Stepping Motors

Closed Loop Stepping Motor and Driver Packages

αSTEP

AC Input **AS** Series

DC Input **ASC** Series

RoHS RoHS-Compliant

Closed Loop Stepping Motor and Driver Package

αSTEP AS Series

●Additional Information●
Technical reference ➜ Page F-1
Safety standards ➜ Page G-2

The αSTEP is an innovative stepping motor and driver package 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.

c UL us CE

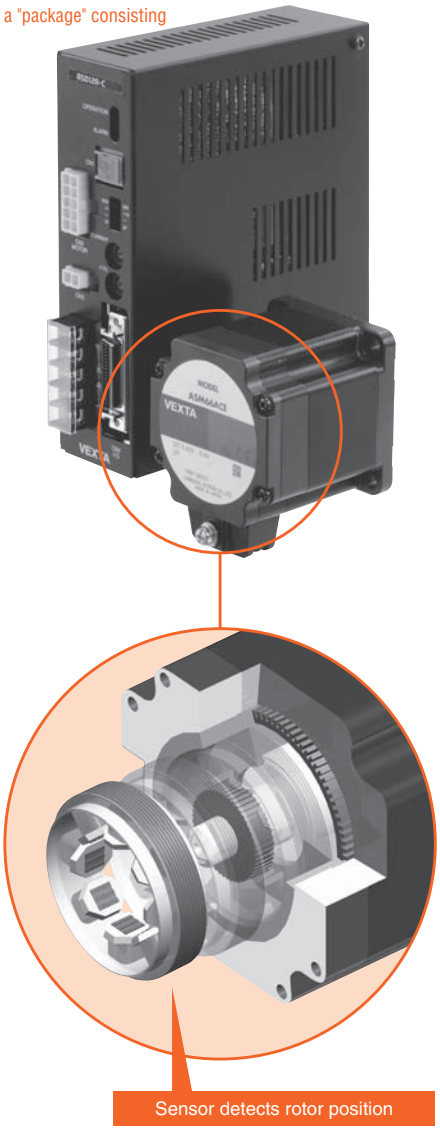
●List of safety standard approved products (Model, Standards, File No., Certification Body) ➜ Page G-10

■Features

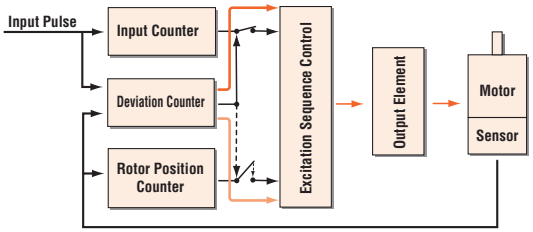
●Thanks to Closed Loop Control, There is No Loss of Synchronism

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 activated, so there is no need to worry about loss of steps. When the successive overload is given, αSTEP outputs the 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.



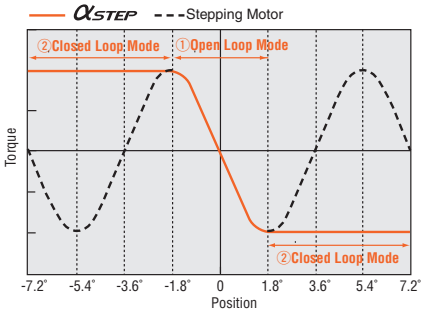
◇αSTEP Control Diagram



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



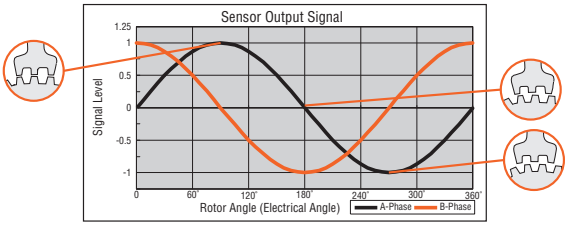
①If the positioning deviation is less than ±1.8˚, the motor runs in open loop mode like a stepping motor.
②If the positioning deviation is ±1.8˚ or more, the motor runs in closed loop mode and the position is corrected by exciting the motor windings to generate maximum torque based on the rotor position.

◇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.

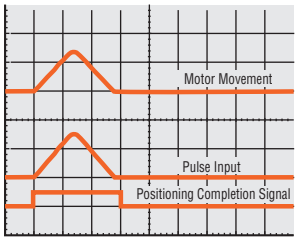
Features

- 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.



●High Response

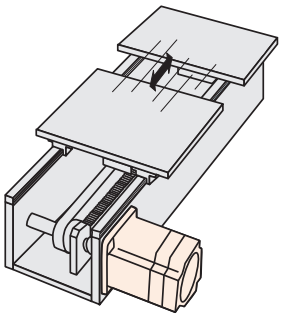
Like conventional stepping motors, αSTEP operates in synchronism with command pulses. This makes it suitable for short stroke positioning.



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

●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.

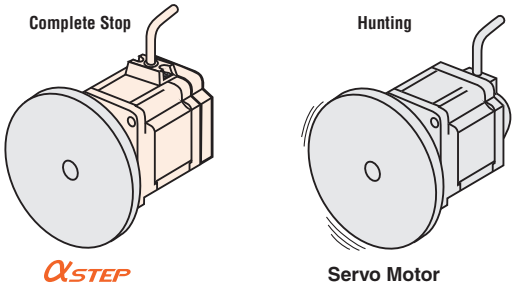


●The αSTEP Complies with Major Safety Standards

The **AS** Series is recognized with the UL/CSA Standards and conforms to EN Standard. The CE Marking certifies compliance with the EMC and Low Voltage Directives.

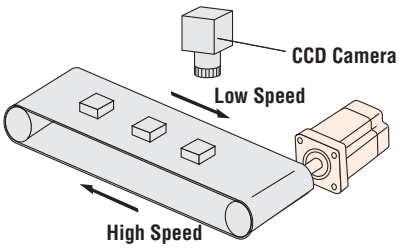
●No Hunting

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 microstep driver. Its vibration level is incredibly low, even when operating in the low speed range. When frequent changes from low to high (or vice versa) speed operations are required, the use of the Resolution Select Function solves the problem. 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 the motor and the other for an encoder. The cable can be extended to a maximum of 20 m (10 m 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 a high positioning 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

- **Twice the Motor Life (Compared with a conventional model)**

The life of a motor is affected by its bearing. The αSTEP achieves approximately twice the life of a conventional motor by adopting a modified bearing. (Except for the standard type IP65 rated motor and geared motor)

- **Protective Earth Terminal**

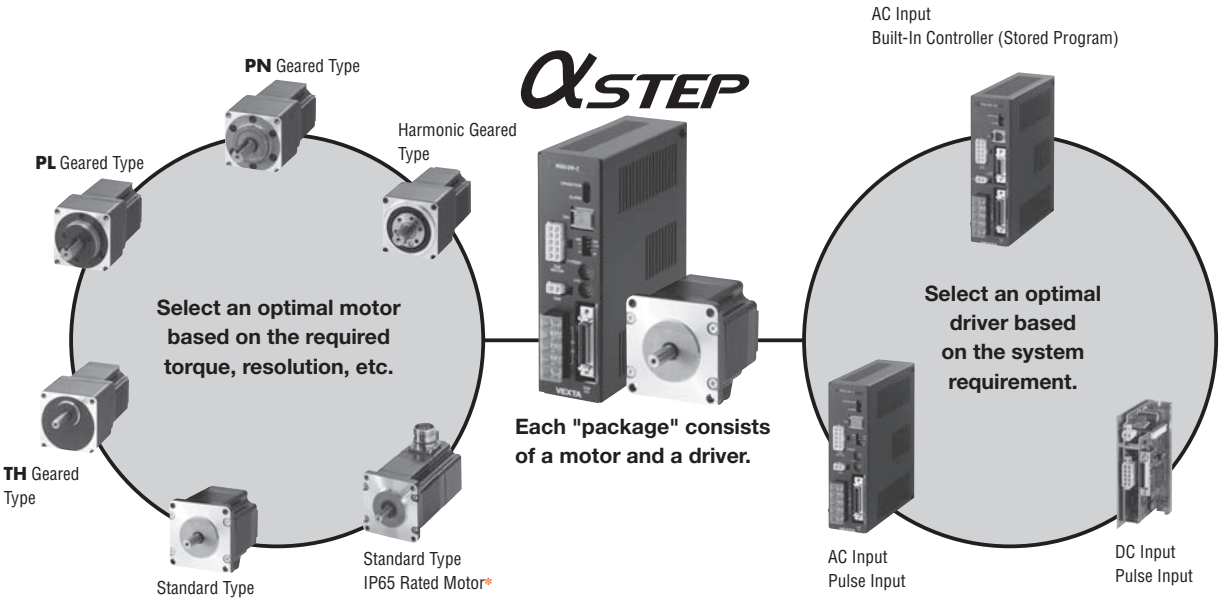
●RoHS RoHS-Compliant

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

Details of RoHS Directive ➜ Page G-23

A Full Lineup of α_{STEP}

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 cable (sold separately) is needed to connect the motor and driver.

Characteristics Comparison for Motors and Geared Motors

Motor Type / Geared Type	Features	Permissible Torque / Maximum Torque [N·m]	Backlash [arc min]	Basic Resolution [deg/step]	Output Shaft Speed [r/min]
Standard 	· Basic model of α_{STEP} motor and driver system	Maximum Holding Torque 4	—	0.36	4000
Standard Type IP65 Rated Motor 	· The IP65 rated motor offering ingress protection against dust and water.	Maximum Holding Torque 4	—	0.36	4000
Low backlash — **TH Geared** (Parallel Shaft) 	· A wide variety of low gear ratios, high-speed operations · Gear ratio: 1:3.6, 1:7.2, 1:10, 1:20, 1:30	12	45	0.012	500
Low backlash — **PL Geared** (Planetary) 	· High permissible torque · A Wide variety of gear ratios for selecting the desired step angle. (resolution) · Centered output shaft · Gear ratio: 1:5, 1:7.2, 1:10, 1:25, 1:36, 1:50	37	20	0.0072	360
Non-backlash — **PN Geared** (Planetary) 	· High speed (low gear ratio), high positioning precision · High permissible/maximum torque · A Wide variety of gear ratios for selecting the desired step angle. (resolution) · Centered output shaft · Gear ratio: 1:5, 1:7.2, 1:10, 1:25, 1:36, 1:50	Permissible Torque 37 / Maximum Torque 60	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: 1:50, 1:100	Permissible Torque 37 / Maximum Torque 55	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.

Features C-12 / System Configuration C-18 / Product Line C-22

Each series offers various motor frame sizes in accordance with the motor type and power supply voltage, as shown below.

(□60: indicates a motor frame size of 60 mm.)

	Power Supply Voltage	Standard Type	Standard Type IP65 Rated Motor	**TH** Geared Type	**PL** Geared Type	**PN** Geared Type	Harmonic Geared Type
AC Input **AS** Series Pulse Input Package 	Single-Phase 200-230 VAC	□60 □85	□60 □85	□60 □90	□60 □90	□60 □90	□60 □90
Built-In Controller (Stored Program) Package 							
DC Input **ASC** Series Pulse Input Package 	24 VDC	□28 □42 □60	–	□28 □42 □60	–	□28 □42 □60	□28 □42 □60

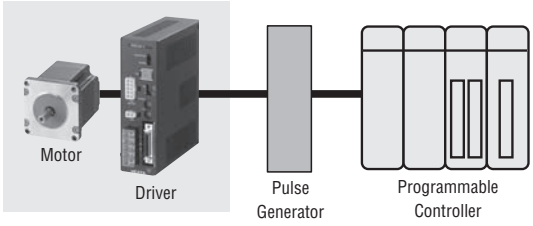
- : A pulse input package and a built-in controller (stored program) package are available.
  White background: A pulse input package is available.
- All the packages can be available motor with electromagnetic brake. (Except for the standard type IP65 rated motor and **ASC** Series with a motor frame size of 28 mm.)
- For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Two Types of Drivers

AC Input | DC Input

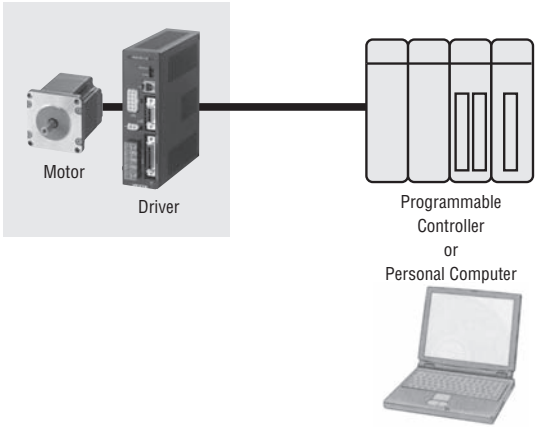
Pulse Input

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



Built-In Controller (Stored Program)

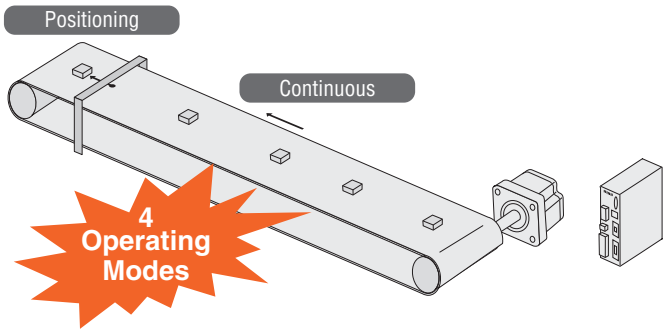
The built-in pulse generation function allows the motor to be driven via a directly connected programmable controller. Since no separate pulse generator is required, the drivers of this type save space, simplify wiring, and also allow the number of axes to be increased with ease.

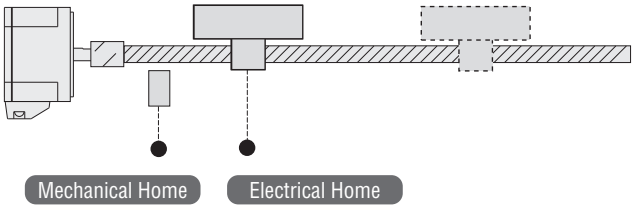


Features of Built-In Controller (Stored Program) Package

The built-in controller (stored program) 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 (stored program) is computer-programmable via an RS-232C connection.

