximum of 4 profiles can be linked) Maximum operating ranges Steps: −8 388 608~+8 388 607 (1 each) Operating speed: 10 Hz~500 000 Hz (500 kHz) Acceleration/Deceleration rate*: 10~50000 msec
Operating Method	–	Positioning operation (Indexing) Continuous operation (Scan) Linked profile Return to electrical home position (Return) Return to mechanicaol home position (Home operation)
Mechanical Home Detection Operation	–	Home seeking operation is performed from the entire range using mechanical position detection signals (+LS, −LS, HOMELS)
Other Functions	–	Speed-filter value setting function Current setting function Electric gear function Setting function for direction of motor rotation Emergency stop function Over-travel function Software over-travel funtion Alarm trace-back function Daisy-chain connections
Terminal Emulation	–	Connection standard: RS-232C confomity Transfer system: Asynchronous communication, NRZ (Non return to zero), Full duplex Data length: 8 bits, 1 stop bit, No parity Transmit speed: 9600 bps Connector specification: Modular (4 wires, 4 pins) Pin arrangement: RS232 Compatible Protocol: TTY (CR+LF)

*The rates of acceleration and deceleration can be set separately.

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General Specifications

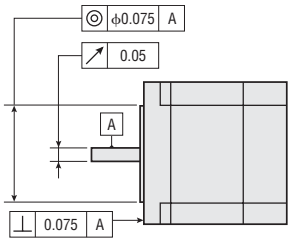
This is the value after rated operation at normal temperature and normal humidity.

Specifications		Motor	Driver
Motor Insulation Class		Class B [130°C (266°F)][UL/CSA: Recognized as class A 105°C (221°F)]	–
Insulation Resistance		100 MΩ minimum when measured by a 500 VDC megger between the following places · Frame-Windings · Frame-Electromagnetic brake windings	100 MΩ minimum when measured by a 500 VDC megger between the following places · Frame-Power supply input terminal · I/O-Power supply input terminal
Dielectric Strength		Sufficient to withstand the following for one minute: · Frame-Windings 1.5 kV (1.0 kV for **AS46**) 50 Hz or 60 Hz · Frame-Electromagnetic brake windings 1.0 kV 50 Hz or 60 Hz	Sufficient to withstand the following for one minute: · Frame-Power supply input terminal 1.5 kV 50 Hz or 60 Hz · I/O-Power supply input terminal 2.3 kV (3.0 kV for 200-230 VAC) 50 Hz or 60 Hz: Pulse input package 1.8 kV 50 Hz or 60 Hz: Built-in controller package
Operating Environment (In Operation)	Ambient Temperature	0°C～+50°C (+32°F～+122°F) (nonfreezing): Standard Type **TH** · **PN** Geared Type 0°C～+40°C (+32°F～+104°F) (nonfreezing): Harmonic Geared Type	0°C～+50°C (+32°F～+122°F) (nonfreezing): Pulse input package 0°C～+40°C (+32°F～+104°F) (nonfreezing): Built-in controller package
	Ambient Humidity	85% or less (noncondensing)	
	Atmosphere	No corrosive gases, dust, water or oil (Standard IP65 rated motor: No corrosive gases.).	
Static Angle Error		±5 arc minutes (0.084°)	–
Shaft Runout		0.05 mm (0.002 inch) T.I.R.*	–
Concentricity		0.075 mm (0.003 inch) T.I.R.*	–
Perpendicularity		0.075 mm (0.003 inch) 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.



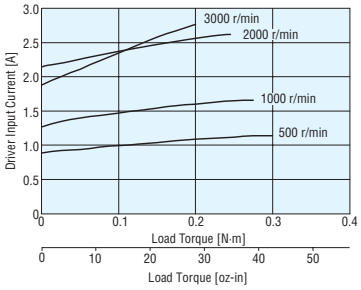
Load Torque – Driver Input Current Characteristics

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 axis.

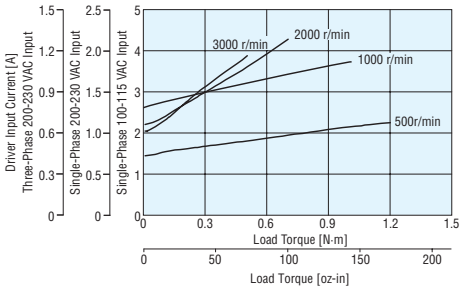
Motor shaft speed = Gear output shaft speed×Gear ratio [r/min]

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

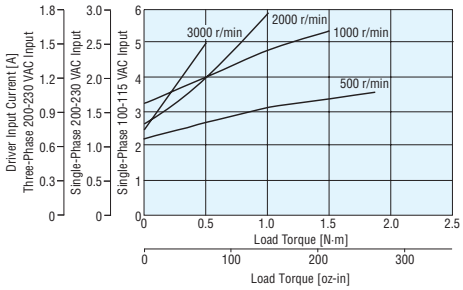
AS46



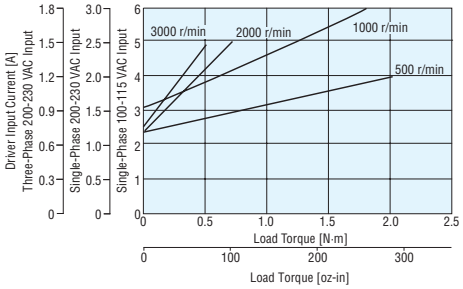
AS66



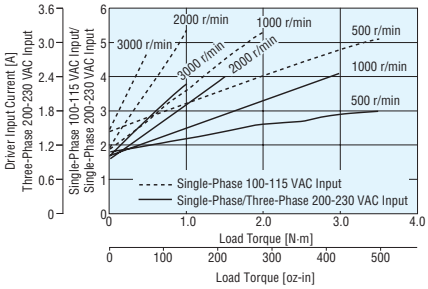
AS69



AS98



AS911



Permissible Overhung Load and Permissible Thrust Load

Unit = N (lb.)

Type	Model	Gear Ratio	Overhung Load Distance from Shaft End mm (in.)					Thrust Load
			0	5 (0.2)	10 (0.39)	15 (0.59)	20 (0.79)	
Standard Type Standard Type IP65 Rated Motor	**AS46□A** **AS46□AP**	–	20 (4.5)	25 (5.6)	34 (7.6)	52 (11.7)	–	The permissible thrust load shall be no greater than the motor mass.
	AS66□□E **AS66A□T** **AS66□□EP** **AS66A□TP** **AS69□□E** **AS69A□T** **AS69□□EP** **AS69A□TP**		63 (14.1)	75 (16.8)	95 (21)	130 (29)	190 (42)	
	AS98□□E **AS98A□T** **AS98□□EP** **AS98A□TP** **AS911A□E** **AS911A□T** **AS911A□EP** **AS911A□TP**		260 (58)	290 (65)	340 (76)	390 (87)	480 (108)	
TH Geared Type	**AS46□A-T■** **AS46□AP-T■**	**3.6, 7.2, 10, 20, 30**	10 (2.2)	14 (3.1)	20 (4.5)	30 (6.7)	–	15 (3.3)
	AS66□□E-T■ **AS66□□EP-T■**		70 (15.7)	80 (18)	100 (22)	120 (27)	150 (33)	40 (9)
	AS98□□E-T■ **AS98□□EP-T■**		220 (49)	250 (56)	300 (67)	350 (78)	400 (40)	100 (22)
PN Geared Type	**AS46□A-N■** **AS46□AP-N■**	**7.2, 10**	100 (22)	120 (27)	150 (33)	190 (42)	–	100 (22)
	AS66□□E-N5 **AS66□□EP-N5**	–	200 (45)	220 (49)	250 (56)	280 (63)	320 (72)	
	AS66□□E-N■ **AS66□□EP-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)	
	AS98□□E-N5 **AS98□□EP-N5**	–	480 (108)	520 (117)	550 (123)	580 (130)	620 (139)	300 (67)
	AS98□□E-N■ **AS98□□EP-N■**	**7.2, 10**	480 (108)	540 (121)	600 (135)	680 (153)	790 (177)	
	AS98□□E-N25 **AS98□□EP-N25**	–	850 (191)	940 (210)	1050 (230)	1110 (240)	1190 (260)	
	AS98□□E-N36 **AS98□□EP-N36**		930 (200)	1030 (230)	1150 (250)	1220 (270)	1300 (290)	
	AS98□□E-N50 **AS98□□EP-N50**		1050 (230)	1160 (260)	1300 (290)	1380 (310)	1490 (330)	
Harmonic Geared Type	**AS46□A2-H■** **AS46□AP2-H■**	**50, 100**	180 (40)	220 (49)	270 (60)	360 (81)	510 (114)	220 (49)
	AS66□□E-H■ **AS66□□EP-H■**		320 (72)	370 (83)	440 (99)	550 (123)	720 (162)	450 (101)
	AS98□□E-H■ **AS98□□EP-H■**		1090 (240)	1150 (250)	1230 (270)	1310 (290)	1410 (310)	1300 (290)

●Enter **A** (standard) or **M** (electromagnetic brake) in the box (□) within the model name.
Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
Enter the gear ratio in the box (■) within the model name.

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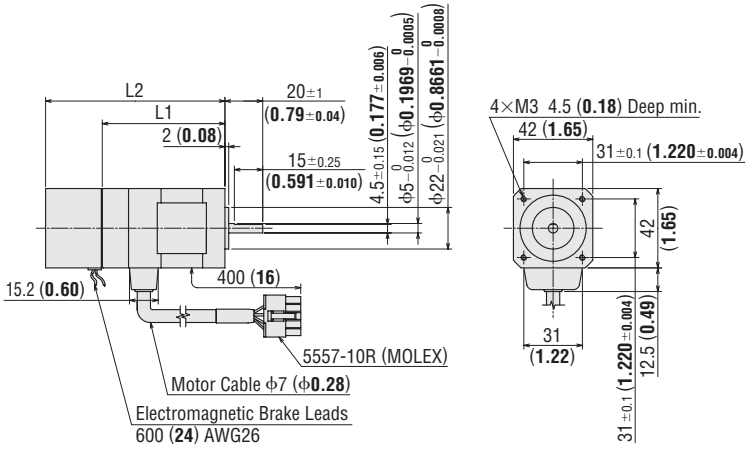
Dimensions Unit = mm (inch)

Motor

◇Standard Type

1 □42 mm (□1.65 in.)

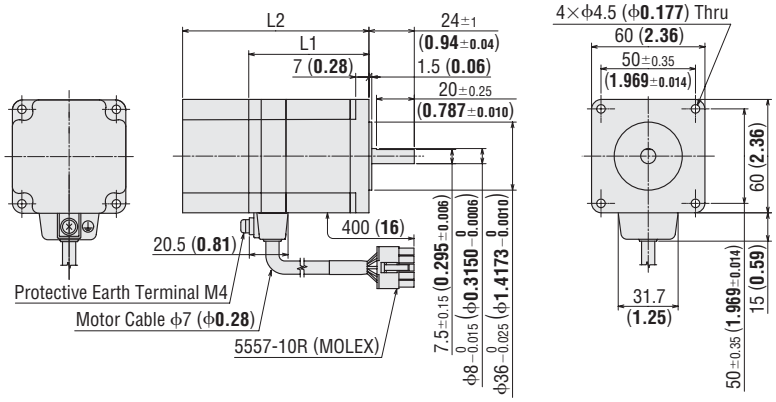
Model	Motor Model	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS46AA **AS46AAP**	ASM46AA	64.9 (2.56)	–	0.5 (1.1)	B192
AS46MA **AS46MAP**	ASM46MA	–	94.9 (3.74)	0.6 (1.32)	B193



2 □60 mm (□2.36 in.)

Model	Motor Model	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS66A□E **AS66A□EP**	ASM66A□E	63.6 (2.50)	—	0.85 (1.9)	B406
AS66M□E **AS66M□EP**	ASM66M□E	—	98.6 (3.88)	1.1 (2.4)	B407
AS69A□E **AS69A□EP**	ASM69A□E	94.6 (3.72)	—	1.4 (3.1)	B408
AS69M□E **AS69M□EP**	ASM69M□E	—	129.6 (5.1)	1.65 (3.6)	B409

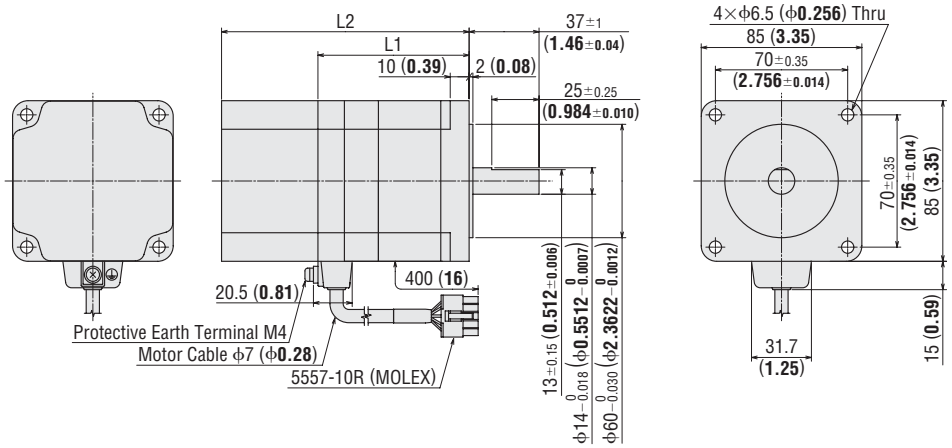
●Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.



3 □85 mm (□3.35 in.)

Model	Motor Model	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS98A□E **AS98A□EP**	ASM98A□E	80 (3.15)	—	1.8 (4.0)	B410
AS98M□E **AS98M□EP**	ASM98M□E	—	131 (5.16)	2.2 (4.8)	B411
AS911A□E **AS911A□EP**	ASM911A□E	110 (4.33)	—	3 (6.6)	B412

●Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.



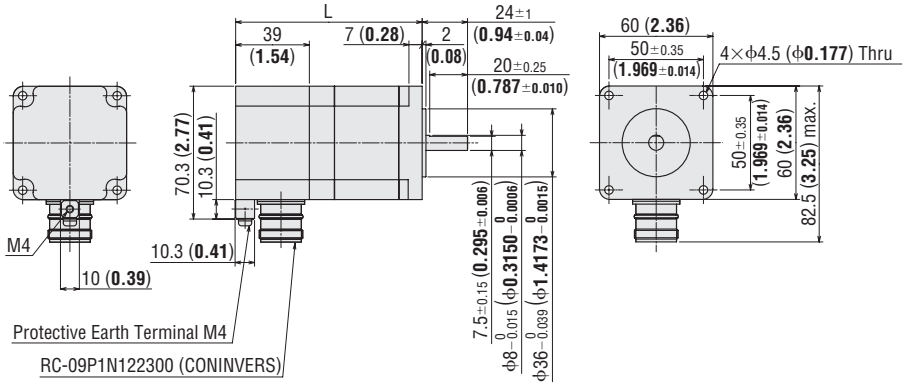
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◇Standard Type IP65 Rated Motor

4 □60 mm (□2.36 in.)

Model	Motor Model	L mm (in.)	Mass kg (lb.)	CAD
AS66A□T **AS66A□TP**	ASM66A□T	98.7 (3.89)	1 (2.2)	B364
AS69A□T **AS69A□TP**	ASM69A□T	129.7 (5.11)	1.5 (3.3)	B365

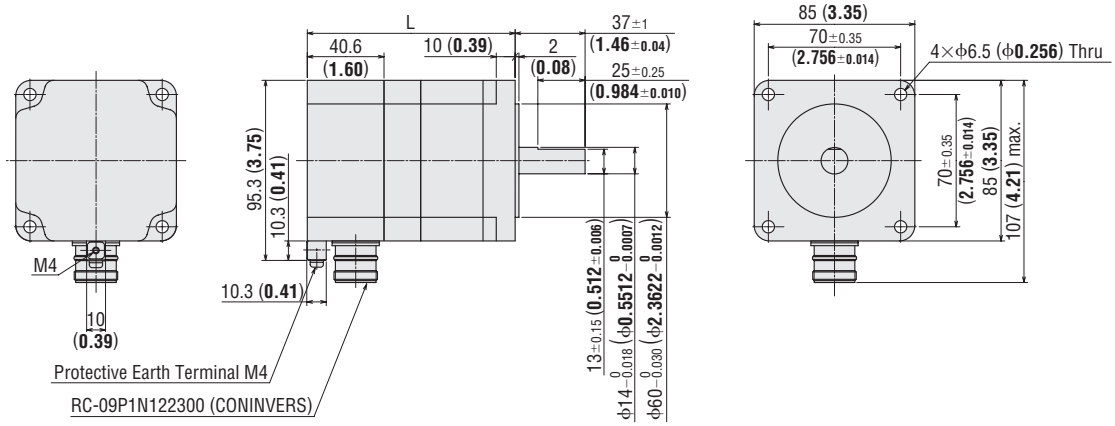
●Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
●Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.



5 □85 mm (□3.35 in.)

Model	Motor Model	L mm (in.)	Mass kg (lb.)	CAD
AS98A□T **AS98A□TP**	ASM98A□T	110 (4.33)	2.2 (4.8)	B317
AS911A□T **AS911A□TP**	ASM911A□T	140 (5.51)	3.3 (7.3)	B318

●Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
●Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.



●Requirement for motor cable for IP65 rated motor (sold separately)

Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.
The IP65 rated motor cannot be driven unless the dedicated motor cable is used.

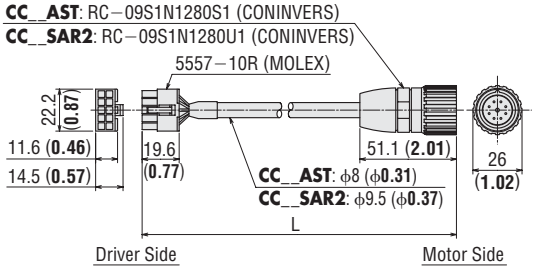
◇Motor cables for IP65 Rated Motor

Model	Length L m (ft.)
CC01AST	1 (3.3)
CC02AST	2 (6.6)
CC03AST	3 (9.8)
CC05AST	5 (16.4)
CC07AST	7 (23)
CC10AST	10 (32.8)
CC15AST	15 (49.2)
CC20AST	20 (65.6)

◇Flexible Motor Cables for IP65 Rated Motor

Model	Length L m (ft.)
CC01SAR2	1 (3.3)
CC02SAR2	2 (6.6)
CC03SAR2	3 (9.8)
CC05SAR2	5 (16.4)
CC07SAR2	7 (23)
CC10SAR2	10 (32.8)

Motor Cables/Flexible Motor Cables for IP65 Rated Motor

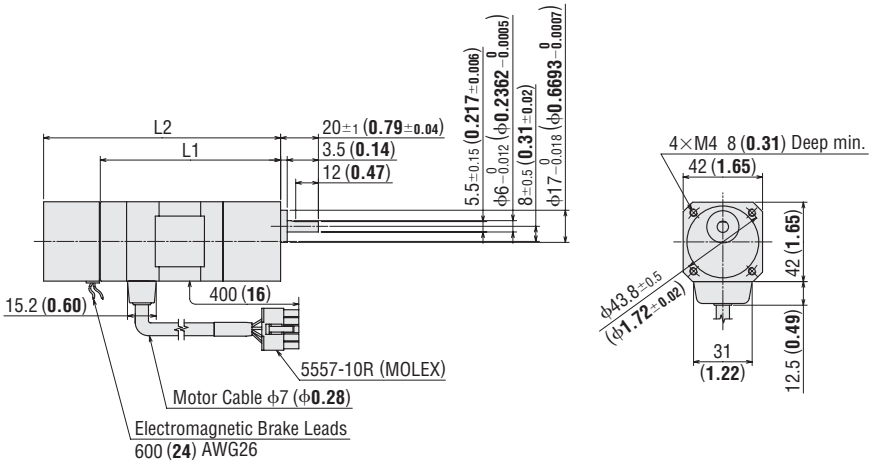


◇TH Geared Type

6 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS46AA-T□ **AS46AAP-T□**	ASM46AA-T□	**3.6, 7.2, 10, 20, 30**	95.4 (3.76)	—	0.65 (1.43)	B199
AS46MA-T□ **AS46MAP-T□**	ASM46MA-T□		—	125.4 (4.94)	0.75 (1.7)	B200

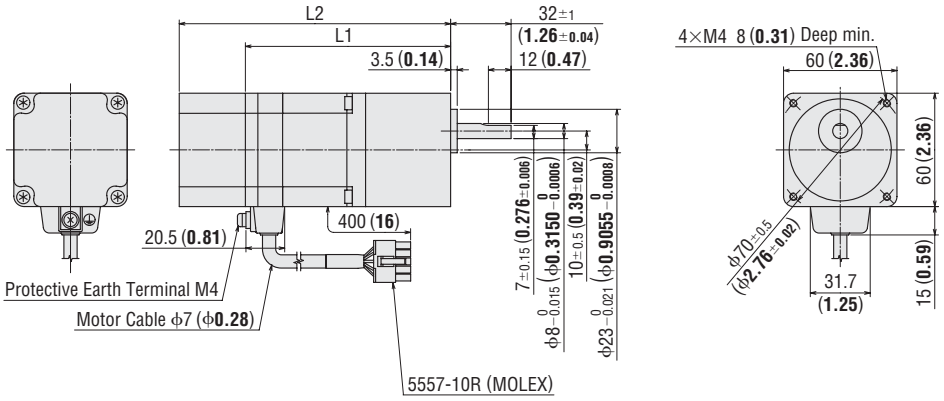
●Enter the gear ratio in the box (□) within the model name.



7 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS66A□E-T□ **AS66A□EP-T□**	ASM66A□E-T□	**3.6, 7.2, 10, 20, 30**	108.6 (4.28)	—	1.25 (2.8)	B413
AS66M□E-T□ **AS66M□EP-T□**	ASM66M□E-T□		—	143.6 (5.65)	1.5 (3.3)	B414

●Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
Enter the gear ratio in the box (□) within the model name.

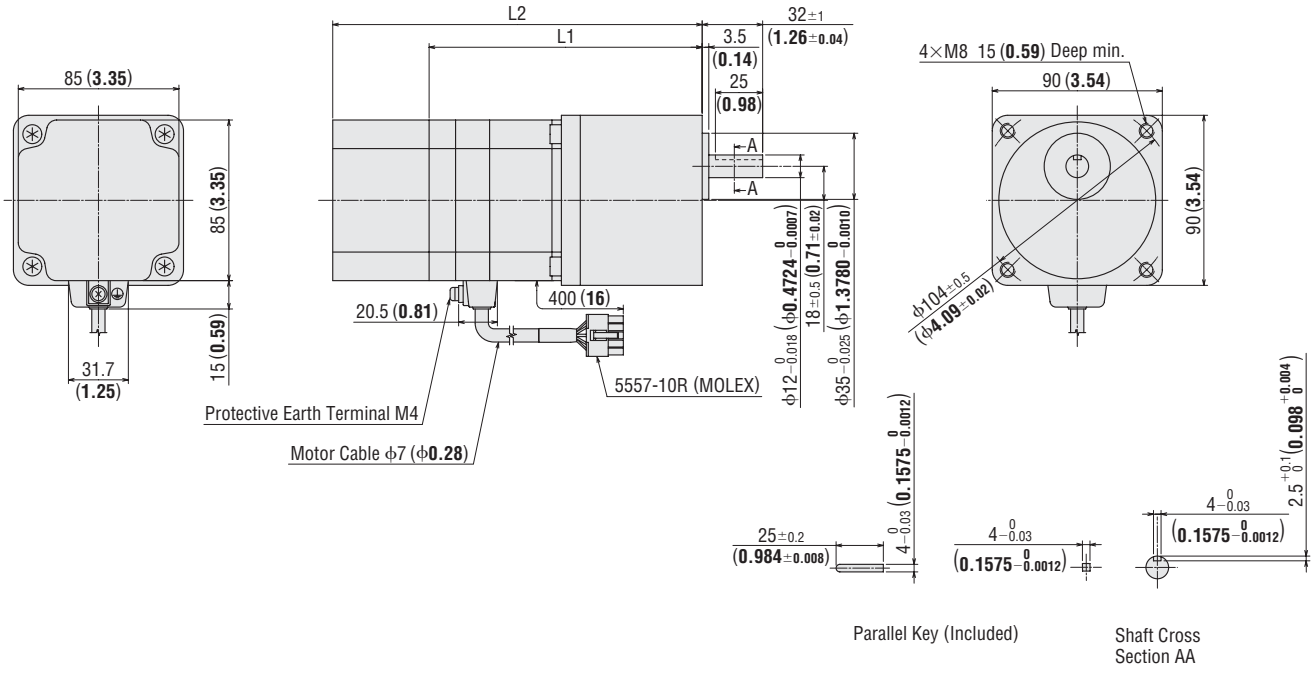


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8 □90 mm (□3.54 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS98A□E-T□ **AS98A□EP-T□**	ASM98A□E-T□	**3.6, 7.2, 10, 20, 30**	144.5 (5.69)	—	3 (6.6)	B415
AS98M□E-T□ **AS98M□EP-T□**	ASM98M□E-T□		—	195.5 (7.70)	3.4 (7.5)	B416

●Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
Enter the gear ratio in the box (□) within the model name.

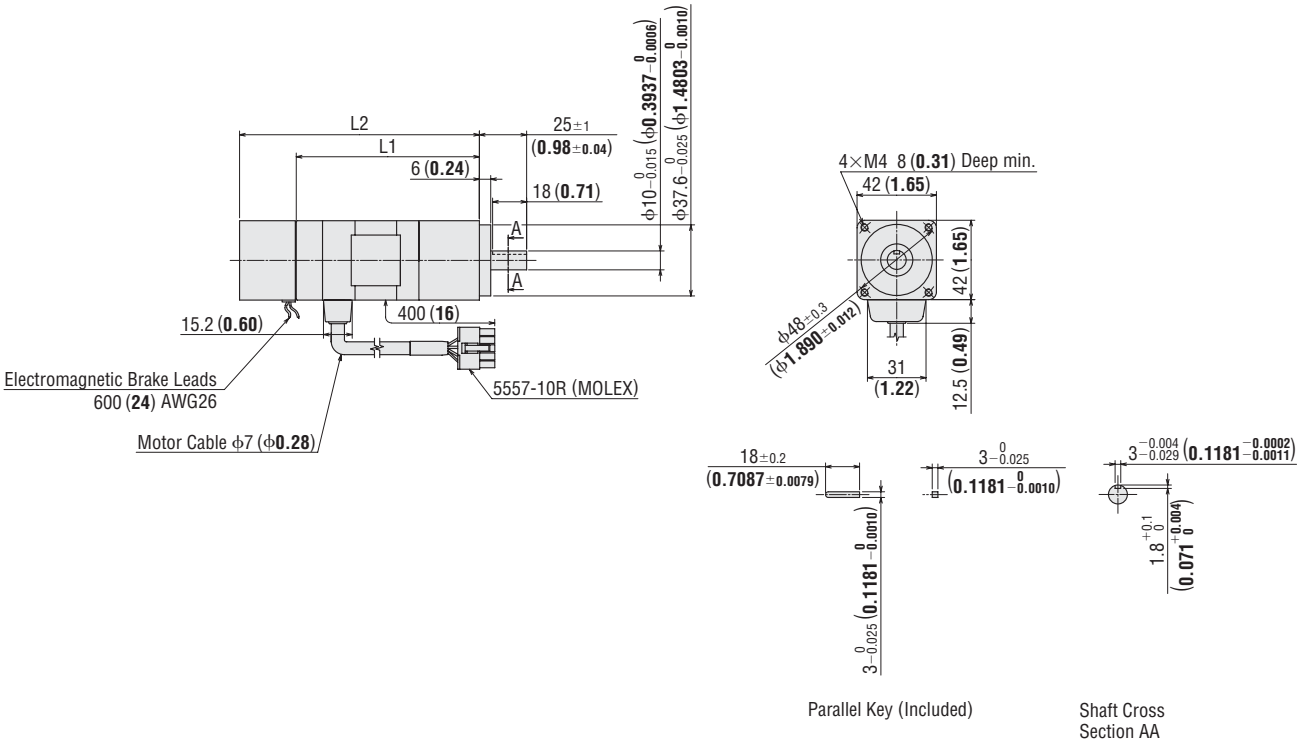


◇PN Geared Type

9 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS46AA-N□ **AS46AAP-N□**	ASM46AA-N□	**7.2, 10**	96.9 (3.18)	—	0.71 (1.6)	B306
AS46MA-N□ **AS46MAP-N□**	ASM46MA-N□		—	126.9 (5.0)	0.81 (1.8)	B307

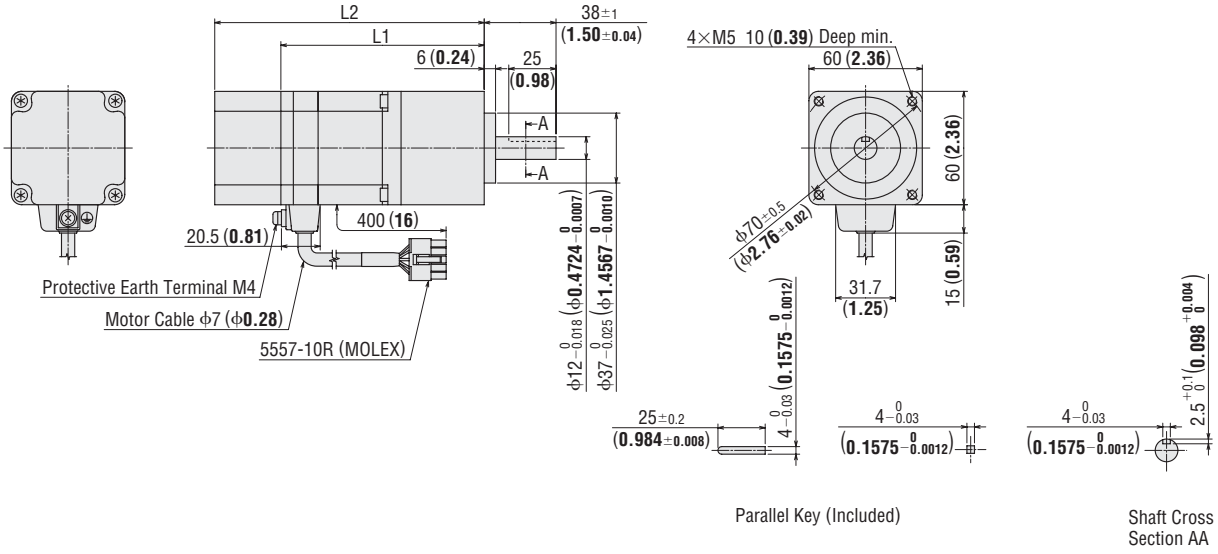
●Enter the gear ratio in the box (□) within the model name.



10 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS66A□E-N□ **AS66A□EP-N□**	ASM66A□E-N□	**5, 7.2, 10**	107.6 (4.24)	—	1.5 (3.3)	B425
		25, 36, 50	123.6 (4.87)	—	1.7 (3.7)	B426
AS66M□E-N□ **AS66M□EP-N□**	ASM66M□E-N□	**5, 7.2, 10**	—	142.6 (5.61)	1.75 (3.9)	B427
		25, 36, 50	—	158.6 (6.24)	1.95 (4.3)	B428

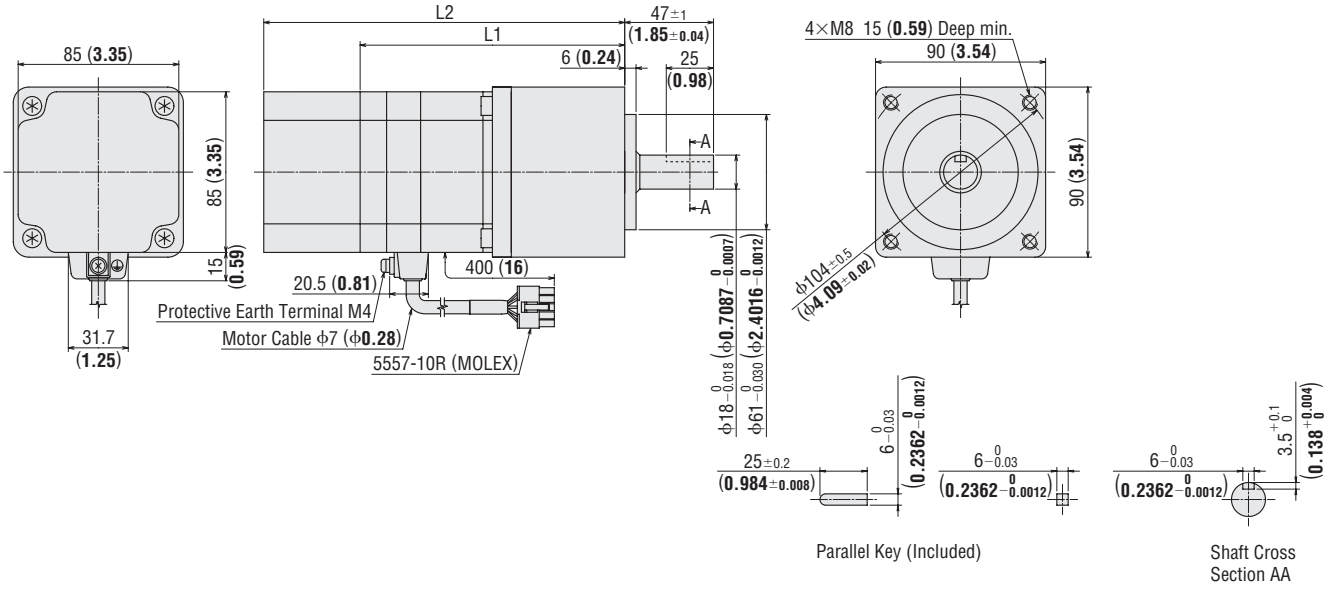
●Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
Enter the gear ratio in the box (□) within the model name.



11 □90 mm (□3.54 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS98A□E-N□ **AS98A□EP-N□**	ASM98A□E-N□	**5, 7.2, 10**	140 (5.51)	—	4 (8.8)	B429
		25, 36, 50	163 (6.42)	—	4.7 (10)	B430
AS98M□E-N□ **AS98M□EP-N□**	ASM98M□E-N□	**5, 7.2, 10**	—	191 (7.52)	4.4 (9.7)	B431
		25, 36, 50	—	214 (8.43)	5.1 (11)	B432

●Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
Enter the gear ratio in the box (□) within the model name.



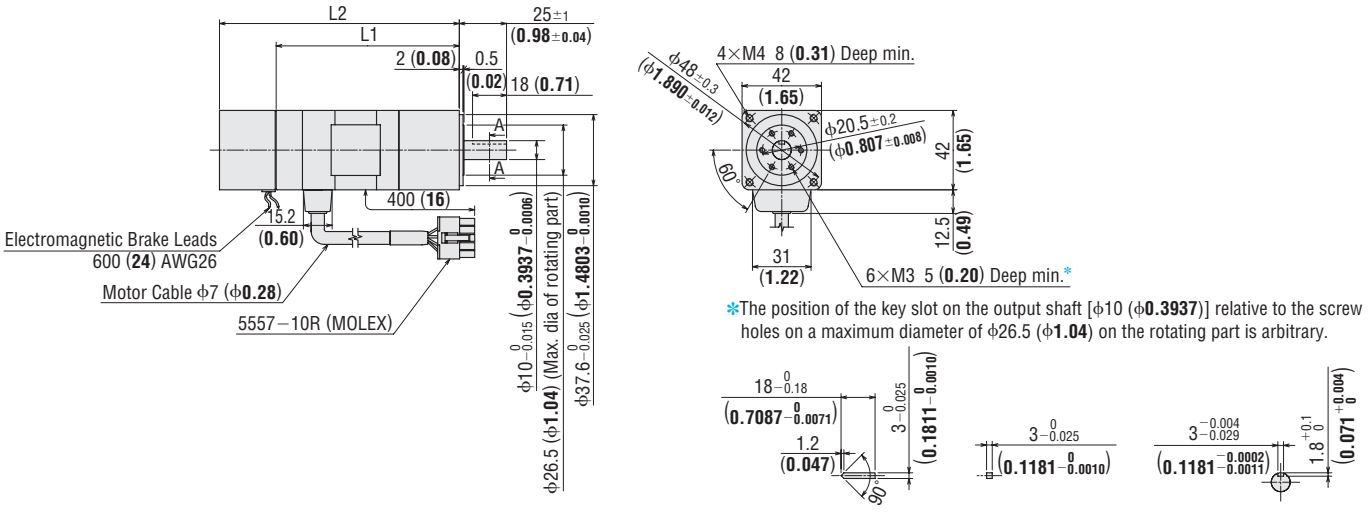
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◇Harmonic Geared Type

12 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS46AA2-H□ **AS46AAP2-H□**	ASM46AA2-H□	**50, 100**	96.9 (3.81)	—	0.7 (1.5)	B308
AS46MA2-H□ **AS46MAP2-H□**	ASM46MA2-H□		—	126.9 (5.0)	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.

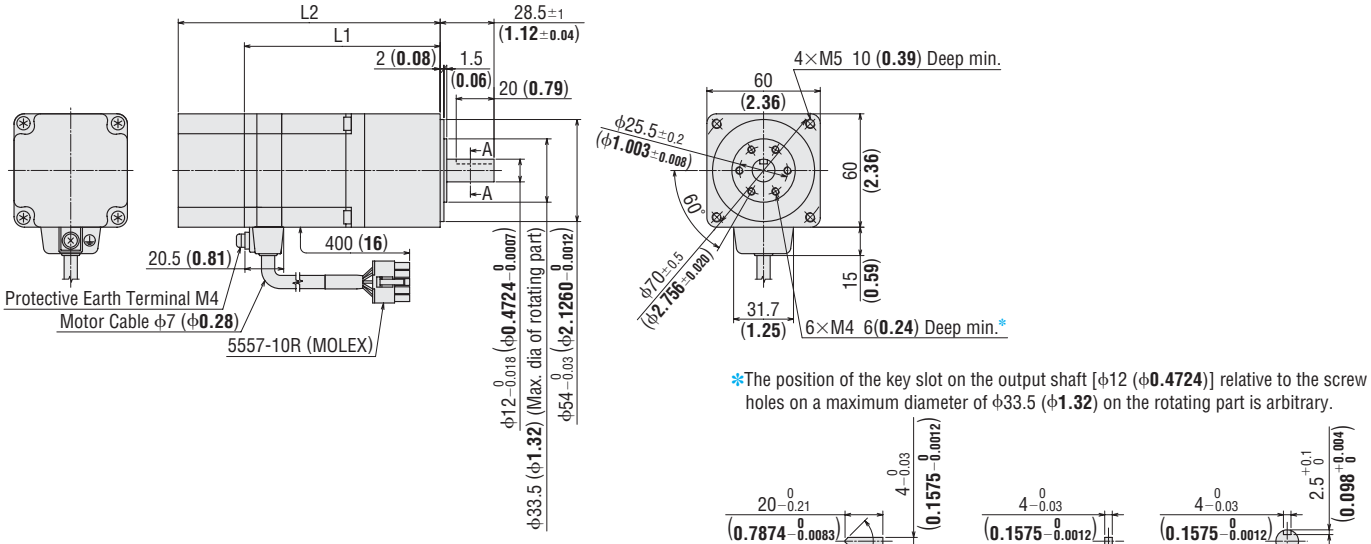
Parallel Key (Included)

Shaft Cross Section AA

13 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS66A□E-H□ **AS66A□EP-H□**	ASM66A□E-H□	**50, 100**	103.6 (4.08)	—	1.4 (3.1)	B433
AS66M□E-H□ **AS66M□EP-H□**	ASM66M□E-H□		—	138.6 (5.46)	1.65 (3.6)	B434

●Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
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.

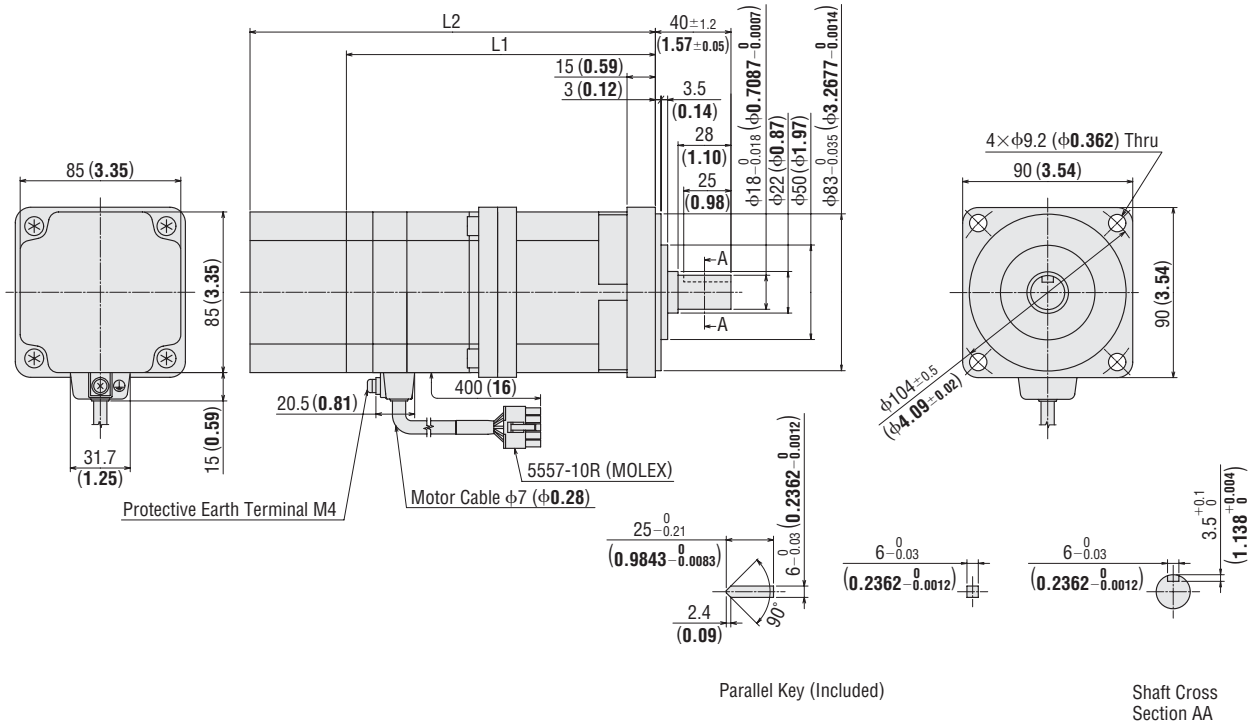
Parallel Key (Included)

Shaft Cross Section AA

14 □90 mm (□3.54 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
AS98A□E-H□ **AS98A□EP-H□**	ASM98A□E-H□	**50, 100**	163.5 (6.44)	—	3.9 (8.6)	B435
AS98M□E-H□ **AS98M□EP-H□**	ASM98M□E-H□		—	214.5 (8.44)	4.3 (9.5)	B436

●Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
Enter the gear ratio in the box (□) within the model name.



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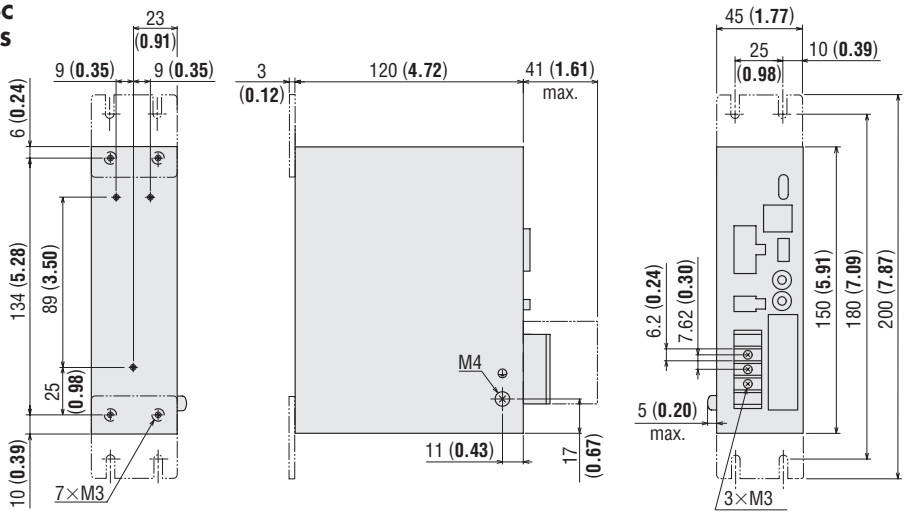
●Driver

15 Pulse Input Package

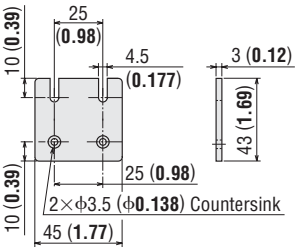
ASD13□-A, **ASD24□-A**, **ASD30□-A**
ASD12□-C, **ASD16□-C**, **ASD20A-C**
ASD12□-S, **ASD16□-S**, **ASD20A-S**

Mass: 0.8 kg (1.8 lb.)

CAD B197



●Mounting Bracket
(2 pieces, included)



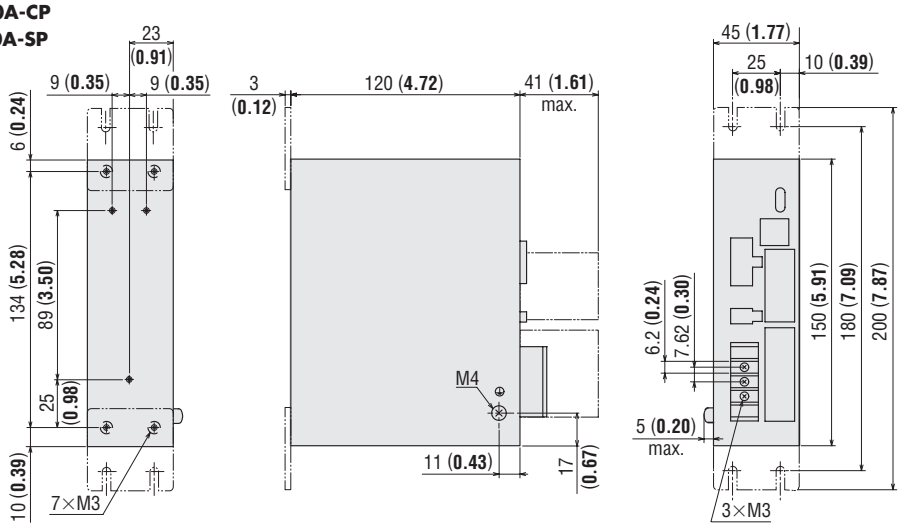
Control I/O Connector
Cover Assembly: 54331-0361 (MOLEX)
Connector: 54306-3619 (MOLEX)

16 Built-In Controller Package

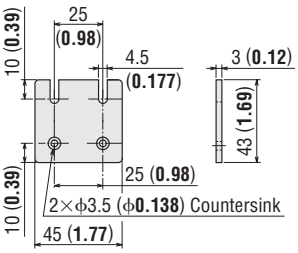
ASD13□-AP, **ASD24□-AP**, **ASD30□-AP**
ASD12□-CP, **ASD16□-CP**, **ASD20A-CP**
ASD12□-SP, **ASD16□-SP**, **ASD20A-SP**

Mass: 0.8 kg (1.8 lb.)

CAD B298



●Mounting Bracket
(2 pieces, included)



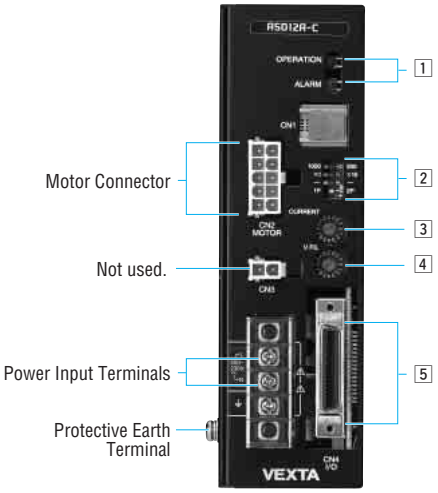
Control I/O Connector
Cover Assembly: 54331-0361 (MOLEX)
Connector: 54306-3619 (MOLEX)

Sensor Input Connector
Cover Assembly: 54331-0201 (MOLEX)
Connector: 54306-2019 (MOLEX)

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Connection and Operation (Pulse Input Package)

Names and Functions of Driver Parts



1 Signal Monitor Display

◇LED Indicators

Indication	Color	Function	When Activated
OPERATION	Green	Power supply indication	Lights when power is on.
ALARM	Red	Alarm indication	Blinks when protective functions are activated.

◇Alarm

Blink Count	Function	When Activated
1	Overheat	The temperature of the driver's internal heat sink has risen to approximately 85˚C (185˚F).
2	Overload	The motor is operated continuously over 5 seconds under a load exceeding the maximum torque.
3	Overvoltage	The primary voltage of the driver's inverter exceeds the permissible value.
4	Speed error	The motor cannot accurately follow at the indicated pulse speed.
5	Overcurrent	An excessive current has flowed to the driver's inverter.
6	Overspeed	The motor shaft velocity exceeds 5000 r/min. (Except geared type)
7	EEPROM data error	The EEPROM has a fault.
8	Sensor error	The power source turns on when the motor cable is not 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 Pulses (0.36˚/step) "1000" "×10" → 10000 Pulses (0.036˚/step) "500" "×1" → 500 Pulses (0.72˚/step) "500" "×10" → 5000 Pulses (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.

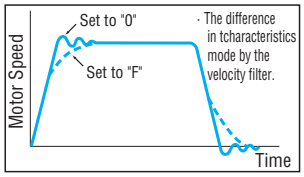
Notes:

- 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 terminals. It will always be "×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.

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.	

5 Input/Output Signals

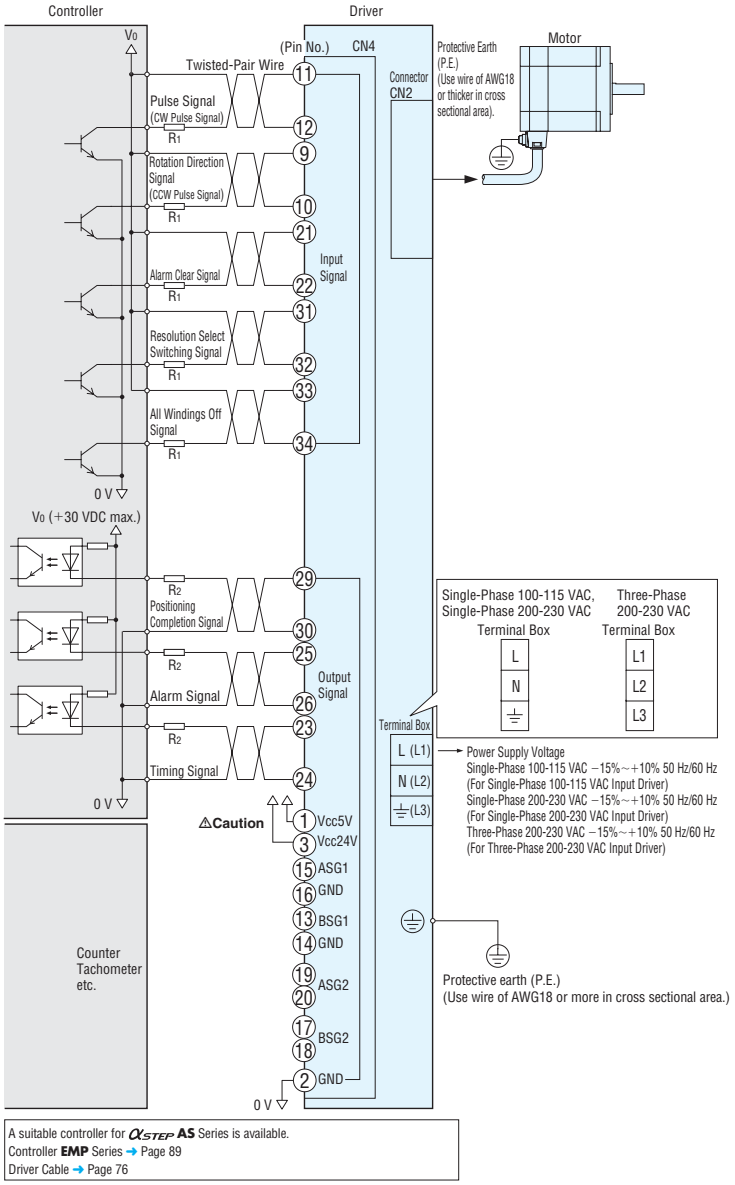
Indication	Input/Output	Pin. No	Signal	Name of Signal
CN4	External power input	1	Vcc+5V	Power supply for signal control
		2	GND	
		3	Vcc+24V	
	Input signal	9	DIR. (CCW)	Rotation direction (CCW pulse)*
		10	$\overline{\text{DIR. (CCW)}}$	
		11	PLS (CW)	Pulse (CW pulse)*
		12	$\overline{\text{PLS (CW)}}$	
	Output signal	13	BSG1	B-phase pulse output (Open-collector)
		14	GND	
		15	ASG1	A-phase pulse output (Open-collector)
		16	GND	
		17	BSG2	B-phase pulse output (Line driver)
		18	$\overline{\text{BSG2}}$	
		19	ASG2	A-phase pulse output (Line driver)
		20	$\overline{\text{ASG2}}$	
	Input signal	21	ACL	Alarm clear
		22	$\overline{\text{ACL}}$	
	Output signal	23	TIM.1	Timing (Open-collector)
		24	GND	
		25	ALARM	Alarm
		26	$\overline{\text{ALARM}}$	
		27	TIM.2	Timing (Line driver)
		28	$\overline{\text{TIM.2}}$	
		29	END	Positioning completion
		30	$\overline{\text{END}}$	
	Input signal	31	×10	Resolution select
		32	$\overline{\times 10}$	
		33	C.OFF	All windings off
		34	$\overline{\text{C.OFF}}$	

Description of Input/Output Signals ➜ Page 38

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

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●Connection Diagrams



A suitable controller for αSTEP **AS** Series is available.
Controller **EMP** Series ➜ Page 89
Driver Cable ➜ Page 76

◇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 elements may be damaged.
Check the specification of the connected equipment.
When the current is above 15 mA, connect the external resistor R_2.

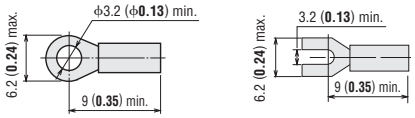
◇Notes on Wiring

●Use a multi-core, twisted-pair shielded wire AWG28 or thicker for the control input/output signal line (CN4), 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.
●When it is necessary to have a connection more than 0.4 m (1.31 ft.) between motor and driver, the optional extension cable or flexible extension cable must be used.
Electromagnetic brake motor models [except motor frame size 42 mm (1.65 ft.)] must use an electromagnetic brake extension cable or flexible extension cable (sold separately).
The frame size 42 mm (1.65 ft.) models can use a standard extension cable even for electromagnetic brake motor models.
Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.
●Use the following cable for the power line:
Single-phase 100-115VAC, Single-phase 200-230VAC : 3-core cable with a conductor cross-sectional area of at least AWG18.
Three-phase 200-230VAC : 4-core cable with a conductor cross-sectional area of at least AWG18.
●Provide a minimum distance of 300 mm (1 ft.) between the control I/O signal line and power lines (AC lines, motor lines and other large-current circuits).
Do not run the control I/O signal line in the same duct as power lines or bundle it with power lines.
●To ground the driver, lead the ground conductor from the protective ground terminal (M4) and connect the ground conductor to provide single-point grounding.

⚠Caution

●If the timing signal output or pulse signal output is used, a 5 VDC or 24 VDC power supply is required. Connect the power supply for timing signal output or pulse signal output to either 5 VDC or 24 VDC. Do not input 5 VDC and 24 VDC at the same time.
Description of Output Signals ➜ Page 39

◇Recommended Crimp Terminals



●Crimp terminals are not provided with the package. They must be furnished separately.

■Connecting the Electromagnetic Brake to Power Supply

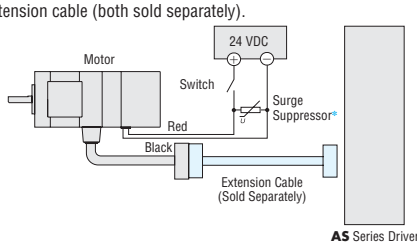
Connect the electromagnetic brake to the power supply using a cable with a conductor cross-sectional area of at least AWG24. The power supply input to the electromagnetic brake is 24 VDC ±5% 0.3 A minimum (**AS46**: 0.1 A minimum) and therefore must be independent of the driver's power supply for signal control.

Notes:

●Applying a voltage that exceeds the specifications will cause the electromagnetic brake to generate a great amount 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 (Included).*
(*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 lead wire of **AS** Series to the DC power supply. If polarity is incorrect, the electromagnetic brake will not operate.
●When using as a CE certified part, use a dedicated DC power supply for electromagnetic brake.

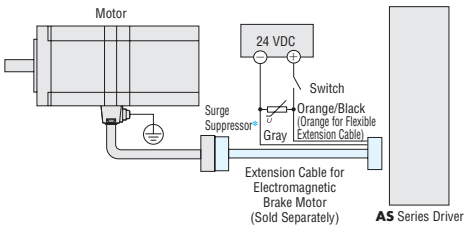
(1)AS46

The electromagnetic brake wire is 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).



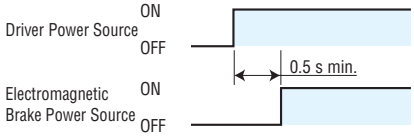
(2)AS66, AS69, AS98

The electromagnetic brake wire is 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 (23.6 in.)] to +24 V, and the gray lead wire [60 mm (2.36 in.)] to the ground (GND).



Timing Chart for Electromagnetic Brake Operation

To release the electromagnetic brake, wait at least 0.5 seconds after turning on the driver power source.
The load may fall down due to a loss of holding torque.



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●Description of Input/Output Signals

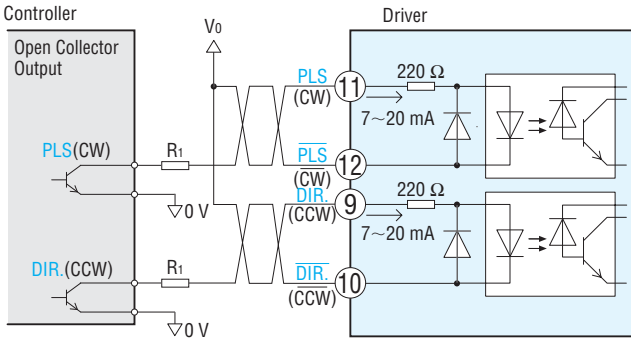
Indication of Input/Output Signal "ON""OFF"

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

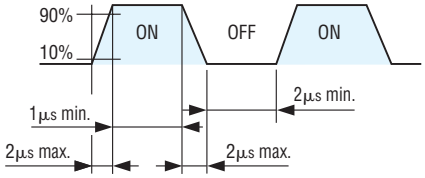


●**The colored characters** indicate signals under the 1-pulse input mode, while the black characters indicate signals under the 2-pulse input mode.

Note:

●The external resistance is not needed when Vo is 5 VDC. When the voltage exceeds 5 VDC, connect the external resistance R_1 to keep input current at 20 mA or less. When 5 VDC or more is applied without the external resistance, the elements may get damaged.

◇Pulse Waveform Characteristics



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

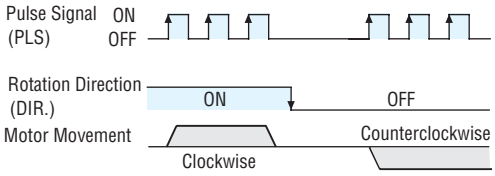
◇Pulse Input Modes

<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

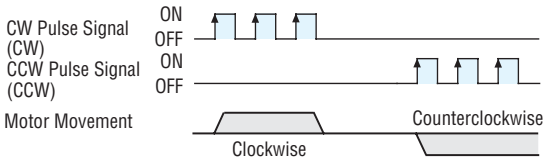
1-Pulse Input Mode



<2-Pulse Input Mode>

The 2-pulse input mode is used for "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.

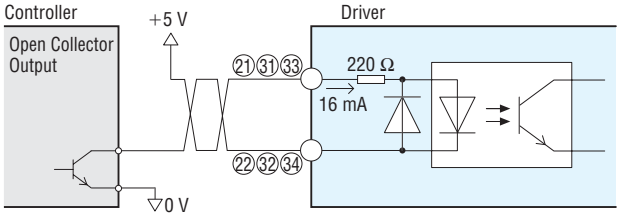
2-Pulse Input Mode



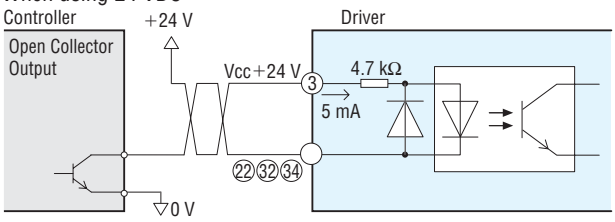
All Windings OFF (C.OFF) Input Signal
Resolution Select (×10) Input Signal
Alarm Clear (ACL) Input Signal

◇Input Circuit and Sample Connection

When using 5 VDC

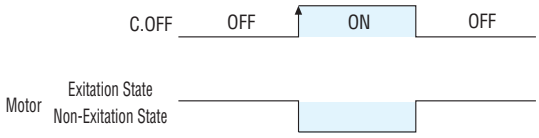


When using 24 VDC



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

This controller power source 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 source 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 source 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 protection circuit has been activated.

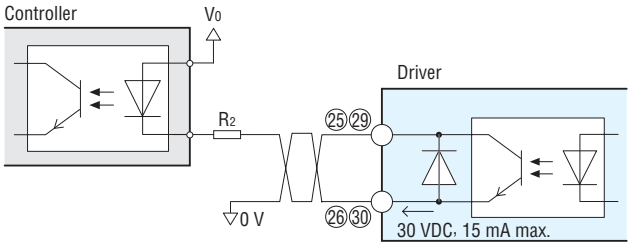
Note:

●The following alarm cannot be cleared. To cancel the alarm, first resolve the cause and check for safety, and then turn power on again.
· Overcurrent · EEPROM data error · System error

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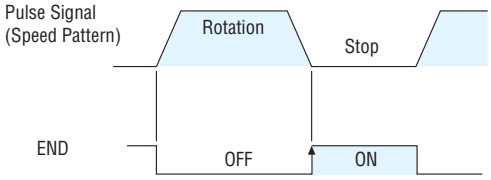
Position Completion (END) Output Signal
Alarm (ALARM) Output Signal

◇Output Circuit and Sample Connection



◇Position Completion (END) Output Signal
Pin No.㉙, ㉚

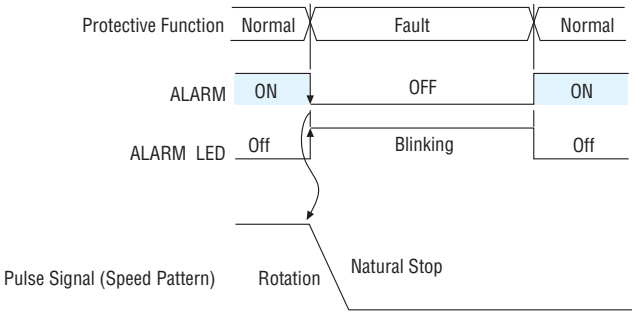
Circuit for use with 30 VDC, 15 mA maximum.
This signal is output at the photocoupler ON state when positioning is completed. This signal is output when the rotor position is less than ±1.8˚ from the command position, approximately 2 ms after the pulse input stops.



Note:
- The END signal flashes 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 protection circuits has been activated. When an abnormality such as an overload or over current is detected, the alarm signal will output, the ALARM indicator 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 10 seconds before turning it on again.

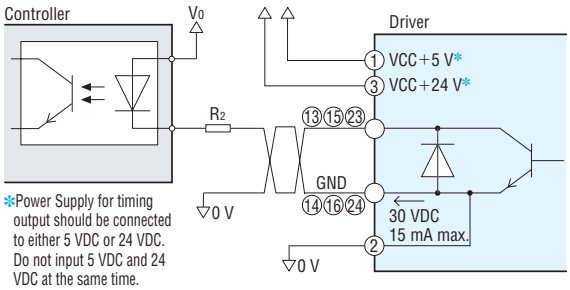


Notes:
- The alarm output uses positive logic (Normally Closed), all other outputs use negative logic (Normally Open).
- The ALARM indicator lights (not blinks) when system error protective function has been activated.

Excitation Timing Signal (TIM.) Output Signal
Quadrature (ASG1/BSG1, ASG2/BSG2) Output Signal

◇Output Circuit and Sample Connection

Open-Collector Output

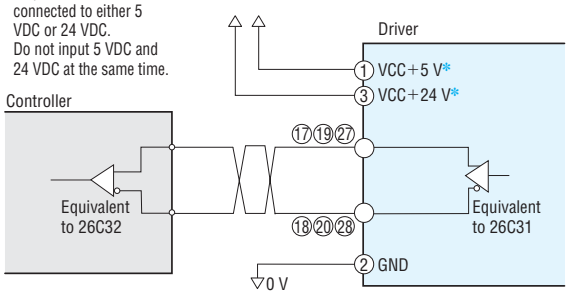


*Power Supply for timing output should be connected to either 5 VDC or 24 VDC. Do not input 5 VDC and 24 VDC at the same time.

Circuits for use with 30 VDC, 15 mA maximum.

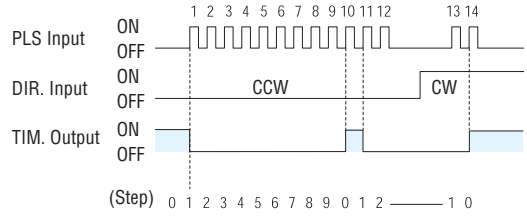
Line Driver Output

*Power Supply for timing output should be connected to either 5 VDC or 24 VDC. Do not input 5 VDC and 24 VDC at the same time.



◇Excitation Timing Signal (TIM.) Output Signal
Pin No.㉓, ㉔, ㉗, ㉘

When the Excitation Timing signal is output, the transistor turns ON (For the line driver output which is TIM.2, the output signal is ON). This signal can be used to detect the home position with greater precision. This signal is output 50 times per motor shaft revolution.



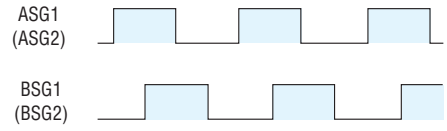
Notes:
- A precise timing signal cannot be obtained when the speed of the pulse input frequency is over 500 Hz.
- When the Timing Signal Output is used, 5 VDC or 24 VDC power supply is necessary.

◇Quadrature (ASG1/BSG1, ASG2/BSG2) Output Signal
Pin No.⑬～⑳

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 revolution (1000).] The phase difference between A and B is 90˚ electrical.

Notes:
- The pulse output accuracy is, regardless of resolution, within ±0.36˚ (repetition accuracy: within ±0.09˚).
- When the "quadrature" signal output is used, 5 VDC or 24 VDC power supply is necessary. These signals are only for position verification when the motor has stopped. There is a 1 ms (maximum) time lag between real rotor motion and the output signals.

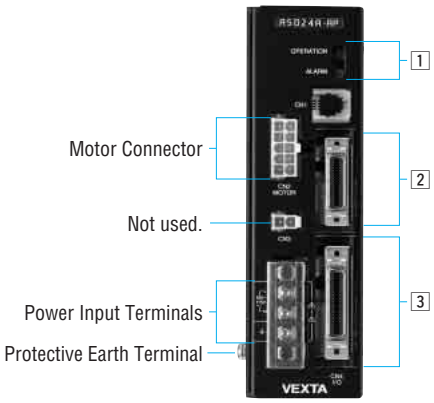
◇Pulse Waveform Characteristics



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Connection and Operation (Built-In Controller Package)

Names and Functions of Driver Parts



1 Signal Monitor Display

◇LED Indicators

Indication	Color	Function	When Activated
OPERATION	Green	Power supply indication	Lights when AC power is on.
ALARM	Red	Alarm Indication	Blinks when protective functions are activated.

◇Alarm

Blink Count	Protective Function	When Activated	Alarm Code Output	Operation	Reset
1	Stack overflow	Too many nested LOOP, ENDL, CALL, etc.	90h (Decimal: 144)	The program stops. The motor performs stop operation set by MSTOPACT.	✻ Possible
	Memory read error	The data stored in the memory is damaged.	91h (Decimal: 145)		
	Program reference error	The called program does not exist.	94h (Decimal: 148)		
	Compilation error	The executed program is not executable.	95h (Decimal: 149)		
	Operation result overflow	The operation result exceeds the range of −8 388 608 to +8 388 607.	98h (Decimal: 152)		
	Parameter out-of-range error	The parameter exceeds its setting range.	99h (Decimal: 153)		
	Divide by zero	Divide by zero was executed.	9Ah (Decimal: 154)		
	General I/O definition error	The signal assignment method for general I/O ports was not correct.	9Ch (Decimal: 156)		
	PC command execution error	A PC command was executed while the motor was operating or not energized.	9Dh (Decimal: 157)		
2	Overheat protection	The temperature of the heat sink in the driver has reached approx. 85˚C (185˚F).	21h (Decimal: 33)	The motor loses it's holding torque.	✻ Possible
	Overload protection	A load exceeding the maximum torque was applied to the motor for the duration set by the OLTIME command.	30h (Decimal: 48)		
	Overspeed error	The speed of the motor's output shaft has exceeded 5000 r/min.	31h (Decimal: 49)		
3	Overvoltage protection	The driver's primary inverter voltage has exceeded the limit of tolerance.	22h (Decimal: 34)	The motor loses it's holding torque.	✻ Possible
4	Excessive position deviation	The position of the motor's output shaft has deviated from the position specified by the operation command, by at least the number of revolutions set by the OVERFLOW command.	10h (Decimal: 16)	The motor loses it's holding torque.	✻ Possible
5	Overcurrent protection	An excessive current has flowed into the power element of the driver's inverter section.	20h (Decimal: 32)	The motor loses it's holding torque.	✻ Impossible
6	Emergency stop	An E-STOP signal has been input.	68h (Decimal: 104)	The program stops. The motor loses it's holding torque (ESTOPACT = 0).	✻ Possible
7	Incorrect limit-sensor logic	Both the +LS and −LS are ON simultaneously.	60h (Decimal: 96)	The motor stops immediately.	✻ Possible
	Reverse limit-sensor connection	The +LS and −LS are connected in reverse.	61h (Decimal: 97)		
	Mechanical home seeking error	Mechanical home seeking could not be executed correctly.	62h (Decimal: 98)		
	Overtravel	The motor has exceeded its hardware limit.	66h (Decimal: 102)	The program stops. The motor stops immediately (ESTOPACT= 1).	
	Software overtravel	The motor has exceeded its software limit.	67h (Decimal: 103)	Decelerates to a stop.	
	Emergency stop	An E-STOP signal has been input.	68h (Decimal: 104)	The motor stops immediately.	
	Invalid operation data	An inoperable operation pattern has been started.	70h (Decimal: 112)	Motion is stopped.	
8	Resolver sensor error	The motor cable has not been connected or a motor's error has occurred in a sensor.	42h (Decimal: 66)	The motor loses it's holding torque.	✻ Impossible
	Initial rotor revolution error	The driver's power was turned on while the motor's output shaft was turning by external force.	43h (Decimal: 67)		
9	NVRAM error	Motor control parameters has been damaged.	41h (Decimal: 65)	The motor loses it's holding torque.	✻ Impossible
Stays ON.	System error	Driver failure has occurred.	F0h (Decimal: 240)	The motor loses it's holding torque.	✻ Impossible

✻Possible - The Alarm can be cleared with the ALMCLR command or an ACL input.
Impossible - The AC power must be cycled to clear these alarms.

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2 Limit Sensor Input Communication Signals (CN5)

Connector	Pin No.	Input/Output	Signal	Signal Name
CN5	1	Input	COM1	Power source for input signals
	2		COM2	Power source for input signals
	3	—	—	No Connection
	4	—	—	No Connection
	5	Output	TX	RS-232C Transmit
	6	—	—	No Connection
	7	Input	RX	RS-232C Receive
	8	—	—	No Connection
	9	—	—	No Connection
	10	Input	N24	External power supply terminal (GND)
	11	Input	COM1	Power source for input signals
	12		COM2	Power source for input signals
	13		+LS	+LS limit sensor
	14		−LS	−LS limit sensor
	15		HOMELS	HOME sensor
	16		SENSOR	Sensor
	17		—	No connection
	18		—	No connection
	19		COM1	Power source for input signals
	20		COM2	Power source for input signals

3 I/O Signals (CN4)

Connector	Pin No.	Input/Output	Signal	Signal Name
CN4	1	Input	P24	Power source for RS-232C, ASG and BSG (24 VDC)
	2		N24	Power source for RS-232C, ASG and BSG (GND)
	3	Output	Y0	General output*1 (Y0 to Y3)
	4		$\overline{Y0}$	
	5		Y1	
	6		$\overline{Y1}$	
	7		Y2	
	8		$\overline{Y2}$	
	9		Y3	
	10		$\overline{Y3}$	
	11		ASG	Phase A pulse output (Line driver output)
	12		$\overline{ASG}$	
	13		BSG	Phase B pulse output (Line driver output)
	14		$\overline{BSG}$	
	15	Input	START	START
	16		E-STOP	Emergency stop
	17		COM1	Power source for input signal
	18			
	19	Output	Y4	General output*1 (Y4 to Y7)
	20		$\overline{Y4}$	
	21		Y5	
	22		$\overline{Y5}$	
	23		Y6	
	24		$\overline{Y6}$	
	25		Y7	
	26		$\overline{Y7}$	
	27		ALM	Alarm
	28		ALM	
	29	Input	X0	General input*2 (X0 to X7)
	30		X1	
	31		X2	
	32		X3	
	33		X4	
	34		X5	
	35		X6	
	36		X7	

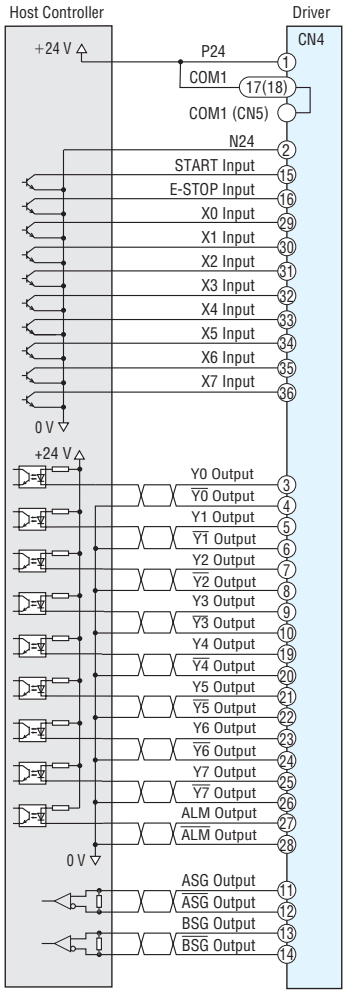
*1 The following signals can be assigned arbitrarily via program settings. Additionally, the output logic of each signal can be switched. END output, RUN output, MOVE output, HOME-P output, TIM output, MBC output

*2 The following signals can be assigned arbitrarily via program settings. Additionally, the input logic of each signal can be switched. ACL input, PAUSE input, MSTOP input, RESTART input

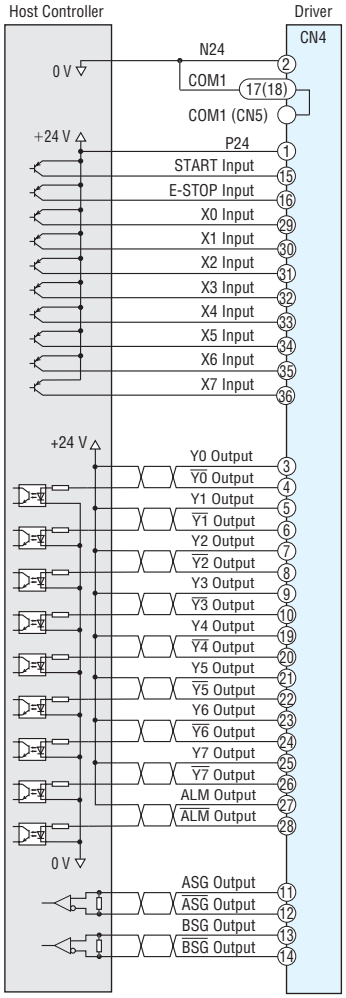
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●Connection Diagrams

● Current Source Input and Current Sink Output



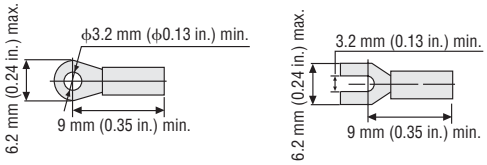
● Current Sink Input and Current Source Output



◇Notes on Wiring

- Use input signals at 24 VDC±10%.
- Use output signals at 30 VDC or below and at 4 to 8 mA.
- Use a shielded cable with a wire of a size ranging between AWG24 and AWG22 for the driver signal cable (I/O signals, limit sensors signals), and keep it as short as possible.
- Keep the control input/output signal line at least 300 mm (1 ft.) away from power lines (e.g. lines carrying large current, such as AC lines and motor lines). Also, do not run these lines through the same ducts or pipes as power lines.
- Always use the optional cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.
- Use the following cable for the power line:
  Single-phase 200 to 230 VAC: 3-core cable (AWG18 or thicker)
  Provide a minimum distance of 300 mm (1 ft.) between the control I/O signal line and power lines (AC lines, motor lines and other large-current circuits).
- Do not guide the control I/O signal line in the same duct as power lines or bundle it with power lines.
- The power cable and control I/O signal cable are not supplied with the package and must be provided separately by the user.
  To ground the driver, lead the ground conductor from the protective ground terminal (M4) and connect the ground conductor to a cable of AWG18 or thicker to provide single-point grounding.