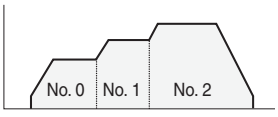
Operating Modes





Linked Motion Capability

Single Motion

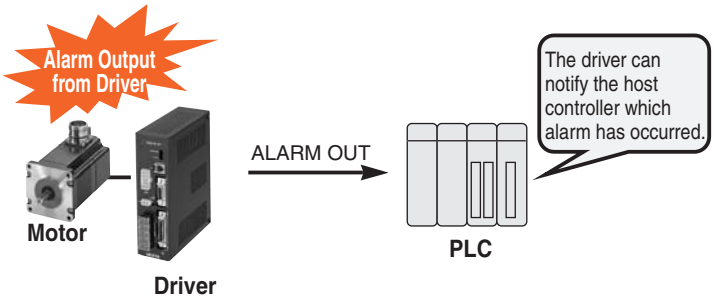


Linked Motion

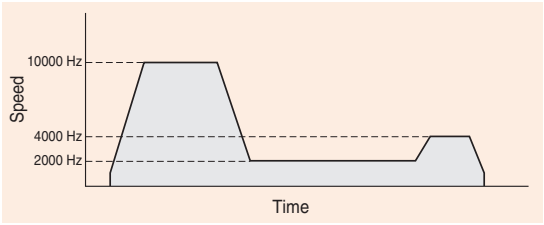
When a START signal is received motions 0, 1 and 2 are executed without stopping between each one.

Alarm Functions

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

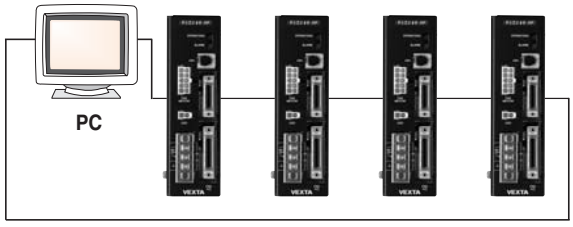


Speed Change on the Fly



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.

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

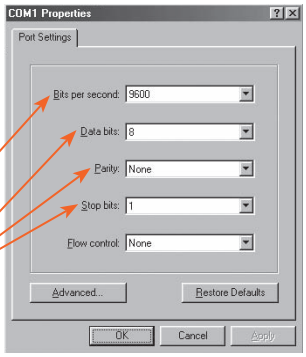
- ASCII based commands
- Conforms to RS-232C communication specifications
- Start-stop asynchronous transmission method
- Transmission speed: 9600 bps
- Data length: 8 bits, 1 stop bit, no parity
  Protocol: TTY (CR+LF)
- Modular 4-pin connector

Program Memory

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

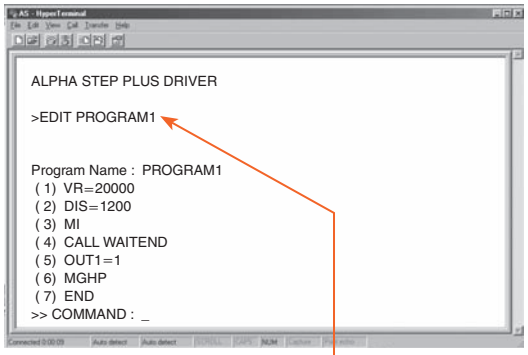
Built-In Functions

- Selectable motor-resolution
- Run and stop current values
- Speed-filter set value
- Motor rotation direction
- External stop
- Sensor logic
- Overtravel limits
- Software overtravel
- Alarm history
- Syntax checking
- Display values
- Incremental moves
- I/O status



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

Example: "PROGRAM1"



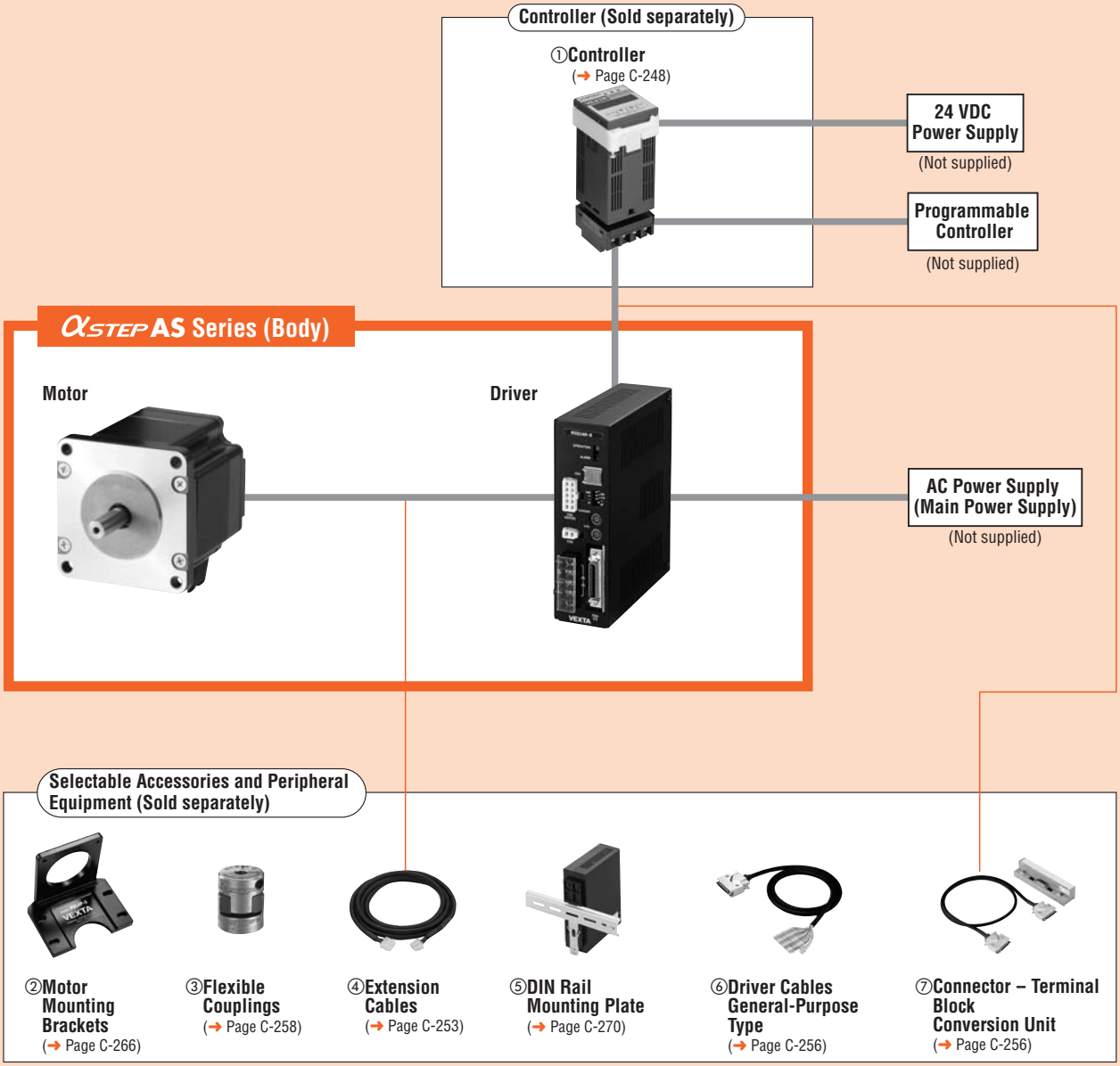
PROGRAM1 Definition

- 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

System Configuration

Pulse Input Package Standard Type

An example of a single-axis system configuration with the **SG8030JY** controller.



No.	Product Name	Overview	Page
①	Controller	This controller outputs pulse commands that determine the rotating amount and rotating speed.	C-248
②	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	C-266
③	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	C-258
④	Extension Cables	Cable for extending the wiring distance between the motor and driver (1 to 20 m).	C-253
	Flexible Extension Cables	Cable offering flexibility, used to extend the wiring distance between the motor and driver (1 to 10 m).	
⑤	DIN Rail Mounting Plate	Use this plate when installing the driver to a DIN rail.	C-270
⑥	Driver Cables General-Purpose Type	General-purpose cable for connecting the driver and controller (1 m, 2 m).	C-256
⑦	Connector – Terminal Block Conversion Unit	Set of terminal block and cable for connecting the driver and controller (1 m).	C-256

Example of System Configuration

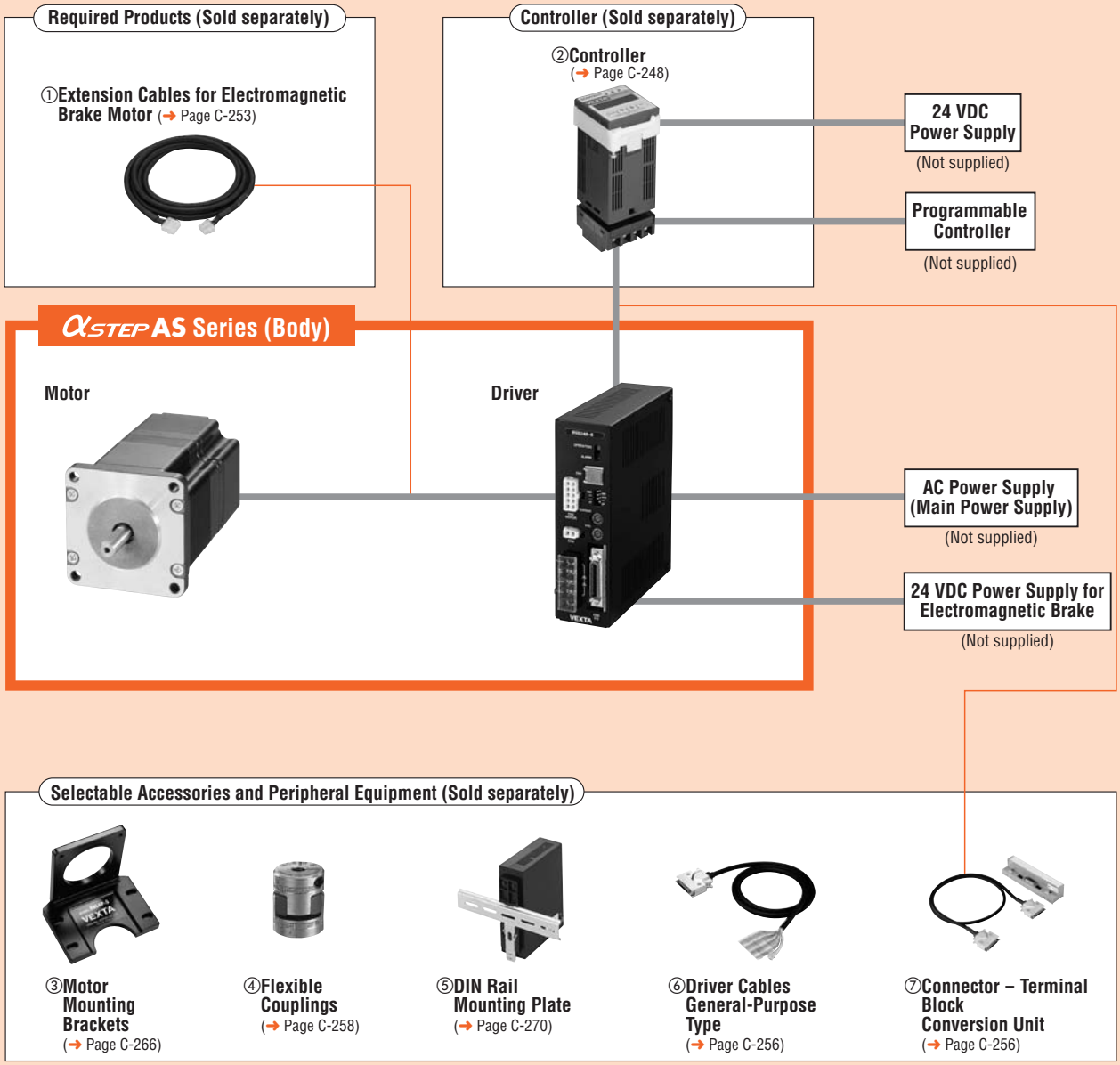
(Body)		(Sold separately)					
αSTEP AS Series	+	Controller	Extension Cable (3 m)	Motor Mounting Bracket	Flexible Coupling	DIN Rail Mounting Plate	Connector – Terminal Block Conversion Unit (1 m)
AS66ACE		SG8030JY-U	CC03AIP	PAL2P-5	MCS300808	PADP01	CC36T1

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

System Configuration

Pulse Input Package Standard Type with Electromagnetic Brake

An example of a single-axis system configuration with the **SG8030JY** controller.