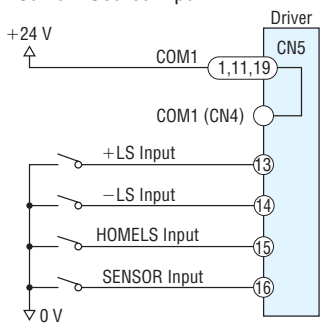
◇Recommended Crimp Terminals



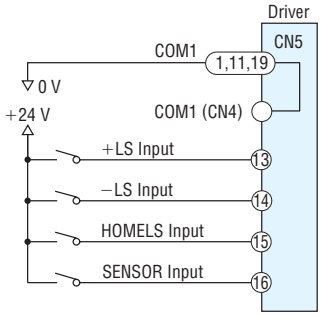
- Crimp terminals are not provided with the package. They must be furnished separately.

◇Limit Sensor (CN5)

● Current Source Input

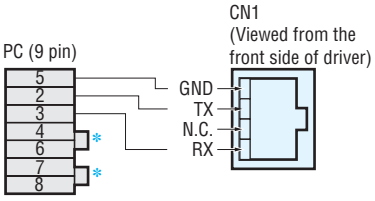


● Current Sink Input



◇Connecting the Driver with a Personal Computer (CN1)

●Pin Assignments and Connecting



✻Short pins 4 and 6 together, as well as pins 7 and 8 together.

●Communication Specifications

Item	Description
Electrical characteristics	In conformance with RS-232C.
Transmission method	Start-stop asynchronous method, NRZ (non-return to Zero), full-duplex
Data length	8 bits, 1 stop bit, no parity
Transmission speed	9600 bps
Protocol	TTY (CR+LF)
Connector specification	Modular (4 lines, 4 pins)

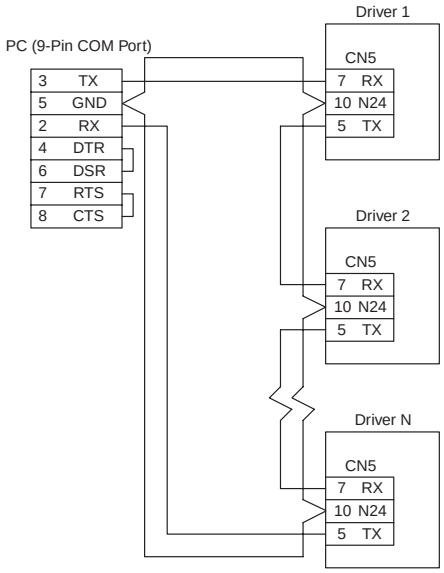
Notes:

- Confirm that 24 VDC is supplied to the driver's external power supply input terminals (P24 and N24).
- Use the RS-232C signal lines over the shortest possible distance. It is recommended that the signal lines be shielded to protect them from noise interference.
- The maximum distance between drivers when using a daisy chain connection should be 15 m (49.2 ft.).

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●Description of Daisy-Chain Connection

Use the RS-232C communication pins (TX, RX and N24) of the sensor connector (CN5) when connecting two or more drivers via a daisy chain (up to 36 drivers).



◇TX, RX

These communication terminals are used when implementing daisy-chain connections.

Notes:

- Confirm that each driver is supplied 24 VDC±10% (P24 and N24) of CN4 from outside for communication.
- Wire the RS-232C signal lines over the shortest possible distance. It is recommended that the signal lines be shielded to protect them from noise interference.
- The maximum distance between drivers when using a daisy-chain connection should be 15 m (49.2 ft.).
- Do not use the RS-232C communication port (CN1).

■Connecting the Electromagnetic Brake to Power Supply

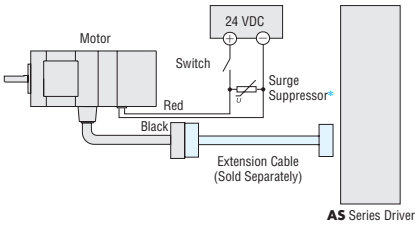
Connect the electromagnetic brake to the power supply using a cable with a conductor cross-sectional area of at least AWG24. The power supply input to the electromagnetic brake is 24 VDC ±5% 0.3 A minimum (**AS46**: 0.1 A minimum) and therefore must be independent of the driver's power supply for signal control.

Notes:

- Applying a voltage that exceeds the specifications will cause the electromagnetic brake to generate a great amount 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 (Included).*
  (*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 lead wire of **AS** Series to the DC power supply. If polarity is incorrect, the electromagnetic brake will not operate.
- When using as a CE certified part, use a dedicated DC power supply for electromagnetic brake.

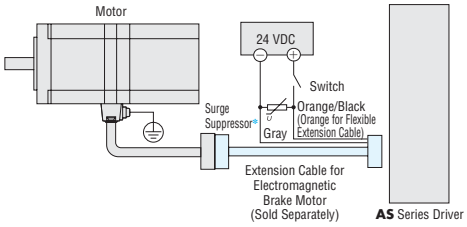
(1) AS46

The electromagnetic brake wire is 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).



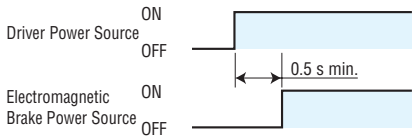
(2) AS66, AS69, AS98

The electromagnetic brake wire is 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).



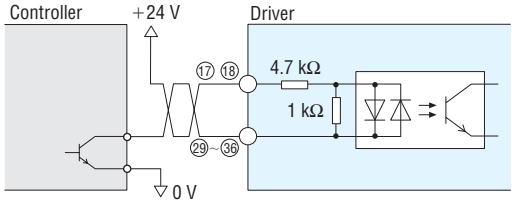
Timing Chart for Electromagnetic Brake Operation

To release the electromagnetic brake, wait at least 0.5 seconds after turning on the driver power source.
The load may fall down due to a loss of holding torque.



●Description of Input Signals (CN4)

◇Input Circuit and Sample Connection



Note:
●Use input signals at 24 VDC±10%.

◇P24 Input, N24 Input

These inputs are for the external power supply required for the RS-232C communication, ASG and BSG outputs. Make sure to use a power supply of at least 24 VDC±10%, 0.05 A.
If the same power supply is going to be used for the RS-232C, ASG, BSG and other external I/O, make sure to use a power supply of at least 24 VDC±10%, 0.2 A.

◇START Input

This signal starts the program named "STARTUP."
OFF→ON edge to start "STARTUP" program.

◇E-STOP Input

This signal is used to forcibly stop the operation.
Set the stopping method using the ESTOPACT command.
Additionally, the input logic can be changed using the ESTOPLV command. (The factory setting of this command is normally open.)
OFF→ON edge to stop operation.

◇COM1 Input

This is an external power-source terminal for input signals.
This signal is internally connected to terminals COM1 of CN5.

◇X0 to X7 Inputs

The X0 thorough X7 inputs can be used as input ports for general signals. The status of each port can be read using an IN command or INx command.
The general signals assignable to the X0 through X7 inputs are listed below. Use a corresponding command to assign signal.

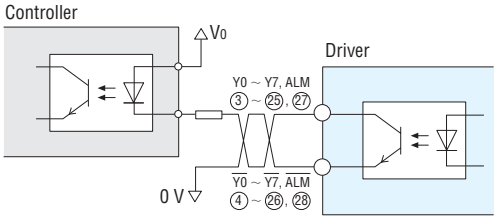
ACL input ..... INACL command
PAUSE input..... INPAUSE command
MSTOP input..... INMSTOP command
RESTART input... INRESTART command

◇ACL Input

This signal is used to reset the alarm that has been generated by the driver's protective function.
Input an ACL signal once after removing the cause that has triggered the protective function.

●Description of Output Signals (CN4)

◇Output Circuit and Sample Connection



Note:
●Use output signals at 30 VDC or below and at 4 to 8 mA.

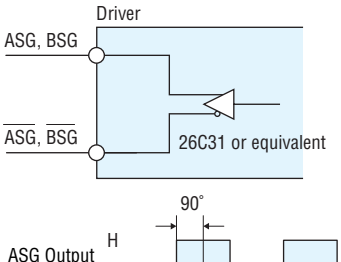
◇Y0 to Y7 Output

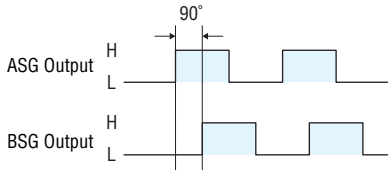
The Y0 through Y7 outputs can be used as output ports for general signals. The status of each port can be read using an OUT command or OUTx command.
The general signals assignable to the Y0 through Y7 outputs are listed below. Use the corresponding command to assign each signal.

END output ..... OUTEND command
RUN output ..... OUTRUN command
MOVE output..... OUTMOVE command
HOME-P output..... OUTHOMEP command
TIM output..... OUTTIM command
MBC output..... OUTMBC command

◇ASG Output, BSG Output

● Line driver output (26C31 or equivalent)





To monitor the motor position, connect these signals to a counter, etc. The pulse resolution is the same as the motor resolution at the time of power-on.
The ASG output and BSG output have a phase difference of 90 degrees electrical.
Pulse output is subject to a maximum delay of 1 ms relative to the motor's motion. Use the ASG output and BSG output to check the stopping position.

◇ALM Output

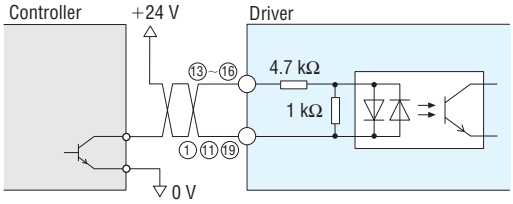
This signal is output when an alarm is generated by the driver's protective function.
The reason for triggering of the protective function can be identified through the blink count of the alarm LED, or ALM command.
To reset the ALM output, remove the cause of the alarm and then perform one of the following procedures after ensuring safety:

●Assign INACL then turn the ACL input to ON.
●Enter an ALMCLR command.
●Turn off the AC power, wait at least 10 seconds, then turn it back on.

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●Description of Limit Sensors (CN5)

◇Input Circuit and Sample Connection



Note:

●Use input signals at 24 VDC±10%.

◇COM1 Input

This is a power-source input terminal for limit-sensor signals. The power-source voltage must be 24 VDC±10%.
This signal is internally connected to terminals COM1 of CN4.

◇COM2 Input

This is a power-source input terminal for limit-sensor signals.
Use it when sharing the input signal power source among two or more drivers.

◇+LS Input, −LS Input

These signals are input from +LS and −LS.
The input logic can be changed using the OTLV command. (The factory setting of this command is normally open.) Input logic for the +LS input and −LS input cannot be set separately.

Continuous Operation and Positioning Operation

When a +LS or −LS is detected, the driver's protective function (over travel) is activated. As a result, the ALM output is turned OFF and the motor stops.
Set the stopping method using the OTACT command.
To pull out of +LS or −LS, cancel the protective function by inputting an ACL signal once or by using the ALMCLR command.
Then perform mechanical home seeking routine or operate the motor in the direction opposite that of the limit sensor during continuous operation.

Mechanical Home Seeking Routine

When a +LS or −LS is detected, the motor operates in the direction opposite that of the detected limit.

◇HOMELS Input

This signal is input from HOMELS.
Connect the HOMELS when mechanical home seeking is performed in 3-sensor mode.
When mechanical home seeking is performed in 3-sensor mode, the HOMELS becomes the mechanical home. The input logic can be changed using the HOMELV command. (The factory setting of this command is normally open.)

◇SENSOR Input

This signal is input from SENSOR.
The input logic can be changed using the SENSORLV command. (The factory setting of this command is normally open.)

Mechanical Home Seeking Routine

This input is used when detecting the mechanical home at a specific point on the motor's output shaft or load shaft using a slotted disc, etc. The accuracy of mechanical home hunting increases if this input is used in conjunction with the TIM. signal.

Continuous Operation

The motor can be stopped forcibly upon the detection of SENSOR.
Set the stopping method using the SENSORACT command.

Note:

●If the SENSOR input is used in mechanical home hunting, it cannot be used during continuous operation.

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List of Motor and Driver Combinations

Model names for motor and driver combinations are shown below.

Power Supply Voltage	Type	Pulse Input Package			Built-In Controller Package		
		Package Model	Motor Model	Driver Model	Package Model	Motor Model	Driver Model
Single-Phase 100-115 VAC Input	Standard Type	**AS46□A**	ASM46□A	ASD13A-A	**AS46□AP**	ASM46□A	ASD13A-AP
		AS66□AE	ASM66□AE	ASD24A-A	**AS66□AEP**	ASM66□AE	ASD24A-AP
		AS69□AE	ASM69□AE	ASD30D-A	**AS69□AEP**	ASM69□AE	ASD30D-AP
		AS98□AE	ASM98□AE	ASD30A-A	**AS98□AEP**	ASM98□AE	ASD30A-AP
		AS911AAE	ASM911AAE	ASD30E-A	**AS911AAEP**	ASM911AAE	ASD30E-AP
	Standard Type IP65 Rated Motor	**AS66AAT**	ASM66AAT	ASD24A-A	**AS66AATP**	ASM66AAT	ASD24A-AP
		AS69AAT	ASM69AAT	ASD30D-A	**AS69AATP**	ASM69AAT	ASD30D-AP
		AS98AAT	ASM98AAT	ASD30A-A	**AS98AATP**	ASM98AAT	ASD30A-AP
		AS911AAT	ASM911AAT	ASD30E-A	**AS911AATP**	ASM911AAT	ASD30E-AP
	TH Geared Type	**AS46□A-T3.6**	ASM46□A-T3.6	ASD13B-A	**AS46□AP-T3.6**	ASM46□A-T3.6	ASD13B-AP
		AS46□A-T7.2	ASM46□A-T7.2		**AS46□AP-T7.2**	ASM46□A-T7.2	
		AS46□A-T10	ASM46□A-T10		**AS46□AP-T10**	ASM46□A-T10	
		AS46□A-T20	ASM46□A-T20	ASD13C-A	**AS46□AP-T20**	ASM46□A-T20	ASD13C-AP
		AS46□A-T30	ASM46□A-T30		**AS46□AP-T30**	ASM46□A-T30	
		AS66□AE-T3.6	ASM66□AE-T3.6	ASD24B-A	**AS66□AEP-T3.6**	ASM66□AE-T3.6	ASD24B-AP
		AS66□AE-T7.2	ASM66□AE-T7.2		**AS66□AEP-T7.2**	ASM66□AE-T7.2	
		AS66□AE-T10	ASM66□AE-T10		**AS66□AEP-T10**	ASM66□AE-T10	
		AS66□AE-T20	ASM66□AE-T20	ASD24C-A	**AS66□AEP-T20**	ASM66□AE-T20	ASD24C-AP
		AS66□AE-T30	ASM66□AE-T30		**AS66□AEP-T30**	ASM66□AE-T30	
		AS98□AE-T3.6	ASM98□AE-T3.6	ASD30A-A	**AS98□AEP-T3.6**	ASM98□AE-T3.6	ASD30A-AP
		AS98□AE-T7.2	ASM98□AE-T7.2		**AS98□AEP-T7.2**	ASM98□AE-T7.2	
		AS98□AE-T10	ASM98□AE-T10		**AS98□AEP-T10**	ASM98□AE-T10	
		AS98□AE-T20	ASM98□AE-T20	ASD30C-A	**AS98□AEP-T20**	ASM98□AE-T20	ASD30C-AP
		AS98□AE-T30	ASM98□AE-T30		**AS98□AEP-T30**	ASM98□AE-T30	
	PN Geared Type	**AS46□A-N7.2**	ASM46□A-N7.2	ASD13A-A	**AS46□AP-N7.2**	ASM46□A-N7.2	ASD13A-AP
		AS46□A-N10	ASM46□A-N10		**AS46□AP-N10**	ASM46□A-N10	
		AS66□AE-N5	ASM66□AE-N5	ASD24A-A	**AS66□AEP-N5**	ASM66□AE-N5	ASD24A-AP
		AS66□AE-N7.2	ASM66□AE-N7.2		**AS66□AEP-N7.2**	ASM66□AE-N7.2	
		AS66□AE-N10	ASM66□AE-N10		**AS66□AEP-N10**	ASM66□AE-N10	
		AS66□AE-N25	ASM66□AE-N25	ASD24B-A	**AS66□AEP-N25**	ASM66□AE-N25	ASD24B-AP
		AS66□AE-N36	ASM66□AE-N36	ASD24C-A	**AS66□AEP-N36**	ASM66□AE-N36	ASD24C-AP
		AS66□AE-N50	ASM66□AE-N50		**AS66□AEP-N50**	ASM66□AE-N50	
		AS98□AE-N5	ASM98□AE-N5	ASD30A-A	**AS98□AEP-N5**	ASM98□AE-N5	ASD30A-AP
		AS98□AE-N7.2	ASM98□AE-N7.2		**AS98□AEP-N7.2**	ASM98□AE-N7.2	
		AS98□AE-N10	ASM98□AE-N10		**AS98□AEP-N10**	ASM98□AE-N10	
		AS98□AE-N25	ASM98□AE-N25		**AS98□AEP-N25**	ASM98□AE-N25	
		AS98□AE-N36	ASM98□AE-N36		**AS98□AEP-N36**	ASM98□AE-N36	
		AS98□AE-N50	ASM98□AE-N50	ASD30B-A	**AS98□AEP-N50**	ASM98□AE-N50	ASD30B-AP
	Harmonic Geared Type	**AS46□A2-H50**	ASM46□A2-H50	ASD13A-A	**AS46□AP2-H50**	ASM46□A2-H50	ASD13A-AP
		AS46□A2-H100	ASM46□A2-H100		**AS46□AP2-H100**	ASM46□A2-H100	
		AS66□AE-H50	ASM66□AE-H50	ASD24B-A	**AS66□AEP-H50**	ASM66□AE-H50	ASD24B-AP
		AS66□AE-H100	ASM66□AE-H100	ASD24C-A	**AS66□AEP-H100**	ASM66□AE-H100	ASD24C-AP
		AS98□AE-H50	ASM98□AE-H50	ASD30B-A	**AS98□AEP-H50**	ASM98□AE-H50	ASD30B-AP
		AS98□AE-H100	ASM98□AE-H100		**AS98□AEP-H100**	ASM98□AE-H100	
Single-Phase 200-230 VAC Input	Standard Type	**AS66□CE**	ASM66□CE	ASD12A-C	**AS66□CEP**	ASM66□CE	ASD12A-CP
		AS69□CE	ASM69□CE	ASD16D-C	**AS69□CEP**	ASM69□CE	ASD16D-CP
		AS98□CE	ASM98□CE	ASD16A-C	**AS98□CEP**	ASM98□CE	ASD16A-CP
		AS911ACE	ASM911ACE	ASD20A-C	**AS911ACEP**	ASM911ACE	ASD20A-CP
	Standard Type IP65 Rated Motor	**AS66ACT**	ASM66ACT	ASD12A-C	**AS66ACTP**	ASM66ACT	ASD12A-CP
		AS69ACT	ASM69ACT	ASD16D-C	**AS69ACTP**	ASM69ACT	ASD16D-CP
		AS98ACT	ASM98ACT	ASD16A-C	**AS98ACTP**	ASM98ACT	ASD16A-CP
		AS911ACT	ASM911ACT	ASD20A-C	**AS911ACTP**	ASM911ACT	ASD20A-CP
	TH Geared Type	**AS66□CE-T3.6**	ASM66□CE-T3.6	ASD12B-C	**AS66□CEP-T3.6**	ASM66□CE-T3.6	ASD12B-CP
		AS66□CE-T7.2	ASM66□CE-T7.2		**AS66□CEP-T7.2**	ASM66□CE-T7.2	
		AS66□CE-T10	ASM66□CE-T10		**AS66□CEP-T10**	ASM66□CE-T10	
		AS66□CE-T20	ASM66□CE-T20	ASD12C-C	**AS66□CEP-T20**	ASM66□CE-T20	ASD12C-CP
		AS66□CE-T30	ASM66□CE-T30		**AS66□CEP-T30**	ASM66□CE-T30	

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

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Power Supply Voltage	Type	Pulse Input Package			Built-In Controller Package		
		Package Model	Motor Model	Driver Model	Package Model	Motor Model	Driver Model
Single-Phase 200-230 VAC Input	**TH** Geared Type	**AS98□CE-T3.6**	ASM98□CE-T3.6	ASD16A-C	**AS98□CEP-T3.6**	ASM98□CE-T3.6	ASD16A-CP
		AS98□CE-T7.2	ASM98□CE-T7.2		**AS98□CEP-T7.2**	ASM98□CE-T7.2	
		AS98□CE-T10	ASM98□CE-T10		**AS98□CEP-T10**	ASM98□CE-T10	
		AS98□CE-T20	ASM98□CE-T20	ASD16C-C	**AS98□CEP-T20**	ASM98□CE-T20	ASD16C-CP
		AS98□CE-T30	ASM98□CE-T30		**AS98□CEP-T30**	ASM98□CE-T30	
	PN Geared Type	**AS66□CE-N5**	ASM66□CE-N5	ASD12A-C	**AS66□CEP-N5**	ASM66□CE-N5	ASD12A-CP
		AS66□CE-N7.2	ASM66□CE-N7.2		**AS66□CEP-N7.2**	ASM66□CE-N7.2	
		AS66□CE-N10	ASM66□CE-N10		**AS66□CEP-N10**	ASM66□CE-N10	
		AS66□CE-N25	ASM66□CE-N25	ASD12B-C	**AS66□CEP-N25**	ASM66□CE-N25	ASD12B-CP
		AS66□CE-N36	ASM66□CE-N36	ASD12C-C	**AS66□CEP-N36**	ASM66□CE-N36	ASD12C-CP
		AS66□CE-N50	ASM66□CE-N50		**AS66□CEP-N50**	ASM66□CE-N50	
		AS98□CE-N5	ASM98□CE-N5	ASD16A-C	**AS98□CEP-N5**	ASM98□CE-N5	ASD16A-CP
		AS98□CE-N7.2	ASM98□CE-N7.2		**AS98□CEP-N7.2**	ASM98□CE-N7.2	
		AS98□CE-N10	ASM98□CE-N10		**AS98□CEP-N10**	ASM98□CE-N10	
		AS98□CE-N25	ASM98□CE-N25		**AS98□CEP-N25**	ASM98□CE-N25	
		AS98□CE-N36	ASM98□CE-N36		**AS98□CEP-N36**	ASM98□CE-N36	
		AS98□CE-N50	ASM98□CE-N50	ASD16B-C	**AS98□CEP-N50**	ASM98□CE-N50	ASD16B-CP
	Harmonic Geared Type	**AS66□CE-H50**	ASM66□CE-H50	ASD12B-C	**AS66□CEP-H50**	ASM66□CE-H50	ASD12B-CP
		AS66□CE-H100	ASM66□CE-H100	ASD12C-C	**AS66□CEP-H100**	ASM66□CE-H100	ASD12C-CP
		AS98□CE-H50	ASM98□CE-H50	ASD16B-C	**AS98□CEP-H50**	ASM98□CE-H50	ASD16B-CP
		AS98□CE-H100	ASM98□CE-H100		**AS98□CEP-H100**	ASM98□CE-H100	
Three-Phase 200-230 VAC Input	Standard Type	**AS66□SE**	ASM66□CE	ASD12A-S	**AS66□SEP**	ASM66□CE	ASD12A-SP
		AS69□SE	ASM69□CE	ASD16D-S	**AS69□SEP**	ASM69□CE	ASD16D-SP
		AS98□SE	ASM98□CE	ASD16A-S	**AS98□SEP**	ASM98□CE	ASD16A-SP
		AS911ASE	ASM911ACE	ASD20A-S	**AS911ASEP**	ASM911ACE	ASD20A-SP
	Standard Type IP65 Rated Motor	**AS66AST**	ASM66ACT	ASD12A-S	**AS66ASTP**	ASM66ACT	ASD12A-SP
		AS69AST	ASM69ACT	ASD16D-S	**AS69ASTP**	ASM69ACT	ASD16D-SP
		AS98AST	ASM98ACT	ASD16A-S	**AS98ASTP**	ASM98ACT	ASD16A-SP
		AS911AST	ASM911ACT	ASD20A-S	**AS911ASTP**	ASM911ACT	ASD20A-SP
	TH Geared Type	**AS66□SE-T3.6**	ASM66□CE-T3.6	ASD12B-S	**AS66□SEP-T3.6**	ASM66□CE-T3.6	ASD12B-SP
		AS66□SE-T7.2	ASM66□CE-T7.2		**AS66□SEP-T7.2**	ASM66□CE-T7.2	
		AS66□SE-T10	ASM66□CE-T10		**AS66□SEP-T10**	ASM66□CE-T10	
		AS66□SE-T20	ASM66□CE-T20	ASD12C-S	**AS66□SEP-T20**	ASM66□CE-T20	ASD12C-SP
		AS66□SE-T30	ASM66□CE-T30		**AS66□SEP-T30**	ASM66□CE-T30	
		AS98□SE-T3.6	ASM98□CE-T3.6	ASD16A-S	**AS98□SEP-T3.6**	ASM98□CE-T3.6	ASD16A-SP
		AS98□SE-T7.2	ASM98□CE-T7.2		**AS98□SEP-T7.2**	ASM98□CE-T7.2	
		AS98□SE-T10	ASM98□CE-T10		**AS98□SEP-T10**	ASM98□CE-T10	
		AS98□SE-T20	ASM98□CE-T20	ASD16C-S	**AS98□SEP-T20**	ASM98□CE-T20	ASD16C-SP
		AS98□SE-T30	ASM98□CE-T30		**AS98□SEP-T30**	ASM98□CE-T30	
	PN Geared Type	**AS66□SE-N5**	ASM66□CE-N5	ASD12A-S	**AS66□SEP-N5**	ASM66□CE-N5	ASD12A-SP
		AS66□SE-N7.2	ASM66□CE-N7.2		**AS66□SEP-N7.2**	ASM66□CE-N7.2	
		AS66□SE-N10	ASM66□CE-N10		**AS66□SEP-N10**	ASM66□CE-N10	
		AS66□SE-N25	ASM66□CE-N25	ASD12B-S	**AS66□SEP-N25**	ASM66□CE-N25	ASD12B-SP
		AS66□SE-N36	ASM66□CE-N36	ASD12C-S	**AS66□SEP-N36**	ASM66□CE-N36	ASD12C-SP
		AS66□SE-N50	ASM66□CE-N50		**AS66□SEP-N50**	ASM66□CE-N50	
		AS98□SE-N5	ASM98□CE-N5	ASD16A-S	**AS98□SEP-N5**	ASM98□CE-N5	ASD16A-SP
		AS98□SE-N7.2	ASM98□CE-N7.2		**AS98□SEP-N7.2**	ASM98□CE-N7.2	
		AS98□SE-N10	ASM98□CE-N10		**AS98□SEP-N10**	ASM98□CE-N10	
		AS98□SE-N25	ASM98□CE-N25		**AS98□SEP-N25**	ASM98□CE-N25	
		AS98□SE-N36	ASM98□CE-N36		**AS98□SEP-N36**	ASM98□CE-N36	
		AS98□SE-N50	ASM98□CE-N50	ASD16B-S	**AS98□SEP-N50**	ASM98□CE-N50	ASD16B-SP
	Harmonic Geared Type	**AS66□SE-H50**	ASM66□CE-H50	ASD12B-S	**AS66□SEP-H50**	ASM66□CE-H50	ASD12B-SP
		AS66□SE-H100	ASM66□CE-H100	ASD12C-S	**AS66□SEP-H100**	ASM66□CE-H100	ASD12C-SP
		AS98□SE-H50	ASM98□CE-H50	ASD16B-S	**AS98□SEP-H50**	ASM98□CE-H50	ASD16B-SP
		AS98□SE-H100	ASM98□CE-H100		**AS98□SEP-H100**	ASM98□CE-H100	

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

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RoHS RoHS-Compliant

Closed Loop Stepping Motor and Driver Package

αSTEP ASC Series

The αSTEP is an innovative stepping motor unit that adopts a closed-loop control to eliminate misstep. In the αSTEP, the user friendliness of a stepping motor is combined with a range of new functions for improved reliability of your equipment.



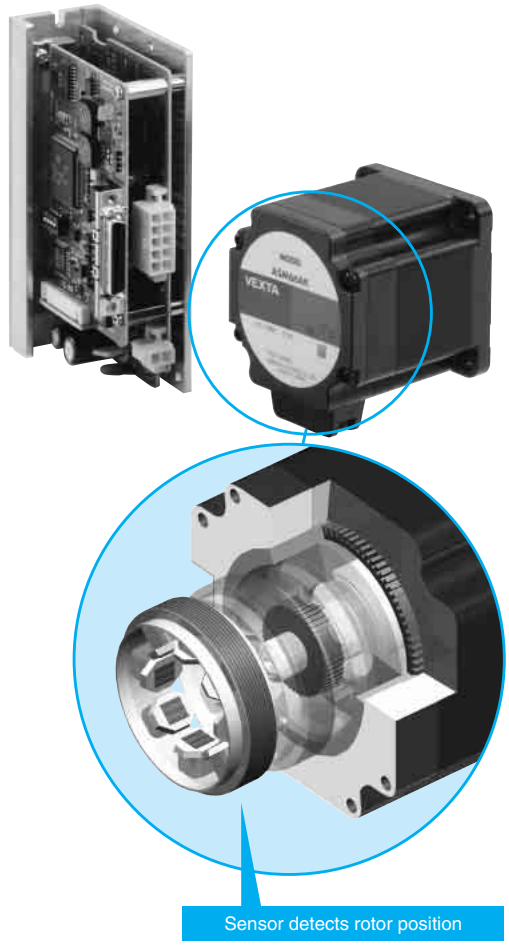
Features

●Thanks to Closed Loop Control, There is No Loss of Synchronism

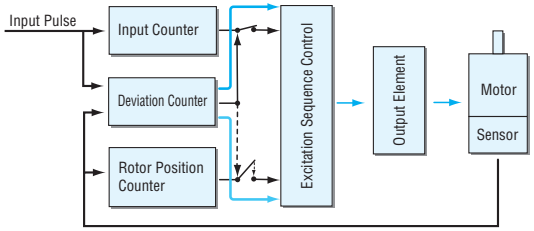
αSTEP does not lose synchronism even when subjected to abrupt load fluctuation or acceleration.

A newly developed rotor position detection sensor constantly monitors the motor movement. If synchronism is about to be lost, closed loop control is used, so there is no need to worry about loss of steps. When the successive overload is given, αSTEP outputs an alarm signal. The reliability of αSTEP is as high as that of a servo motor.

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



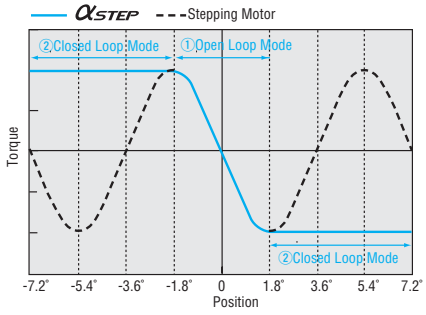
◇αSTEP Control Diagram



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

If Motor Missteps (Positioning Deviation is ±1.8˚ or more)
Control sitches to closed loop mode to prevent loss of synchronism.

◇αSTEP Angle-Torque Characteristics



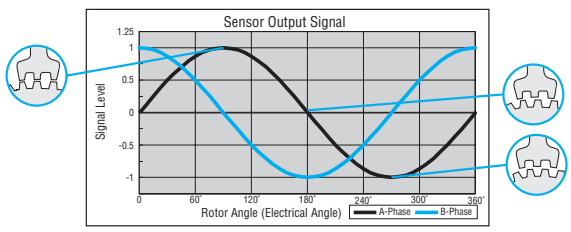
①If the positioning deviation is less than ±1.8˚ the motor runs in open loop mode like a stepping motor.
②If the positioning deviation is ±1.8˚ or more, the motor runs in closed loop mode and the position is corrected by exciting the motor windings to generate maximum torque based on the rotor position.

◇The Newly Developed Sensor to Detect Rotor's Position

The newly developed 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

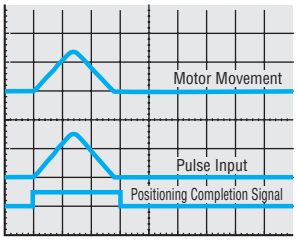
- This structure can be made small and thin, so the overall size of the motor can be reduced.
- High resolution
- This structure does not use electronic parts, so it is not affected by heat or vibration.



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●High Response

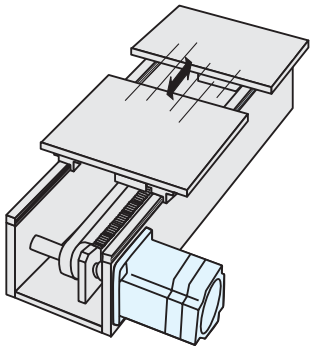
Like conventional stepping motors, αSTEP operates in synchronism with command pulses. This makes possible short stroke positioning in a short time.



Measurement Condition: Feed 1/5 rotation
Load inertia 250×10⁻⁷ kg·m² (J)
(1.365 oz-in²)

●No Gain Tuning

Gain tuning for servo motors is critical, troublesome and time-consuming. Since the αSTEP operates like a stepping motor, there are no gain tuning requirements. Low rigidity applications, such as a belt and pulley system, are ideal for αSTEP.



●The αSTEP Complies with International Safety Standards

The **ASC** Series is recognized with the UL/CSA standards and conforms to EN standard. The CE marking certifies compliance with the EMC Directives.

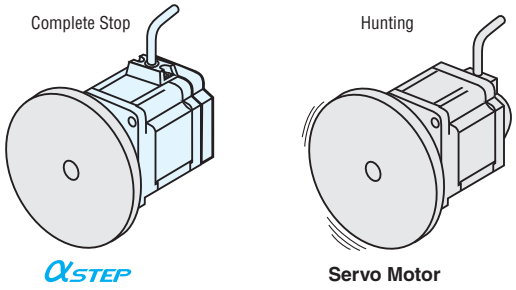
■Safety Standards and CE Marking

Model	Standards	Certification Body	Standards File No.	CE Marking
Motor	UL 60950 CSA C22.2 No.60950	UL	E208200	EMC Directives
Driver	UL 508C CSA C22.2 No.14	UL	E171462	
	UL 1950 CSA C22.2 No.950	UL	E208200	

●When the system is approved under various safety standards, the model names in the motor and driver nameplates are the approved model names.
List of Motor and Driver Combinations ➜ Page 72
●The EMC value changes according to the wiring and layout. Therefore, the final EMC level must be checked with the motor/driver incorporated in the user's equipment.

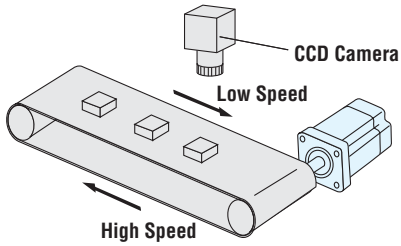
●No Hunting

Since αSTEP is a stepping motor, it has no hunting problem. Therefore, when it stops, its position is completely stable and does not fluctuate. αSTEP is ideal for applications in which vibration would be a problem.



●Low Vibration at Low Speed

The driver employs advanced technology that produces smoothness comparable to a microstepping 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. αSTEP provides resolution as low as 0.036˚ per step without any damping mechanism or other mechanical device.



αSTEP 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

αSTEP 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.