No.	Product Name	Overview	Page
①	Extension Cables for Electromagnetic Brake Motor	Dedicated cable for connecting the electromagnetic brake motor and driver (1 to 20 m). Be sure to purchase this cable.	C-253
	Flexible Extension Cables for Electromagnetic Brake Motor	Dedicated cable offering flexibility, used to connect the electromagnetic brake motor and driver (1 to 10 m). Be sure to purchase this cable.	
②	Controller	This controller outputs pulse commands that determine the rotating amount and rotating speed.	C-248
③	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	C-266
④	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	C-258
⑤	DIN Rail Mounting Plate	Use this plate when installing the driver to a DIN rail.	C-270
⑥	Driver Cables General-Purpose Type	General-purpose cable for connecting the driver and controller (1 m, 2 m).	C-256
⑦	Connector – Terminal Block Conversion Unit	Set of terminal block and cable for connecting the driver and controller (1 m).	C-256

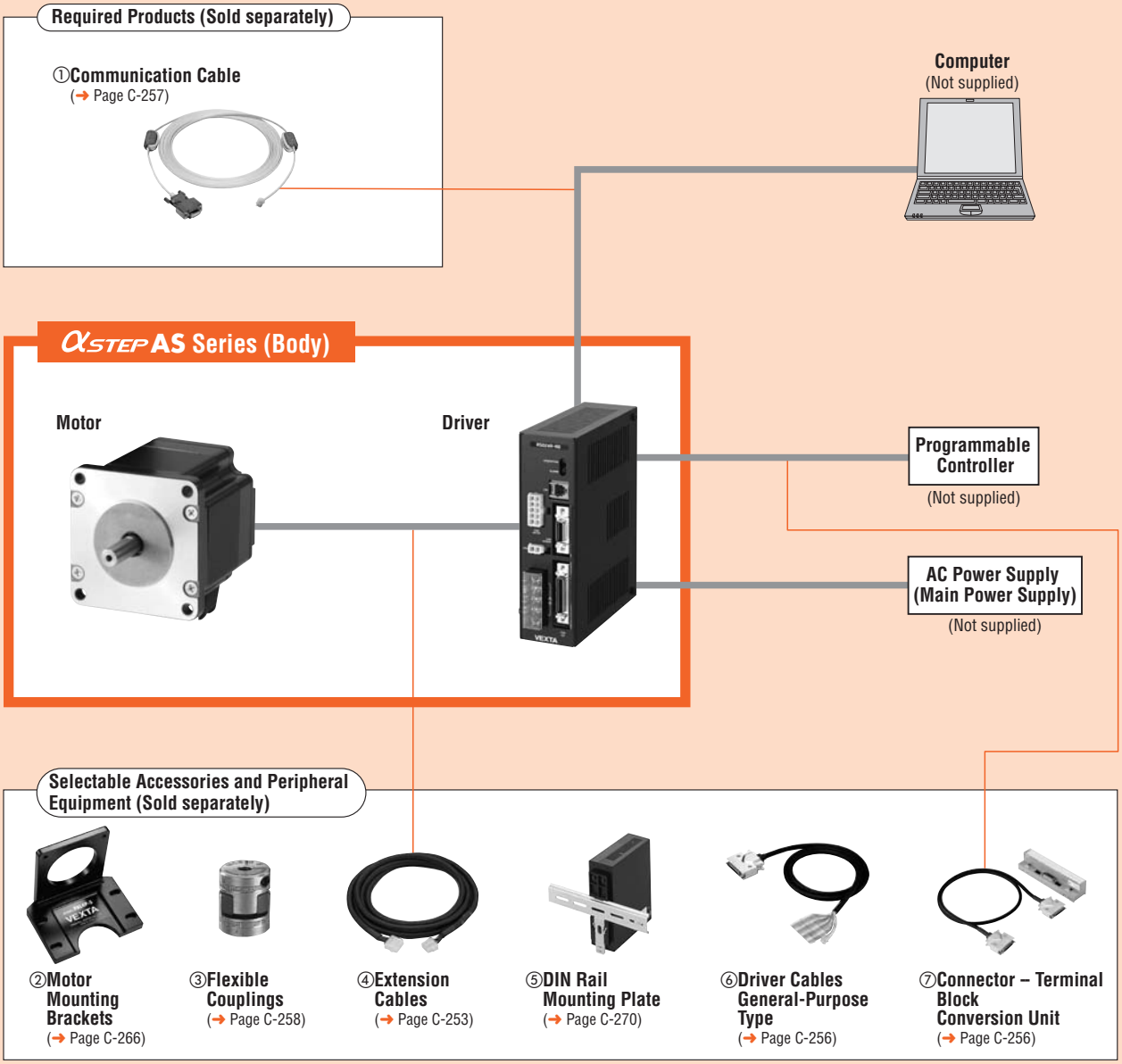
Example of System Configuration

(Body)	(Sold separately)		(Sold separately)				
αSTEP AS Series	Extension Cable for Electromagnetic Brake Motor (3 m)	+	Controller	Motor Mounting Bracket	Flexible Coupling	DIN Rail Mounting Plate	Connector – Terminal Block Conversion Unit (1 m)
AS66MCE	CC03AIPM		SG8030JY-U	PAL2P-5	MCS300808	PADP01	CC36T1

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

System Configuration

Built-In Controller (Stored Program) Package Standard Type



No.	Product Name	Overview	Page
①	Communication Cable	Cable for connecting the computer and driver (5 m).	C-257
②	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	C-266
③	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	C-258
④	Extension Cables	Cable for extending the wiring distance between the motor and driver (1 to 20 m).	C-253
	Flexible Extension Cables	Cable offering flexibility, used to extend the wiring distance between the motor and driver (1 to 10 m).	
⑤	DIN Rail Mounting Plate	Use this plate when installing the driver to a DIN rail.	C-270
⑥	Driver Cables General-Purpose Type	General-purpose cable for connecting the driver and controller (1 m, 2 m).	C-256
⑦	Connector – Terminal Block Conversion Unit	Set of terminal block and cable for connecting the driver and host controller (1 m).	C-256

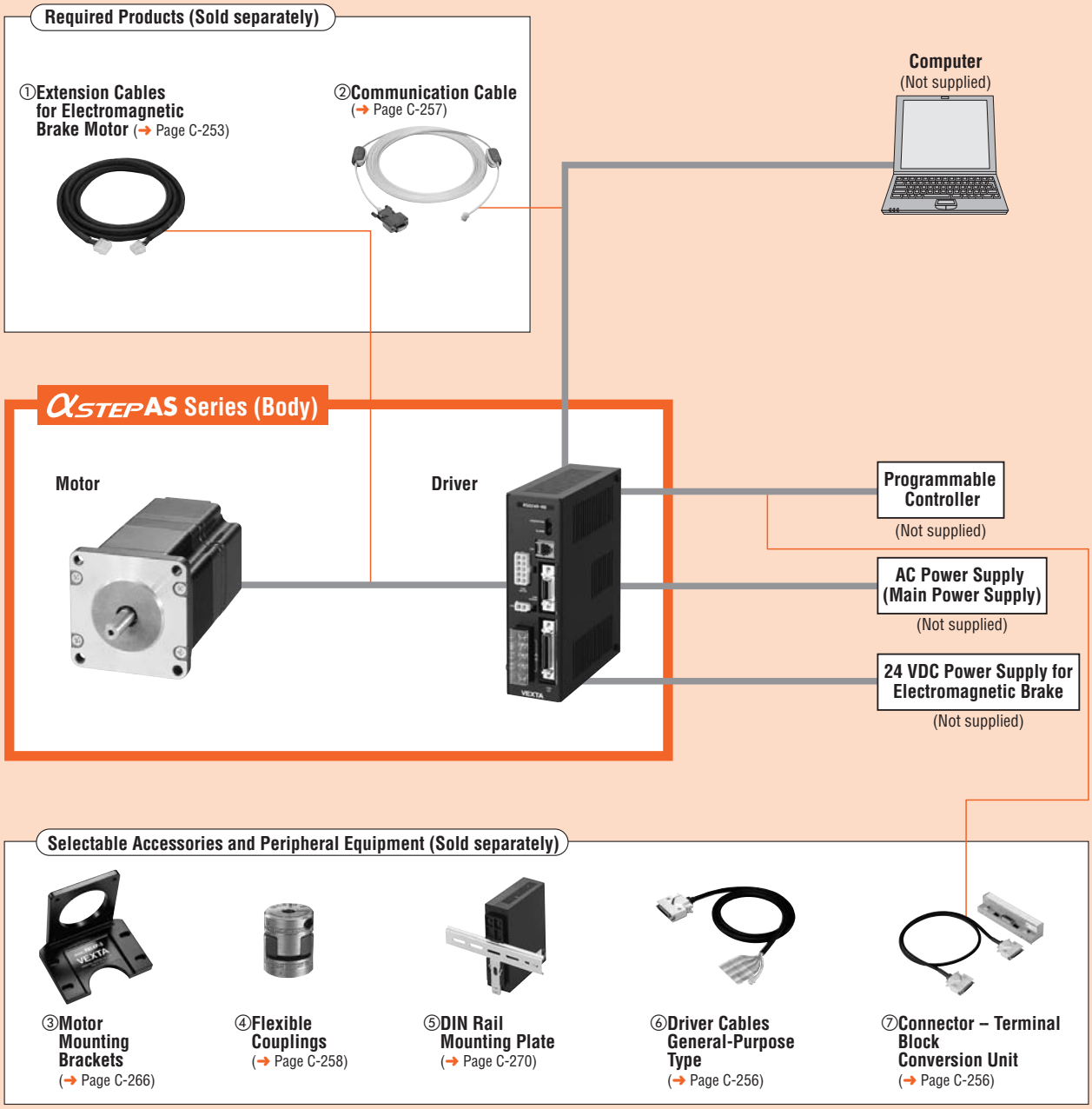
Example of System Configuration

(Body)	(Sold separately)		(Sold separately)					
αSTEP AS Series	Communication Cable	+	Extension Cable (3 m)	Motor Mounting Bracket	Flexible Coupling	DIN Rail Mounting Plate	Connector – Terminal Block Conversion Unit (1 m) For Sensor Input	Connector – Terminal Block Conversion Unit (1 m) For Control I/O
AS66ACEP	FC04W5		CC03AIP	PAL2P-5	MCS300808	PADP01	CC20T1	CC36T1

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

System Configuration

●Built-In Controller (Stored Program) Package Standard Type with Electromagnetic Brake



No.	Product Name	Overview	Page
①	Extension Cables for Electromagnetic Brake Motor	Dedicated cable for connecting the electromagnetic brake motor and driver (1 to 20 m). Be sure to purchase this cable.	C-253
	Flexible Extension Cables for Electromagnetic Brake Motor	Dedicated cable offering flexibility, used to connect the electromagnetic brake motor and driver (1 to 10 m). Be sure to purchase this cable.	
②	Communication Cable	Cable for connecting the computer and driver (5 m).	C-257
③	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	C-266
④	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	C-258
⑤	DIN Rail Mounting Plate	Use this plate when installing the driver to a DIN rail.	C-270
⑥	Driver Cables General-Purpose Type	General-purpose cable for connecting the driver and controller (1 m, 2 m).	C-256
⑦	Connector – Terminal Block Conversion Unit	Set of terminal block and cable for connecting the driver and host controller (1 m).	C-256

●Example of System Configuration

(Body)	(Sold separately)			(Sold separately)				
αSTEP AS Series	Extension Cable for Electromagnetic Brake Motor (3 m)	Communication Cable	+	Motor Mounting Bracket	Flexible Coupling	DIN Rail Mounting Plate	Connector – Terminal Block Conversion Unit (1 m) For Sensor Input	Connector – Terminal Block Conversion Unit (1 m) For Control I/O
AS66MCEP	CC03AIPM	FC04W5		PAL2P-5	MCS300808	PADP01	CC20T1	CC36T1

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

Product Number Code

Standard Type

AS 6 6 A C E P
① ② ③ ④ ⑤ ⑥ ⑦

①	Series **AS**: **AS** Series
②	Motor Frame Size **6**: 60 mm **9**: 85 mm
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 (Stored Program) Package Blank: Pulse Input Package

Standard Type IP65 Rated Motor

AS 6 6 A C T P
① ② ③ ④ ⑤ ⑥ ⑦

①	Series **AS**: **AS** Series
②	Motor Frame Size **6**: 60 mm **9**: 85 mm
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 (Stored Program) 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

①	Series **AS**: **AS** Series
②	Motor Frame Size **6**: 60 mm **9**: 90 mm
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 (Stored Program) Package Blank: Pulse Input Package
⑧	Gearhead Type **T**: **TH** Geared Type **P**: **PL** Geared Type **N**: **PN** Geared Type **H**: Harmonic Geared Type
⑨	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 or IP65 rated motor. Please contact the nearest Oriental Motor sales office for further information on the double shaft models.

Pulse Input Package

◇Standard Type

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66AAE** **AS69AAE**	✻
	AS98AAE **AS911AAE**	✻
Single-Phase 200-230 VAC	**AS66ACE** **AS69ACE**	C-27
	AS98ACE **AS911ACE**	C-27
Three-Phase 200-230 VAC	**AS66ASE** **AS69ASE**	✻
	AS98ASE **AS911ASE**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

◇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.

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66AAT** **AS69AAT**	✻
	AS98AAT **AS911AAT**	✻
Single-Phase 200-230 VAC	**AS66ACT** **AS69ACT**	C-28
	AS98ACT **AS911ACT**	C-28
Three-Phase 200-230 VAC	**AS66AST** **AS69AST**	✻
	AS98AST **AS911AST**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Motor cables for IP65 rated motor ➜ Page C-254

◇Standard Type with Electromagnetic Brake

Electromagnetic brake models must use an extension cable or flexible extension cable for an electromagnetic brake motor.

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66MAE** **AS69MAE**	✻
	AS98MAE	✻
Single-Phase 200-230 VAC	**AS66MCE** **AS69MCE**	C-27
	AS98MCE	C-27
Three-Phase 200-230 VAC	**AS66MSE** **AS69MSE**	✻
	AS98MSE	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Extension cables for electromagnetic brake motor ➜ Page C-253

• Motor Cables for IP65 Rated Motor (Sold separately)

Model	Length (m)	Model	Length (m)
CC01AIPM	1	**CC07AIPM**	7
CC02AIPM	2	**CC10AIPM**	10
CC03AIPM	3	**CC15AIPM**	15
CC05AIPM	5	**CC20AIPM**	20

• Flexible Motor Cables for IP65 Rated Motor (Sold separately)

Model	Length (m)	Model	Length (m)
CC01SARM2	1	**CC05SARM2**	5
CC02SARM2	2	**CC07SARM2**	7
CC03SARM2	3	**CC10SARM2**	10

The following items are included in each product.
Motor, Parallel Key✻1, Surge Suppressor✻2, Driver, Connector for Input/Output Signal, Mounting Bracket for Driver (with screws), Operating Manual
✻1 Only for the products with a key slot on the output shaft
✻2 Only for electromagnetic brake type

◇TH Geared Type

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66AAE-T3.6** **AS66AAE-T7.2** **AS66AAE-T10** **AS66AAE-T20** **AS66AAE-T30**	✻
	AS98AAE-T3.6 **AS98AAE-T7.2** **AS98AAE-T10** **AS98AAE-T20** **AS98AAE-T30**	✻
Single-Phase 200-230 VAC	**AS66ACE-T3.6** **AS66ACE-T7.2** **AS66ACE-T10** **AS66ACE-T20** **AS66ACE-T30**	C-29
	AS98ACE-T3.6 **AS98ACE-T7.2** **AS98ACE-T10** **AS98ACE-T20** **AS98ACE-T30**	C-30
Three-Phase 200-230 VAC	**AS66ASE-T3.6** **AS66ASE-T7.2** **AS66ASE-T10** **AS66ASE-T20** **AS66ASE-T30**	✻
	AS98ASE-T3.6 **AS98ASE-T7.2** **AS98ASE-T10** **AS98ASE-T20** **AS98ASE-T30**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

◇TH Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66MAE-T3.6** **AS66MAE-T7.2** **AS66MAE-T10** **AS66MAE-T20** **AS66MAE-T30**	✻
	AS98MAE-T3.6 **AS98MAE-T7.2** **AS98MAE-T10** **AS98MAE-T20** **AS98MAE-T30**	✻
Single-Phase 200-230 VAC	**AS66MCE-T3.6** **AS66MCE-T7.2** **AS66MCE-T10** **AS66MCE-T20** **AS66MCE-T30**	C-29
	AS98MCE-T3.6 **AS98MCE-T7.2** **AS98MCE-T10** **AS98MCE-T20** **AS98MCE-T30**	C-30
Three-Phase 200-230 VAC	**AS66MSE-T3.6** **AS66MSE-T7.2** **AS66MSE-T10** **AS66MSE-T20** **AS66MSE-T30**	✻
	AS98MSE-T3.6 **AS98MSE-T7.2** **AS98MSE-T10** **AS98MSE-T20** **AS98MSE-T30**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Extension cables for electromagnetic brake motor ➜ Page C-253

◇PL Geared Type

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66AAE-P5** **AS66AAE-P7.2** **AS66AAE-P10** **AS66AAE-P25** **AS66AAE-P36** **AS66AAE-P50**	✻
	AS98AAE-P5 **AS98AAE-P7.2** **AS98AAE-P10** **AS98AAE-P25** **AS98AAE-P36** **AS98AAE-P50**	✻
Single-Phase 200-230 VAC	**AS66ACE-P5** **AS66ACE-P7.2** **AS66ACE-P10** **AS66ACE-P25** **AS66ACE-P36** **AS66ACE-P50**	C-31
	AS98ACE-P5 **AS98ACE-P7.2** **AS98ACE-P10** **AS98ACE-P25** **AS98ACE-P36** **AS98ACE-P50**	C-32
Three-Phase 200-230 VAC	**AS66ASE-P5** **AS66ASE-P7.2** **AS66ASE-P10** **AS66ASE-P25** **AS66ASE-P36** **AS66ASE-P50**	✻
	AS98ASE-P5 **AS98ASE-P7.2** **AS98ASE-P10** **AS98ASE-P25** **AS98ASE-P36** **AS98ASE-P50**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

◇PL Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66MAE-P5** **AS66MAE-P7.2** **AS66MAE-P10** **AS66MAE-P25** **AS66MAE-P36** **AS66MAE-P50**	✻
	AS98MAE-P5 **AS98MAE-P7.2** **AS98MAE-P10** **AS98MAE-P25** **AS98MAE-P36** **AS98MAE-P50**	✻
Single-Phase 200-230 VAC	**AS66MCE-P5** **AS66MCE-P7.2** **AS66MCE-P10** **AS66MCE-P25** **AS66MCE-P36** **AS66MCE-P50**	C-31
	AS98MCE-P5 **AS98MCE-P7.2** **AS98MCE-P10** **AS98MCE-P25** **AS98MCE-P36** **AS98MCE-P50**	C-32
Three-Phase 200-230 VAC	**AS66MSE-P5** **AS66MSE-P7.2** **AS66MSE-P10** **AS66MSE-P25** **AS66MSE-P36** **AS66MSE-P50**	✻
	AS98MSE-P5 **AS98MSE-P7.2** **AS98MSE-P10** **AS98MSE-P25** **AS98MSE-P36** **AS98MSE-P50**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Extension cables for electromagnetic brake motor ➜ Page C-253

◇PN Geared Type

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66AAE-N5** **AS66AAE-N7.2** **AS66AAE-N10** **AS66AAE-N25** **AS66AAE-N36** **AS66AAE-N50**	✻
	AS98AAE-N5 **AS98AAE-N7.2** **AS98AAE-N10** **AS98AAE-N25** **AS98AAE-N36** **AS98AAE-N50**	✻
Single-Phase 200-230 VAC	**AS66ACE-N5** **AS66ACE-N7.2** **AS66ACE-N10** **AS66ACE-N25** **AS66ACE-N36** **AS66ACE-N50**	C-33
	AS98ACE-N5 **AS98ACE-N7.2** **AS98ACE-N10** **AS98ACE-N25** **AS98ACE-N36** **AS98ACE-N50**	C-34
Three-Phase 200-230 VAC	**AS66ASE-N5** **AS66ASE-N7.2** **AS66ASE-N10** **AS66ASE-N25** **AS66ASE-N36** **AS66ASE-N50**	✻
	AS98ASE-N5 **AS98ASE-N7.2** **AS98ASE-N10** **AS98ASE-N25** **AS98ASE-N36** **AS98ASE-N50**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

◇PN Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66MAE-N5** **AS66MAE-N7.2** **AS66MAE-N10** **AS66MAE-N25** **AS66MAE-N36** **AS66MAE-N50**	✻
	AS98MAE-N5 **AS98MAE-N7.2** **AS98MAE-N10** **AS98MAE-N25** **AS98MAE-N36** **AS98MAE-N50**	✻
Single-Phase 200-230 VAC	**AS66MCE-N5** **AS66MCE-N7.2** **AS66MCE-N10** **AS66MCE-N25** **AS66MCE-N36** **AS66MCE-N50**	C-33
	AS98MCE-N5 **AS98MCE-N7.2** **AS98MCE-N10** **AS98MCE-N25** **AS98MCE-N36** **AS98MCE-N50**	C-34
Three-Phase 200-230 VAC	**AS66MSE-N5** **AS66MSE-N7.2** **AS66MSE-N10** **AS66MSE-N25** **AS66MSE-N36** **AS66MSE-N50**	✻
	AS98MSE-N5 **AS98MSE-N7.2** **AS98MSE-N10** **AS98MSE-N25** **AS98MSE-N36** **AS98MSE-N50**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Extension cables for electromagnetic brake motor ➜ Page C-253

◇Harmonic Geared Type

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66AAE-H50** **AS66AAE-H100**	✻
	AS98AAE-H50 **AS98AAE-H100**	✻
Single-Phase 200-230 VAC	**AS66ACE-H50** **AS66ACE-H100**	C-35
	AS98ACE-H50 **AS98ACE-H100**	C-35
Three-Phase 200-230 VAC	**AS66ASE-H50** **AS66ASE-H100**	✻
	AS98ASE-H50 **AS98ASE-H100**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

◇Harmonic Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66MAE-H50** **AS66MAE-H100**	✻
	AS98MAE-H50 **AS98MAE-H100**	✻
Single-Phase 200-230 VAC	**AS66MCE-H50** **AS66MCE-H100**	C-35
	AS98MCE-H50 **AS98MCE-H100**	C-35
Three-Phase 200-230 VAC	**AS66MSE-H50** **AS66MSE-H100**	✻
	AS98MSE-H50 **AS98MSE-H100**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Extension cables for electromagnetic brake motor ➜ Page C-253

●Electromagnetic brake models must use an extension cable or flexible extension cable for an electromagnetic brake motor.

• Extension Cables for Electromagnetic Brake Motor

Model	Length (m)
CC01AIPM	1
CC02AIPM	2
CC03AIPM	3
CC05AIPM	5
CC07AIPM	7
CC10AIPM	10
CC15AIPM	15
CC20AIPM	20

• Flexible Extension Cables for Electromagnetic Brake Motor

Model	Length (m)
CC01SARM2	1
CC02SARM2	2
CC03SARM2	3
CC05SARM2	5
CC07SARM2	7
CC10SARM2	10

●Built-In Controller (Stored Program) Package

◇Standard Type

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66AAEP** **AS69AAEP**	✻
	AS98AAEP **AS911AAEP**	✻
Single-Phase 200-230 VAC	**AS66ACEP** **AS69ACEP**	C-27
	AS98ACEP **AS911ACEP**	C-27
Three-Phase 200-230 VAC	**AS66ASEP** **AS69ASEP**	✻
	AS98ASEP **AS911ASEP**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

◇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.

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66AATP** **AS69AATP**	✻
	AS98AATP **AS911AATP**	✻
Single-Phase 200-230 VAC	**AS66ACTP** **AS69ACTP**	C-28
	AS98ACTP **AS911ACTP**	C-28
Three-Phase 200-230 VAC	**AS66ASTP** **AS69ASTP**	✻
	AS98ASTP **AS911ASTP**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Motor cables for IP65 rated motor ➜ Page C-254

◇TH Geared Type

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66AAEP-T3.6** **AS66AAEP-T7.2** **AS66AAEP-T10** **AS66AAEP-T20** **AS66AAEP-T30**	✻
	AS98AAEP-T3.6 **AS98AAEP-T7.2** **AS98AAEP-T10** **AS98AAEP-T20** **AS98AAEP-T30**	✻
Single-Phase 200-230 VAC	**AS66ACEP-T3.6** **AS66ACEP-T7.2** **AS66ACEP-T10** **AS66ACEP-T20** **AS66ACEP-T30**	C-29
	AS98ACEP-T3.6 **AS98ACEP-T7.2** **AS98ACEP-T10** **AS98ACEP-T20** **AS98ACEP-T30**	C-30
Three-Phase 200-230 VAC	**AS66ASEP-T3.6** **AS66ASEP-T7.2** **AS66ASEP-T10** **AS66ASEP-T20** **AS66ASEP-T30**	✻
	AS98ASEP-T3.6 **AS98ASEP-T7.2** **AS98ASEP-T10** **AS98ASEP-T20** **AS98ASEP-T30**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

◇Standard Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66MAEP** **AS69MAEP**	✻
	AS98MAEP	✻
Single-Phase 200-230 VAC	**AS66MCEP** **AS69MCEP**	C-27
	AS98MCEP	C-27
Three-Phase 200-230 VAC	**AS66MSEP** **AS69MSEP**	✻
	AS98MSEP	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Extension cables for electromagnetic brake motor ➜ Page C-253

◇TH Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66MAEP-T3.6** **AS66MAEP-T7.2** **AS66MAEP-T10** **AS66MAEP-T20** **AS66MAEP-T30**	✻
	AS98MAEP-T3.6 **AS98MAEP-T7.2** **AS98MAEP-T10** **AS98MAEP-T20** **AS98MAEP-T30**	✻
Single-Phase 200-230 VAC	**AS66MCEP-T3.6** **AS66MCEP-T7.2** **AS66MCEP-T10** **AS66MCEP-T20** **AS66MCEP-T30**	C-29
	AS98MCEP-T3.6 **AS98MCEP-T7.2** **AS98MCEP-T10** **AS98MCEP-T20** **AS98MCEP-T30**	C-30
Three-Phase 200-230 VAC	**AS66MSEP-T3.6** **AS66MSEP-T7.2** **AS66MSEP-T10** **AS66MSEP-T20** **AS66MSEP-T30**	✻
	AS98MSEP-T3.6 **AS98MSEP-T7.2** **AS98MSEP-T10** **AS98MSEP-T20** **AS98MSEP-T30**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Extension cables for electromagnetic brake motor ➜ Page C-253

◇PN Geared Type

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66AAEP-N5** **AS66AAEP-N7.2** **AS66AAEP-N10** **AS66AAEP-N25** **AS66AAEP-N36** **AS66AAEP-N50**	✻
	AS98AAEP-N5 **AS98AAEP-N7.2** **AS98AAEP-N10** **AS98AAEP-N25** **AS98AAEP-N36** **AS98AAEP-N50**	✻
Single-Phase 200-230 VAC	**AS66ACEP-N5** **AS66ACEP-N7.2** **AS66ACEP-N10** **AS66ACEP-N25** **AS66ACEP-N36** **AS66ACEP-N50**	C-33
	AS98ACEP-N5 **AS98ACEP-N7.2** **AS98ACEP-N10** **AS98ACEP-N25** **AS98ACEP-N36** **AS98ACEP-N50**	C-34
Three-Phase 200-230 VAC	**AS66ASEP-N5** **AS66ASEP-N7.2** **AS66ASEP-N10** **AS66ASEP-N25** **AS66ASEP-N36** **AS66ASEP-N50**	✻
	AS98ASEP-N5 **AS98ASEP-N7.2** **AS98ASEP-N10** **AS98ASEP-N25** **AS98ASEP-N36** **AS98ASEP-N50**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

◇PN Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66MAEP-N5** **AS66MAEP-N7.2** **AS66MAEP-N10** **AS66MAEP-N25** **AS66MAEP-N36** **AS66MAEP-N50**	✻
	AS98MAEP-N5 **AS98MAEP-N7.2** **AS98MAEP-N10** **AS98MAEP-N25** **AS98MAEP-N36** **AS98MAEP-N50**	✻
Single-Phase 200-230 VAC	**AS66MCEP-N5** **AS66MCEP-N7.2** **AS66MCEP-N10** **AS66MCEP-N25** **AS66MCEP-N36** **AS66MCEP-N50**	C-33
	AS98MCEP-N5 **AS98MCEP-N7.2** **AS98MCEP-N10** **AS98MCEP-N25** **AS98MCEP-N36** **AS98MCEP-N50**	C-34
Three-Phase 200-230 VAC	**AS66MSEP-N5** **AS66MSEP-N7.2** **AS66MSEP-N10** **AS66MSEP-N25** **AS66MSEP-N36** **AS66MSEP-N50**	✻
	AS98MSEP-N5 **AS98MSEP-N7.2** **AS98MSEP-N10** **AS98MSEP-N25** **AS98MSEP-N36** **AS98MSEP-N50**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Extension cables for electromagnetic brake motor ➜ Page C-253

◇Harmonic Geared Type

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66AAEP-H50** **AS66AAEP-H100**	✻
	AS98AAEP-H50 **AS98AAEP-H100**	✻
Single-Phase 200-230 VAC	**AS66ACEP-H50** **AS66ACEP-H100**	C-35
	AS98ACEP-H50 **AS98ACEP-H100**	C-35
Three-Phase 200-230 VAC	**AS66ASEP-H50** **AS66ASEP-H100**	✻
	AS98ASEP-H50 **AS98ASEP-H100**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

◇Harmonic Geared Type with Electromagnetic Brake

Power Supply Voltage	Model (Single Shaft)	Page
Single-Phase 100-115 VAC	**AS66MAEP-H50** **AS66MAEP-H100**	✻
	AS98MAEP-H50 **AS98MAEP-H100**	✻
Single-Phase 200-230 VAC	**AS66MCEP-H50** **AS66MCEP-H100**	C-35
	AS98MCEP-H50 **AS98MCEP-H100**	C-35
Three-Phase 200-230 VAC	**AS66MSEP-H50** **AS66MSEP-H100**	✻
	AS98MSEP-H50 **AS98MSEP-H100**	✻

✻For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

Extension cables for electromagnetic brake motor ➜ Page C-253

• Communication Cable

This cable is used to connect personal computer and built-in controller (stored program) driver through an RS-232C connection.