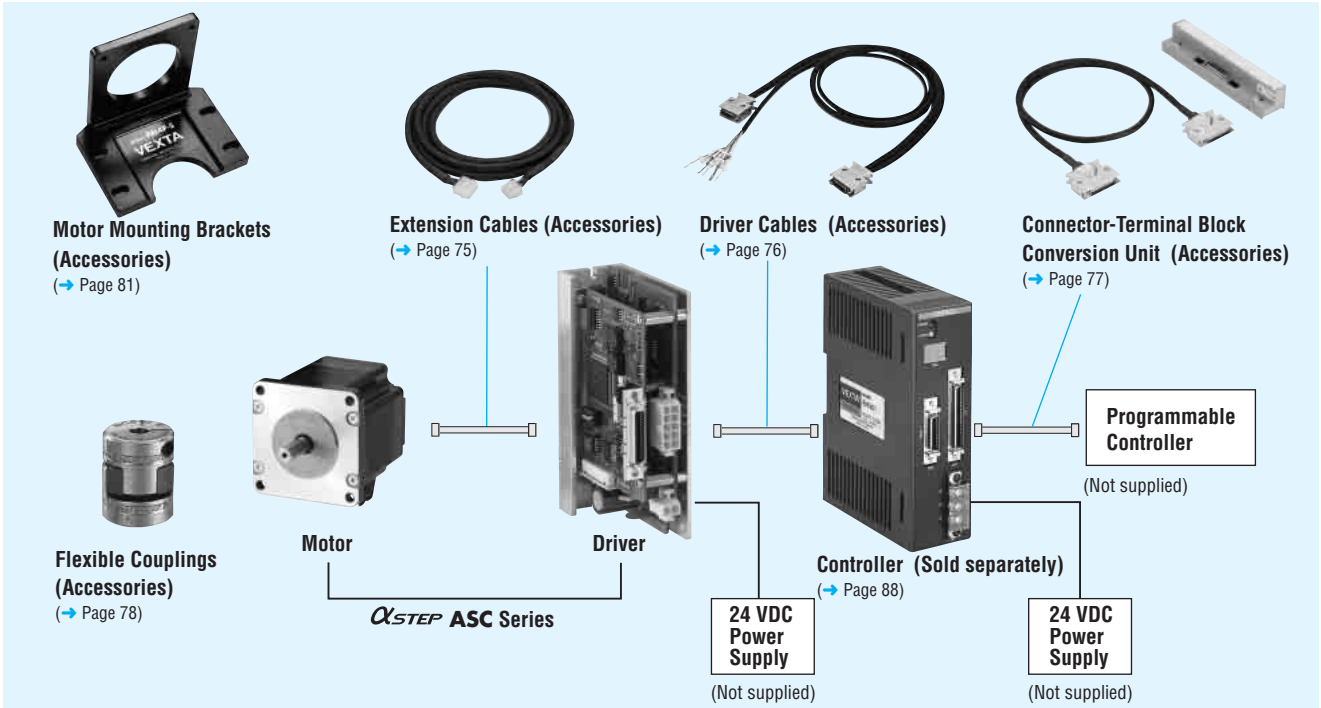
●RoHS RoHS-Compliant

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

RoHS (Restriction of Hazardous Substances) Directive:
Directive on restriction of the use of certain hazardous substances in electrical and electronic equipment (2002/95/EC). The RoHS Directive prohibits the use of six chemical substances in electrical and electronic products sold in the E.U. member countries on or after July 1, 2006. The six controlled substances are: lead, hexavalent chromium, cadmium, mercury and two specific brominated flame-retardants (PBB and PBDE).

System Configuration

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



●**Example of System Configuration**

◎: Required under this system.
○: Selectable according to necessity. Oriental Motor provides.

(Body) + (Sold separately)

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

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

Extension Cables

Extension cables are not included with αSTEP products. When using the αSTEP stepping motor and driver more than 0.4 m (1.31 ft.) apart from each other, use an extension cable (sold separately).

●Electromagnetic brake motor models [except motor frame size 42 mm (1.65 in.)] must use an extension cable for electromagnetic brake motor (sold separately). For electromagnetic brake motor with motor frame size □42 mm (□1.65 in.), use an extension cable for standard motor.

➜ Page 75

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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	Electromagnetic Brake **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 models available for all products except for those with electromagnetic brakes. Contact the nearest Oriental Motor office for further information on the double shaft models.

◇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

◇Standard Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)
24 VDC	**ASC46MK**
	ASC66MK

◇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

◇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

◇Harmonic Geared Type with Electromagnetic Brake

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

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

Specifications RoHS

Model	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·m^2 (oz-in^2)		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 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 73

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

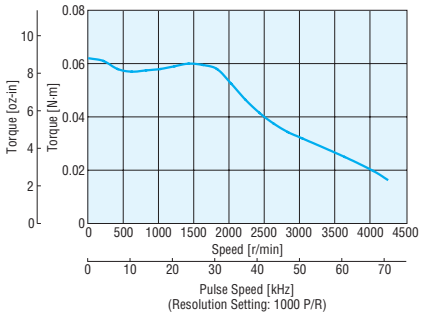
*2 The resolution can be set to any one of 500 P/R, 1000 P/R, 5000 P/R, or 10000 P/R with the resolution select switch or resolution select switching signals.
Resolution Select Switch ➜ Page 68

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

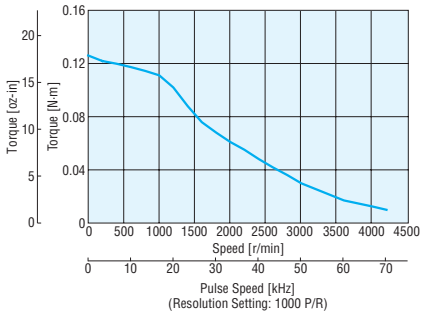
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

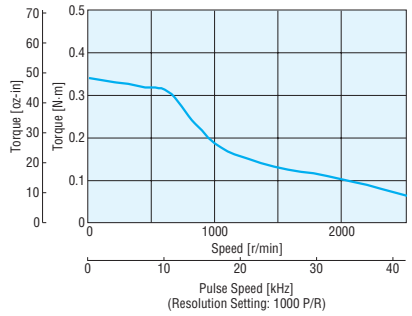
ASC34AK



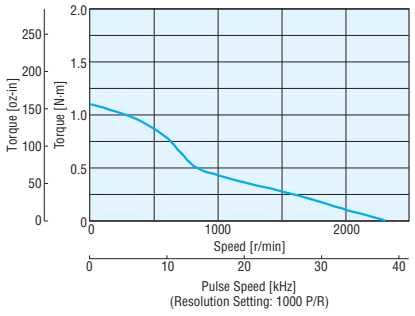
ASC36AK



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°C (212°F). [Under 75°C (167°F) is required to comply with UL or CSA standards.]
- When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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

Specifications RoHS

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 73

*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 switching signals.

Resolution Select Switch ➜ Page 68

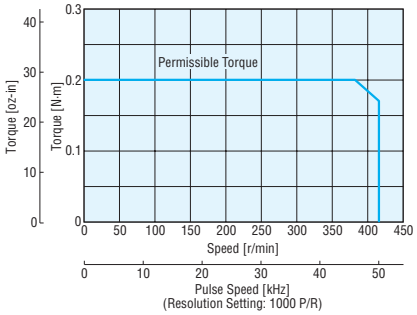
Note:

●Direction of rotation of the motor and that of the gear output shaft are the same for unit type with reduction ratio 20:1 and 30:1. It is opposite for 7.2:1 and 10:1 ratio type.

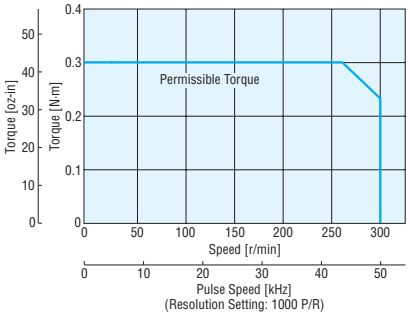
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

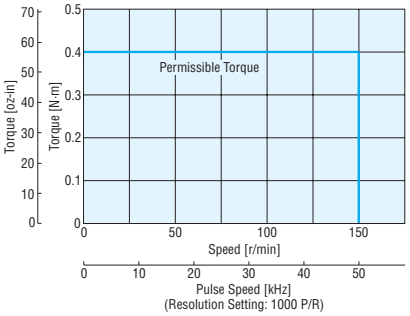
ASC34AK-T7.2



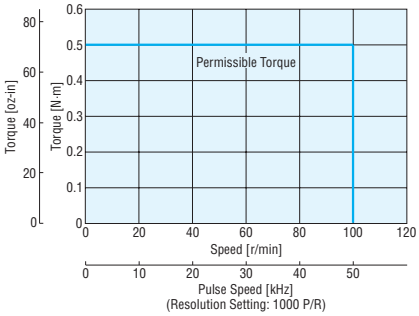
ASC34AK-T10



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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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·m^2 (oz-in^2)		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 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 73

*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 switching signals.
Resolution Select Switch ➜ Page 68

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

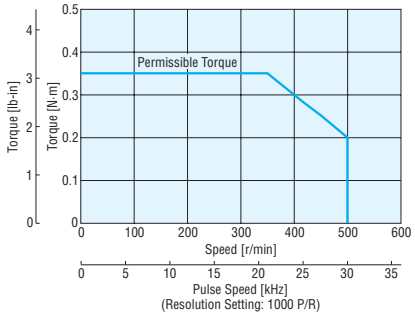
Note:

●Direction of rotation of the motor and that of the gear output shaft are the same for unit type with reduction ratio 3.6:1, 7.2:1 and 10:1. It is opposite for 20:1 and 30:1 ratio type.

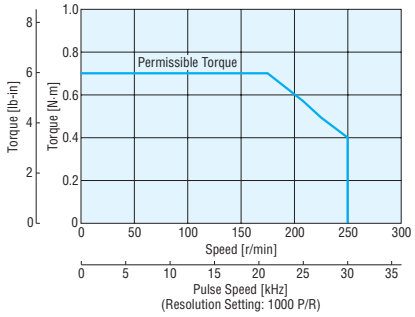
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

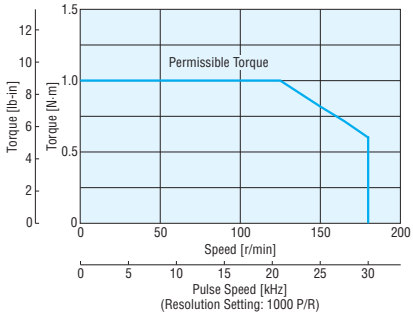
ASC46AK-T3.6/ASC46MK-T3.6



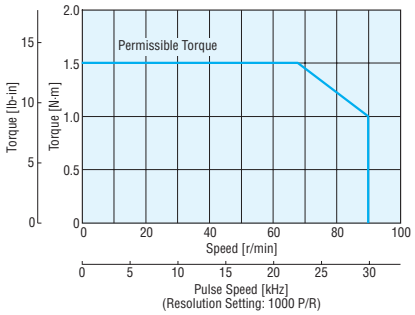
ASC46AK-T7.2/ASC46MK-T7.2



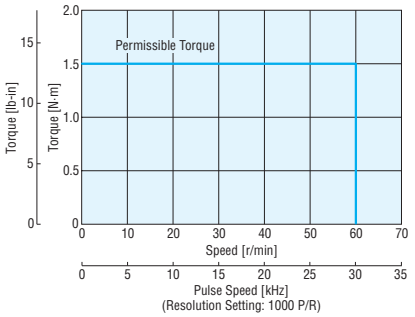
ASC46AK-T10/ASC46MK-T10



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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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

Specifications RoHS

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 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 73

*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 switching signals.
Resolution Select Switch ➜ Page 68

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

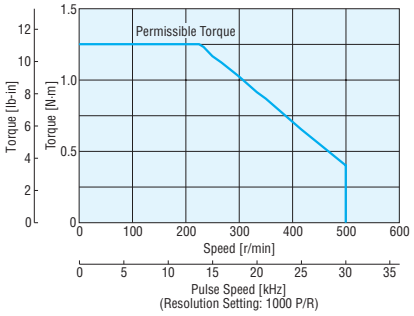
Note:

●Direction of rotation of the motor and that of the gear output shaft are the same for unit type with reduction ratio 3.6:1, 7.2:1 and 10:1. It is opposite for 20:1 and 30:1 ratio type.

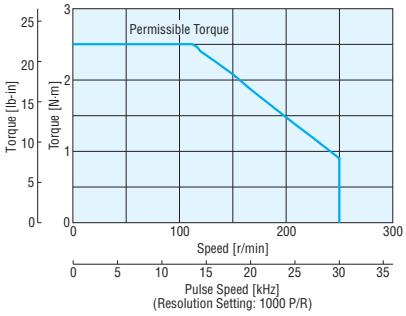
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

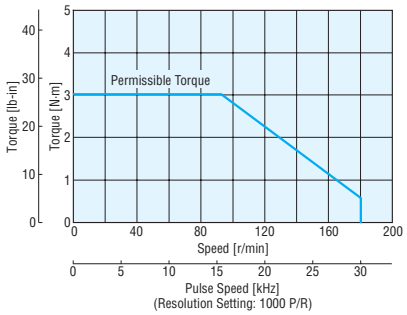
ASC66AK-T3.6/ASC66MK-T3.6



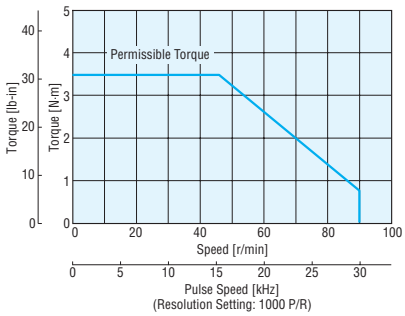
ASC66AK-T7.2/ASC66MK-T7.2



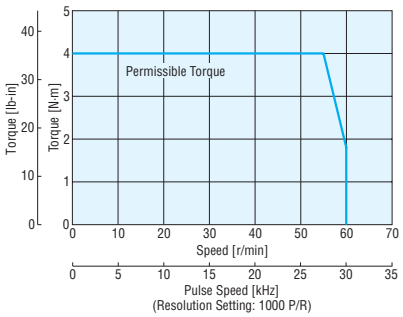
ASC66AK-T10/ASC66MK-T10



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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function 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·m^2 (oz-in^2)	11×10^{-7} (0.06)		
Backlash	arc minute (degrees)	3 (0.05°)		
Angle Error	min	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 73

*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 switching signals.
Resolution Select Switch ➜ Page 68

*2 The value of Maximum Torque is for gear. For output torque for geared motor, refer to the Speed - Torque Characteristics.

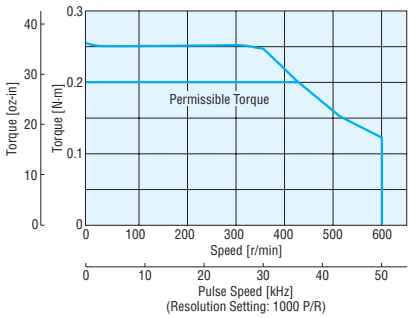
Note:

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

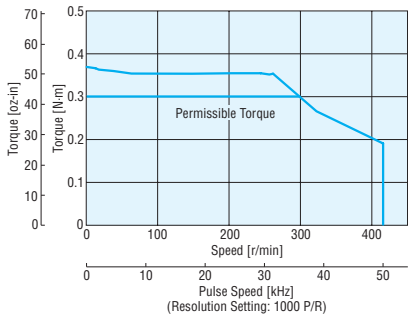
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

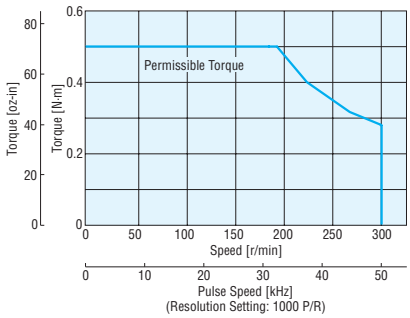
ASC34AK-N5



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.]
- When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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

Specifications RoHS

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·m² (oz-in²)		68×10^{-7} (0.37) [83×10^{-7} (0.454)]*1	
Backlash arc minute (degrees)		2 (0.034°)	
Angle Error min		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 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 73

*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 switching signals.
Resolution Select Switch ➜ Page 68

*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 for complicated braking. Also, a separate 24 VDC±5%, 0.1 A minimum. power supply is required for the electromagnetic brakes.

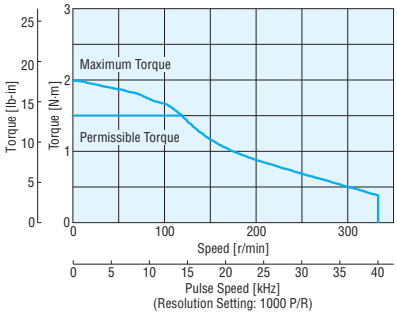
Note:

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

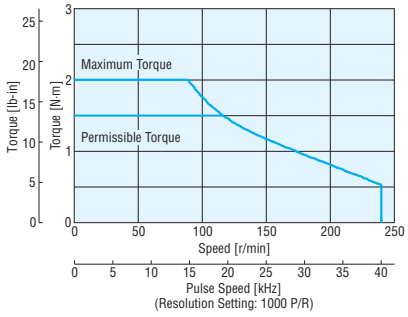
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.

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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·m^2 (oz-in^2)	405×10^{-7} (2.2) [564×10^{-7} (3.1)]*1					
Backlash	arc minute (degrees)	2 (0.034°)			3 (0.05°)		
Angle 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 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 73

*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 switching signals.
Resolution Select Switch ➜ Page 68

*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 for complicated braking. Also, a separate 24 VDC±5%, 0.3 A minimum power supply is required for the electromagnetic brakes.

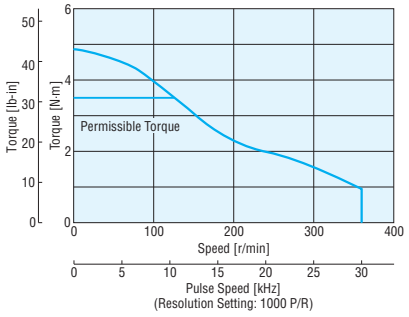
Note:

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

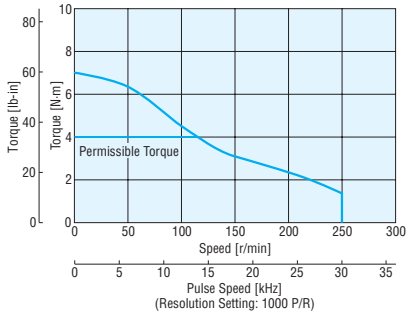
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

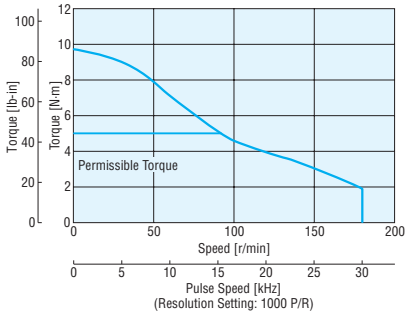
ASC66AK-N5/ASC66MK-N5



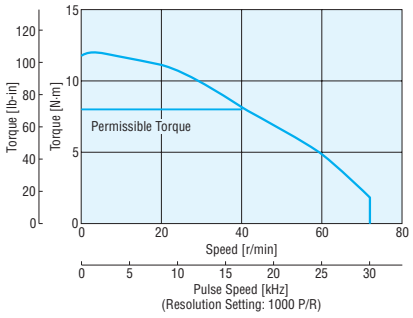
ASC66AK-N7.2/ASC66MK-N7.2



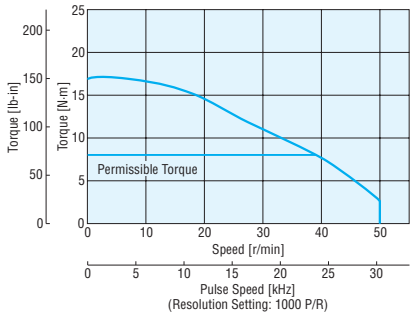
ASC66AK-N10/ASC66MK-N10



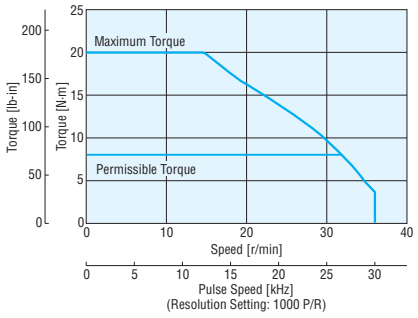
ASC66AK-N25/ASC66MK-N25



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.]

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function 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

Model	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·m^2 (oz-in^2)		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 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 73

*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 switching signals.
Resolution Select Switch ➜ Page 68

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

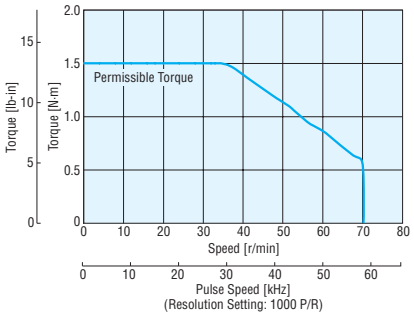
Note:

●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.

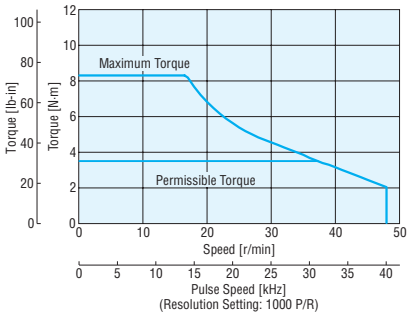
Speed – Torque Characteristics

How to Read Speed-Torque Characteristics ➜ Page 73

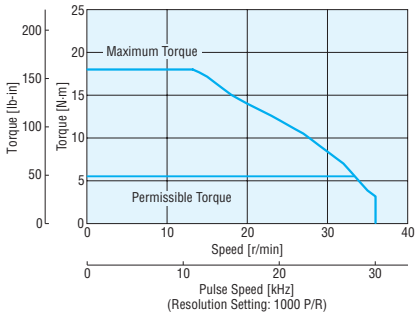
ASC34AK-H50



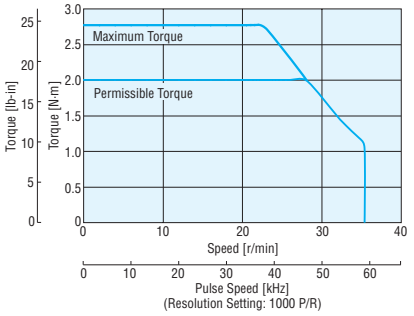
ASC46AK-H50/ASC46MK-H50



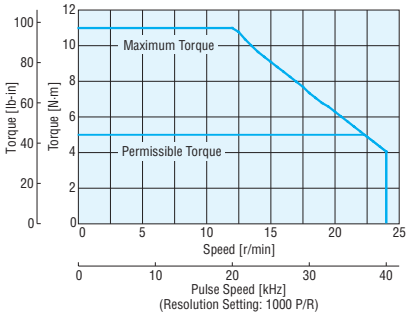
ASC66AK-H50/ASC66MK-H50



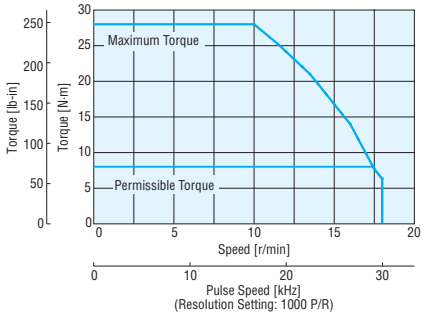
ASC34AK-H100



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.]

●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).

●When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding 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 stops automatically. 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 signal/Rotation direction signal (Negative logic pulse input), CW pulse signal/CCW pulse signal (Negative logic pulse input), All windings off, Alarm clear, Resolution setting]
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 (Feedback pulse ASG·BSG signal)

General Specifications

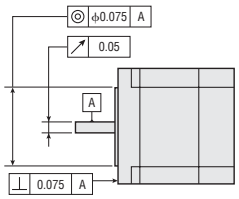
This is the value after rated operation at normal temperature and normal humidity.

Specifications		Motor	Driver
Motor Insulation Class		Class B [130˚C (266˚F)][UL/CSA: Recognized as class A 105˚C (221˚F)]	–
Insulation Resistance		100 MΩ minimum when measured by a 500 VDC megger between the following places · Frame-Windings · Frame-Electromagnetic brake windings	100 MΩ minimum when measured by a 500 VDC megger between the following places · Heat sink-Power supply input terminal
Dielectric Strength		Sufficient to withstand the following for one minute: · Frame-Windings 0.5 kV 50 Hz or 60 Hz · Frame-Electromagnetic brake windings 1.0 kV 50 Hz or 60 Hz	Sufficient to withstand the following for one minute: · Heat sink-Power supply input terminal 0.5 kV 50 Hz or 60 Hz
Operating Environment (In Operation)	Ambient Temperature	0˚C～+50˚C (+32˚F～+122˚F) (nonfreezing): Standard Type **TH·PN** Geared Type 0˚C～+40˚C (+32˚F～+104˚F) (nonfreezing): Harmonic Geared Type	0˚C～+40˚C (+32˚F～+104˚F) (nonfreezing)
	Ambient Humidity	85% or less (noncondensing)	
	Atmosphere	No corrosive gases, dust, water or oil.	
Static Angle Error		±5 arc minutes (0.084˚)	–
Shaft Runout		0.05 mm (0.002 inch) T.I.R.*	–
Concentricity		0.075 mm (0.003 inch) T.I.R.*	–
Perpendicularity		0.075 mm (0.003 inch) 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.



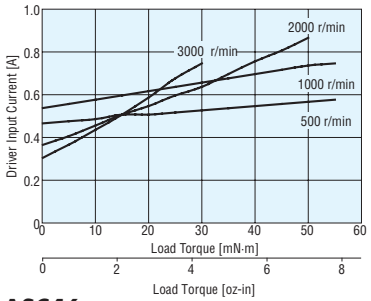
Load Torque – Driver Input Current Characteristics

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 axis.

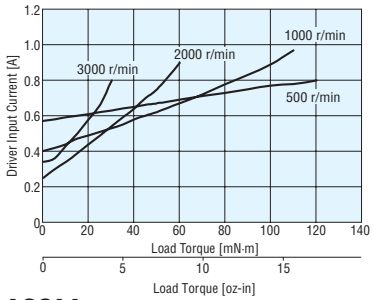
Motor shaft speed = Gear output shaft speed×Gear ratio [r/min]

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

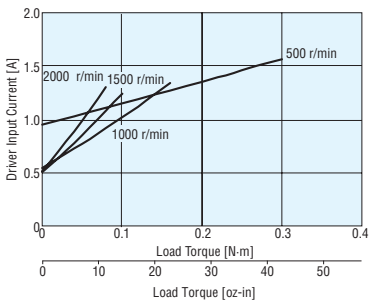
ASC34



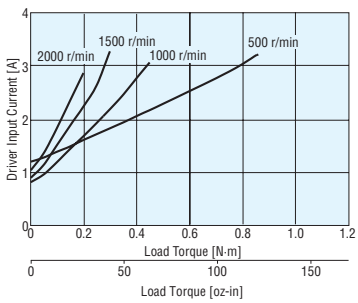
ASC36



ASC46



ASC66



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Permissible Overhung Load and Permissible Thrust Load

Unit = N (lb.)

Type	Model	Gear Ratio	Overhung Load Distance from Shaft End mm (in.)					Thrust Load
			0	5 (0.2)	10 (0.39)	15 (0.59)	20 (0.79)	
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	–	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.

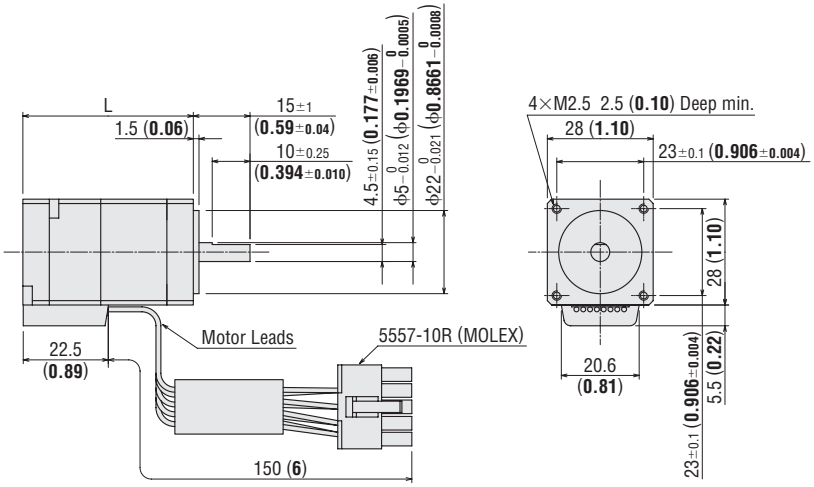
Dimensions Unit = mm (inch)

●Motor

◇Standard Type

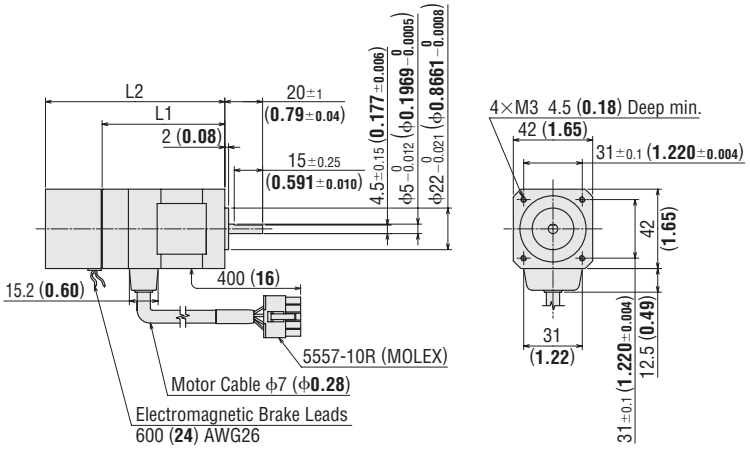
1 □28 mm (□1.10 in.)

Model	Motor Model	L mm (in.)	Mass kg (lb.)	CAD
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.)

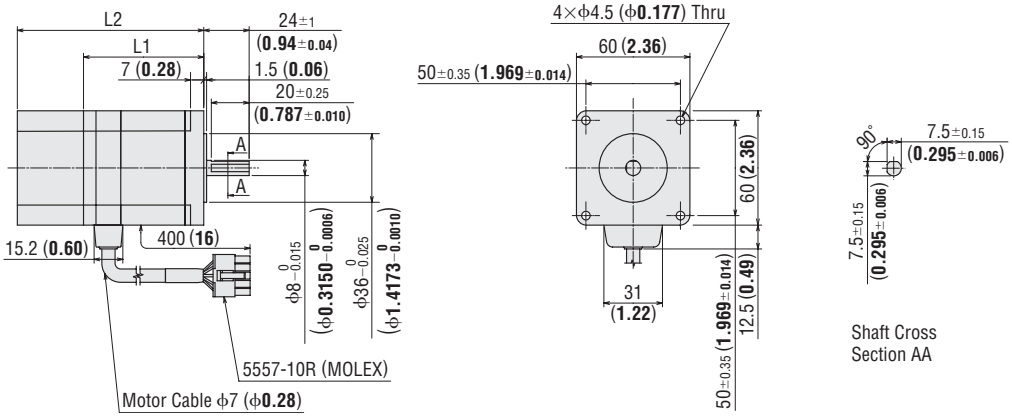
Model	Motor Model	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
ASC46AK	ASM46AK	64.9 (2.56)	–	0.5 (1.1)	B192
ASC46MK	ASM46MK	–	94.9 (3.74)	0.6 (1.3)	B193



◇**Standard Type**

3 □60 mm (□2.36 in.)

Model	Motor Model	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
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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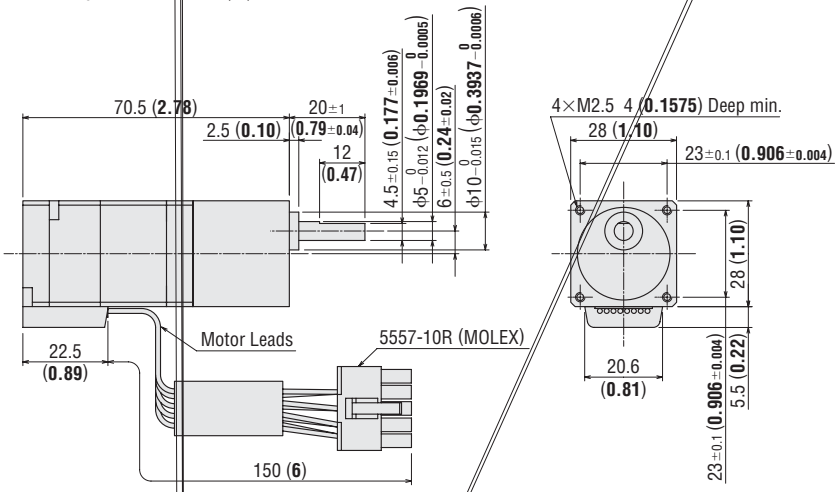
0.14

◇TH Geared Type

4 □28 mm (□1.10 in.)

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

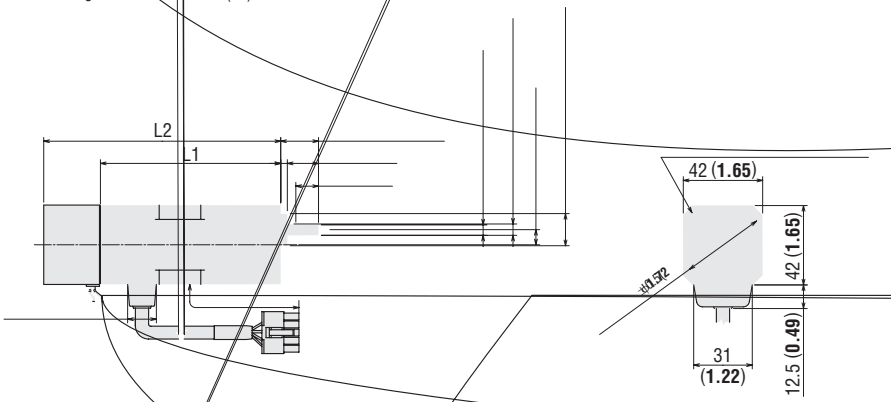
●Enter the gear ratio in the box (□) within the model name.



5 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
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.

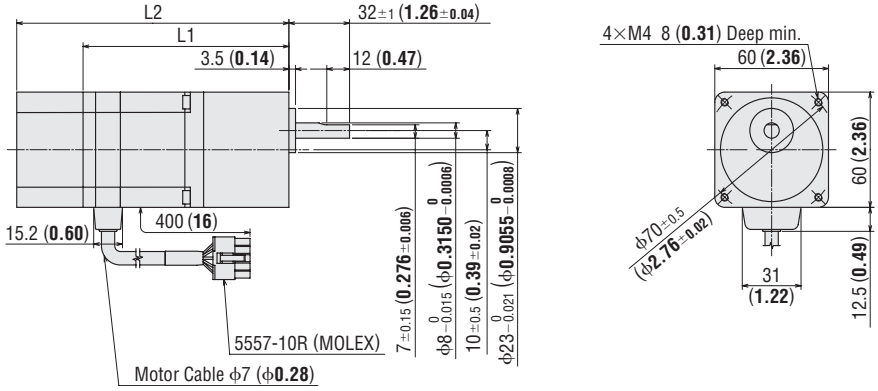


◇TH Geared Type

6 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
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.

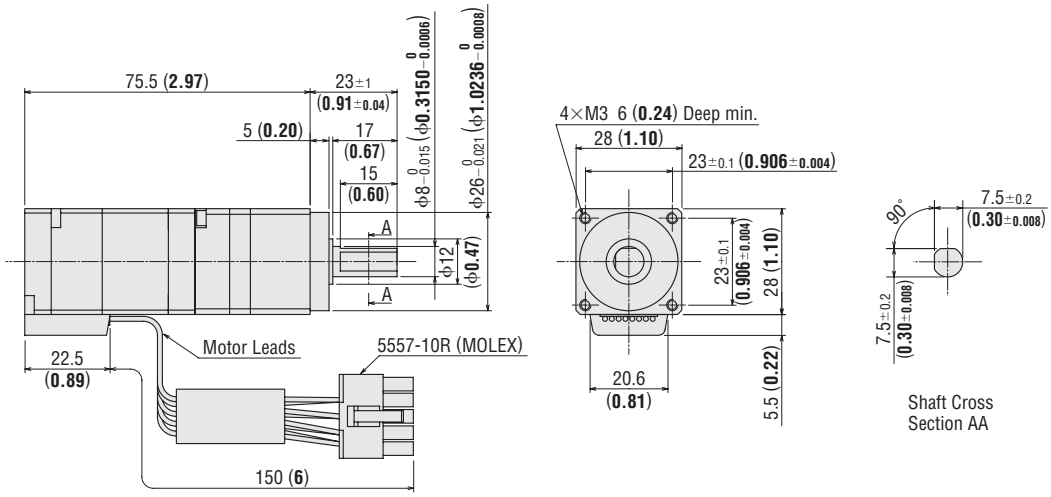


◇PN Geared Type

7 □28 mm (□1.10 in.)

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

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

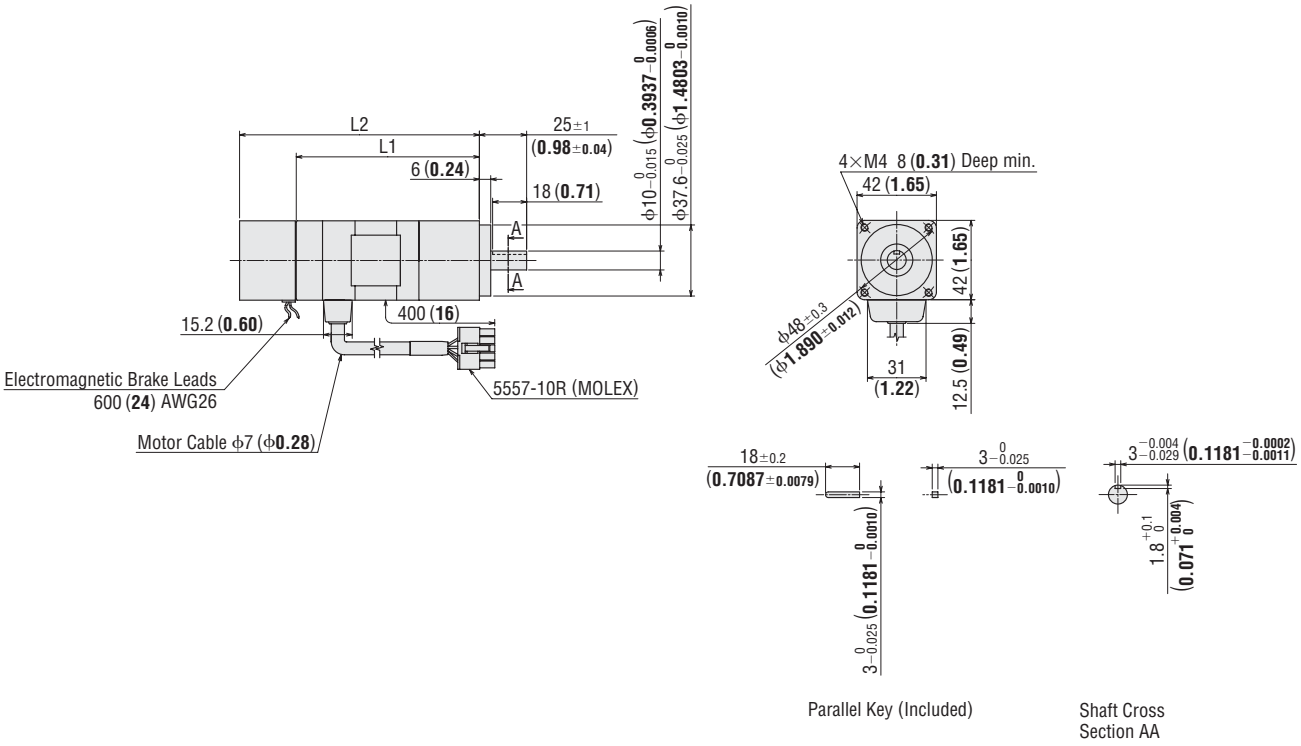


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8 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
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.