Model
FC04W5

(Cable length: 5 m)

Standard Type Motor Frame Size 60 mm, 85 mm

Specifications RoHS

Model			AS66ACE	AS69ACE	AS98ACE	AS911ACE
Pulse Input Package	Standard		AS66ACE	AS69ACE	AS98ACE	AS911ACE
	Electromagnetic Brake		AS66MCE	AS69MCE	AS98MCE	–
Built-In Controller (Stored Program) Package	Standard		AS66ACEP	AS69ACEP	AS98ACEP	AS911ACEP
	Electromagnetic Brake		AS66MCEP	AS69MCEP	AS98MCEP	–
Maximum Holding Torque		N·m	1.2	2		4
Rotor Inertia		J: kg·m²	405×10^{-7} [564×10^{-7}]*1	802×10^{-7} [961×10^{-7}]*1	1400×10^{-7} [1560×10^{-7}]*1	2710×10^{-7}
Resolution*2	Resolution Setting: 1000 P/R		0.36°/Pulse			
Power Source	Voltage/Frequency		Single-Phase 200-230 VAC −15～+10% 50/60 Hz			
	Maximum Input Current	A	3	3.9	3.5	4.5
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	0.6	1		–
Mass	Motor	kg	0.85 [1.1]*1	1.4 [1.65]*1	1.8 [2.2]*1	3
	Driver	kg	0.8			
Dimension No.	Motor		1		2	
	Driver	Pulse Input	13			
		Built-In Controller (Stored Program)	14			

How to read specifications table ➜ Page C-10 **Extension cables for electromagnetic brake motor** ➜ Page C-253

*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 C-45
Built-In Controller (Stored Program) Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

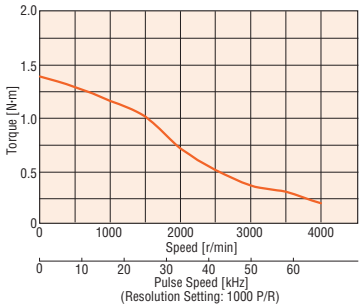
*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate 24 VDC±5%, 0.3 A minimum power supply is required for the electromagnetic brakes.

● For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

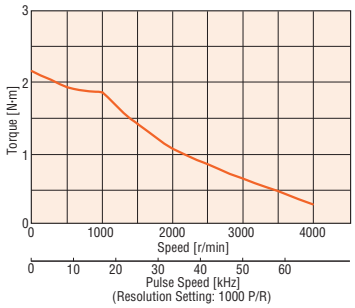
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page C-10

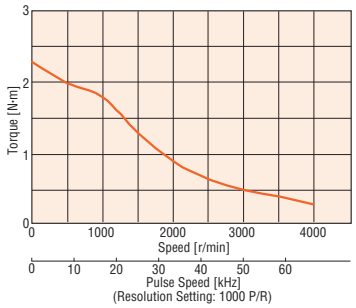
AS66□CE/AS66□CEP



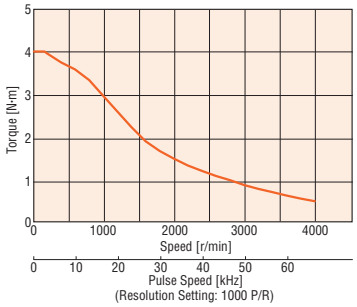
AS69□CE/AS69□CEP



AS98□CE/AS98□CEP



AS911ACE/AS911ACEP



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

Notes:

● Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C. (Under 75°C is required to comply with UL or CSA Standards as the motor is recognized as insulation class A.)

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

Standard Type IP65 Rated Motor Motor Frame Size 60 mm, 85 mm

Specifications RoHS

Model	Pulse Input Package	Standard	AS66ACT	AS69ACT	AS98ACT	AS911ACT
	Built-In Controller (Stored Program) Package	Standard	AS66ACTP	AS69ACTP	AS98ACTP	AS911ACTP
Maximum Holding Torque		N·m	1.2	2		4
Rotor Inertia		J: kg·m^2	405×10^{-7}	802×10^{-7}	1400×10^{-7}	2710×10^{-7}
Resolution*1		Resolution Setting: 1000 P/R	0.36°/Pulse			
Power Source	Voltage/Frequency		Single-Phase 200-230 VAC −15～+10% 50/60 Hz			
	Maximum Input Current	A	3	3.9	3.5	4.5
Degree of Protection			Motor: IP65*2 Driver: IP10			
Mass		Motor kg	1	1.5	2.2	3.3
		Driver kg	0.8			
Dimension No.	Motor		3		4	
	Driver	Pulse Input	13			
		Built-In Controller (Stored Program)	14			

How to read specifications table ➜ Page C-10

*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 C-45
Built-In Controller (Stored Program) Package: The resolution can be set from 500 P/R to 10000 P/R by setting parameters.

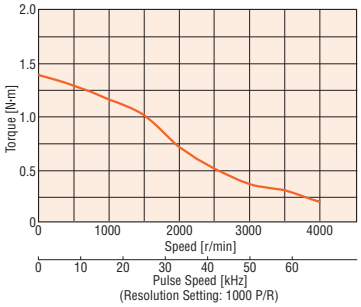
*2 Excluding the gap between the shaft and the flange.

- Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver. ➜ Page C-254
- For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

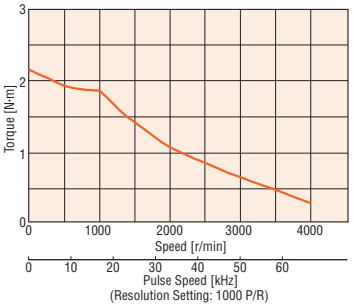
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page C-10

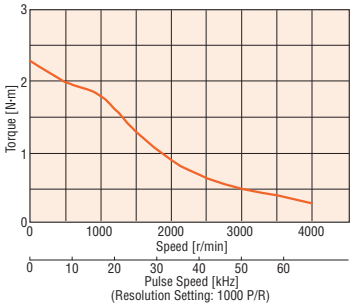
AS66ACT/AS66ACTP



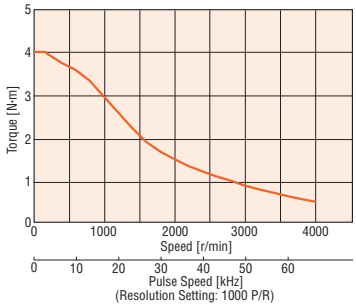
AS69ACT/AS69ACTP



AS98ACT/AS98ACTP



AS911ACT/AS911ACTP

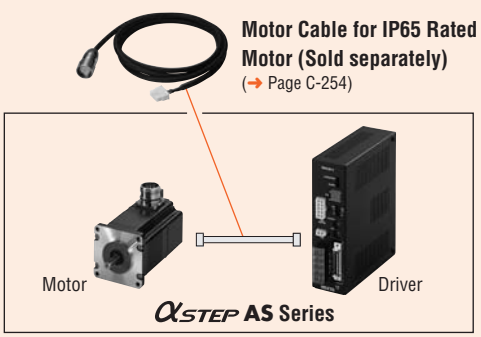


Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C. (Under 75°C is required to comply with UL or CSA Standards as the motor is recognized as insulation class A.)
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

Requirement for Motor Cables 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.



Features C-12 / System Configuration C-18 / Product Line C-22

TH Geared Type Motor Frame Size 60 mm

Specifications RoHS

Model			AS66ACE-T3.6	AS66ACE-T7.2	AS66ACE-T10	AS66ACE-T20	AS66ACE-T30
	Pulse Input Package	Electromagnetic Brake	AS66MCE-T3.6	AS66MCE-T7.2	AS66MCE-T10	AS66MCE-T20	AS66MCE-T30
	Built-In Controller (Stored Program) Package	Standard	AS66ACEP-T3.6	AS66ACEP-T7.2	AS66ACEP-T10	AS66ACEP-T20	AS66ACEP-T30
		Electromagnetic Brake	AS66MCEP-T3.6	AS66MCEP-T7.2	AS66MCEP-T10	AS66MCEP-T20	AS66MCEP-T30
Maximum Holding Torque		N·m	1.25	2.5	3	3.5	4
Rotor Inertia		J: kg·m²	405×10^{-7} [564×10^{-7}]*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			1: 3.6	1: 7.2	1: 10	1: 20	1: 30
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	1.25	2.5	3	3.5	4
Power Source	Voltage/Frequency		Single-Phase 200-230 VAC −15～+10% 50/60 Hz				
	Maximum Input Current	A	3				
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	0.62	1.25	1.5	1.75	2
Mass		Motor kg	1.25 [1.5]*1				
		Driver kg	0.8				
Dimension No.	Motor		5				
	Driver	Pulse Input	13				
		Built-In Controller (Stored Program)	14				

How to read specifications table ➜ Page C-10 **Extension cables for electromagnetic brake motor** ➜ Page C-253

- For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

*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 C-45
Built-In Controller (Stored Program) 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 braking. Also, a separate 24 VDC±5%, 0.3 A minimum power supply is required for the electromagnetic brakes.

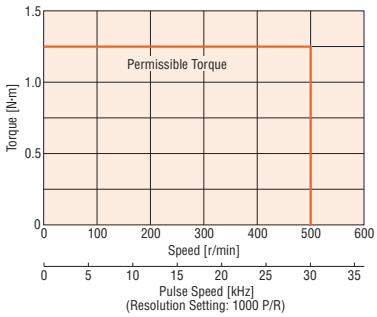
Note:

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

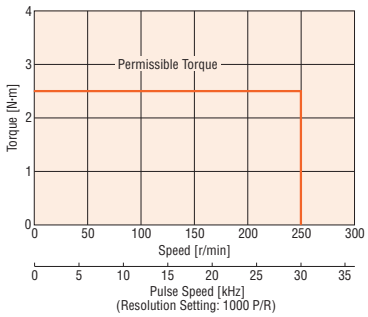
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page C-10

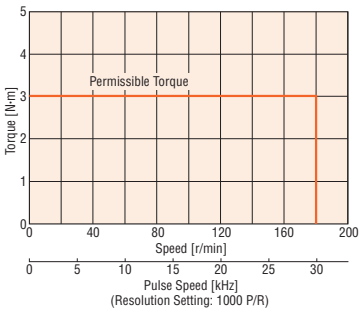
AS66□CE-T3.6/AS66□CEP-T3.6



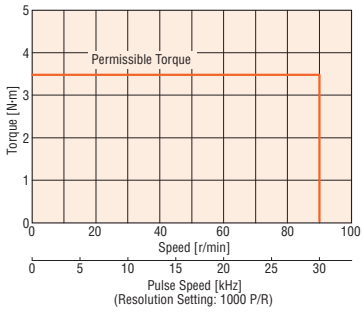
AS66□CE-T7.2/AS66□CEP-T7.2



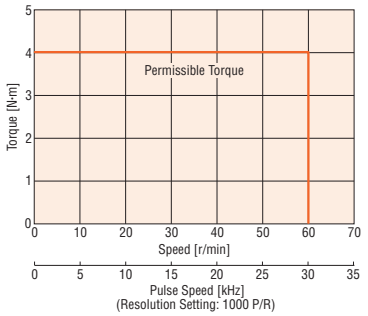
AS66□CE-T10/AS66□CEP-T10



AS66□CE-T20/AS66□CEP-T20



AS66□CE-T30/AS66□CEP-T30



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

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C. (Under 75°C is required to comply with UL or CSA Standards as the motor is recognized as insulation class A.)
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

TH Geared Type Motor Frame Size 90 mm

Specifications RoHS

Model							
Pulse Input Package	Standard	AS98ACE-T3.6	AS98ACE-T7.2	AS98ACE-T10	AS98ACE-T20	AS98ACE-T30
	Electromagnetic Brake	AS98MCE-T3.6	AS98MCE-T7.2	AS98MCE-T10	AS98MCE-T20	AS98MCE-T30
Built-In Controller (Stored Program) Package	Standard	AS98ACEP-T3.6	AS98ACEP-T7.2	AS98ACEP-T10	AS98ACEP-T20	AS98ACEP-T30
	Electromagnetic Brake	AS98MCEP-T3.6	AS98MCEP-T7.2	AS98MCEP-T10	AS98MCEP-T20	AS98MCEP-T30
Maximum Holding Torque N·m		4.5	9		12	
Rotor Inertia J: kg·m^2		1400×10^{-7} [1560×10^{-7}]※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		1: 3.6	1: 7.2	1: 10	1: 20	1: 30
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		4.5	9		12	
Power Source	Voltage/Frequency	Single-Phase 200-230 VAC −15～+10% 50/60 Hz				
	Maximum Input Current A	3.5				
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	2.25	4.5		6	
Mass	Motor kg	3 [3.4]※1				
	Driver kg	0.8				
Dimension No.	Motor	6				
	Driver Pulse Input	13				
	Driver Built-In Controller (Stored Program)	14				

How to read specifications table ➜ Page C-10 **Extension cables for electromagnetic brake motor** ➜ Page C-253

- For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

※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 C-45
Built-In Controller (Stored Program) 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 braking. Also, a separate 24 VDC±5%, 0.3 A minimum power supply is required for the electromagnetic brakes.