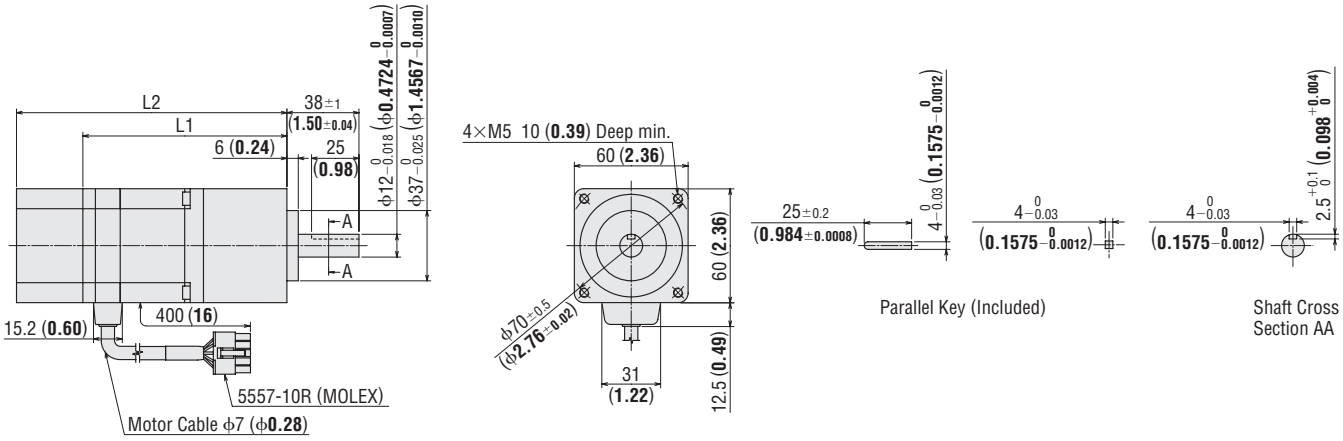


◇**PN Geared Type**

9 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
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.



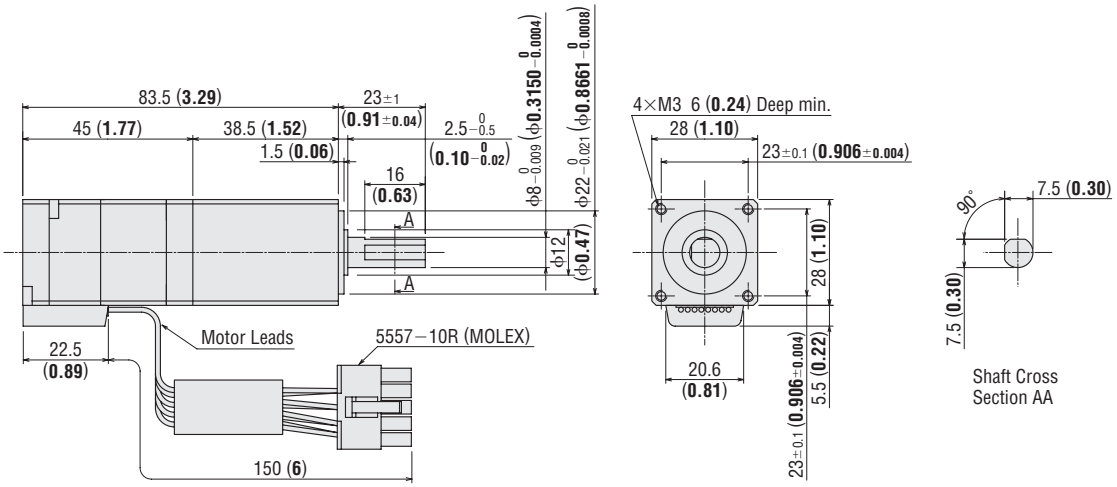
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◇Harmonic Geared Type

10 □28 mm (□1.10 in.)

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

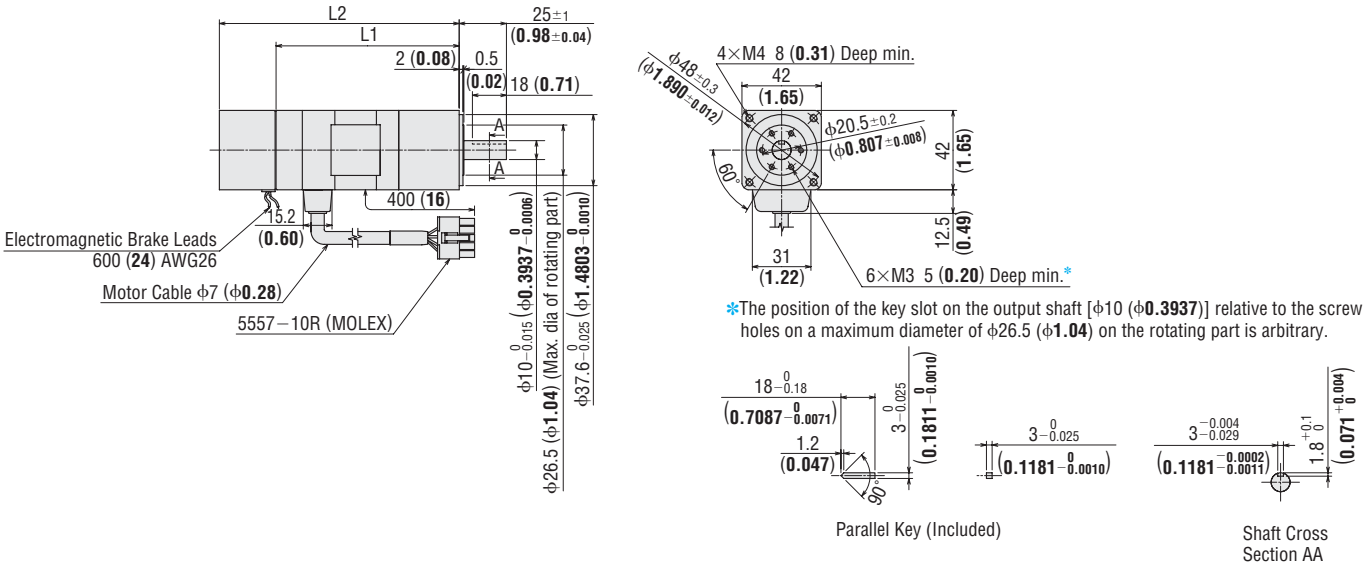
●Enter the gear ratio in the box (□) within the model name.



11 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
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 (ϕ**0.3937**)] relative to the screw holes on a maximum diameter of ϕ26.5 (ϕ**1.04**) on the rotating part is arbitrary.

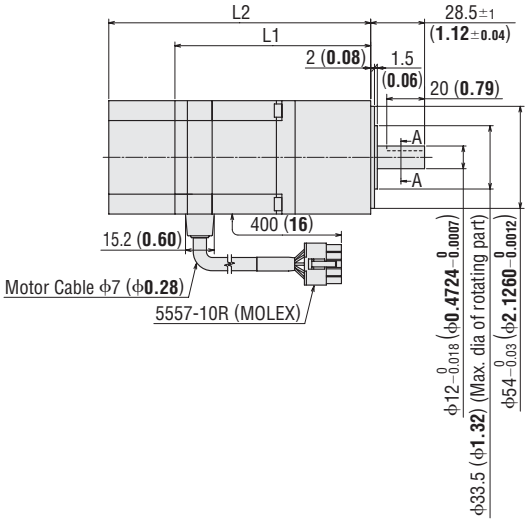
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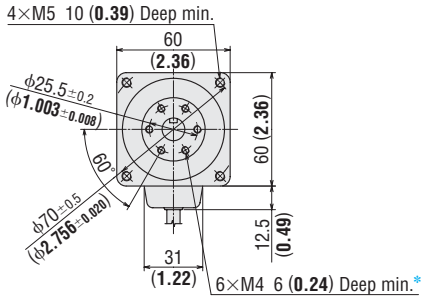
◇Harmonic Geared Type

12 □60 mm (□2.36 in.)

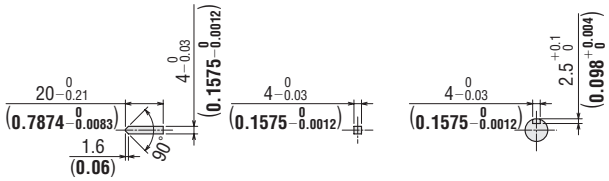
Model	Motor Model	Gear Ratio	L1 mm (in.)	L2 mm (in.)	Mass kg (lb.)	CAD
ASC66AK-H□	ASM66AK-H□	**50, 100**	103.6 (4.08)	–	1.4 (3.1)	B310
ASC66MK-H□	ASM66MK-H□		–	138.6 (5.46)	1.65 (3.6)	B311

●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)

Shaft Cross Section AA

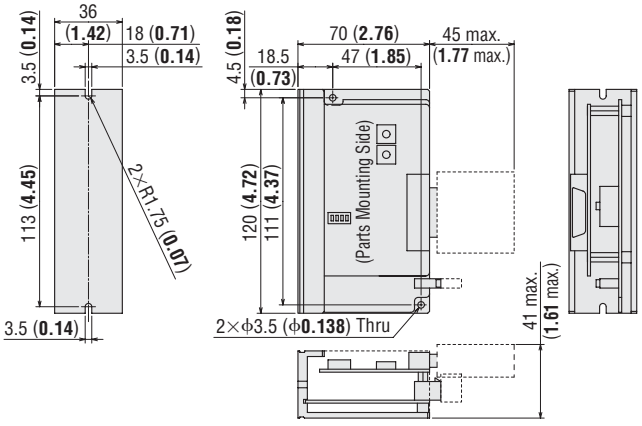
●Driver

13 Common to All Types

ASD10□-K, **ASD18□-K**, **ASD36□-K**

Mass: 0.25 kg (0.55 lb.)

CAD B198



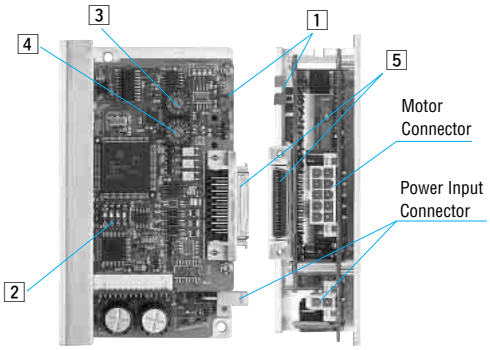
●I/O Connector (Included)
Cover Assembly: 54331-0361 (MOLEX)
Connector: 54306-3619 (MOLEX)

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

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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	Blinks when protective functions are activated.

◇Alarm

Blink Count	Function	When Activated
2	Overload	The motor is operated continuously over 5 seconds under a load exceeding the maximum torque.
3	Overvoltage	The primary voltage of the driver's inverter exceeds the permissible value.
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	The EEPROM has a fault.
8	Sensor error	The power source turns on when the motor cable is not 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 Pulses (0.36˚/step) "1000" "×10" → 10000 Pulses (0.036˚/step) "500" "×1" → 500 Pulses (0.72˚/step) "500" "×10" → 5000 Pulses (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.

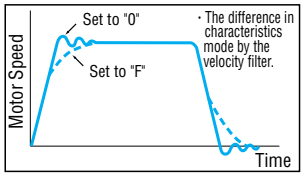
Notes:

- 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 terminals. It will always be "×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.

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.	

5 Input/Output Signals

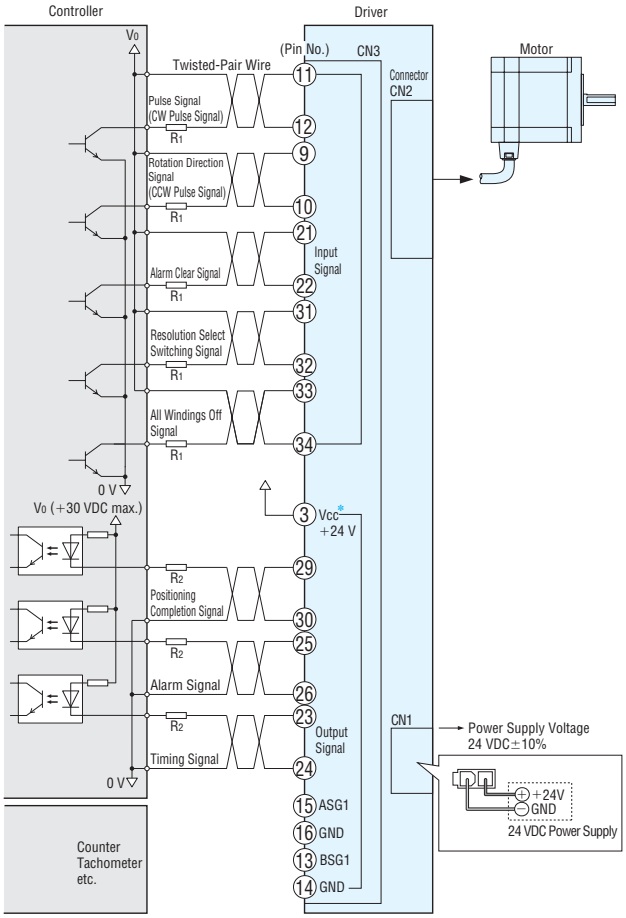
Indication	Input/Output	Pin. No	Signal	Name of Signal
CN3	External power input	2	GND	Power supply for signal control
		3	Vcc+24V	
	Input signal	9	DIR. (CCW)	Rotation direction (CCW pulse)*
		10	$\overline{\text{DIR.}}$ ($\overline{\text{CCW}}$)	
		11	PLS (CW)	Pulse (CW pulse)*
		12	$\overline{\text{PLS}}$ ($\overline{\text{CW}}$)	
	Output signal	13	BSG1	B-Phase pulse output (Open-collector)
		14	GND	
		15	ASG1	A-Phase pulse output (Open-collector)
		16	GND	
	Input signal	21	ACL	Alarm clear
		22	$\overline{\text{ACL}}$	
	Output signal	23	TIM.1	Timing (Open-collector)
		24	$\overline{\text{TIM.1}}$	
		25	ALARM	Alarm
		26	$\overline{\text{ALARM}}$	
		29	END	Positioning completion
		30	$\overline{\text{END}}$	
	Input signal	31	×10	Resolution select
		32	$\overline{\times 10}$	
		33	C.OFF	All windings off
		34	$\overline{\text{C.OFF}}$	

Description of Input/Output Signals ➜ Page 71

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

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●Connection Diagrams



The most suitable controllers for αSTEP **ASC** Series are available.
Controller **EMP** Series ➜ Page 89
Driver Cable ➜ Page 76

◇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 elements may be damaged.
Check the specification of the connected equipment.
✻Check the connection on page 71 when using a 24 VDC power supply for control signals.

◇Notes on Wiring

●Use a multi-core, twisted-pair shielded wire AWG28 or thicker for the control input/output signal line (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.
●When it is necessary to have a connection more than 0.4 m (1.31 ft.) between motor and driver [0.15 m (0.5 ft.) or more: **ASC34** and **ASC36** types], the optional 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.
●The range of wire for the power connector (CN1) is AWG24～18. Use wire AWG20 or thicker for the power line.
●Keep the control input/output signal line at least 300 mm (1 ft.) away from power lines (e.g. lines carrying large current, such as AC lines and motor lines). Also, do not run these lines through the same ducts or pipes as power lines.
●The customer must furnish the cables for power supply lines and control input/output signal lines.
●Use included connector for connection of power source.
●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 Power Supply

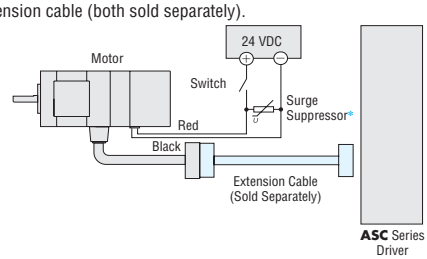
Connect the electromagnetic brake to the power supply using a cable with a conductor cross-sectional area of at least AWG24. The power supply input to the electromagnetic brake is 24 VDC ±5% 0.3 A minimum (**ASC46**: 0.1 A minimum) and therefore must be independent of the driver's power supply for signal 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 (Included).*
(✻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 lead wire 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.

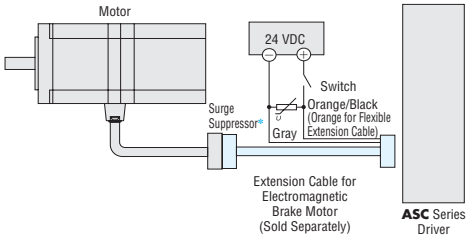
(1) **ASC46**

The electromagnetic brake wire is 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).



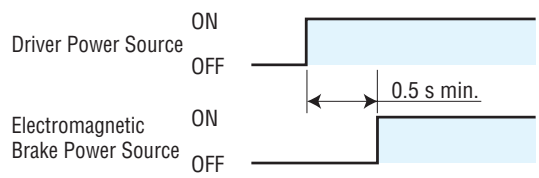
(2) **ASC66**

The electromagnetic brake wire is 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).



Timing Chart for Electromagnetic Brake Operation

To release the electromagnetic brake, wait at least 0.5 seconds after turning on the driver power source.
The load may fall down due to a loss of holding torque.



●Description of Input/Output Signals

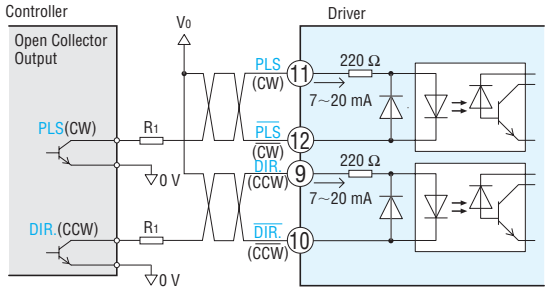
Indication of Input/Output Signal "ON""OFF"

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

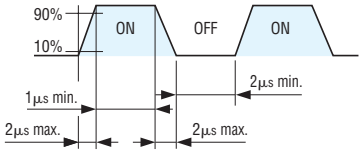


●**The colored characters** indicate signals under the 1-pulse input mode, while the black characters indicate signals under the 2-pulse input mode.

Note:

●The external resistor is not needed when Vo 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 elements get damaged.

◇Pulse Waveform Characteristics



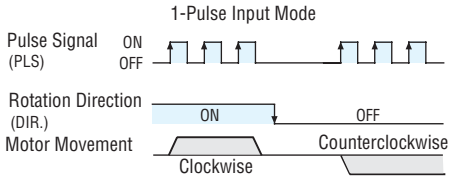
●For pulse signals, use input pulse waveforms like those shown in the figure above.

◇Pulse Input Modes

<1-Pulse Input Mode>

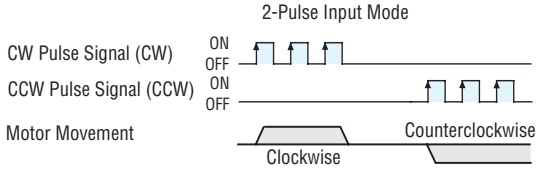
The 1-pulse input mode uses Pulse (PLS) and Rotation Direction (DIR.) signals. CW is selected by inputting DIR. signal at low level (with the input photocoupler ON), CCW by inputting at high level (with input photocoupler OFF).

[Rotation Direction Signals] Photocoupler "ON": Clockwise
Photocoupler "OFF": Counterclockwise



<2-Pulse Input Mode>

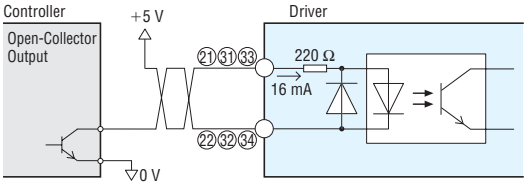
The 2-pulse input mode is used for "CW" and "CCW" pulses. When "CW" pulses are input, the motor's output shaft rotates clockwise when the motor is viewed facing the shaft; when "CCW" pulses are input, the shaft rotates counterclockwise.



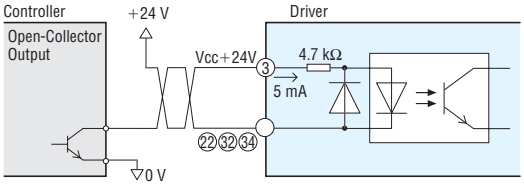
All Windings OFF (C.OFF) Input Signal
Resolution Select (×10) Input Signal
Alarm Clear (ACL) Input Signal

◇Input Circuit and Sample Connection

· When using 5 VDC

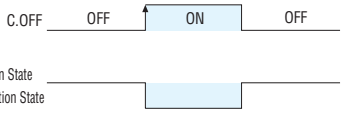


· When using 24 VDC



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

This controller power source 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 source 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

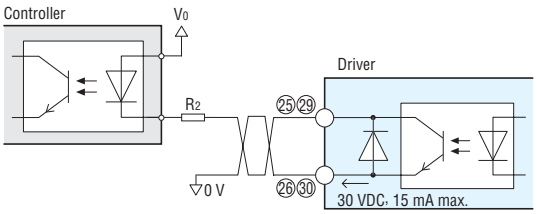
This controller power source offers a choice of either 5 VDC or 24 VDC. This signal is used for canceling the alarm without turning off power to the driver when a protection circuit has been activated.

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

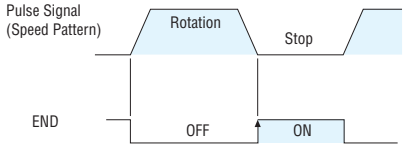
Position Completion (END) Output Signal
Alarm (ALARM) Output Signal

◇Output Circuit and Sample Connection



◇Position Completion (END) Output Signal Pin No.㉙, ㉚

Circuit 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 ms after the pulse input stops.



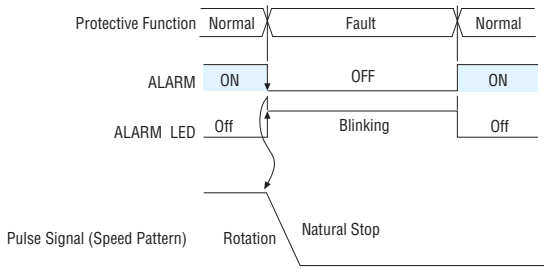
Note:

●The END signal flashes during operation with a pulse input frequency of 500 Hz or less.

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◇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 protection circuits has been activated. When an abnormality such as an overload or over current is detected, the alarm signal will output, the ALARM indicator 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 5 seconds before turning it on again.

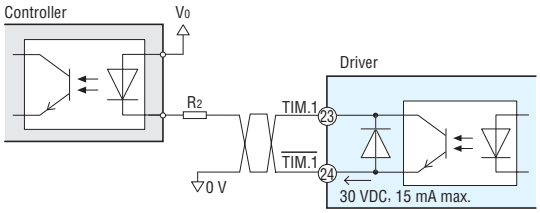


Note:

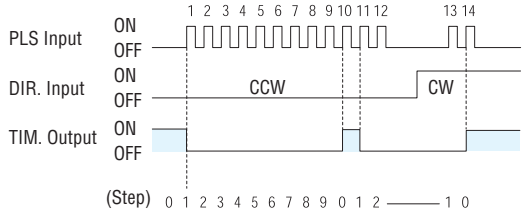
●The alarm output uses positive logic (Normally Closed), all other outputs use negative logic (Normally Open).

Excitation Timing Signal (TIM.) Output Signal

◇Output Circuit and Sample Connection



Circuits for use with 30 VDC, 15 mA maximum. When the Excitation Timing signal is output, the transistor turns ON. This signal can be used to detect the home position with greater precision. This signal is output 50 times per motor shaft revolution.

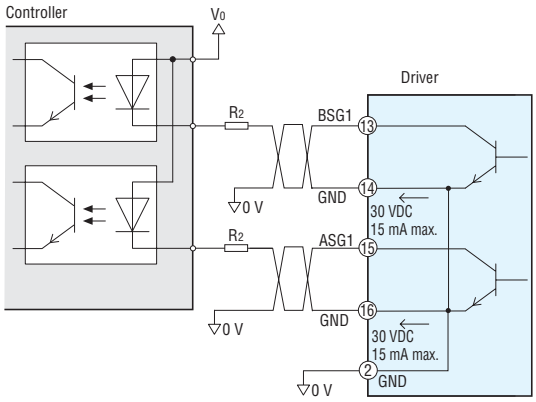


Note:

●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



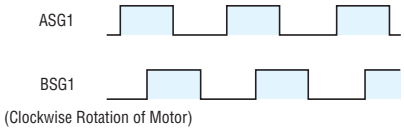
Circuits for use with 30 VDC, 15 mA maximum. A counter or similar device can be connected to monitor the position of the motor.
The pulse resolution is the same as the motor resolution at the time of power-on.
[Example: Resolution select switch (1000 P/R) → Output pulse number for each motor revolution (1000).]
The phase difference between A and B is 90˚ electrical.

Notes:

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

●These signals are only for position verification when the motor has stopped. There is a 1 ms (maximum) time lag between real rotor motion and the output signals.

●Pulse Waveform Characteristics



(Clockwise Rotation of Motor)

List of Motor and Driver Combinations

Model names for motor and driver combinations are shown below.

Type	Package 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	Package 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.

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How to Read Specifications Table

	Model	Pulse Input Package	Standard	AS66A□E	AS66A□E-N7.2
			Electromagnetic Brake	AS66M□E	AS66M□E-N7.2
		Built-In Controller Package	Standard	AS66A□EP	AS66A□EP-N7.2
			Electromagnetic Brake	AS66M□EP	AS66M□EP-N7.2
①	Maximum Holding Torque		N·m (oz-in)	1.2 (170)	4 (560)
②	Rotor Inertia		J: kg·m² (oz-in²)	405×10⁻⁷ (2.2) [564×10⁻⁷ (3.1)]*1	
③	Backlash		arc minute (degrees)	–	2 (0.034°)
④	Angle Error		arc minute (degrees)	–	5 (0.084°)
⑤	Permissible Speed Range		r/min	–	0～416
⑥	Gear Ratio			–	7.2:1
⑦	Resolution*2	Resolution Setting: 1000 P/R		0.36°/Pulse	0.05°/Pulse
⑧	Permissible Torque		N·m (lb-in)	3.5 (30)	4 (35)
⑨	Maximum Torque*3		N·m (lb-in)	7 (61)	9 (79)
⑩	Power Source	Voltage-Frequency		Single-Phase 100-115 VAC −15%～+10% 50/60 Hz	
				Single-Phase 200-230 VAC −15%～+10% 50/60 Hz	
				Three-Phase 200-230 VAC −15%～+10% 50/60 Hz	
		Maximum Input Current A	Single-Phase 100-115 VAC	5	
			Single-Phase 200-230 VAC	3	
			Three-Phase 200-230 VAC	1.5	
⑪	Electromagnetic Brake*4		Type	Active when power is off	
			Power Supply Input	24 VDC±5%	
			Power Consumption W	6	
			Excitation Current A	0.25	
		Static Friction Torque	N·m (oz-in)	0.6 (85)	2 (17.7)
	Mass		Motor kg (lb.)	0.85 (1.9) [1.1 (2.4)]*1	1.5 (13.2) [1.75 (15.4)]*1
			Driver kg (lb.)	0.8 (1.8)	
	Dimension No.	Motor		2	11
		Driver	Pulse Input	16	
			Built-In Controller	17	

●The square box in the model name will contain one of the following letters to indicate the power supply voltage: **A** (Single-Phase 100-115 VAC), **C** (Single-Phase 200-230 VAC) or **S** (Three-Phase 200-230 VAC).

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

*2 Pulse Input Package: 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 switching signals.
Resolution Select Switch ➔ Page 36
Built-In Controller Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

*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 for complicated braking. 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. (**PN** geared type)

①Maximum Holding Torque
The holding torque is the maximum holding power (torque) the stepping motor has when power (rated current) is being supplied but the motor is not rotating (with consideration given to the permissible strength of the gear when applicable). At motor standstill, the driver's "Automatic Current Cutback" function reduces the maximum holding torque by approximately 50%.

②Rotor Inertia
This refers to the inertia of rotor inside the motor. This is necessary when the required torque (acceleration torque) for the motor needs is calculated.

③Backlash
The play of gear output shaft when the motor shaft is fixed. When positioning in bi-direction, the positioning accuracy is affected.

④Angle Error (PN Geared Type only)
Angle error is the difference between the theoretical angle of rotation of the output shaft, as calculated from the input pulse count, and actual angle of rotation.

⑤Permissible Speed Range
This is the rotation speed that the motor can be operated at with the gear output shaft.

⑥Gear Ratio
This is the ratio in rotation speed between the input speed from the motor and the speed of the gear output shaft. For example, the gear ratio 1:10 is that when the input speed from the motor is 10 r/min, the gear output shaft is 1 r/min.

⑦Resolution
Resolution is the angular distance (in degrees) that the motor moves at the input of one pulse from the driver. It differs depending on the motor structure and excitation mode.

⑧Permissible Torque
The permissible torque represents the torque value limited by the mechanical strength of the gear when operated at a constant speed. For the types excluding **PN** and Harmonic geared type, the total torque including accelerati on/deceleration torque should not exceed this value.

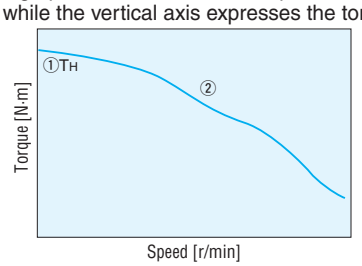
⑨Maximum Torque (PN Geared, Harmonic Geared Type only)
This is the maximum torque that can be used instantaneously (for a short time). During acceleration/ deceleration, the motor can be operated up to this value.

⑩Power Source
The current value of the power input is the maximum input current value. (The input current varies according to the rotation speed.)

⑪Static Friction Torque
The electromagnetic brake specifications. This is the maximum holding torque at which the electromagnetic brake can hold the position.

How to Read Speed – Torque Characteristics

The graph below is the characteristics that indicate the relationship between the speed and torque when a stepping motor is driven. The required speed and torque is always used when selecting a stepping motor. On the graph, the horizontal axis expresses the speed at motor output shaft while the vertical axis expresses the torque.

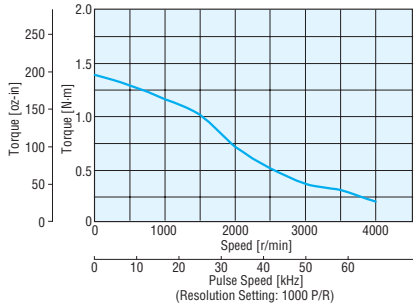


The speed-torque characteristics are determined by the motor and driver, so they vary greatly based upon the type of the driver used.

①Maximum Holding Torque
The holding torque is the maximum holding power (torque) the stepping motor has when power is being supplied but the motor shaft is not rotating (rated current). At motor standstill, the driver's "Automatic Current Cutback" function reduces the maximum holding torque by approximately 50%.

②Pullout Torque
Pullout torque is the maximum torque that can be output at a given speed. When selecting a motor, be sure the required torque falls within this curve.

The following figure shows the speed–torque characteristics of the α_{STEP} **AS** Series **AS66AAE**.



●Pay attention to heat dissipation from the motor and driver. 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.]

●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).

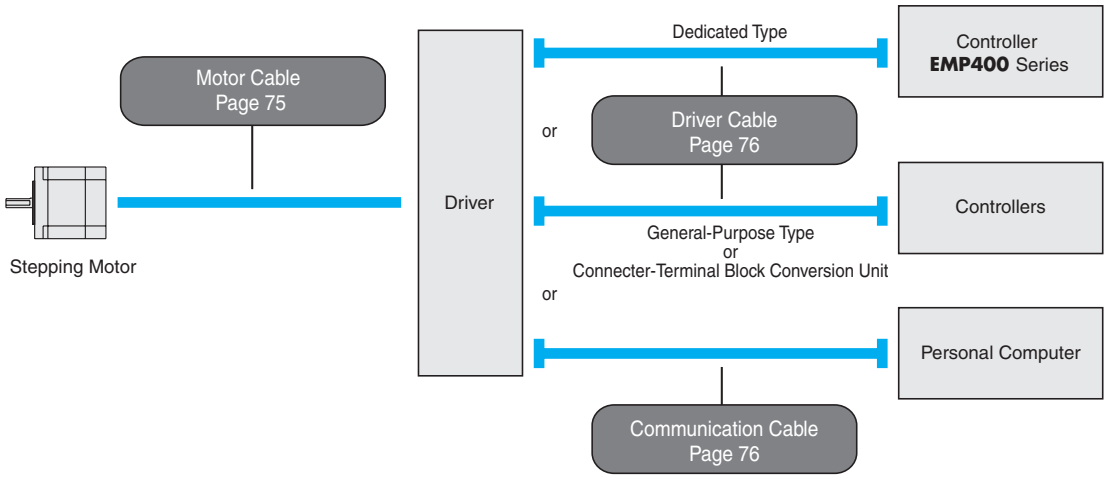
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Accessories (Sold Separately)

Cables

Various cables provide convenient connection between a motor, driver and controller.

■Type of Cables



■Cable Selection Table

Use these cables to extend the wiring length between the α_{STEP} motor and driver or connect the standard IP65 rated motor and driver. Select an appropriate type of cable according to the motor frame size and additional function.

●AS Series Pulse Input Package (Standard, TH Geared, PN Geared, Harmonic Geared Type)
AS Series Built-In Controller Package (Standard, TH Geared, PN Geared, Harmonic Geared Type)
ASC Series (Standard, TH Geared, PN Geared, Harmonic Geared Type)

Motor		Cable Name			
Motor Frame Size	Type	1 Extension Cable		2 Flexible Extension Cable	
		For Standard Motor	For Electromagnetic Brake Motor	For Standard Motor	For Electromagnetic Brake Motor
28 mm (1.10 in.)	Standard*	●	–	●	–
42 mm (1.65 in.)	Standard*	●	–	●	–
	Electromagnetic Brake*	●	–	●	–
60 mm (2.36 in.)	Standard*	●	–	●	–
	Electromagnetic Brake	–	●	–	●
85 mm (3.35 in.) [Geared Type: 90 mm (3.54 in.)]	Standard*	●	–	●	–
	Electromagnetic Brake	–	●	–	●

Notes:

●As for the products indicated by *, neither an extension cable nor flexible extension cable is required if the wiring distance between the motor and driver is 0.4 m (1.31 ft.) or shorter [or 0.15 m (0.5 ft.) or shorter : **ASC34** and **ASC36** types].

●Any motor with an electromagnetic brake cannot be driven without an extension cable for electromagnetic brake motor. Take note, however, for electromagnetic brake type with motor frame size □42 mm (□1.65 in.), use a standard extension cable.

●AS Series Pulse Input Package (Standard Type IP65 Rated Motor)

Motor		Cable Name	
Motor Frame Size	Type	Motor Cable for IP65 Rated Motor	
		3 Extension Cable	4 Flexible Extension Cable
60 mm (2.36 in.)	Standard	●	●
85 mm (3.35 in.)	Standard	●	●

Note:

●Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.

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Motor Cables RoHS

1 Extension Cables



These extension cables are convenient when using the αSTEP motor and driver more than 0.4 m (1.31 ft.) apart from each other.

Product Line

For Standard Motor

Model	Length L m (ft.)
CC01AIP	1 (3.3)
CC02AIP	2 (6.6)
CC03AIP	3 (9.8)
CC05AIP	5 (16.4)
CC07AIP	7 (23)
CC10AIP	10 (32.8)
CC15AIP	15 (49.2)
CC20AIP	20 (65.6)

For Electromagnetic Brake Motor

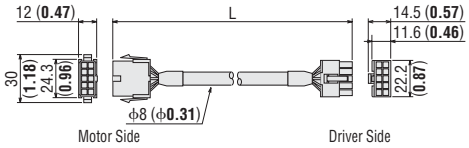
Model	Length L m (ft.)
CC01AIPM	1 (3.3)
CC02AIPM	2 (6.6)
CC03AIPM	3 (9.8)
CC05AIPM	5 (16.4)
CC07AIPM	7 (23)
CC10AIPM	10 (32.8)
CC15AIPM	15 (49.2)
CC20AIPM	20 (65.6)

Notes:

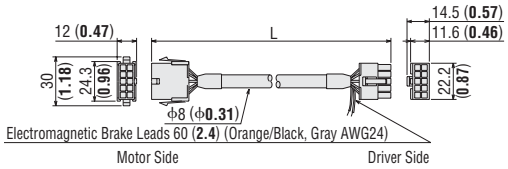
- Electromagnetic brake models must use an extension cable for an electromagnetic brake motor. But for electromagnetic brake motor with motor frame size □42 mm (□1.65 in.), use an extension cable for standard motor.
- **ASC** Series cannot use extension cable with 15 m (49.2 ft.), 20 m (65.6 ft.) length.

Dimensions Unit = mm (inch)

For Standard Motor



For Electromagnetic Brake Motor



2 Flexible Extension Cables



This flexible extension cable is used between αSTEP motors and dedicated drivers. We recommend this cable when the motor is installed on a moving section and the cable is repeatedly bent and extended.

Product Line

For Standard Motor

Model	Length L m (ft.)
CC01SAR	1 (3.3)
CC02SAR	2 (6.6)
CC03SAR	3 (9.8)
CC05SAR	5 (16.4)
CC07SAR	7 (23)
CC10SAR	10 (32.8)

For Electromagnetic Brake Motor

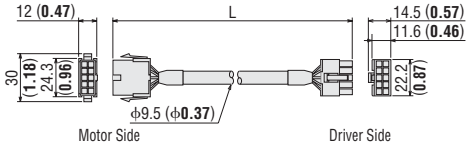
Model	Length L m (ft.)
CC01SARM2	1 (3.3)
CC02SARM2	2 (6.6)
CC03SARM2	3 (9.8)
CC05SARM2	5 (16.4)
CC07SARM2	7 (23)
CC10SARM2	10 (32.8)

Note:

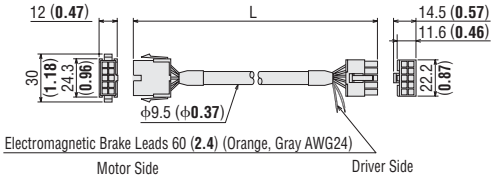
- For electromagnetic brake motor with motor frame size □42 mm (□1.65 in.), use a flexible extension cable for standard motor.

Dimensions Unit = mm (inch)

For Standard Motor



For Electromagnetic Brake Motor



Motor Cable for IP65 Rated Motor RoHS



This motor cable must be used for connection between the IP65 rated motor and the driver.
Any IP65 rated motor cannot be driven without this cable.
One end of the cable connects to the metal connector on the motor, while the other end connects to the driver.
Use a flexible extension cable if the motor is installed on a moving part and its cable will be flexed repeatedly.

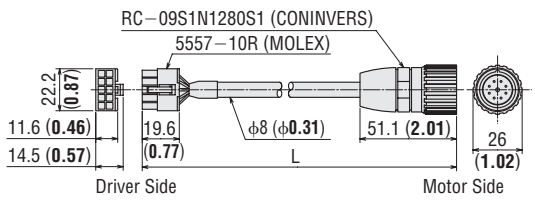
3 Extension Cables for IP65 Rated Motor

Product Line

Model	Length L m (ft.)
CC01AST	1 (3.3)
CC02AST	2 (6.6)
CC03AST	3 (9.8)
CC05AST	5 (16.4)

Model	Length L m (ft.)
CC07AST	7 (23)
CC10AST	10 (32.8)
CC15AST	15 (49.2)
CC20AST	20 (65.6)

Dimensions Unit = mm (inch)



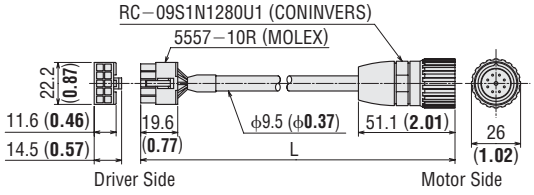
4 Flexible Extension Cables for IP65 Rated Motor

Product Line

Model	Length L m (ft.)
CC01SAR2	1 (3.3)
CC02SAR2	2 (6.6)
CC03SAR2	3 (9.8)
CC05SAR2	5 (16.4)

Model	Length L m (ft.)
CC07SAR2	7 (23)
CC10SAR2	10 (32.8)

Dimensions Unit = mm (inch)



Driver Cables RoHS

These shielded cables are convenient for connecting α_{STEP} Series drivers to controllers. Dedicated type (equipped with the connector for the **EMP** Series controller) and general-purpose type are available.

Dedicated Type (Conforms to EMP Series)



One end of the cable is a half-pitch connector that snaps into the driver for α_{STEP} Series. The other end of the cable is equipped with the connector for the **EMP** Series controller.

Note:

- Note that as the length of the pulse signal line increases, the maximum transmission frequency decreases.

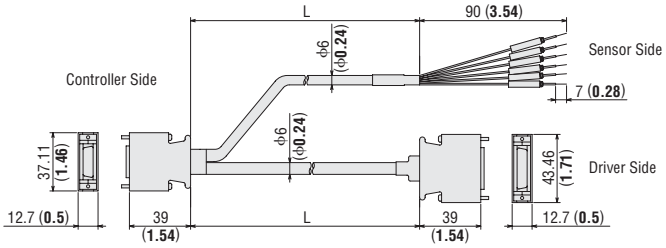
Product Line

Model	Applicable Series	Length L (m)
CC01EMP4	**AS** Series Pulse Input Package **ASC** Series	1
CC02EMP4		2

Note:

- The alarm clear signal of the **AS** and **ASC** Series cannot be used with the **EMP400** Series controller.

Dimensions (Unit = mm)



General-Purpose Type



This is a shielded cable equipped with, at one end of the cable, the half-pitch connector that snaps into the driver for α_{STEP} Series.

Notes:

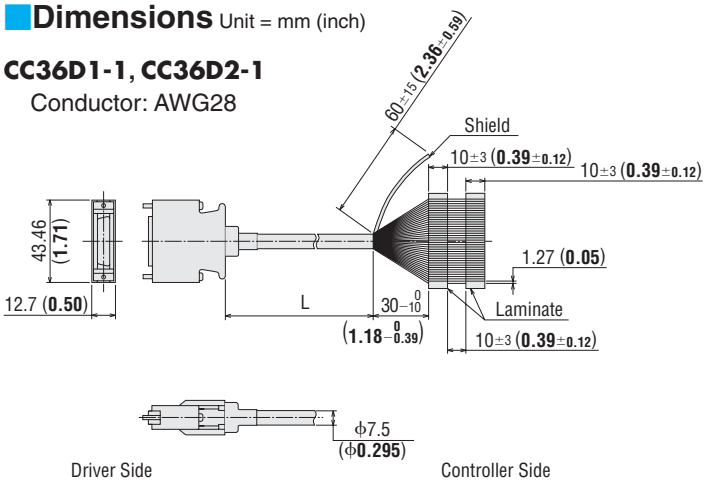
- Note that as the length of the pulse signal line increases, the maximum transmission frequency decreases.
- Install a connector that matches the controller you are using to the other end of the cable.

Product Line

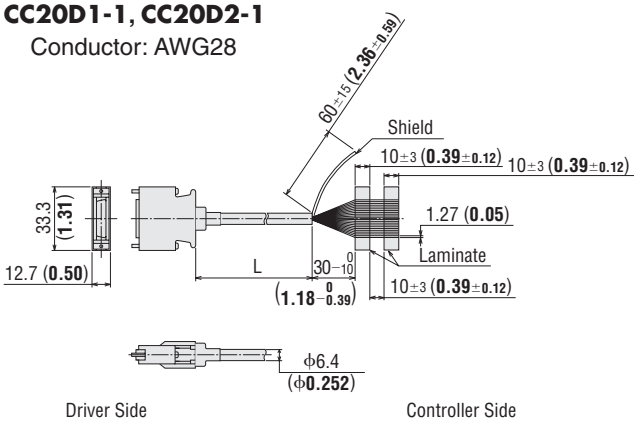
Model	Applicable Series	Length L m (ft.)
CC36D1-1	**AS** Series Pulse Input Package **AS** Series Built-In Controller Package **ASC** Series	1 (3.3)
CC36D2-1		2 (6.6)
CC20D1-1	**AS** Series Built-In Controller Package	1 (3.3)
CC20D2-1		2 (6.6)

Dimensions Unit = mm (inch)

CC36D1-1, CC36D2-1
Conductor: AWG28



CC20D1-1, CC20D2-1
Conductor: AWG28



Communication Cable FC04W5 RoHS

This cable is used to connect a personal computer and built-in controller (stored program) driver through an RS232 connection.



Cable Length: 5 m (16.4 ft.)

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Connector-Terminal Block Conversion Unit RoHS NEW



CC20T1



CC36T1

A conversion unit that connects a driver to a host controller using a terminal block.

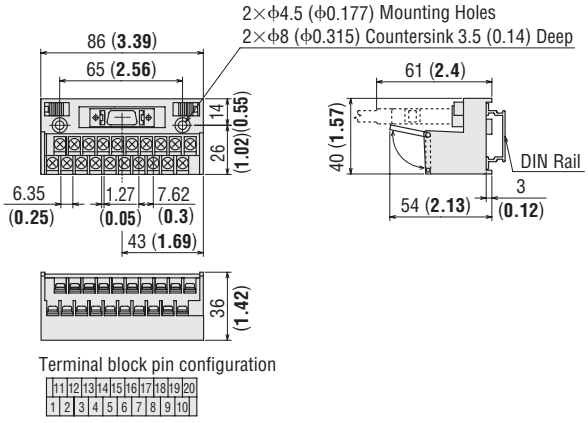
- With a signal name plate for easy, one-glance identification of driver signal names.
- DIN-rail mountable
- Cable length: 1 m (3.3 ft.)

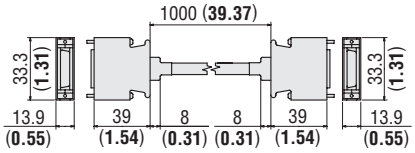
Product Line

Model	Applicable Series	Length L m (ft.)
CC20T1	**AS** Built-In Controller Package	1 (3.3)
CC36T1	**AS** Series Pulse Input Package **AS** Series Built-In Controller Package **ASC** Series	1 (3.3)

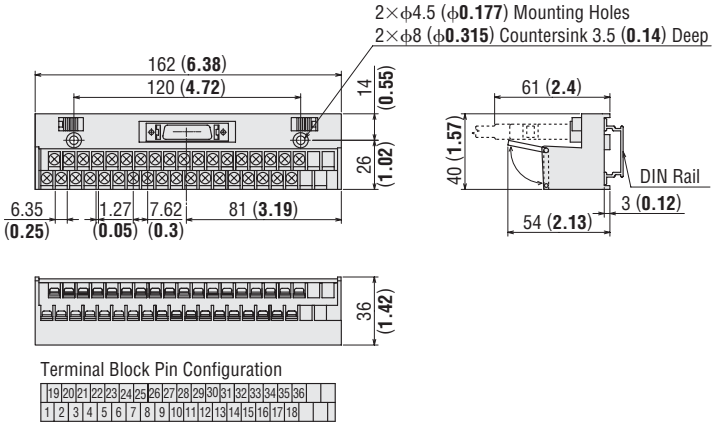
Dimensions Unit = mm (inch)

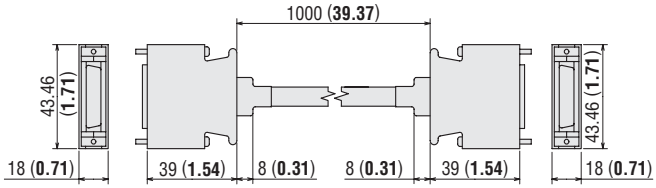
CC20T1





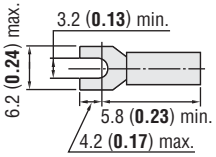
CC36T1





●Recommended Crimp Terminals

- Terminal screw size: M3
- Tightening torque: 1.2 N·m (170 oz-in)
- Applicable minimum lead wire: AWG22



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Flexible Couplings RoHS NEW

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



Features of MCS Couplings

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

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

Coupling Selection Table

Applicable Motor		Gear Ratio	Motor Shaft Diameter mm (in.)	Type	Driven Shaft Diameter mm (in.)												
AS Series	**ASC** Series				ϕ4 (ϕ0.1575)	ϕ5 (ϕ0.1969)	ϕ6 (ϕ0.2362)	ϕ6.35 (ϕ0.2500)	ϕ8 (ϕ0.3150)	ϕ10 (ϕ0.3937)	ϕ12 (ϕ0.4724)	ϕ14 (ϕ0.5512)	ϕ15 (ϕ0.5906)	ϕ16 (ϕ0.6299)	ϕ18 (ϕ0.7087)	ϕ20 (ϕ0.7874)	ϕ25 (ϕ0.9843)
AS46□A **AS46□AP**	**ASC34AK** **ASC36AK** **ASC46□K**	–	ϕ5 (ϕ0.1969)	**MCS14**	●	●	●										
–	**ASC34AK-T■**	**7.2, 10, 20, 30**															
AS46□A-T■ **AS46□AP-T■**	**ASC46□K-T■**	**3.6, 7.2, 10**	ϕ6 (ϕ0.2362)	**MCS20**		●	●	●	●	●							
–	**ASC34AK-N■**	**5, 7.2, 10**															
AS46□A-T■ **AS46□AP-T■**	**ASC46□K-T■**	**20, 30**	ϕ6 (ϕ0.2362)	**MCS30**			●	●	●	●							
AS66□□E **AS66A□T** **AS66□□EP** **AS66A□TP** **AS69□□E** **AS69A□T** **AS69□□EP** **AS69A□TP**	**ASC66□K**	–	ϕ8 (ϕ0.3150)				●	●	●	●	●						
AS66□□E-T■ **AS66□□EP-T■**	**ASC66□K-T■**	**3.6, 7.2**															
–	**ASC34AK-H■**	**50, 100**															
AS46□A-N■ **AS46□AP-N■**	**ASC46□K-N■**	**7.2, 10**	ϕ10 (ϕ0.3937)				●	●	●	●	●	●					
AS98□□E **AS98A□T** **AS98□□EP** **AS98A□TP** **AS911A□E** **AS911A□T** **AS911A□EP** **AS911A□TP**	–	–	ϕ14 (ϕ0.5512)							●	●	●		●			
AS66□□E-T■ **AS66□□EP-T■**	**ASC66□K-T■**	**10, 20, 30**	ϕ8 (ϕ0.3150)	**MCS40**					●	●	●		●				
AS46□A2-H■ **AS46□AP2-H■**	**ASC46□K-H■**	**50, 100**	ϕ10 (ϕ0.3937)						●	●	●		●				
AS66□□E-N■ **AS66□□EP-N■**	**ASC66□K-N■**	**5, 7.2**	ϕ12 (ϕ0.4724)						●	●	●		●				
AS98□□E-T■ **AS98□□EP-T■**	–	**3.6, 7.2, 10, 20, 30**	ϕ12 (ϕ0.4724)	**MCS55**													
AS66□□E-N■ **AS66□□EP-N■**	**ASC66□K-N■**	**10, 25, 36, 50**									●	●	●	●			
AS66□□E-H■ **AS66□□EP-H■**	**ASC66□K-H■**	**50, 100**															
AS98□□E-N■ **AS98□□EP-N■**	–	**5, 7.2, 10, 25, 36, 50**	ϕ18 (ϕ0.7087)	**MCS65**										●	●	●	●
AS98□□E-H■ **AS98□□EP-H■**	–	**50, 100**															

- Enter **A** (standard) or **M** (electromagnetic brake) in the box (□) within the model name.
  Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
  Enter the gear ratio in the box (■) within the model name.

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Product Number Code

MCS 30 08 12

① ② ③ ④

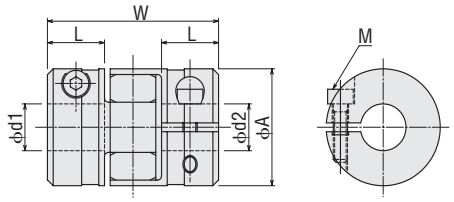
①	**MCS** Couplings
②	Outer Diameter of Coupling
③	Inner Diameter d1 (Smaller Side) [**F04** represents ϕ6.35 mm (ϕ0.25 in.)]
④	Inner Diameter d2 (Larger Side) [**F04** represents ϕ6.35 mm (ϕ0.25 in.)]

Specifications

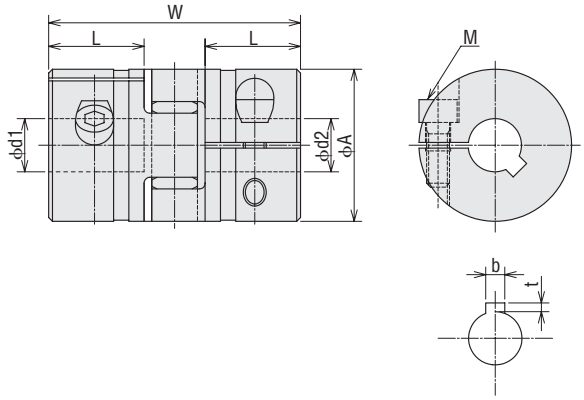
Model	Dimensions							Normal Torque N·m (lb-in)	Mass g (oz.)	Inertia kg·m² (oz-in²)	Static Torsion Spring Constant N·m/rad (lb-in/rad)	Permissible Eccentricity mm (in.)	Permissible Declination deg	Permissible End Play mm (in.)
	Outer Diameter ϕA mm (in.)	Length W mm (in.)	Axis Hole Diameter d1 H7 mm (in.)	Axis Hole Diameter d2 H7 mm (in.)	Key Slot Tolerance b/t mm (in.)	L mm (in.)	Screw Used M							
MCS140405 **MCS140505** **MCS140506** **MCS140606**	14 (0.55)	22 (0.87)	4 (0.1575) 5 (0.1969) 5 (0.1969) 6 (0.2362)	5 (0.1969) 5 (0.1969) 6 (0.2362) 6 (0.2362)	–	7 (0.28)	M2	2.0 (17.7)	6.7 (0.23)	0.184×10^{-6} (0.01)	22.9 (200)	0.06 (0.0024)	0.9	$+0.6\ 0\ (+0.024\ 0)$
MCS200506 **MCS200606** **MCS2006F04** **MCS200608** **MCS200610**	20 (0.79)	30 (1.18)	5 (0.1969) 6 (0.2362) 6 (0.2362) 6 (0.2362) 6 (0.2362)	6 (0.2362) 6 (0.2362) 6.35 (0.2500) 8 (0.3150) 10 (0.3937)	–	10 (0.39)	M2.5	5.0 (44)	19.8 (0.69)	1.059×10^{-6} (0.06)	51.6 (450)	0.08 (0.0031)	0.9	$+0.8\ 0\ (+0.031\ 0)$
MCS300606 **MCS3006F04** **MCS300608** **MCS300610** **MCS30F0408** **MCS30F0410** **MCS300808** **MCS300810** **MCS300812** **MCS301010** **MCS301012** **MCS301014** **MCS301214** **MCS301414** **MCS301416**	30 (1.18)	35 (1.38)	6 (0.2362) 6 (0.2362) 6 (0.2362) 6 (0.2362) 6.35 (0.2500) 6.35 (0.2500) 8 (0.3150) 8 (0.3150) 8 (0.3150) 10 (0.3937) 10 (0.3937) 10 (0.3937) 12 (0.4724) 14 (0.5512) 14 (0.5512)	6 (0.2362) 6.35 (0.2500) 8 (0.3150) 10 (0.3937) 8 (0.3150) 10 (0.3937) 8 (0.3150) 10 (0.3937) 12 (0.4724) 10 (0.3937) 12 (0.4724) 14 (0.5512) 14 (0.5512) 16 (0.6299)	–	11 (0.43)	M3	12.5 (110)	44.6 (1.57)	6.057×10^{-6} (0.33)	171.9 (1520)	0.09 (0.0035)	0.9	$+1.0\ 0\ (+0.039\ 0)$
MCS400808 **MCS400810** **MCS400812** **MCS400815** **MCS401010** **MCS401012** **MCS401015** **MCS401212** **MCS401215**	40 (1.57)	66 (2.60)	8 (0.3150) 8 (0.3150) 8 (0.3150) 8 (0.3150) 10 (0.3937) 10 (0.3937) 10 (0.3937) 12 (0.4724) 12 (0.4724)	8 (0.3150) 10 (0.3937) 12 (0.4724) 15 (0.5906) 10 (0.3937) 12 (0.4724) 15 (0.5906) 12 (0.4724) 15 (0.5906)	ϕ8 (ϕ0.3150) b : 2±0.0125 (0.0787±0.0005) t : $1^{+0.1}_{0}$ ($0.039^{+0.0039}_{0}$) ϕ10 (ϕ0.3937) b : 3±0.0125 (0.1181±0.0005) t : $1.4^{+0.1}_{0}$ ($0.055^{+0.0039}_{0}$) ϕ12 (ϕ0.4724) b : 4±0.015 (0.1575±0.0006) t : $1.8^{+0.1}_{0}$ ($0.071^{+0.0039}_{0}$) ϕ14 (ϕ0.5512) b : 5±0.015 (0.1969±0.0006) t : $2.3^{+0.1}_{0}$ ($0.091^{+0.0039}_{0}$) ϕ15 (ϕ0.5906) b : 5±0.015 (0.1969±0.0006) t : $2.3^{+0.1}_{0}$ ($0.091^{+0.0039}_{0}$) ϕ16 (ϕ0.6299) b : 5±0.015 (0.1969±0.0006) t : $2.3^{+0.1}_{0}$ ($0.091^{+0.0039}_{0}$) ϕ18 (ϕ0.7078) b : 6±0.015 (0.2362±0.0006) t : $2.8^{+0.1}_{0}$ ($0.110^{+0.0039}_{0}$) ϕ20 (ϕ0.7874) b : 6±0.015 (0.2362±0.0006) t : $2.8^{+0.1}_{0}$ ($0.110^{+0.0039}_{0}$) ϕ25 (ϕ0.9843) b : 8±0.018 (0.3150±0.0007) t : $3.3^{+0.2}_{0}$ ($0.0130^{+0.0079}_{0}$)	25 (0.98)	M6	17.0 (150)	139 (4.9)	42.29×10^{-6} (2.3)	859.5 (7600)	0.06 (0.0024)	0.9	$+1.2\ 0\ (+0.047\ 0)$
MCS551212 **MCS551214** **MCS551215** **MCS551216**	55 (2.17)	78 (3.07)	12 (0.4724) 12 (0.4724) 12 (0.4724) 12 (0.4724)	12 (0.4724) 14 (0.5512) 15 (0.5906) 16 (0.6299)		30 (1.18)	M6	60.0 (530)	282 (10)	109.1×10^{-6} (6)	2063 (18200)	0.1 (0.0039)	0.9	$+1.4\ 0\ (+0.055\ 0)$
MCS651618 **MCS651818** **MCS651820** **MCS651825**	65 (2.56)	90 (3.54)	16 (0.6299) 18 (0.7087) 18 (0.7087) 18 (0.7087)	18 (0.7087) 18 (0.7087) 20 (0.7874) 25 (0.9843)		35 (1.38)	M8	160 (1410)	535 (18.9)	417.1×10^{-6} (22.8)	3438 (30000)	0.11 (0.0043)	0.9	$+1.5\ 0\ (+0.059\ 0)$

Dimensions

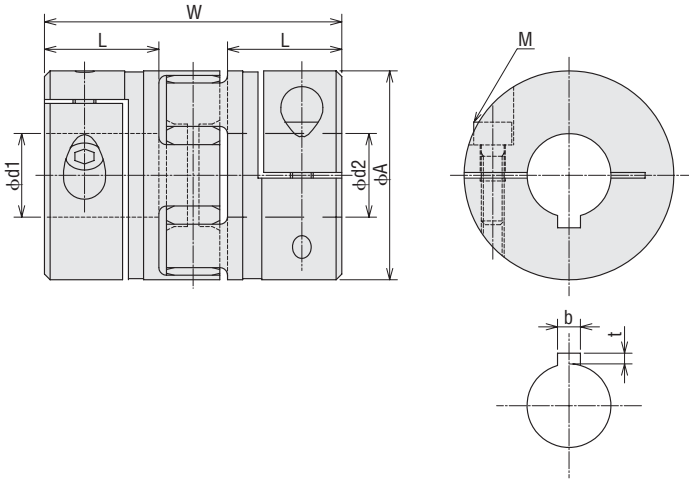
MCS14 Mass: 6.7 g (0.23 oz.)
MCS20 Mass: 19.8 g (0.69 oz)
MCS30 Mass: 44.6 g (1.57 oz.)



MCS40 Mass: 139 g (4.9 oz.)



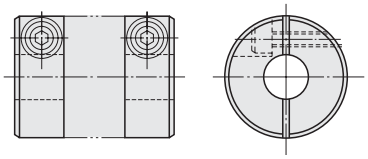
MCS55 Mass: 282 g (10 oz.)
MCS65 Mass: 535 g (18.9 oz.)



Mounting to a Shaft

Clamp Type

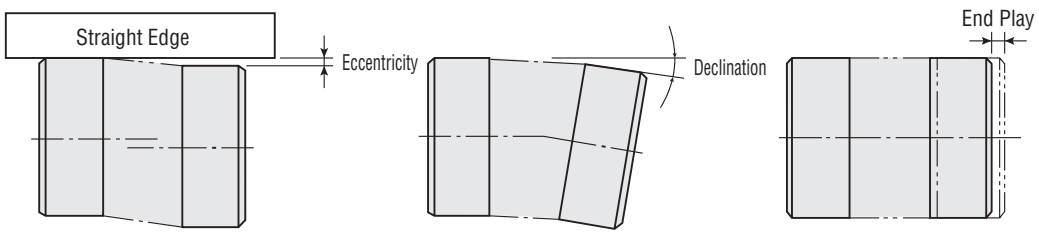
Clamp couplings use the binding force of the screw to compress the shaft hole diameter and thereby fasten the coupling to the shaft. This does not damage the shaft and is easy to mount and remove. The following table shows the screw binding torque. We recommend use of a torque wrench to fasten the coupling.



Type	MCS14	MCS20	MCS30	MCS40	MCS55	MCS65
Tightening Torque N·m (oz-in)	0.37 (52)	0.76 (107)	1.34 (190)	10.5 (1490)	10.5 (1490)	25 (3550)

Alignment Adjustment

Flexible couplings tolerate misalignment of the axis center and transfer rotational angle and torque, but produce vibration when the permissible value for misalignment is exceeded. This can dramatically shorten the coupling's service life. This requires alignment adjustment.
Misalignment of the axis center includes eccentricity (parallel error of both centers), declination (angular error of both centers) and end play (shaft movement in the axial direction). To keep misalignment within the permissible value, always check and adjust the alignment.
To increase the service life of the coupling, we recommend keeping misalignment to below 1/3 of the permissible value.



Notes:

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

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Motor Mounting Brackets

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



Product Line

Standard Type

Material: Aluminum die cast

Mounting Bracket Models	Applicable Motor
PAF0P	**AS46□A** **AS46□AP** **ASC46□K**
PAL0P	**AS46□A** **AS46□AP** **ASC46□K**
PAL2P-5A	**AS66□■E** **AS66A■T** **AS66□■EP** **AS66A■TP** **ASC66□K** **AS69□■E** **AS69A■T** **AS69□■EP** **AS69A■TP**
PAL4P-5A	**AS98□■E** **AS98A■T** **AS98□■EP** **AS98A■TP** **AS911A■E** **AS911A■T** **AS911A■EP** **AS911A■TP**

- Enter **A** (standard) or **M** (electromagnetic brake) in the box (□) within the model name.
  Enter the power supply voltage **A**, **C** or **S** in the box (■) within the model name.
- The mounting bracket base is built with holes large enough to allow for alignment adjustments in the horizontal direction.
- These mounting brackets can be perfectly fitted to the pilot of the stepping motors. (except for **PAL0P**)

Note:

- They cannot be used with geared stepping motors.

Geared Type

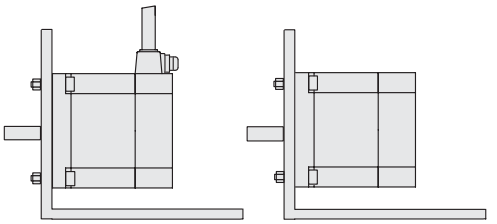
Material: Aluminum die cast RoHS

Mounting Bracket Models	Applicable Motor
SOL0B-A	**AS46□A-T■** **AS46□AP-T■** **ASC46□K-T■**
SOL2A-A	**AS66□■E-T■** **AS66□■EP-T■** **ASC66□K-T■**
SOL5B-A	**AS98□■E-T■** **AS98□■EP-T■**

- Enter **A** (standard) or **M** (electromagnetic brake) in the box (□) within the model name.
  Enter the power supply voltage **A**, **C** or **S** in the box (■) within the model name.
  Enter the gear ratio in the box (■) within the model name.
- The mounting bracket base is built with holes large enough to allow for alignment adjustments in the horizontal direction.
- No screws are supplied for installing. Provide appropriate screws separately.

Motor Installation Direction

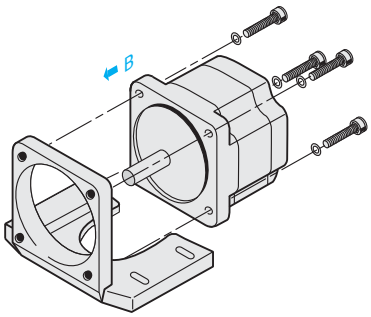
The motor cable comes out at right angles to the motor. Orient the motor so that the cable faces either upward or sideways.



Cable facing upward　　Cable facing sideways

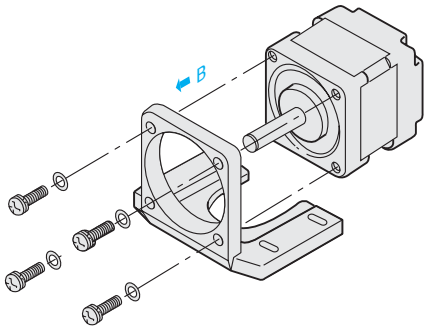
Mounting the Motor

1 PAL2P-5A, PAL4P-5A



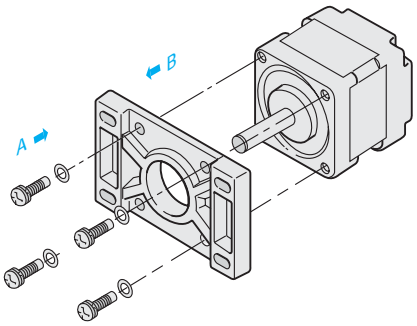
①Use the screws provided to secure the motor to the mounting bracket.
②Attach the motor from the direction shown by the arrow (B).

2 PAL0P, SOL0B-A, SOL2A-A, SOL5B-A



①Use the screws provided to secure the motor to the mounting bracket.
(No screws are supplied for **SOL0B-A**, **SOL2A-A** and **SOL5B-A**. Provide appropriate screws separately.)
②Attach the motor from the direction shown by the arrow (B).

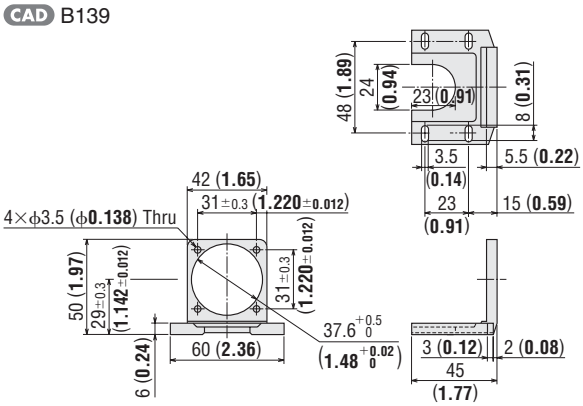
3 PAF0P



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

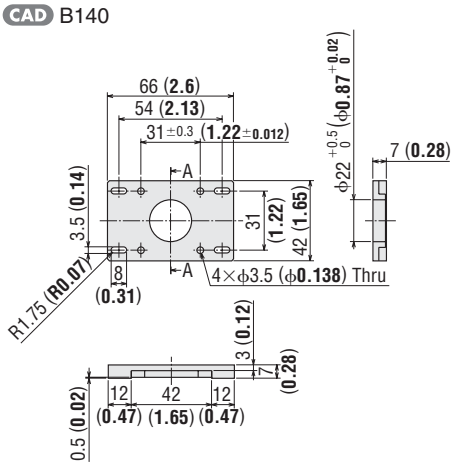
Dimensions Unit = mm (inch)

PAL0P
Mass: 35 g (1.24 oz.)
CAD B139



●Screws (Included)
M3P0.5 Length 10 mm (0.39 in.) ··· 4 Pieces

PAF0P
Mass: 30 g (1.06 oz.)
CAD B140



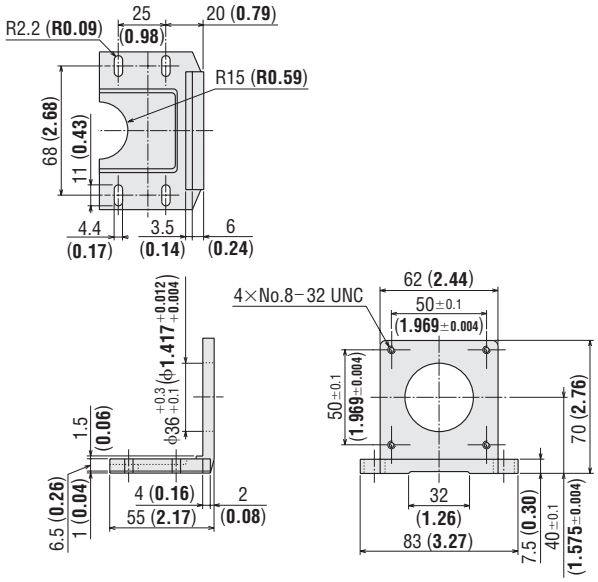
●Screws (Included)
M3P0.5 Length 7 mm (0.28 in.) ··· 4 Pieces

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PAL2P-5A

Mass: 110 g (3.9 oz.)

CAD B143



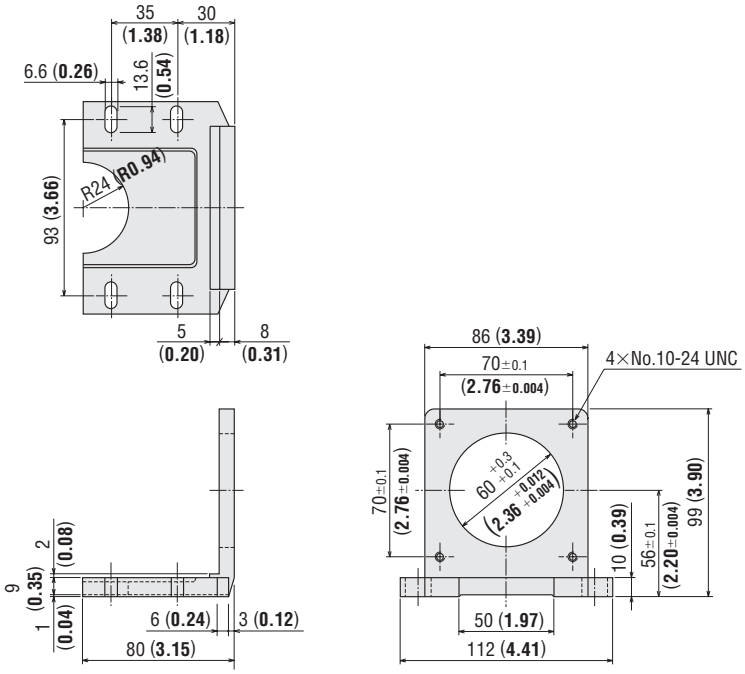
●Screws (Included)

No.8-32 UNC ··· 4 Pieces

PAL4P-5A

Mass: 250 g (8.8 oz.)

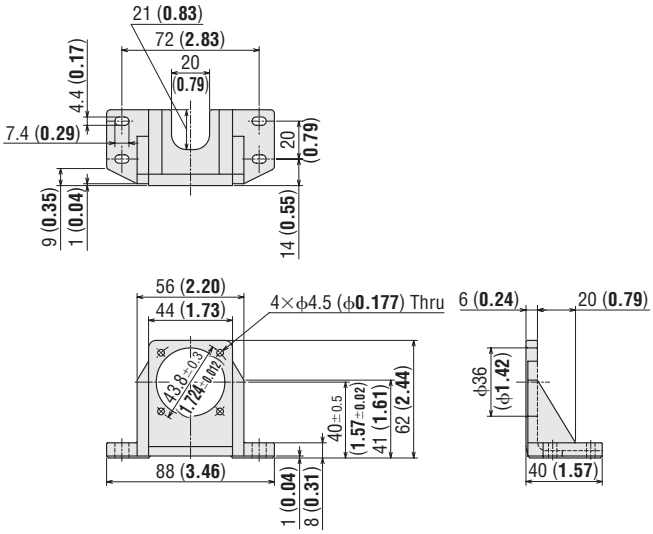
CAD B145



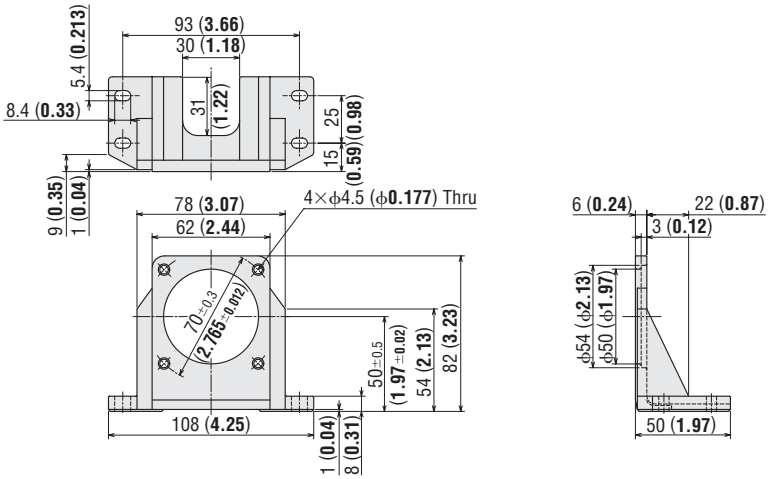
●Screws (Included)

No.10-24 UNC ··· 4 Pieces

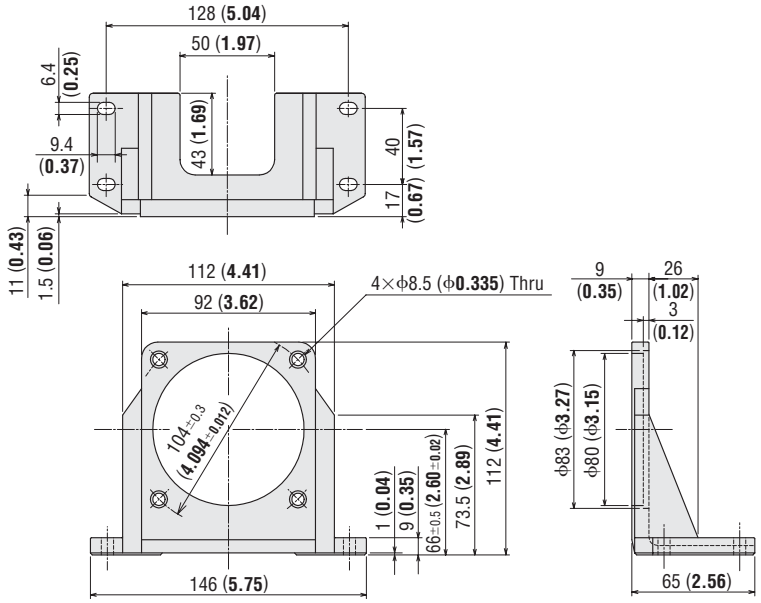
SOL0B-A
Mass: 85 g (3 oz.)
CAD B267



SOL2A-A
Mass: 120 g (4.2 oz.)
CAD B268



SOL5B-A
Mass: 270 g (9.5 oz.)
CAD B271



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DIN Rail Mounting Plate RoHS

This installation plate is convenient for installing the driver of αSTEP **AS** Series on DIN rails with ease.