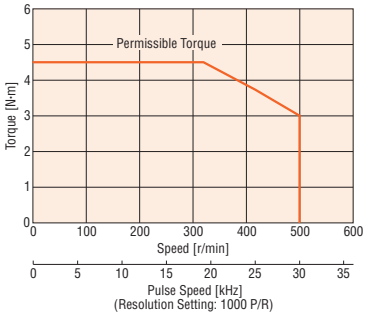
Note:

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

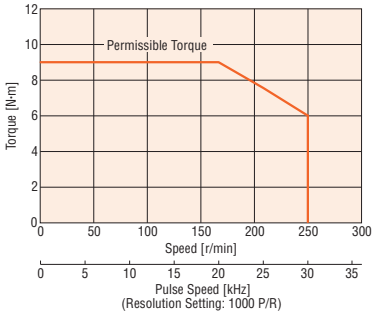
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page C-10

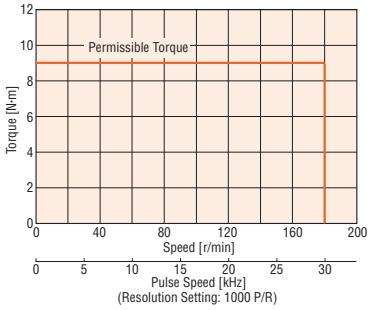
AS98□CE-T3.6/AS98□CEP-T3.6



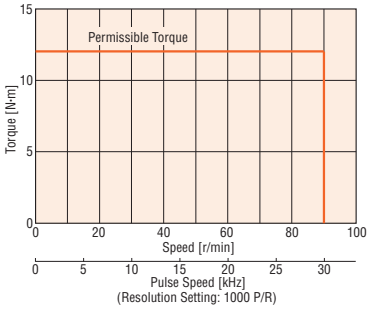
AS98□CE-T7.2/AS98□CEP-T7.2



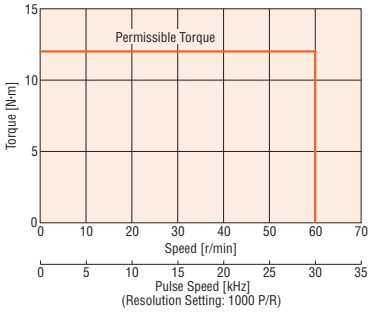
AS98□CE-T10/AS98□CEP-T10



AS98□CE-T20/AS98□CEP-T20



AS98□CE-T30/AS98□CEP-T30



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

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C. (Under 75°C is required to comply with UL or CSA Standards as the motor is recognized as insulation class A.)
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

PL Geared Type Motor Frame Size 60 mm

Specifications RoHS

Model	Pulse Input Package	Standard	AS66ACE-P5	AS66ACE-P7.2	AS66ACE-P10	AS66ACE-P25	AS66ACE-P36	AS66ACE-P50
		Electromagnetic Brake	AS66MCE-P5	AS66MCE-P7.2	AS66MCE-P10	AS66MCE-P25	AS66MCE-P36	AS66MCE-P50
Maximum Holding Torque		N·m	3.5	4	5	8		
Rotor Inertia		J: kg·m²	405×10^{-7} [564×10^{-7}]*1					
Backlash		arc minute (degrees)	20 (0.33°)					
Permissible Speed Range		r/min	0～360	0～250	0～180	0～72	0～50	0～36
Gear Ratio			1: 5	1: 7.2	1: 10	1: 25	1: 36	1: 50
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	3.5	4	5	8		
Power Source	Voltage/Frequency		Single-Phase 200-230 VAC −15～+10% 50/60 Hz					
	Maximum Input Current	A	3					
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	1.75	2	2.5	4		
Mass		Motor kg	1.25 [1.5]*1			1.55 [1.8]*1		
		Driver kg	0.8					
Dimension No.	Motor		7					
	Driver	Pulse Input	13					

How to read specifications table ➜ Page C-10 **Extension cables for electromagnetic brake motor** ➜ Page C-253

- For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

*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 C-45

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

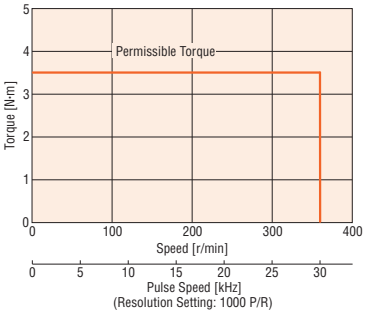
Note:

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

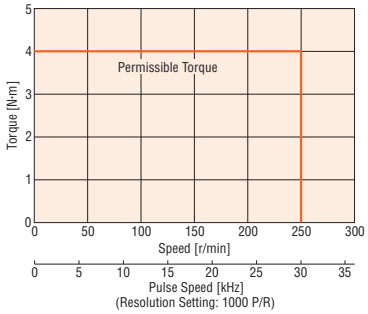
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page C-10

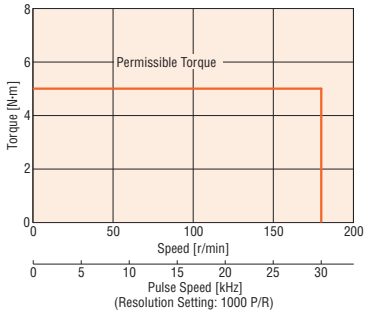
AS66□CE-P5



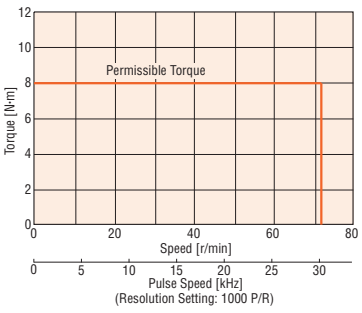
AS66□CE-P7.2



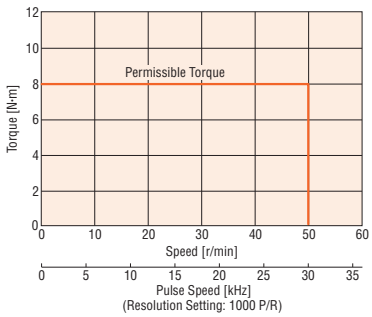
AS66□CE-P10



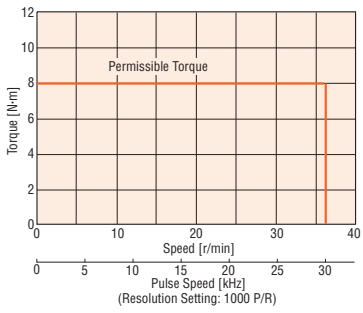
AS66□CE-P25



AS66□CE-P36



AS66□CE-P50



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

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C. (Under 75°C is required to comply with UL or CSA Standards as the motor is recognized as insulation class A.)
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

PL Geared Type Motor Frame Size 90 mm

Specifications RoHS

Model / Pulse Input Package / Standard			AS98ACE-P5	AS98ACE-P7.2	AS98ACE-P10	AS98ACE-P25	AS98ACE-P36	AS98ACE-P50
		Electromagnetic Brake	AS98MCE-P5	AS98MCE-P7.2	AS98MCE-P10	AS98MCE-P25	AS98MCE-P36	AS98MCE-P50
Maximum Holding Torque		N·m	9	12.9	18	37		
Rotor Inertia		J: kg·m²	1400×10^{-7} [1560×10^{-7}]*1					
Backlash		arc minute (degrees)	15 (0.25°)					
Permissible Speed Range		r/min	0～360	0～250	0～180	0～72	0～50	0～36
Gear Ratio			1: 5	1: 7.2	1: 10	1: 25	1: 36	1: 50
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	9	12.9	18	37		
Power Source	Voltage/Frequency		Single-Phase 200-230 VAC −15～+10% 50/60 Hz					
	Maximum Input Current	A	3.5					
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	4.5	6.45	9	18.5		
Mass		Motor kg	3.2 [3.6]*1			4 [4.4]*1		
		Driver kg	0.8					
Dimension No.	Motor		8					
	Driver	Pulse Input	13					

How to read specifications table ➜ Page C-10 **Extension cables for electromagnetic brake motor** ➜ Page C-253

- For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

*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 C-45

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

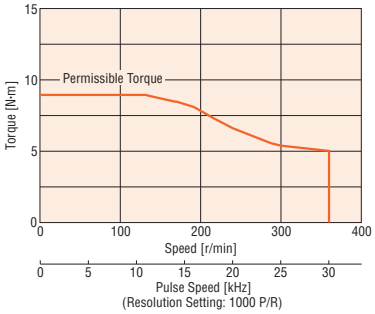
Note:

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

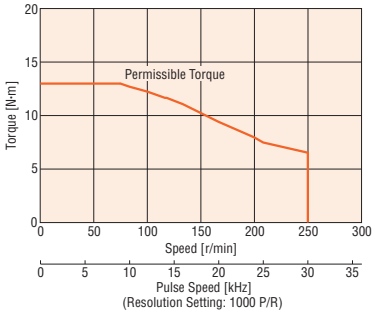
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page C-10

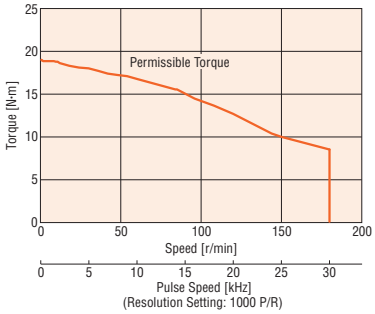
AS98□CE-P5



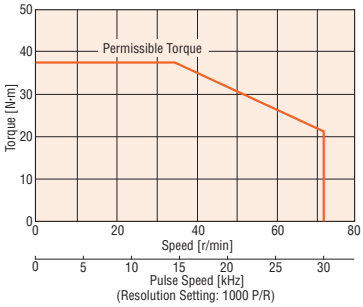
AS98□CE-P7.2



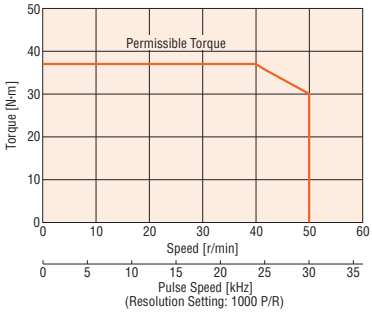
AS98□CE-P10



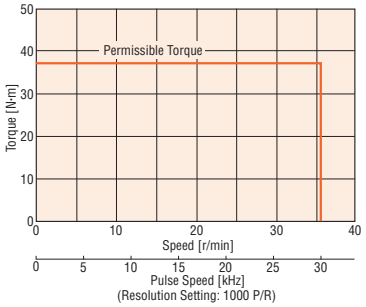
AS98□CE-P25



AS98□CE-P36



AS98□CE-P50



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

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C. (Under 75°C is required to comply with UL or CSA Standards as the motor is recognized as insulation class A.)
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

PN Geared Type Motor Frame Size 60 mm

Specifications RoHS

Model								
Pulse Input Package	Standard	AS66ACE-N5	AS66ACE-N7.2	AS66ACE-N10	AS66ACE-N25	AS66ACE-N36	AS66ACE-N50
	Electromagnetic Brake	AS66MCE-N5	AS66MCE-N7.2	AS66MCE-N10	AS66MCE-N25	AS66MCE-N36	AS66MCE-N50
Built-In Controller (Stored Program) Package	Standard	AS66ACEP-N5	AS66ACEP-N7.2	AS66ACEP-N10	AS66ACEP-N25	AS66ACEP-N36	AS66ACEP-N50
	Electromagnetic Brake	AS66MCEP-N5	AS66MCEP-N7.2	AS66MCEP-N10	AS66MCEP-N25	AS66MCEP-N36	AS66MCEP-N50
Maximum Holding Torque	N·m	3.5	4	5	8		
Rotor Inertia	J: kg·m²	405×10^{-7} [564×10^{-7}]*1					
Backlash	arc minute (degrees)	2 (0.034°)			3 (0.05°)		
Angular Transmission Error	arc minute (degrees)	5 (0.084°)					
Permissible Speed Range	r/min	0～600	0～416	0～300	0～120	0～83	0～60
Gear Ratio		1: 5	1: 7.2	1: 10	1: 25	1: 36	1: 50
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	3.5	4	5	8		
Maximum Torque*3	N·m	7	9	11	16	20	
Power Source	Voltage/Frequency	Single-Phase 200-230 VAC −15～+10% 50/60 Hz					
	Maximum Input Current A	3					
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	1.75	2	2.5	4		
Mass	Motor kg	1.5 [1.75]*1			1.7 [1.95]*1		
	Driver kg	0.8					
Dimension No.	Motor	9					
	Driver Pulse Input	13					
	Driver Built-In Controller (Stored Program)	14					

How to read specifications table ➜ Page C-10 **Extension cables for electromagnetic brake motor** ➜ Page C-253

- For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

*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 C-45
Built-In Controller (Stored Program) 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 braking. Also, a separate 24 VDC±5%, 0.3 A minimum power supply is required for the electromagnetic brakes.

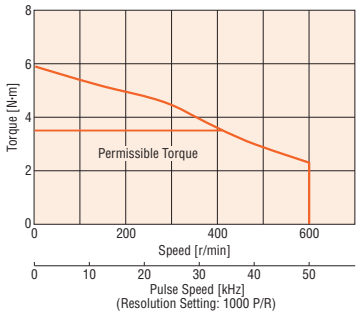
Note:

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

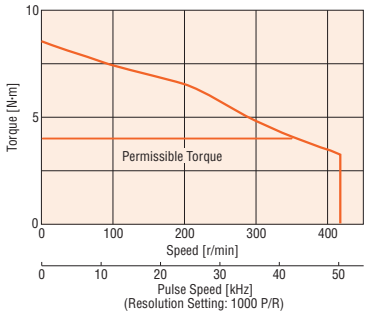
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page C-10

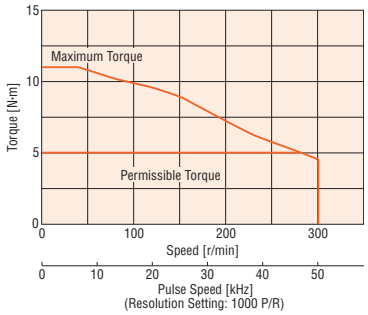
AS66□CE-N5/AS66□CEP-N5



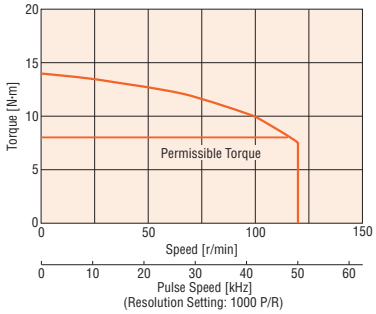
AS66□CE-N7.2/AS66□CEP-N7.2



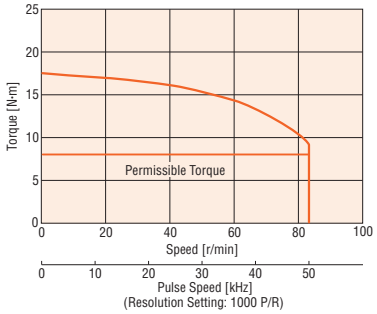
AS66□CE-N10/AS66□CEP-N10



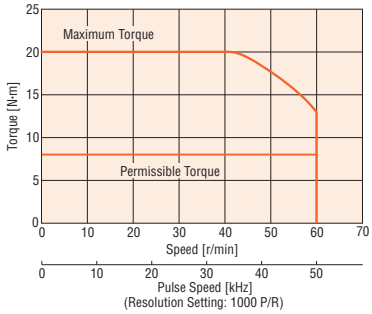
AS66□CE-N25/AS66□CEP-N25



AS66□CE-N36/AS66□CEP-N36



AS66□CE-N50/AS66□CEP-N50



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

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C. (Under 75°C is required to comply with UL or CSA Standards as the motor is recognized as insulation class A.)
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