Product Line

Model	Applicable Product
PADP01	**AS** Series Driver



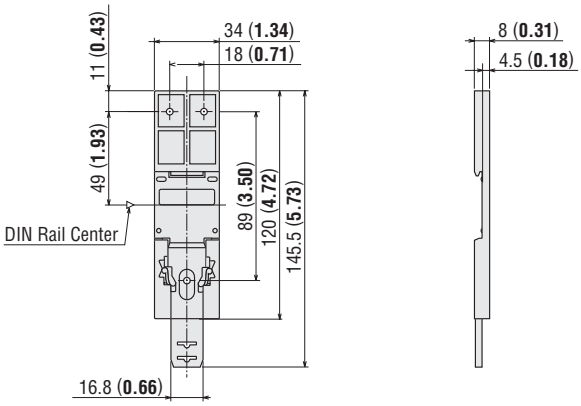
Dimensions Unit = mm (inch)

PADP01

Mass: 20 g (0.71 oz.)

●Screws (Included)

M3P0.5 Length 8 mm (0.31 in.) ··· 3 pieces

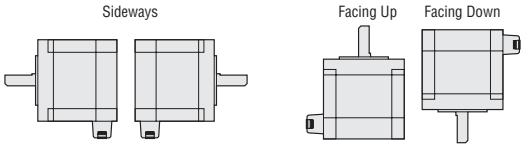


Before Using a Stepping Motor

Motor Installation

Direction of Mounting

Motors can be mounted freely in any direction as shown below.
Regardless of how the motor is mounted, take care not to apply an overhung load or thrust load on the shaft.
Make sure the cable does not contact the mounting surface causing undesirable force on the cable.

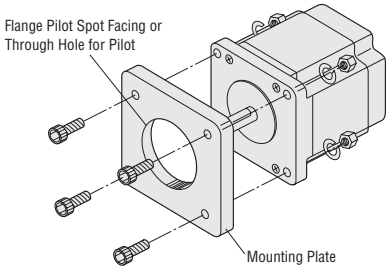


Notes:
- Do not disassemble the motors.
- Do not apply any shock load to the motor.

Mounting Method

Considering heat radiation and vibration isolation as much as possible, mount the motor tightly against a metal surface.

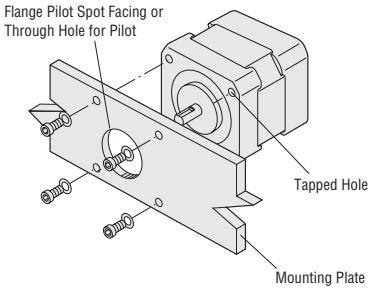
◇Through Hole Type



Model	Thickness of the Mounting Plate
AS66□□E **AS66A□T** **AS66□□EP** **AS66A□TP** **ASC66□K** **AS69□□E** **AS69A□T** **AS69□□EP** **AS69A□TP**	5 mm (0.2 in.) min.
AS98□□E **AS98A□T** **AS98□□EP** **AS98A□TP** **AS911A□E** **AS911A□T** **AS911A□EP** **AS911A□TP**	8 mm (0.31 in.) min.
AS98□□E-H■ **AS98□□EP-H■**	12 mm (0.47 in.) min.

- Enter **A** (standard) or **M** (electromagnetic brake) in the box (□) within the model name.
  Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
  Enter the gear ratio in the box (■) within the model name.

◇Tapped Hole Type



Applicable Motor		Thickness of the Mounting Plate
AS Series	**ASC** Series	
AS46□A **AS46□AP**	**ASC34AK** **ASC36AK** **ASC46□K** **ASC34AK-T■** **ASC34AK-N■** **ASC34AK-H■**	3 mm (0.12 in.) min.
AS46□A-T■ **AS46□AP-T■** **AS46□A-N■** **AS46□AP-N■** **AS46□A2-H■** **AS46□AP2-H■** **AS66□□E-T■** **AS66□□EP-T■**	**ASC46□K-T■** **ASC46□K-N■** **ASC46□K-H■** **ASC66□K-T■**	5 mm (0.20 in.) min.
AS66□□E-N■ **AS66□□EP-N■** **AS66□□E-H■** **AS66□□EP-H■** **AS98□□E-T■** **AS98□□EP-T■**	**ASC66□K-N■** **ASC66□K-H■**	8 mm (0.31 in.) min.
AS98□□E-N■ **AS98□□EP-N■**	–	12 mm (0.47 in.) min.

- Enter **A** (standard) or **M** (electromagnetic brake) in the box (□) within the model name.
  Enter the power supply voltage **A**, **C** or **S** in the box (□) within the model name.
  Enter the gear ratio in the box (■) within the model name.

Installation Conditions

Install the motor in a location that meets the following conditions, or the product may be damaged.

- Indoors (This product is designed and manufactured to be installed within another device)
- Ambient temperature:
  0˚C to +50˚C (+32˚F~+122˚F) (nonfreezing)
  0˚C to +40˚C (+32˚F~+104˚F) (nonfreezing): Harmonic geared type
- Ambient humidity: 85% or less (noncondensing)
- Not exposed to explosive, flammable, or corrosive gas
- Not exposed to direct sunlight
- Not exposed to dust
- Not exposed to water or oil (except for IP65 rated motor)
- A place where heat can escape easily
- Not exposed to continuous vibration or excessive impact

Notes:
- When installing the motor in an enclosed space such as a control box, or somewhere close to a heat-radiating object, vent holes should be used to prevent the motor from overheating.
- Do not install the motor in a location where a source of vibration will cause the motor to vibrate.

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Driver Installation

AC Input Type

◇Installation Direction and Method

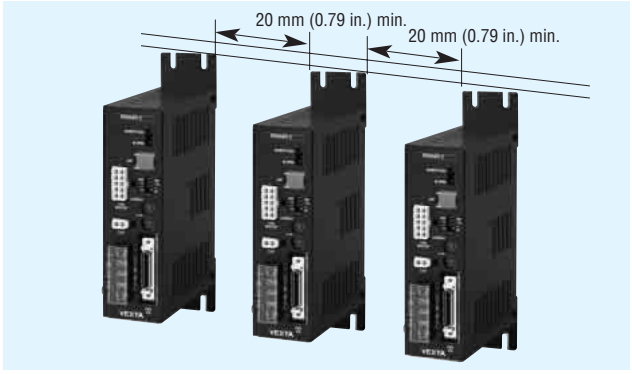
Drivers are designed to dissipate heat through natural convection. Install the driver vertically as shown in the photograph.



- Firmly install on a metal plate that has good heat conductivity, such as iron or aluminum 2 mm (0.08 in.) or more in thickness.
- To directly install the driver without using the screws provided, pay particular attention to the length of the screws used for the tapped holes. For **AS** Series, the use of screw that would penetrate 3 mm (0.12 in.) or more through the surface of the driver may cause damage to the driver.

◇Using Multiple Axes

When using multiple stepping motor axes, driver temperature rise will cause ambient temperatures to rise. At least 20 mm (0.79 in.) must be allowed between driver units and at least 25 mm (0.98 in.) between drivers and other equipment or structures.
Install a forced-air cooling fan if ambient temperatures exceed 50˚C (122˚F) [40˚C (104˚F) for built-in controller].



◇Installation Conditions

Install the driver in a location that meets the following conditions, or the product may be damaged.

- Indoors (This product is designed and manufactured to be installed within another device)
- Ambient temperature:
  0˚C to +50˚C (+32˚F~+122˚F)(nonfreezing):
  Pulse input driver
  0˚C to +40˚C (+32˚F~+104˚F)(nonfreezing):
  Built-in controller driver
- Ambient humidity: 85% or less (noncondensing)
- Not exposed to explosive, flammable, or corrosive gas
- Not exposed to direct sunlight
- Not exposed to dust
- Not exposed to water or oil
- A place where heat can escape easily
- Not exposed to continuous vibration or excessive impact

Notes:

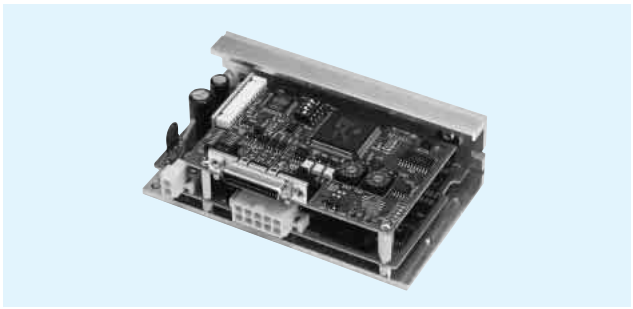
- When installing the driver in an enclosed space such as a control box, or somewhere close to a heat-radiating object, vent holes should be used to prevent the driver from overheating.
- Do not install the driver in a location where a source of vibration will cause the driver to vibrate.
- In situations where drivers are located close to a large noise source such as high frequency welding machines or large electromagnetic switches, take steps to prevent noise interference, either by inserting noise filters or connecting the driver to a separate circuit.
- Take care that pieces of conductive material (filings, pins, pieces of wire, etc.) do not enter the drivers.

DC Input Type

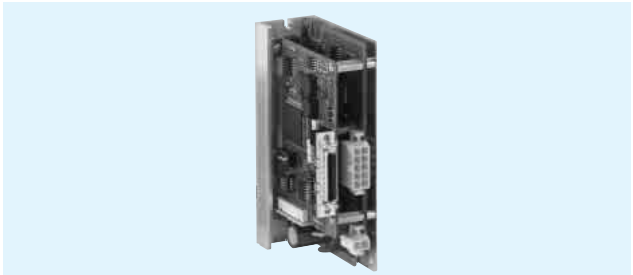
◇Installation Direction

Considering heat radiation, install the driver vertically or board side down. Install the driver in a way that the power element side faces up and the aluminum electrolytic capacitor side faces down.

Horizontal Installation



Vertical Installation



Note:

- The driver can generate a great deal of heat depending on the operating conditions. Make sure that the temperature of the heat sink does not exceed 80˚C (176˚F). [When the temperature of the heat sink exceeds 80˚C (176˚F), forced cooling is required.]

◇Installation Conditions

Install the driver in a location that meets the following conditions, or the product may be damaged.

- Indoors (This product is designed and manufactured to be installed within another device)
- Ambient temperature: 0˚C to +40˚C (+32˚F~+104˚F) (nonfreezing)
- Ambient humidity: 85% or less (noncondensing)
- Not exposed to explosive, flammable, or corrosive gas
- Not exposed to direct sunlight
- Not exposed to dust
- Not exposed to water or oil
- A place where heat can escape easily
- Not exposed to continuous vibration or excessive impact

Notes:

- When installing the driver in an enclosed space such as a control box, or somewhere close to a heat-radiating object, vent holes should be used to prevent the driver from overheating.
- Do not install the driver in a location where a source of vibration will cause the driver to vibrate.
- In situations where drivers are located close to a large noise source such as high frequency welding machines or large electromagnetic switches, take steps to prevent noise interference, either by inserting noise filters or connecting the driver to a separate circuit.
- Take care that pieces of conductive material (filings, pins, pieces of wire, etc.) do not enter the drivers.

Controllers

Types of Controllers

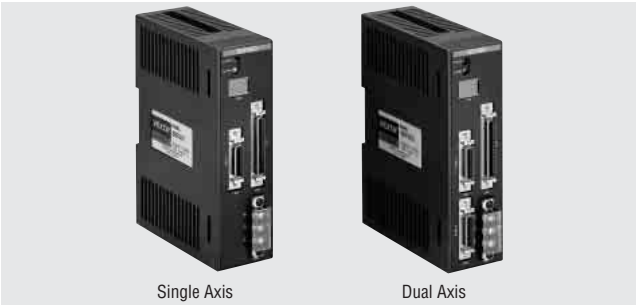
We offer an extensive range of controllers that are designed with Oriental Motor's superior technologies to achieve various operations at will.
Choose the optimal controller to match your application.

		Stored Program Controller **EMP400** Series	Stored Data Controller **SG8030J**
			
Program	Number of Programs	32	–
	Capacity	1000 commands	–
	Input Method	Command input via terminal program	–
	Number of Control Tasks	Main: 1, Sub: 0	–
Positioning Data	Number of Settings	–	4 steps Sequential-step positioning type Step-select positioning type
	Setting Mode	–	Set with touch key on front panel
Oscillator Specifications	Number of Control Axes	Single axis, Dual axis	Single axis
	Pulse Output Mode	1-pulse output/2-pulse output mode	1-pulse output/2-pulse output mode
	Acceleration/Deceleration Pattern	Linear Jerk-limit control	Linear Jerk-limit control
Operation Pattern	Relative Positioning Operation	○	○
	Absolute Positioning Operation	○	–
	Continuous Operation	○	○
	Return to Mechanical Home Operation	○	○
	Dual Axis Liner Interpolation Operation	○	–
	Multistep Speed-Change Operation	○	–
Features		·General-purpose inputs: 8 points ·General-purpose outputs: 6 points ·Carefully selected functions and commands to achieve motor operation with greater ease ·Teaching function (when the optional operator interface unit **OP300** is used) ·No special software ·Program input using Windows's standard communication application	·Compact, simple and less wiring ·Jerk limit control function for work transfer applications with low vibration
General Specifications	Power Source	24 VDC	
	Dimensions	W 40 mm (1.57 in.) × H 135 mm (5.31 in.) × D 100 mm (3.94 in.)	W 48 mm (1.89 in.) × H 48 mm (1.89 in.) × D 83.7 mm (3.30 in.) (Except for the socket)
Page		89	101

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Programmable Motion Controller

EMP400 Series RoHS



Single Axis　　Dual Axis

Features

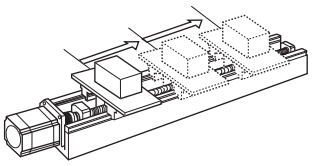
●Allowing the Input of 32 Sequence Programs

The **EMP400** Series can store 32 different operation programs. You can select and execute a desired program or programs using an external input signal.
For example, you can create a dedicated sequence program for each work for selection/execution as necessary.
In addition to the 32 programs, you can input one sequence program that runs automatically when the power is turned on.
A maximum of 1000 steps can be stored when all sequence programs are combined together.

●Various Operation Patterns

◇Repeated Positioning

Simple movements like "repeating positioning operation for a specified number of times and then return to the home at the end" can be implemented effortlessly.



Example of Repeated Positioning

◇Stopping via Sensor Input

You can start an operation from a desired position using a general-purpose input and cause the motor to decelerate to a stop upon sensor detection.

◇Linear Interpolation between Two Axes

Positioning operations involving two axes can be performed simultaneously via linear interpolation.

◇Continuous Operation at Variable Speeds

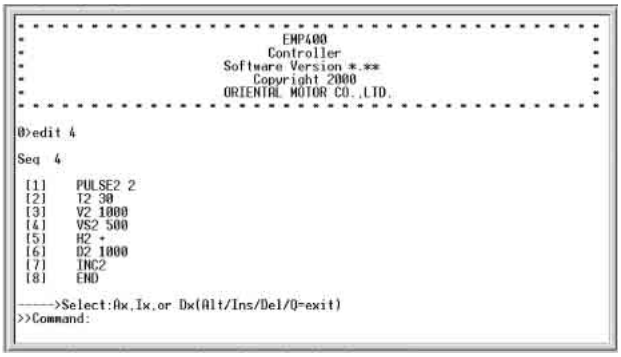
You can change the speed to desired levels during continuous operation.

●Teaching Function

You can adjust the travel amount or monitor the current position via teaching, using an optional **OP300** operational unit.

●No Need for Dedicated Software

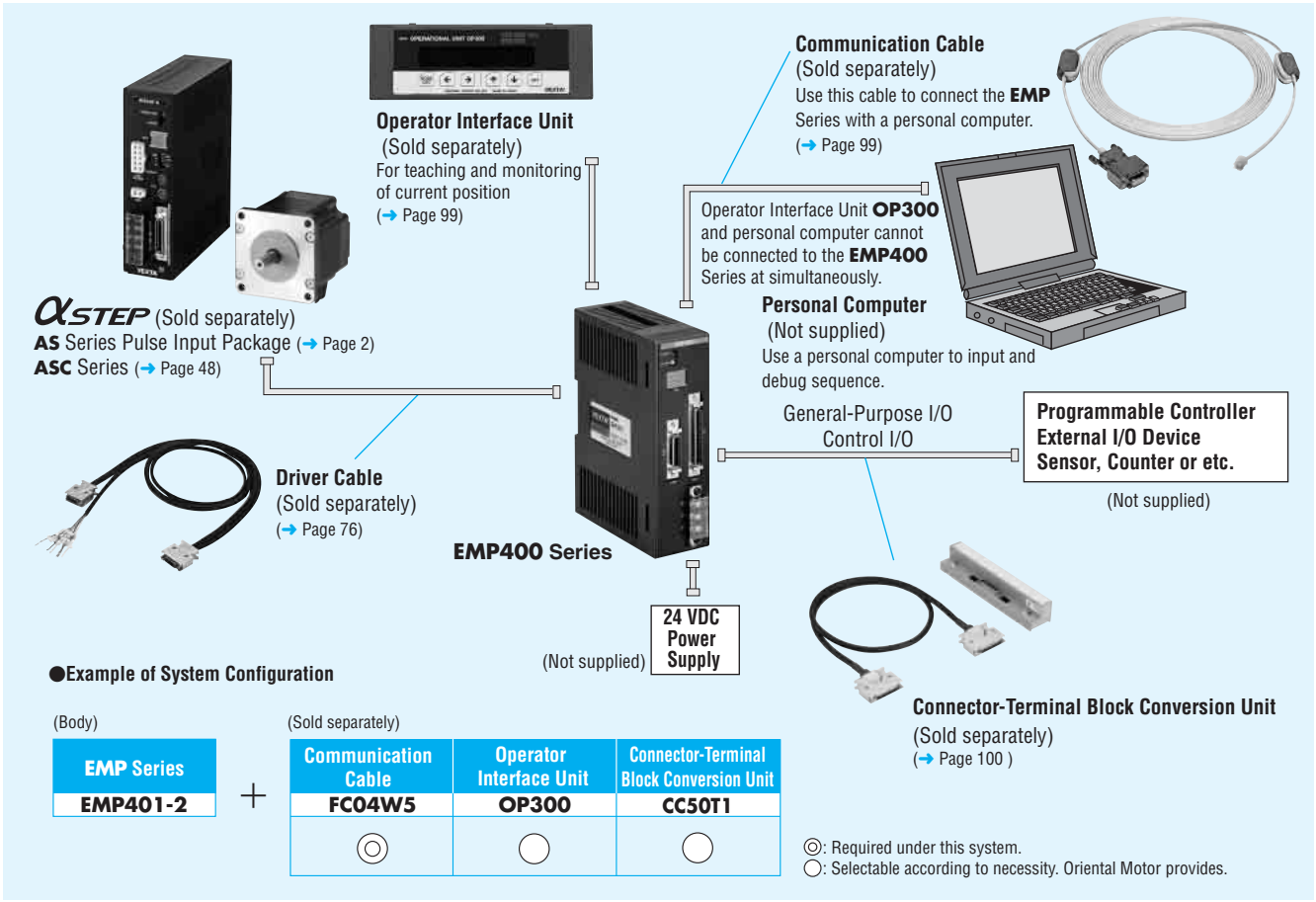
Sequence programs are input from HyperTerminal, a standard Windows application, so no dedicated software is necessary.



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●EMP400 Series

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



●Example of System Configuration

(Body)		(Sold separately)		
EMP Series		Communication Cable	Operator Interface Unit	Connector-Terminal Block Conversion Unit
EMP401-2	+	FC04W5	OP300	CC50T1
		◎	○	○

◎: Required under this system.
○: Selectable according to necessity. Oriental Motor provides.

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

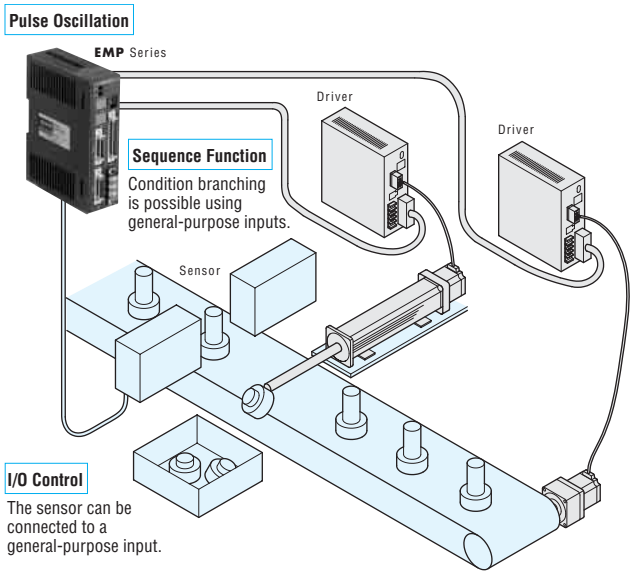
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Functions

Pulse Oscillation
Various operation patterns are provided standard from positioning and origin return to two-axis linear interpolation. All you need is to set the necessary parameters.

Sequence Function
A series of operation patterns can be programmed using dedicated commands. An ideal function for distributed system control.

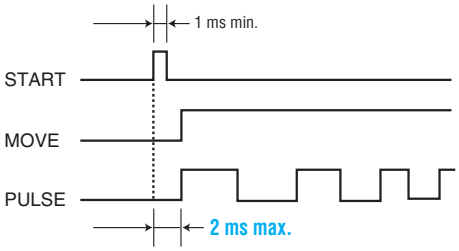
I/O Control
General-purpose I/O signals are provided in addition to dedicated I/Os such as pulse output and limit-sensor input. Synchronization with peripherals is also possible.



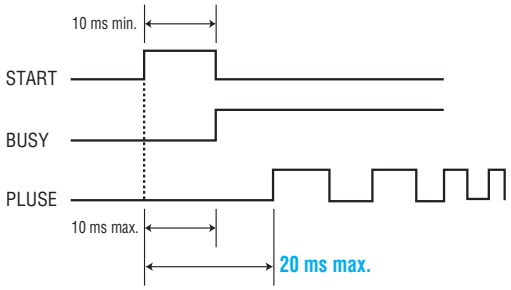
Pulse Oscillation

Fast Response Time
The time between a START signal input and a pulse output is 2 ms or less.

Pulse Oscillating Time of EMP400 Series



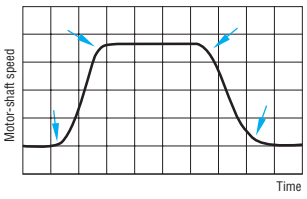
Pulse Oscilltating Time of Conventional Controller

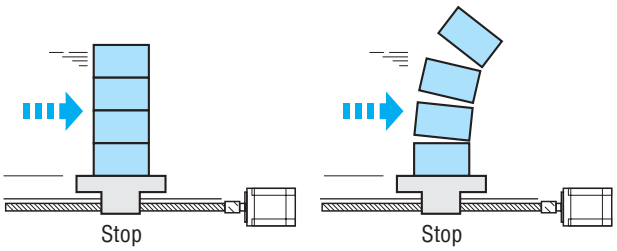


High-Speed Positioning and Low Vibration
The jerk-limit control function allows you to set a shorter acceleration/deceleration time compared with the use of linear acceleration/deceleration patterns. This reduces the overall positioning time.

What is jerk-limit control?

This term refers to the acceleration/deceleration patterns used to ensure the smoothness of speed change at the start of operation or when the machine enters a constant-speed mode from an acceleration mode. Since speed change becomes more smooth, vibration is reduced.





With Jerk-Limit Control

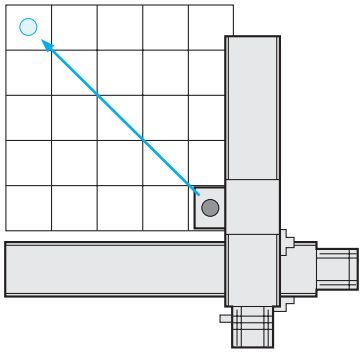
No Jerk-Limit Control

●Positioning Operation

Supports both incremental mode (travel amount) and absolute mode (absolute-position).

●Linear Interpolation Operation

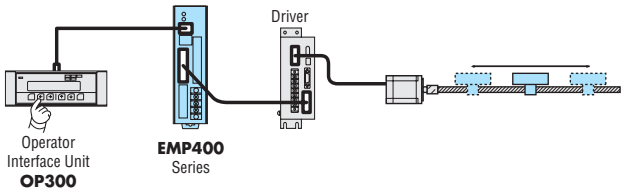
Two axes are controlled simultaneously, allowing direct movement to a target position.



●Teaching Function

The amount of travel can be changed by jogging the load into position via the **OP300** interface.

EMP400 Series



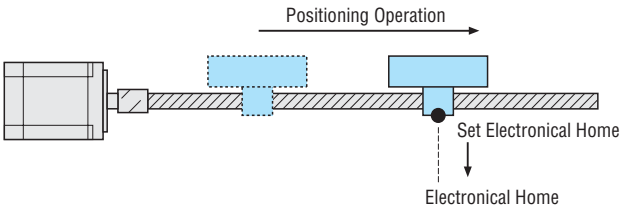
●Continuous Operation

Pulse output continues until a specified input is received or a specified time is reached.

●Set Soft Home (Clears the Current Position)

◇Electronical Home

The controller has an internal position counter. "0" position in this counter is soft home. The ability to set a voluntary position to soft home is available.

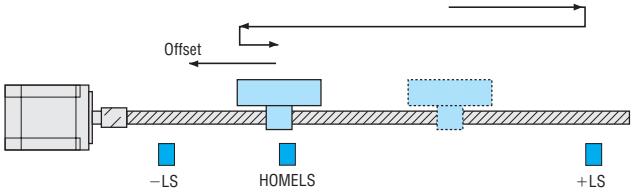


●Homing (Return to Mechanical Home Operation)

Ability to seek for a sensor representing a positioning reference point (home) is available.
Also available is the ability to set an offset from the home position.

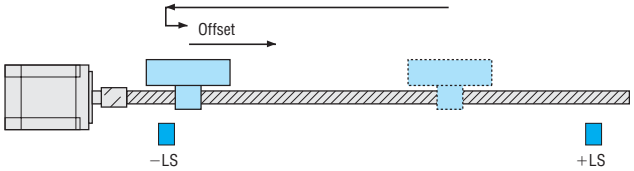
◇High-Speed Return (Three-Sensor Mode)

Using a predetermined sequence, the mechanical unit returns home at high speed from any position with three sensors monitoring the current position.
Since it's possible to specify the direction in which the home sensor is entered, backlash error doesn't occur in applications where positioning accuracy is critical.



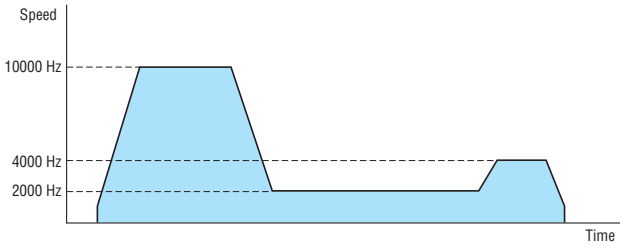
◇Constant-Speed Return (Two-Sensor Mode)

The mechanical unit returns home at a constant speed.
This mode is effective when a compact slider is operated, since the stroke can be fully utilized.



●Multistep Speed-Change Operation

Speed can be changed on the fly during continuous operation.

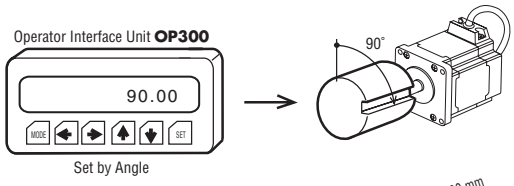


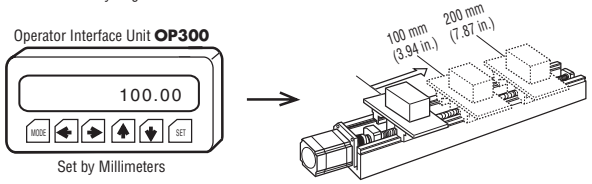
●A Choice of Acceleration/Deceleration Patterns

Each operation can be specified with a linear acceleration /deceleration pattern or jerk limit control.

●Distance Options

Set travel amount using various scaling units such as pulses, millimeters, or degrees.



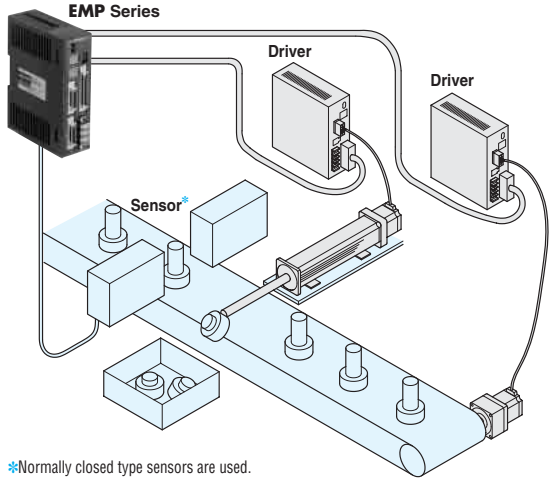


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Sequence Function

Stopping via Sensor Input

Connect a motor for transferring products to axis 1, another motor for ejecting nonconforming products to axis 2, and a sensor for detecting the height of transferred products to general-purpose input 1.



*Normally closed type sensors are used.

Application Description

①Transfer products via an index move of 30000 pulses (axis 1).
②Detect the height of the product using the sensor (general-purpose input 1).
③Return to ① if the detection result is acceptable.
④If the detection result is not acceptable, perform an index move of 30000 pulses and eject the nonconforming product (axis 2). Return to ② and perform acceptability judgment for the next product.

◇Sample Code for Application Example

```
        Seq 1
        [1]  V1 10000      ; Axis 1 (transfer)     Operating speed 10 kHz
        [2]  D1 +30000     ; Axis 1 (transfer)     Travel amount 30000 pulses
①→      [3]  INC1          ; Axis 1 (transfer)     Incremental positioning operation
        [4]  DELAY 0.5     ; Wait for 0.5 sec.
②③→     [5]  CJMP 1,0,3    ; Acceptability judgment (general-purpose input 1 = sensor)
                           ; OFF = Go to step [3] if OK
                           ; ON = Go to next step if NG
④→      [6]  INC1          ; Axis 1 (transfer)     Incremental positioning operation
        [7]  DELAY 0.5     ; Wait for 0.5 sec.
        [8]  V2 5000       ; Axis 2 (ejection)     Operating speed 5000 Hz
        [9]  D2 +1000      ; Axis 2 (ejection)     Travel amount 1000 pulses
        [10] ABS2          ; Axis 2 (ejection)     Absolute positioning operation
        [11] D2 0          ; Axis 2 (ejection)     Travel amount 0 pulse
        [12] ABS2          ; Axis 2 (ejection)     Absolute positioning operation
        [13] JMP 5         ; Jump to step [5]
```

I/O Control

Full Range of I/O

In addition to the signals for controlling the **EMP** Series (e.g., start, emergency stop, ready), a full range of other signals are available, including those necessary for motor control (e.g., pulse, alarm, limit sensor, home sensor) and general-purpose I/Os.

Control I/O (Dedicated)
START Input
E-STOP Input
READY Output
MOVE Output
END Output
etc.

General Purpose I/O
8 inputs
6 outputs
These signals can be easily controlled using conditional branching and timer processing.

Motor Control I/O (Dedicated)
PULSE Output
CCR Output
ALARM Input
END Input
TIMING Input
LD Input
HOMELS Input
SLIT Input
etc.

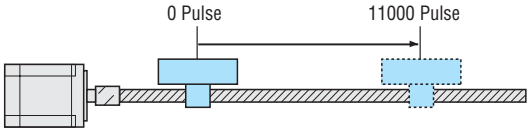
EMP400 Series Command List

Command		Description
Motor control	ABS	Perform the positioning operation with the absolute position specified.
	INC	Perform the positioning operation with the relative position specified.
	MHOME	Perform the return to mechanical home operation.
	SCAN	Perform continuous operation.
	RESET	Reset the software.
	RTNCR	Set the current position to 0 (clear).
	RUN	Execute the sequence program.
	S	Decelerate the motor to a stop.
Data setting	D	Set the travel amount and positioning data.
	DOWEL	Set the operating intervals (dwell time).
	H	Set the direction of rotation.
	OFS	Set the offset travel amount.
	RAMP	Set the acceleration/deceleration pattern and jerk limit time.
	T	Set the acceleration/deceleration rate.
	V	Set the operating speed.
	VS	Set the starting speed.
Program control	CJMP	Jump to a specified step when a given condition is satisfied.
	JMP	Jump to a specified step.
	DELAY	Set the delay time.
	MU	Set parallel processing.
	LOOP	Set the loop.
	ENDL	End the loop section.
	END	End the sequence program.
	IN	Wait for input.
	OUT	Control the general-purpose output.
Hardware setting	ACTL	Switch the logic setting for the sensor and alarm.
	EEN	Set the use of END input.
	ETIME	Set the END output time.
	ID	Perform the initial setting for a linear motion product.
	PULSE	Set the pulse-output mode.
	SEN	Set the home-detection mode.
	TIM	Set the use of TIM. input and SLIT input.
	UNIT	Set the unit for travel amount.
Others	EDIT	Edit the sequence program.
	DEL	Delete the sequence program.
	DWNLD	Download the sequence program.
	UPLD	Upload the sequence program.
	R	Check the system conditions.

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Sample Programs

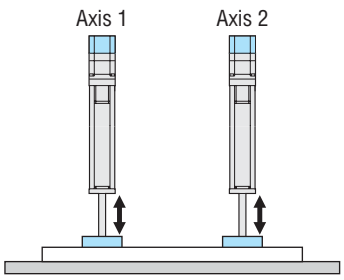
Sample. 1 Positioning operation




```
[1] VS1 500        ; Starting speed   500 Hz
[2] V1 1000        ; Operating speed   1000 Hz
[3] T1 30.0        ; Acceleration/deceleration rate   30.0 ms/kHz
[4] D1 +11000      ; Travel amount   11000 pulses in CW direction
[5] INC1           ; Execute relative positioning operation
```

Sample. 2 Inputting multiple operation patterns

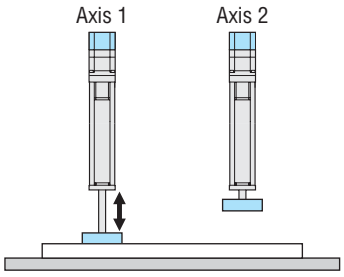
Simultaneous positioning of two axes




```
Seq 99             ; Hardware Setting
[1] UNIT1 0.02,1   ; Axis 1     Change to travel amount mm
[2] UNIT2 0.02,1   ; Axis 2     Change to travel amount mm

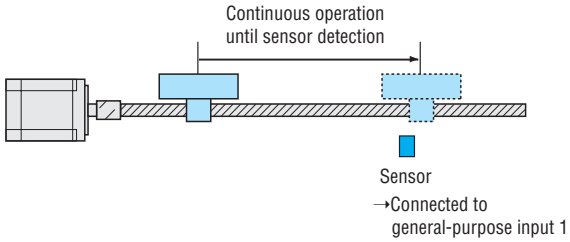
Seq 1              ; 2 axis execute at same time
[1] V1 1000        ; Axis 1     Operating speed 1000 Hz
[2] D1 +50         ; Axis 1     Travel amount 50 mm
[3] D2 +50         ; Axis 2     Travel amount 50 mm
[4] ABSC           ; Axes 1, 2  Execute absolute positioning operation
[5] DELAY 1.0      ; Pause at 1-second internal timer
[6] D1 0           ; Axis 1     Travel amount 0 mm
[7] D2 0           ; Axis 2     Travel amount 0 mm
[8] ABSC           ; Axes 1, 2  Execute absolute positioning operation
```

Axis 2 moves after axis 1 moves.




```
Seq 2              ; After axis 1 executes, axis 2 executes
[1] V1 1000        ; Axis 1     Operating speed 1000 Hz
[2] D1 +50         ; Axis 1     Travel amount 50 mm
[3] ABS1           ; Axis 1     Execute absolute positioning operation
[4] D1 0           ; Axis 1     Travel amount 0 mm
[5] ABS1           ; Axis 1     Execute absolute positioning operation
[6] V2 2000        ; Axis 2     Operating speed 2000 Hz
[7] D2 +50         ; Axis 2     Travel amount 50 mm
[8] ABS2           ; Axis 2     Execute absolute positioning operation
[9] D2 0           ; Axis 2     Travel amount 0 mm
[10] ABS2          ; Axis 2     Execute absolute positioning operation
```

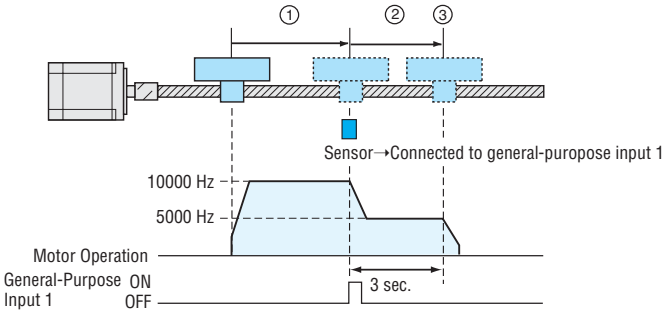
Sample. 3 Positioning using a sensor




```
[1] VS1 500        ; Starting speed   500 Hz
[2] V1 20000       ; Operating speed   20000 Hz
[3] T1 30.0        ; Acceleration/deceleration rate   30.0 ms/kHz
[4] H1 +           ; Direction of rotation   + (CW direction)
[5] SCAN1          ; Start continuous operation
[6] IN 1,1         ; General-purpose input 1   Waiting for ON
[7] S1             ; Decelerate to a stop
```

Sample. 4 Multistep speed-change operation

①Continuous operation at 10000 Hz
②Decelerate to 5000 Hz upon sensor detection
③Decelerate to a stop after three seconds




```
[1] VS1 500        ; Starting speed   500 Hz
[2] V1 10000       ; Operating speed   10000 Hz
[3] T1 30.0        ; Acceleration/deceleration rate   30.0 ms/kHz
[4] H1 +           ; Direction of rotation   + (CW direction)
[5] SCAN1          ; Start continuous operation
[6] IN 1,1         ; General-purpose input 1   Waiting for ON
[7] V1 5000        ; Decelerate to 5000 Hz
[8] DELAY 3.0      ; Wait time 3 seconds
[9] S1             ; Decelerate to a stop
```

Product Number Code

EMP40 1 - 1

① ② ③

①	Series **EMP400**: **EMP400** Series
②	Number of axes **1**: Single axis **2**: Dual axis
③	Connector **1**: Without connectors **2**: With connectors

Product Line

Type	Number of Axes	Connector
EMP401-1	Single axis	Without connectors
EMP401-2		With connectors
EMP402-1	Dual axis	Without connectors
EMP402-2		With connectors

Specifications

Series			**EMP400** Series
Program	Number of programs		32
	Capacity		1000 commands
	Input method		Command input via terminal program
	Number of control tasks	Main	1
		Sub	0
Oscillator Specifications	Number of control axes		**EMP401**: Single axis, **EMP402**: Dual axis
	Pulse output mode		1-pulse output/2-pulse output mode
	Frequency		10 Hz to 200 kHz (1-Hz increment) Pulse duty 50% (Fixed)
	Acceleration/deceleration rate		0.5 to 1000 ms/kHz (0.1 - ms/kHz increments)
	Acceleration/deceleration pattern		Linear/jerk-limit control
	Travel amount		Relative: −16 777 215~+16 777 215 pulse Absolute: −8 388 608~+8 388 607 pulse
Operation Pattern	Relative positioning operation		○
	Absolute positioning operation		○
	Continuous operation		○
	Return to mechanical home operation		○
	Dual axis liner interpolation operation		○
	Multistep speed-change operation		Available at continuous operation
Communication Specifications	Communication method		RS-232C based (3-wire)
	Transmission rate		9600 bps
Input/Output Signal Specifications	Inputs (START, E-STOP, etc.)		3 photocoupler inputs 24 VDC, Input resistance 5.4 kΩ
	Outputs (MOVE, ALM, etc.)		4 open-collector outputs 24 VDC, 25 mA max. each
	General-purpose inputs		8 photocoupler inputs 24 VDC, Input resistance 5.4 kΩ
	General-purpose outputs		6 open-collector outputs 24 VDC, 25 mA max. each
	Driver and sensor inputs		7 photocoupler inputs/axis 12 VDC, input resistance 2.7 kΩ
	Driver outputs		3 open-collector outputs/axis 12 VDC, 20 mA max. each
Encoder Input	Input frequency		No encoder input
	Count method		
	Count range		
	Interface		
General Specifications	Power supply voltage		24 VDC±5%, Current consumption 0.45 A
	Dimensions		W 40 mm (1.57 in.) × H 135 mm (5.31 in.) × D 100 mm (3.94 in.)
	Mass		0.26 kg (0.57 lb.)
	Ambient temperature		0°C~+50°C (32°F~122°F) (nonfreezing)
	Ambient humidity		20%~85% (noncondensing)

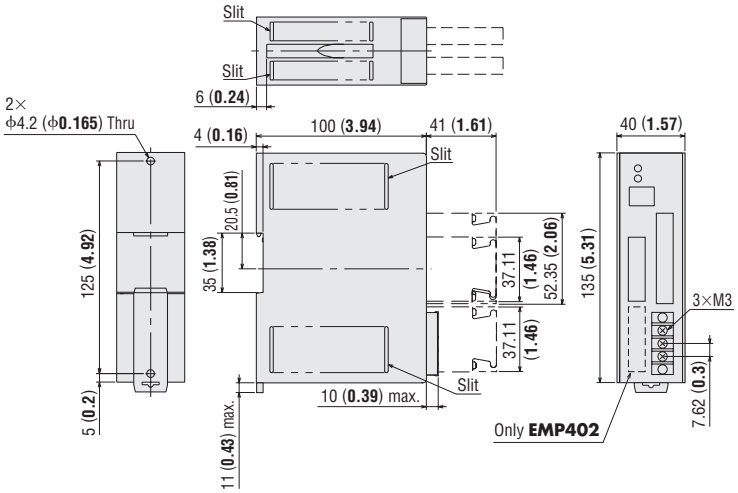
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Dimensions Unit = mm (inch)

EMP400 Series

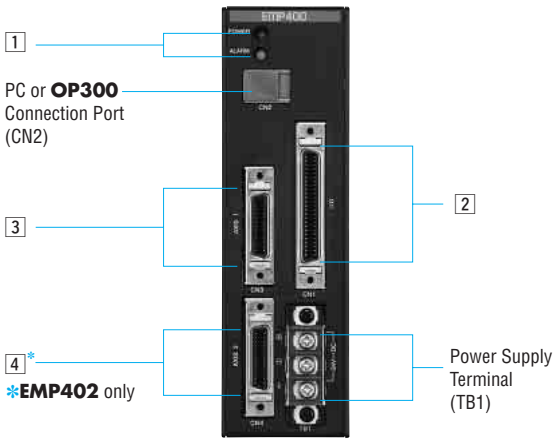
Mass: 0.26 kg (0.57 lb.)