PN Geared Type Motor Frame Size 90 mm

Specifications RoHS

Model			AS98ACE-N5	AS98ACE-N7.2	AS98ACE-N10	AS98ACE-N25	AS98ACE-N36	AS98ACE-N50
	Pulse Input Package	Electromagnetic Brake	AS98MCE-N5	AS98MCE-N7.2	AS98MCE-N10	AS98MCE-N25	AS98MCE-N36	AS98MCE-N50
	Built-In Controller (Stored Program) Package	Standard	AS98ACEP-N5	AS98ACEP-N7.2	AS98ACEP-N10	AS98ACEP-N25	AS98ACEP-N36	AS98ACEP-N50
		Electromagnetic Brake	AS98MCEP-N5	AS98MCEP-N7.2	AS98MCEP-N10	AS98MCEP-N25	AS98MCEP-N36	AS98MCEP-N50
Maximum Holding Torque		N·m	10	14	20	37		
Rotor Inertia		J: kg·m²	1400×10⁻⁷ [1560×10⁻⁷]*1					
Backlash		arc minute (degrees)	2 (0.034°)			3 (0.05°)		
Angular Transmission 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			1: 5	1: 7.2	1: 10	1: 25	1: 36	1: 50
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	10	14	20	37		
Maximum Torque*3		N·m	28	35		56	60	
Power Source	Voltage/Frequency		Single-Phase 200-230 VAC −15～+10% 50/60 Hz					
	Maximum Input Current	A	3.5					
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	4.5	6.45	9	18.5		
Mass	Motor	kg	4 [4.4]*1			4.7 [5.1]*1		
	Driver	kg	0.8					
Dimension No.	Motor		10					
	Driver	Pulse Input	13					
		Built-In Controller (Stored Program)	14					

How to read specifications table ➜ Page C-10 **Extension cables for electromagnetic brake motor** ➜ Page C-253

- For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

*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 C-45
Built-In Controller (Stored Program) 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 braking. Also, a separate 24 VDC±5%, 0.3 A minimum power supply is required for the electromagnetic brakes.

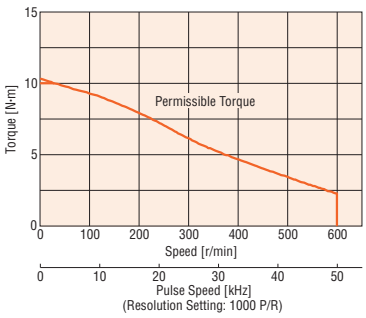
Note:

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

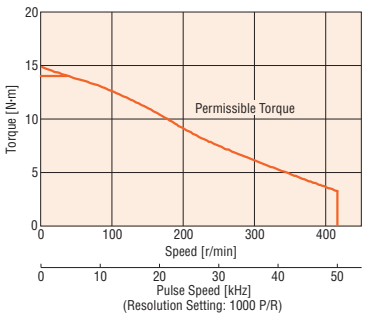
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page C-10

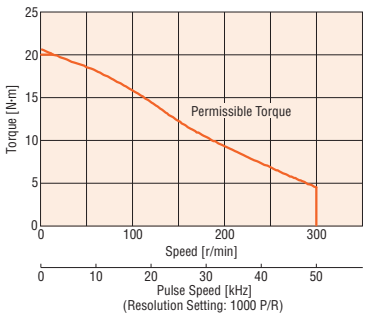
AS98□CE-N5/AS98□CEP-N5



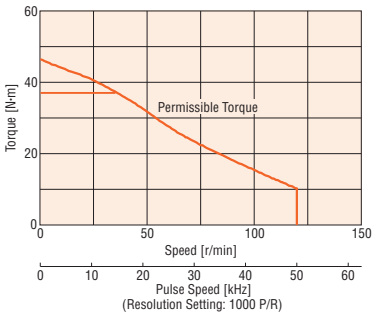
AS98□CE-N7.2/AS98□CEP-N7.2



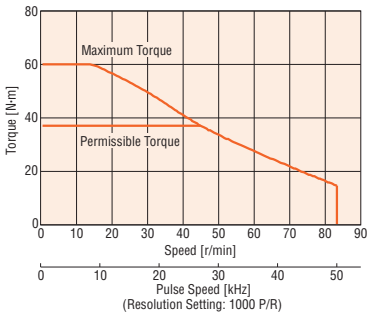
AS98□CE-N10/AS98□CEP-N10



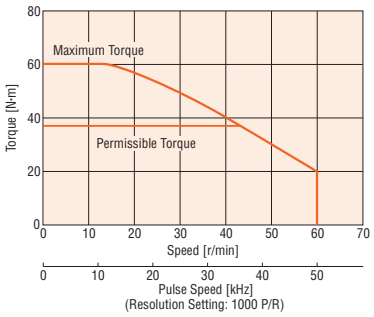
AS98□CE-N25/AS98□CEP-N25



AS98□CE-N36/AS98□CEP-N36



AS98□CE-N50/AS98□CEP-N50



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

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C. (Under 75°C is required to comply with UL or CSA Standards as the motor is recognized as insulation class A.)
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

Harmonic Geared Type Motor Frame Size 60 mm, 90 mm

Specifications RoHS

Model			AS66ACE-H50	AS66ACE-H100	AS98ACE-H50	AS98ACE-H100
	Pulse Input Package	Electromagnetic Brake	AS66MCE-H50	AS66MCE-H100	AS98MCE-H50	AS98MCE-H100
	Built-In Controller (Stored Program) Package	Standard	AS66ACEP-H50	AS66ACEP-H100	AS98ACEP-H50	AS98ACEP-H100
		Electromagnetic Brake	AS66MCEP-H50	AS66MCEP-H100	AS98MCEP-H50	AS98MCEP-H100
Maximum Holding Torque		N·m	5.5	8	25	37
Rotor Inertia		J: kg·m²	440×10^{-7} [599×10^{-7}]*1		1600×10^{-7} [1759×10^{-7}]*1	
Permissible Speed Range		r/min	0～70	0～35	0～70	0～35
Gear Ratio			1: 50	1: 100	1: 50	1: 100
Resolution*2	Resolution Setting: 1000 P/R		0.0072°/Pulse	0.0036°/Pulse	0.0072°/Pulse	0.0036°/Pulse
Permissible Torque		N·m	5.5	8	25	37
Maximum Torque		N·m	18	28	35	55
Lost Motion (Load Torque)		arc minute	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 200-230 VAC −15～+10% 50/60 Hz			
	Maximum Input Current	A	3		3.5	
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	2.75	4	12.5	18.5
Mass		Motor kg	1.4 [1.65]*1		3.9 [4.3]*1	
		Driver kg	0.8			
Dimension No.	Motor		11		12	
	Driver	Pulse Input	13			
		Built-In Controller (Stored Program)	14			

How to read specifications table ➜ Page C-10 **Extension cables for electromagnetic brake motor** ➜ Page C-253

- For the single-phase 100-115 VAC models and three-phase 200-230 VAC models, please contact the nearest Oriental Motor sales office.

*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 C-45
Built-In Controller (Stored Program) 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 braking. Also, a separate 24 VDC±5%, 0.3 A minimum power supply is required for the electromagnetic brakes.

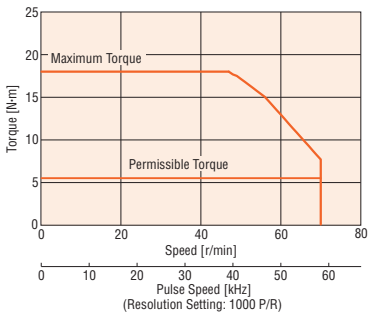
Note:

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

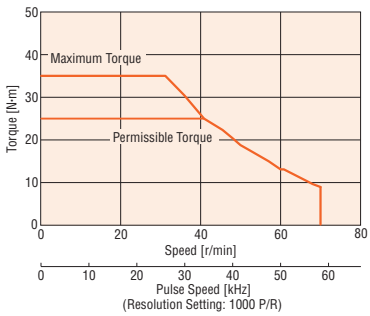
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page C-10

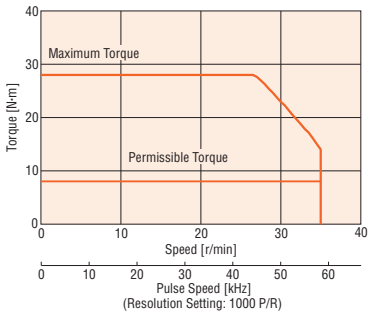
AS66□CE-H50/AS66□CEP-H50



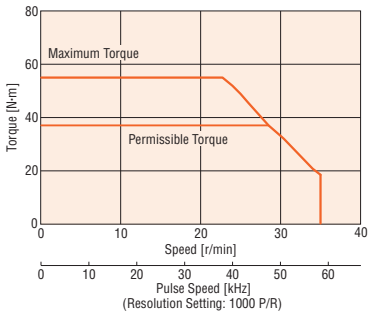
AS98□CE-H50/AS98□CEP-H50



AS66□CE-H100/AS66□CEP-H100



AS98□CE-H100/AS98□CEP-H100



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

Notes:

- Pay attention to heat dissipation from motor as there will be a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 100°C. (Under 75°C is required to comply with UL or CSA Standards as the motor is recognized as insulation class A.)
- In order to prevent fatigue of the gear grease in the harmonic gear, keep the temperature of the gear case under 70°C.
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

Driver Specifications

	Pulse Input Package	Built-In Controller (Stored Program) 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, Overload, Overspeed error, Overvoltage, Excessive position deviation, Overcurrent, External stop, Incorrect limit-sensor logic, Reverse limit-sensor connection, Mechanical home seeking error, Overtravel, Software overtravel, 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, Rotation direction (Negative logic pulse input), CW pulse, CCW pulse (Negative logic pulse input), All windings off, Alarm clear, Resolution select]	Photocoupler input, Control input: 24 VDC, Input resistance: 4.7 kΩ (X0～X7, START, E-STOP, HOMELS, +LS, −LS, SENSOR)
Output Signals	Photocoupler, 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, Quadrature ASG/BSG signal) Line driver output: Equivalent of 26C31 (Timing signal, Quadrature 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*: 10～50 000 msec
Operating Method	–	Positioning operation (Indexing) Continuous operation (Scan) Linked profile Return to electrical home position (Return) Return to mechanical home position (Home operation)
Mechanical Home Detection Operation	–	Return to home 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 External stop function Overtravel function Software overtravel function Alarm trace-back function Daisy chain connections
Terminal Emulation	–	Connection standard: RS-232C conformity 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: RS-232C Compatible Protocol: TTY (CR+LF)

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

Features C-12 / System Configuration C-18 / Product Line C-22

General Specifications

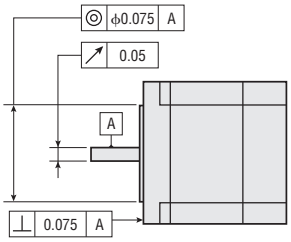
This is the value after rated operation at normal ambient temperature and humidity.

Specifications		Motor	Driver
Motor Insulation Class		Class B (130°C) [UL/CSA: Recognized as class A (105°C)]	–
Insulation Resistance		100 MΩ or more when 500 VDC megger is applied between the following places: · Case – Windings · Case – Electromagnetic brake windings	100 MΩ or more when 500 VDC megger is applied between the following places: · Case – Power supply input terminal · I/O – Power supply input terminal
Dielectric Strength		Sufficient to withstand the following for 1 minute: · Case – Windings 1.5 kV 50 Hz or 60 Hz · Case – Electromagnetic brake windings 1.0 kV 50 Hz or 60 Hz	Sufficient to withstand the following for 1 minute: · Case – Power supply input terminal 1.5 kV 50 Hz or 60 Hz · I/O – Power supply input terminal 3.0 kV 50 Hz or 60 Hz: Pulse input package 1.8 kV 50 Hz or 60 Hz: Built-in controller (stored program) package
Operating Environment (In operation)	Ambient Temperature	0~+50°C (non-freezing) : Standard Type **TH**, **PL**, **PN** Geared Type 0~+40°C (non-freezing) : Harmonic Geared Type	0~+50°C (non-freezing) : Pulse input package 0~+40°C (non-freezing) : Built-in controller (stored program) package
	Ambient Humidity	85% or less (non-condensing)	
	Atmosphere	No corrosive gases, dust, water or oil (Standard IP65 rated motor: No corrosive gases)	
Stop Position Accuracy		±5 arc minutes	–
Shaft Runout		0.05 T.I.R. (mm)*	–
Concentricity		0.075 T.I.R. (mm)*	–
Perpendicularity		0.075 T.I.R. (mm)*	–

*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.



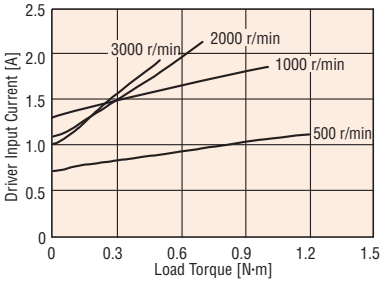
Load Torque – Driver Input Current Characteristics

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.