CAD B295



Connection and Operation

Connector Layout



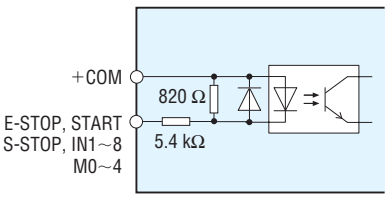
1 LED Monitor Display

Indication	Condition when LED ON
POWER	Lights during 24 VDC input.
ALARM	Lights during alarm signal output.

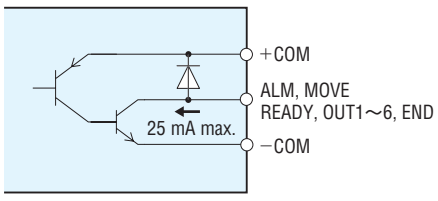
2 CN1 I/O Signal Connector

Pin No.	Signal	Description	Pin No.	Signal	Description
1	–	Not used	26	–	Not used
2	E-STOP Input	Emergency Stop	27	ALM Output	Alarm
3	START Input	Execute Sequence	28	–	Not used
4	S-STOP Input	Cease Sequence Execution	29	MOVE Output	Output when outputting pulses
5	–	Not used	30	–	Not used
6	–	Not used	31	READY Output	Ready to accept START input
7	+COM Input	I/O Power Supply (+24 VDC)	32	+COM Input	I/O Power Supply (+24 VDC)
8	IN1 Input	General Inputs	33	M0 Input	Sequence Number Selection
9	IN2 Input		34	M1 Input	
10	IN3 Input		35	M2 Input	
11	IN4 Input		36	M3 Input	
12	IN5 Input		37	M4 Input	
13	IN6 Input		38	–	Not used
14	IN7 Input		39	–	Not used
15	IN8 Input		40	–	Not used
16	+COM Input	I/O Power Supply (+24 VDC)	41	–	Not used
17	OUT1 Output	General Outputs	42	–	Not used
18	OUT2 Output		43	–	Not used
19	OUT3 Output		44	–	Not used
20	OUT4 Output		45	–	Not used
21	OUT5 Output		46	–	Not used
22	OUT6 Output		47	–	Not used
23	–	Not used	48	–	Not used
24	–	Not used	49	END Output	End Signal
25	–COM Input	GND for I/O	50	–COM Input	GND for I/O

Internal Input Circuit



Internal Output Circuit

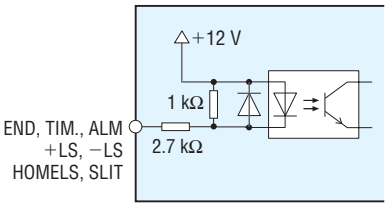


3 CN3 Axis-1 Driver Connector
4 CN4 Axis-2 Driver Connector

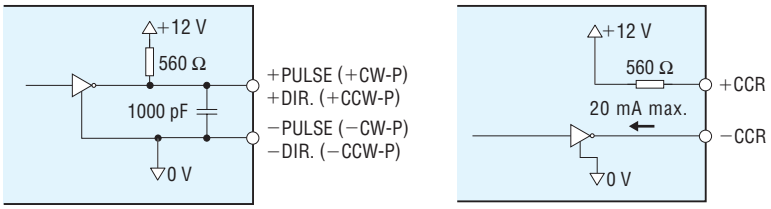
Pin No.	Signal	Description	Pin No.	Signal	Description
1	+PULSE output (+CW-P output)*	Pulse (CW pulse)*	14	–	Not used
2	–PULSE output (–CW-P output)*		15	–	Not used
3	+DIR. output (+CCW-P output)*	Rotation direction (CCW pulse)*	16	+CCR output	Counter-clear
4	–DIR. output (–CCW-P output)*		17	–CCR output	
5	END input	END signal from driver	18	GND	GND signal from driver
6	TIM. input	Timing signal from driver	19	–	Not used
7	ALM input	Alarm signal from driver	20	–	Not used
8	+LS input	CW limit sensor	21	–	Not used
9	–LS input	CCW limit sensor	22	–	Not used
10	HOMELS input	Home sensor	23	–	Not used
11	SLIT input	Slit sensor	24	–	Not used
12	+12 V output	Power source for sensor (140 mA max.)	25	+5 V output	Power source for timing signal (20 mA max.)
13	GND	GND for sensor	26	GND	GND for timing signal

*The signal names in parentheses are for 2-pulse output mode. The other signal names are for 1-pulse output mode.

Internal Input Circuit

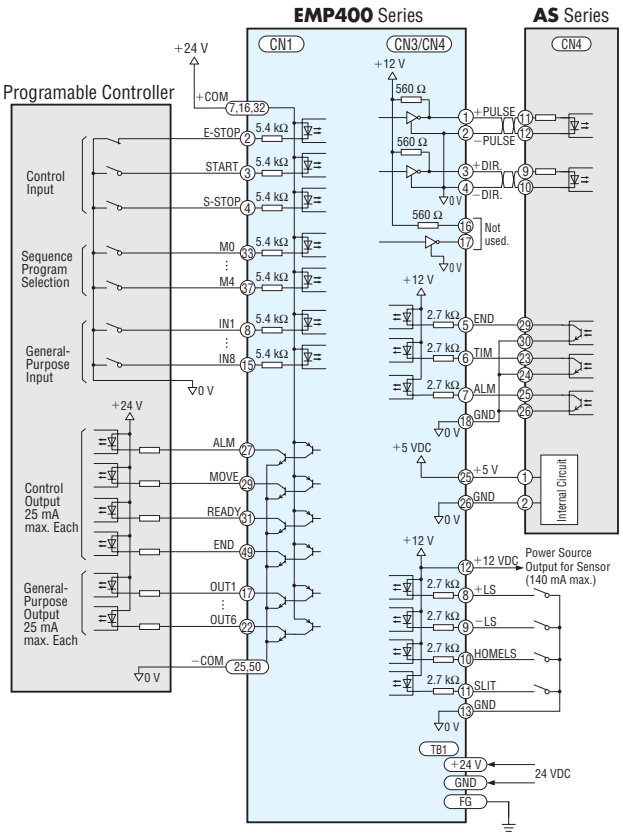


Internal Output Circuit

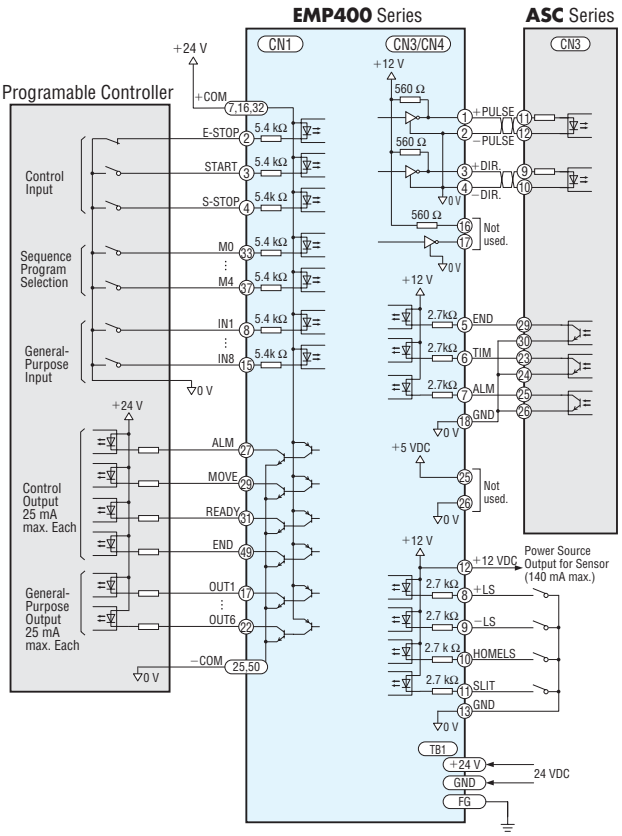


●Connection Diagrams

◇AS Series



◇ASC Series



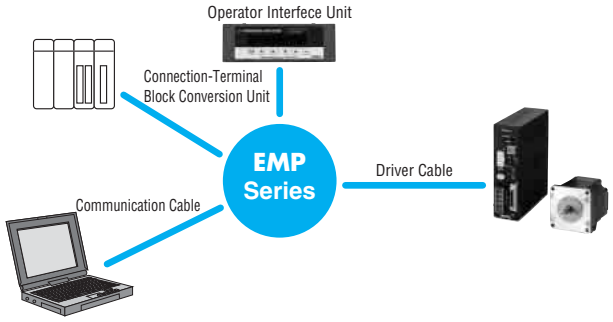
Notes:
- Except for connection between **EMP400** Series and built-in controller (stored data) driver.
- The transmission frequency will drop as the pulse line between the driver and controller becomes longer. Exercise caution.

Note:
- The transmission frequency will drop as the pulse line between the driver and controller becomes longer. Exercise caution.

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Accessories (Sold Separately)

We have a range of optional cables that achieve one-touch connection between the **EMP400** Series and peripherals, as well as an operational unit used for teaching operation.



Operator Interface Unit OP300 RoHS

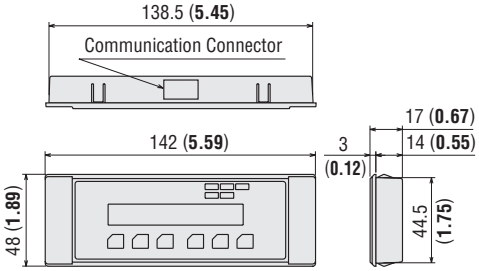
Set the travel amount via teaching or monitor the current position.
The unit comes with a 2 m (6.6 ft.) cable for connection with the **EMP400** Series.



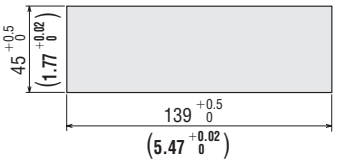


◇**Dimensions Unit = mm (inch)**

CAD B297



◇**Panel Cut-Out**



Panel Cut-Out Dimensions

Communication Cable FC04W5 RoHS

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



Driver Cables Dedicated Type

This is a shielded cable equipped with, at one end of the cable, the half-pitch connector that snaps into the driver for αSTEP. The other end of the cable is equipped with the connector for the **EMP** Series controller.

➜ Page 76



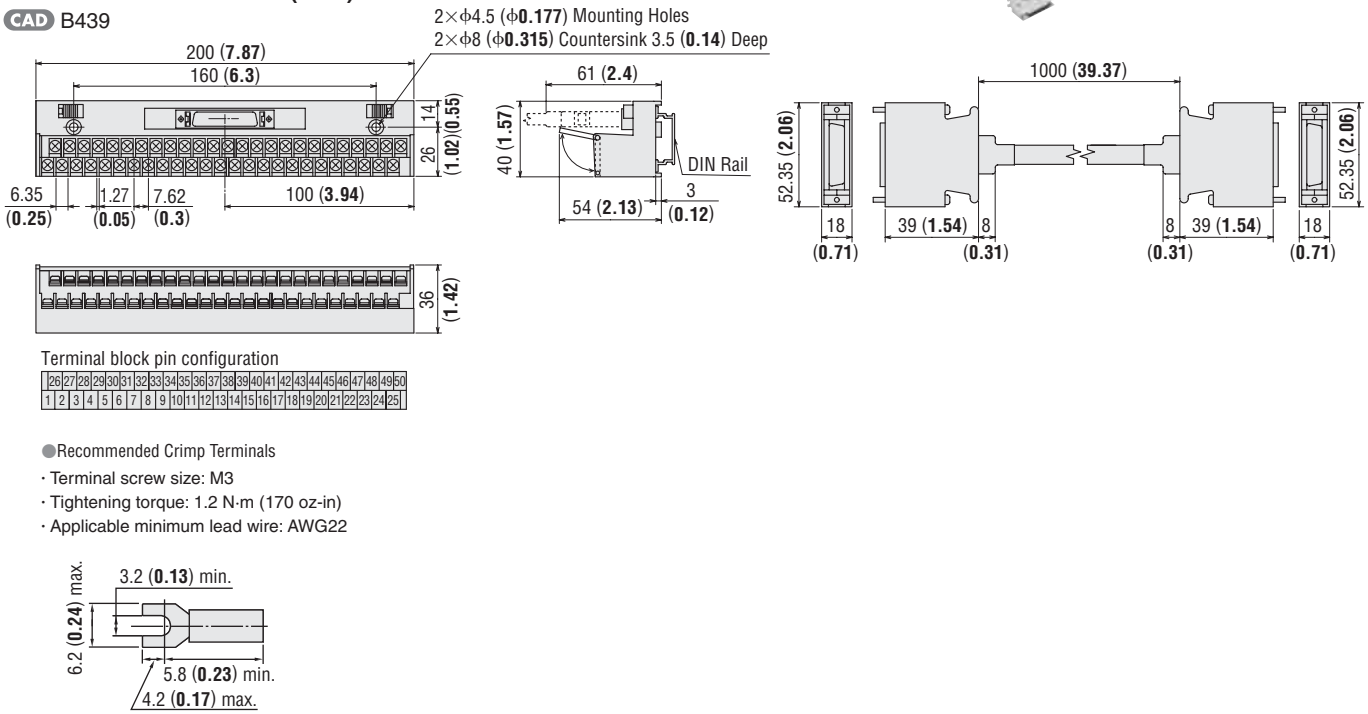
●Connector-Terminal Block Conversion Unit **CC50T1** RoHS NEW

The **EMP** Series and programmable controller can be connected via a terminal block. Cable Length: 1 m (3.3 ft.)



◇Dimensions Unit = mm (inch)

CAD B439



Terminal block pin configuration

26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	

●Recommended Crimp Terminals

- Terminal screw size: M3
- Tightening torque: 1.2 N·m (170 oz-in)
- Applicable minimum lead wire: AWG22

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Controller with Jerk Limiting Control Function
Step-Select Positioning Type/Sequential-Step Positioning Type

SG8030J RoHS

Controller for Stepping Motor

With the **SG8030** Series, all operations including data setting can easily be performed using the four touch-screen buttons on the top panel. In addition, the number of signal lines is reduced to a minimum for easy connection.


DIN Rail Mounting Model

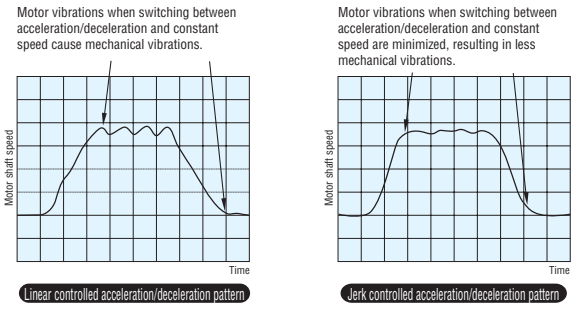

Recessed Mounting Model

■Features

●Jerk Limiting Control Function Suppresses Motor Drive Vibrations

The "Jerk limiting control function" effectively minimizes vibrations during motor drive and stop. This is especially useful in applications such as driving a belt pulley, to ensure smooth motion of transported works.

●Measurement conditions
Application: Belt drive
Operation mode: Positioning operation
Load: 10 kg (22 lb.)

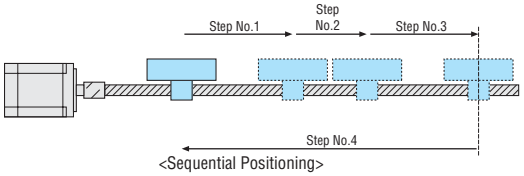


✻These diagrams are simulated. Actual effect will differ depending on mechanical construction.

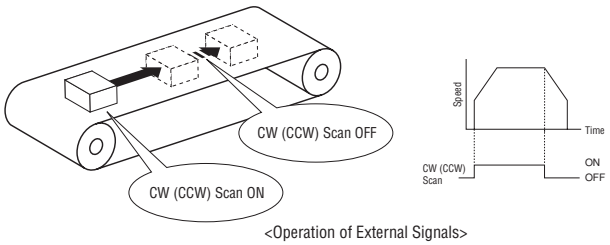
To achieve the same positioning time with jerk controlled acceleration/deceleration, set the acceleration/deceleration rate to 1/2 that of linear controlled acceleration/deceleration.

●Sequential Positioning Operation/External Signal Operation Possible

In "Sequential positioning operation, "the start signal always causes execution from step No. 1 in a preselected sequence. In "External signal operation," when the CW scan (or CCW scan) signal input goes ON, operation starts. When the signal goes OFF, slowdown stop occurs. This is useful for moving the work manually to a desired position.



<Sequential Positioning>



<Operation of External Signals>

●Maximum Oscillation Frequency 200 kHz

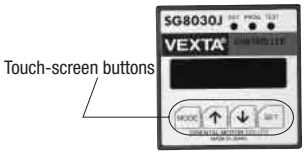
The "Maximum oscillation frequency of 200 kHz" allows motor control in micro steps.

●1-Pulse Output/2-Pulse Output Mode Select Possible

In addition to the 2-pulse output mode, the controller can also provide 1-pulse operation mode, which makes it compatible with a wide range of motor drivers.

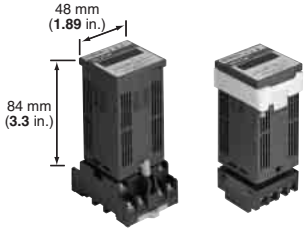
●Top Panel Single Interface for All Settings and Operation Checks

All operations including setting of various data can be performed using the four touch-screen buttons on the top panel. You can also check the status of each operation simply by checking the display on the top panel.



●48×48 mm (1.89×1.89 in.) DIN Size and Two Mounting Configurations Are Provided.

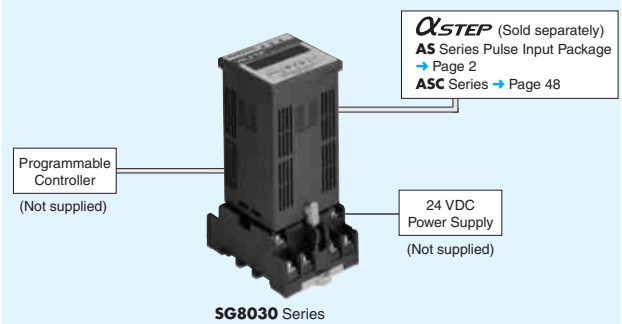
The unit is very compact, measuring only 48 (W)×48 (D)×84 (H) mm [1.89 (W)×1.89 (D)×3.3 (H) in.].
Two mounting configurations are available, for DIN rail mounting and recessed mounting.



<DIN Rail Mounting Model> <Recessed Mounting Model>

■System Configuration

●Configuration Example of Combination with αSTEP



Product Line

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

Specifications

Model		**SG8030J-D SG8030J-U**
Number of Control Axes		1 axis
Positioning Data	Number of Settings	4 steps
	Setting Mode	Set with touch key on front panel (stored in EEPROM)
	Setting Method	Incremental mode (point to point)
Positioning Control	Mode	Sequential-step positioning Step-select positioning
	Move Distance Setting Range	Incremental 1～99999 pulses
	Starting Pulse Speed Setting Range (VS)	100 Hz～10 kHz (100 Hz units)
	Operating Pulse Speed Setting Range (VR)	100 Hz～200 kHz (100 Hz units)
	Acceleration/Deceleration Rate Setting Range (TR)	1～100 ms/kHz (28 rates: ✻)
Pulse Output Mode		1-pulse output/2-pulse output mode select possible
Operation Modes		Positioning operation (INDEX operation) Return to mechanical home operation (HOME operation) Continuous operation (SCAN operation) 1-pulse operation (JOG operation: Test mode only)
Control Modes		External input mode (EXT) Program mode (PROG) Test mode (TEST)
Number of Maximum Return Pulses		–
Mechanical Home Return Function		Sensor detection of home through designation of mechanical home detection direction of rotation
Input Signals		24 VDC photocoupler input, input resistance 4.7 kΩ
Output Signals		Transistor output linked to photocoupler 24 VDC max. 25 mA max.
Power Supply Voltage		24 VDC±5% current consumption 0.1 A
Ambient Temperature		0°C～+40°C (+32°F～+104°F) (Nonfreezing)
Ambient Humidity		20%～85% (Noncondensing)

✻The following 28 acceleration/deceleration rates can be selected. [unit: ms/kHz]
1, 2, 4, 5, 6, 8, 10, 12, 14, 15, 16, 18, 20, 22, 24, 25, 26, 28, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100

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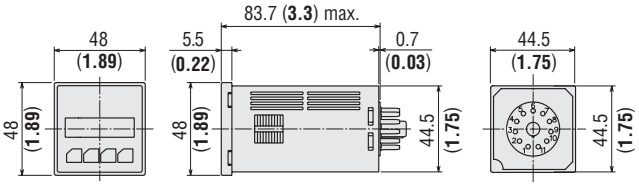
Dimensions Unit = mm (inch)

DIN Rail Mounting Model

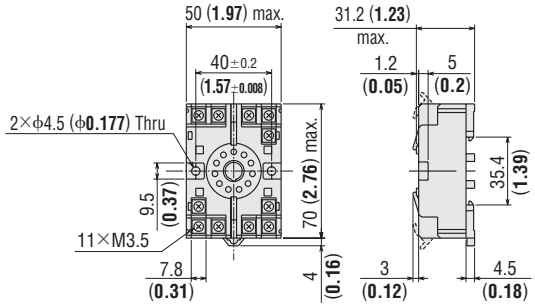
◇SG8030J-D

Mass: 0.17 kg (0.37 lb.)

CAD B094



◇Flush Connection Socket (Included)

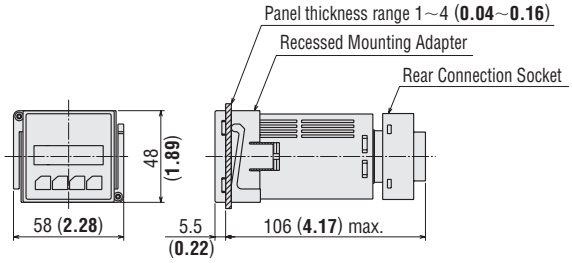


Recessed Mounting Model

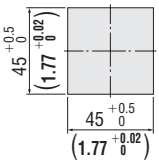
◇SG8030J-U

Mass: 0.15 kg (0.33 lb.)

CAD B095

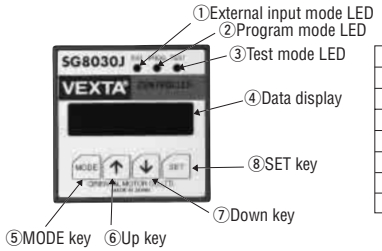


◇Panel Mounting Cut-Out Dimensions



Connection and Operation

Names and Functions of Controller Parts



①	EXT (LED): Lights up when external input is selected.
②	PROG (LED): Lights up when program mode is selected.
③	TEST (LED): Lights up when test mode is selected.
④	Data display: Shows operation and setting status.
⑤	MODE key
⑥	↑ key
⑦	↓ key
⑧	SET key

◇Connection Socket Signal Table

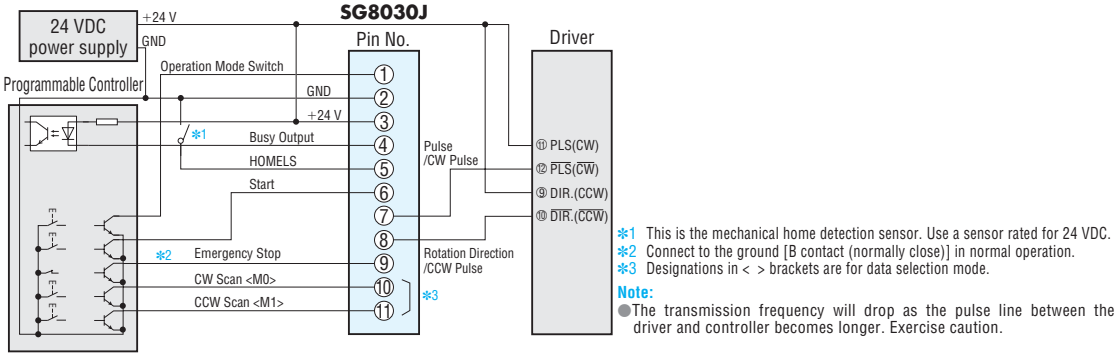
Pin No.	Signal Designation	I/O	Function
1*	Operation Mode Input	Input	S: Switching positioning/home detection operation D: Switching positioning/home detection operation and continuous operation
2	GND	Input	GND connecting terminal
3	+24V	Input	24 VDC power supply input terminal
4	BUSY	Output	Output during pulse oscillation
5	HOMELS	Input	Mechanical home detection sensor
6	Start	Input	Start signal
7	Pulse/CW Pulse	Output	1 pulse output mode: Pulse 2 pulse output mode: CW Pulse
8	Rotation Direction/CCW Pulse	Output	1 pulse output mode: Rotation direction 2 pulse output mode: CCW
9	Emergency Stop	Input	Stop all operations (including busy output)
10*	S: CW Scan D: M0 [CW Scan]	Input	S: CW continuous operation D: M0 data select signal [CW continuous operation]
11*	S: CCW Scan D: M1 [CCW Scan]	Input	S: CCW continuous operation D: M1 data select signal [CCW continuous operation]

●Indications in brackets [ ] apply to state when mode switching signal was input.

*Only pins 1, 10, 11 differ for sequential positioning and selection positioning.
"S" in the table indicates sequential positioning and "D" indicates selection positioning.

Wiring Diagram

◇Connection between SG8030J and αSTEP AS, ASC Series

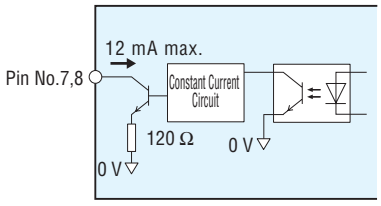


*1 This is the mechanical home detection sensor. Use a sensor rated for 24 VDC.
*2 Connect to the ground [B contact (normally close)] in normal operation.
*3 Designations in < > brackets are for data selection mode.

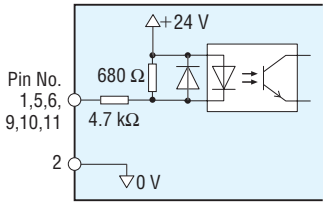
Note:
●The transmission frequency will drop as the pulse line between the driver and controller becomes longer. Exercise caution.

Description of Input/Output Signal

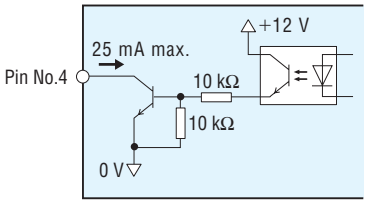
◇Output Signals to Driver



◇Input Signals from Programmable Controller and Limit Sensor



◇Output Signals to Programmable Controller



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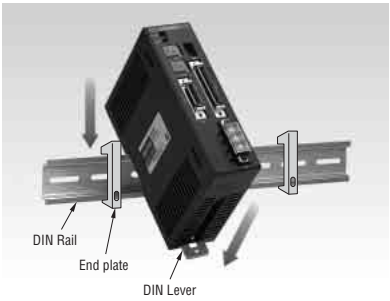
Before Using a Controller

Installation Method

●EMP400 Series

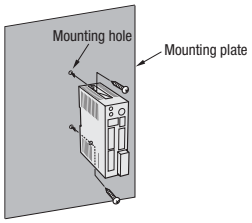
◇DIN Rail Mounting

- Use DIN rails with a width of 35 mm (1.38 in.).
- Use end plates to secure the controller.
- DIN rails and end plates are not provided with the unit.



◇Screw Mounting

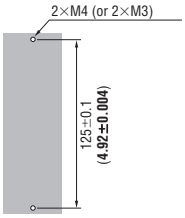
- To fasten the unit with screws, use the two screw holes at the top and bottom.
- The mounting holes should be machined for either M3 or M4 size screws. Use washers to secure the controller.
- The installation area is made of resin, so handle this area carefully to prevent damage.



Note:

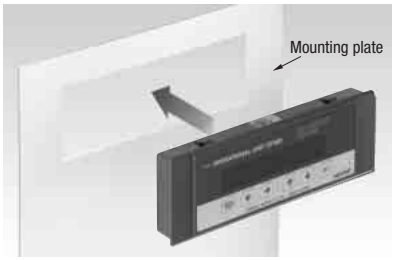
- Mounting screws are not provided with the unit.

Mounting Holes Dimensions Unit = mm (inch)

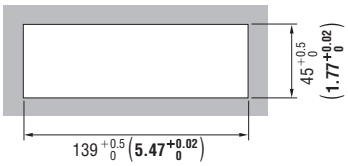


◇Installation Method of the OP300

- The **OP300** can be affixed to a plate of 1 mm (0.04 in.) to 3 mm (0.12 in.) in thickness. The connection cables cannot be installed if the plate is thicker than 3 mm (0.12 in.), so exercise caution.
- Push in the unit from the front side of the mounting plate.



Panel Cut-Out Unit = mm (inch)



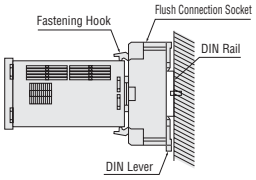
Note:

- Do not suspend the **OP300** from the connection cables.

●SG8030 Series

◇DIN Rail Mounting Using Flush Connection Socket

1. Mount the flush connection socket to the DIN rail. (The DIN lever should face down.)
2. Insert the controller terminals firmly into the flush connection socket.
3. Engage the fastening hooks (two places) of the flush connection socket on the controller to secure the assembly.



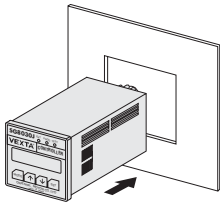
Note:

- Mount the controller only after connecting all required leads to the terminals of the flush connection socket.

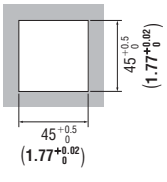
◇Panel Mounting Using Rear Connection Socket

- The **SG8030** Series can be affixed to a plate of 1 mm (0.04 in.) to 4 mm (0.16 in.) in thickness.

1. Push in the controller from the front side of the mounting plate.
2. Insert the burying-type adapter from the back and push it in until the gap with the mounting plate becomes minimal.
3. Affix with the fixing screws (two locations) of the burying-type adapter.
4. Insert the controller terminals firmly into the rear connection socket.



Panel Mounting Cut-Out Dimensions Unit = mm (inch)



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Installation Location

●Indoors, ambient temperature 0˚C～+50˚C (+32˚F～+122˚F) [0˚C～+40˚C (+32˚F～+104˚F) for SG8030 Series] (Nonfreezing)

●If the ambient temperature exceeds 50˚C (122˚F) [40˚C (104˚F) for **SG8030** Series], use a fan to provide forced cooling. Otherwise internal heat buildup may lead to damage.

●When attaching the controller in an enclosed space such as a control box, or somewhere close to a heat-radiating object, ventilation holes should be used to prevent the controllers from overheating.

●Ambient humidity 85% maximum (Noncondensing)

●Not exposed to corrosive gases or dust

Take care that pieces of conductive material (filing, pins, pieces of wire, etc.) do not enter the controllers. Otherwise circuit damage may occur.

●Not exposed to water or oil

Exposure to liquids can lead to corrosion or short-circuits.

●Not exposed to direct sunlight

●Not in the vicinity of noise sources

In situations where controllers are located close to a large noise source such as high frequency welding machines or large electromagnetic switches, take steps to prevent noise interference, either by inserting noise filters, using shielded wires or connecting the controller to a separate circuit.

●Not in the vicinity of vibration sources

When the controller is to be installed in a location where a source of vibration will cause the controller to be damaged.

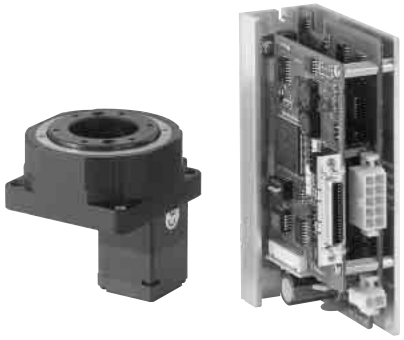
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Hollow Rotary Actuator

DG Series RoHS

To check the product details not featured in this catalog, you must obtain a separate, individual catalog for the product. To request a catalog, contact your nearest Oriental Motor sales office.

The **DG**-Series hollow rotary actuators are constructed to achieve quick, accurate positioning based on a simple design. These actuators come in extensive variations with a choice of frame size of □60 mm (□2.36 in.), □85 mm (□3.35 in.) or □130 mm (□5.12 in.).



Frame size □60 mm (□2.36 in.)

Pulse Input Package

Permissible Torque	Bearing	Diameter of Hollow Section	Safety Standard		Actuator Weight
0.9 N·m (7.9 lb-in)	Ball Bearing	ϕ28 mm (ϕ1.1 in.) (Rotational)	c UL us CE	24-VDC Input Driver	0.5 kg (1.1 lb.)



Frame size □85 mm (□3.35 in.)

Pulse Input Package

Permissible Torque	Bearing	Diameter of Hollow Section		Safety Standard		Actuator Weight
2.8 N·m (24 lb-in)	Cross-Roller Bearing	ϕ33 mm (ϕ1.3 in.) (Rotational)	High Permissible-Moment	High Permissible-Thrust Load	CE	1.2 kg (2.6 lb.)

AC Input Driver



Frame size □130 mm (□5.12 in.)

Pulse Input Package

Diameter of Hollow Section	Bearing	Diameter of Hollow Section		Safety Standard		Actuator Weight
12 N·m (106 lb-in)	Cross-Roller Bearing	ϕ62 mm (ϕ2.44 in.) (Rotational)	High Permissible-Moment	High Permissible-Thrust Load	c UL us CE	2.6 kg (5.7 lb.)

AC Input Driver

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

Specifications are subject to change without notice.
This catalog was published in August, 2006.

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