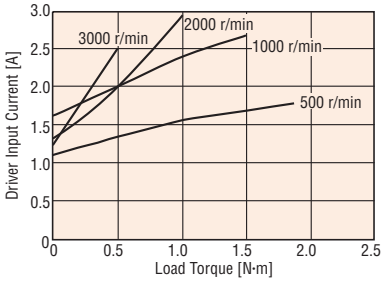
Motor shaft speed = Gear output shaft speed×Gear ratio [r/min]

Motor shaft torque = $\frac{\text{Gear output shaft torque}}{\text{Gear ratio}}$ [N·m]

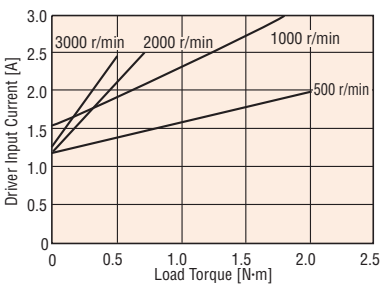
AS66



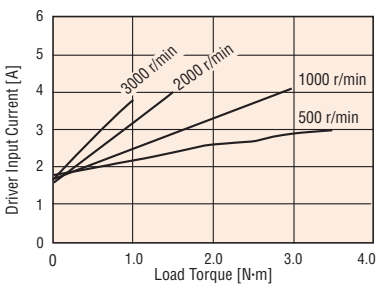
AS69



AS98



AS911



Permissible Overhung Load and Permissible Thrust Load

Unit = N

Type	Model	Gear Ratio	Permissible Overhung Load Distance from Shaft End (mm)					Permissible Thrust Load
			0	5	10	15	20	
Standard Type	**AS66□CE** **AS66ACT** **AS66□CEP** **AS66ACTP** **AS69□CE** **AS69ACT** **AS69□CEP** **AS69ACTP**	–	63	75	95	130	190	The permissible thrust load shall be no greater than the motor mass.
Standard Type IP65 Rated Motor	**AS98□CE** **AS98ACT** **AS98□CEP** **AS98ACTP** **AS911ACE** **AS911ACT** **AS911ACEP** **AS911ACTP**		260	290	340	390	480	
TH Geared Type	**AS66□CE-T□** **AS66□CEP-T□**	**3.6**, **7.2**, **10**, **20**, **30**	70	80	100	120	150	40
	AS98□CE-T□ **AS98□CEP-T□**		220	250	300	350	400	100
PL Geared Type	**AS66□CE-P5**	**5**	200	220	250	280	320	100
	AS66□CE-P□	**7.2**, **10**	250	270	300	340	390	
	AS66□CE-P□	**25**, **36**, **50**	330	360	400	450	520	
	AS98□CE-P□	**5**, **7.2**, **10**	480	540	600	680	790	300
	AS98□CE-P25	**25**	850	940	1050	1190	1380	
	AS98□CE-P36	**36**	930	1030	1150	1310	1520	
	AS98□CE-P50	**50**	1050	1160	1300	1480	1710	
PN Geared Type	**AS66□CE-N5** **AS66□CEP-N5**	**5**	200	220	250	280	320	100
	AS66□CE-N□ **AS66□CEP-N□**	**7.2**, **10**	250	270	300	340	390	
	AS66□CE-N□ **AS66□CEP-N□**	**25**, **36**, **50**	330	360	400	450	520	
	AS98□CE-N5 **AS98□CEP-N5**	**5**	480	520	550	580	620	300
	AS98□CE-N□ **AS98□CEP-N□**	**7.2**, **10**	480	540	600	680	790	
	AS98□CE-N25 **AS98□CEP-N25**	**25**	850	940	1050	1110	1190	
	AS98□CE-N36 **AS98□CEP-N36**	**36**	930	1030	1150	1220	1300	
	AS98□CE-N50 **AS98□CEP-N50**	**50**	1050	1160	1300	1380	1490	
Harmonic Geared Type	**AS66□CE-H□** **AS66□CEP-H□**	**50**, **100**	320	370	440	550	720	450
	AS98□CE-H□ **AS98□CEP-H□**		1090	1150	1230	1310	1410	1300

● 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.

Features C-12 / System Configuration C-18 / Product Line C-22

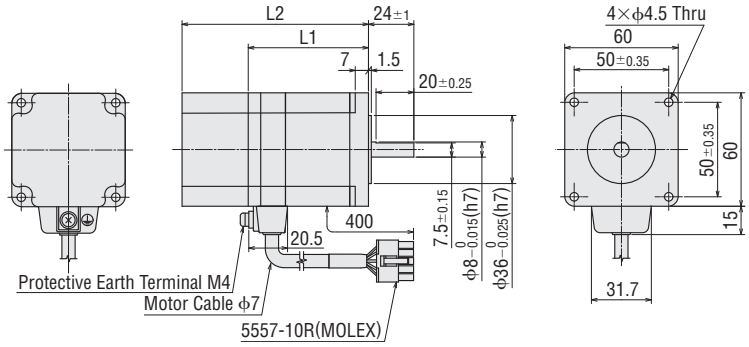
Dimensions (Unit = mm)

Motor

◇Standard Type

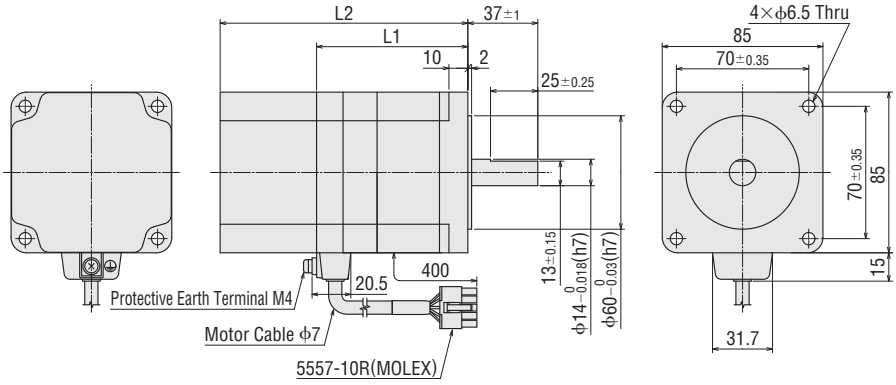
1 □60 mm

Model	Motor Model	L1	L2	Mass (kg)
AS66ACE **AS66ACEP**	ASM66ACE	63.6	–	0.85
AS66MCE **AS66MCEP**	ASM66MCE	–	98.6	1.1
AS69ACE **AS69ACEP**	ASM69ACE	94.6	–	1.4
AS69MCE **AS69MCEP**	ASM69MCE	–	129.6	1.65



2 □85 mm

Model	Motor Model	L1	L2	Mass (kg)
AS98ACE **AS98ACEP**	ASM98ACE	80	–	1.8
AS98MCE **AS98MCEP**	ASM98MCE	–	131	2.2
AS911ACE **AS911ACEP**	ASM911ACE	110	–	3

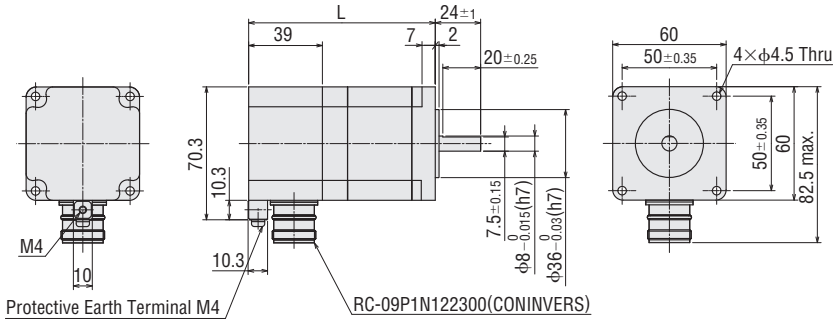


◇Standard Type IP65 Rated Motor

3 □60 mm

Model	Motor Model	L	Mass (kg)
AS66ACT **AS66ACTP**	ASM66ACT	98.7	1
AS69ACT **AS69ACTP**	ASM69ACT	129.7	1.5

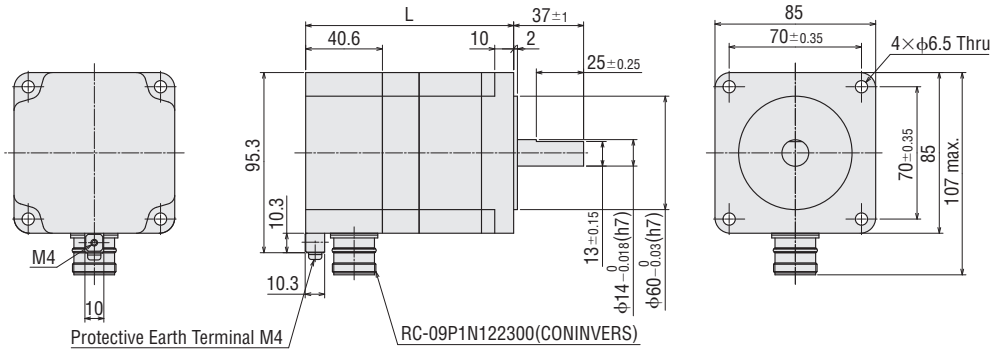
● Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.



4 □85 mm

Model	Motor Model	L	Mass (kg)
AS98ACT **AS98ACTP**	ASM98ACT	110	2.2
AS911ACT **AS911ACTP**	ASM911ACT	140	3.3

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



●These dedicated cables are used 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 cable for IP65 rated motor ➜ Page C-254

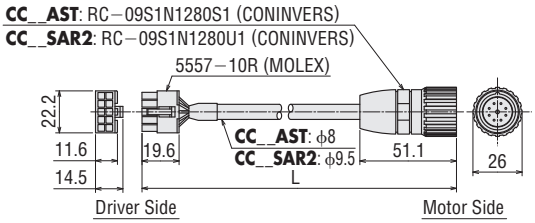
• Motor Cables for IP65 Rated Motor

Model	Length L (m)
CC01AST	1
CC02AST	2
CC03AST	3
CC05AST	5
CC07AST	7
CC10AST	10
CC15AST	15
CC20AST	20

• Flexible Motor Cables for IP65 Rated Motor

Model	Length L (m)
CC01SAR2	1
CC02SAR2	2
CC03SAR2	3
CC05SAR2	5
CC07SAR2	7
CC10SAR2	10

Motor Cables/Flexible Motor Cables for IP65 Rated Motor

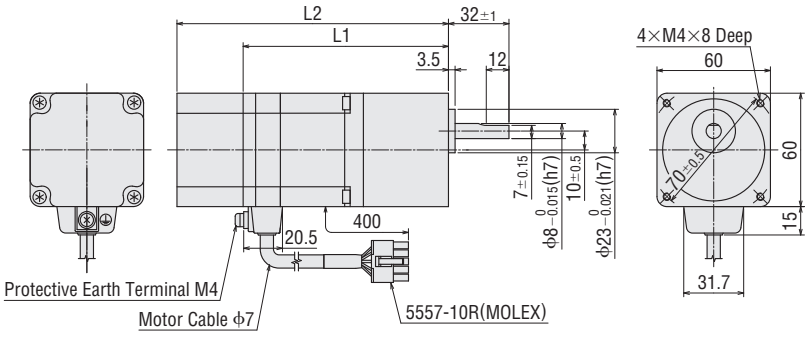


◇TH Geared Type

5 □60 mm

Model	Motor Model	Gear Ratio	L1	L2	Mass (kg)
AS66ACE-T□ **AS66ACEP-T□**	ASM66ACE-T□	**3.6**, **7.2**, **10**, **20**, **30**	108.6	–	1.25
AS66MCE-T□ **AS66MCEP-T□**	ASM66MCE-T□		–	143.6	1.5

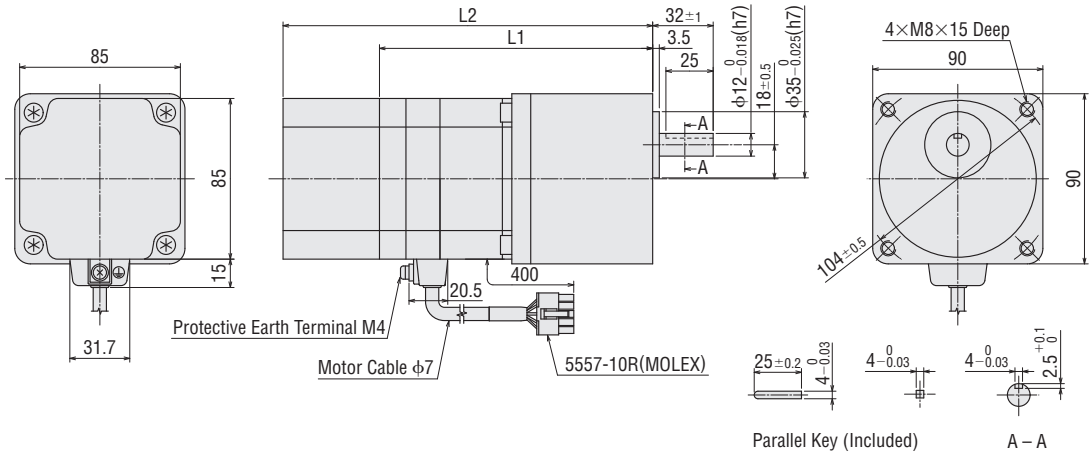
●Enter the gear ratio in the box (□) within the model name.



6 □90 mm

Model	Motor Model	Gear Ratio	L1	L2	Mass (kg)
AS98ACE-T□ **AS98ACEP-T□**	ASM98ACE-T□	**3.6**, **7.2**, **10**, **20**, **30**	144.5	–	3
AS98MCE-T□ **AS98MCEP-T□**	ASM98MCE-T□		–	195.5	3.4

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

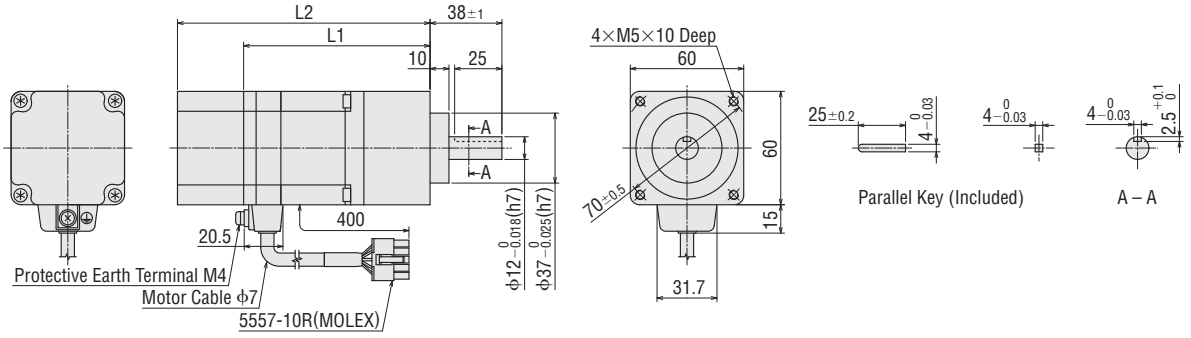


◇PL Geared Type

7 □60 mm

Model	Motor Model	Gear Ratio	L1	L2	Mass (kg)
AS66ACE-P□	ASM66ACE-P□	**5**, **7.2**, **10**	98.6	–	1.25
		25, **36**, **50**	123.6	–	1.55
AS66MCE-P□	ASM66MCE-P□	**5**, **7.2**, **10**	–	133.6	1.5
		25, **36**, **50**	–	158.6	1.8

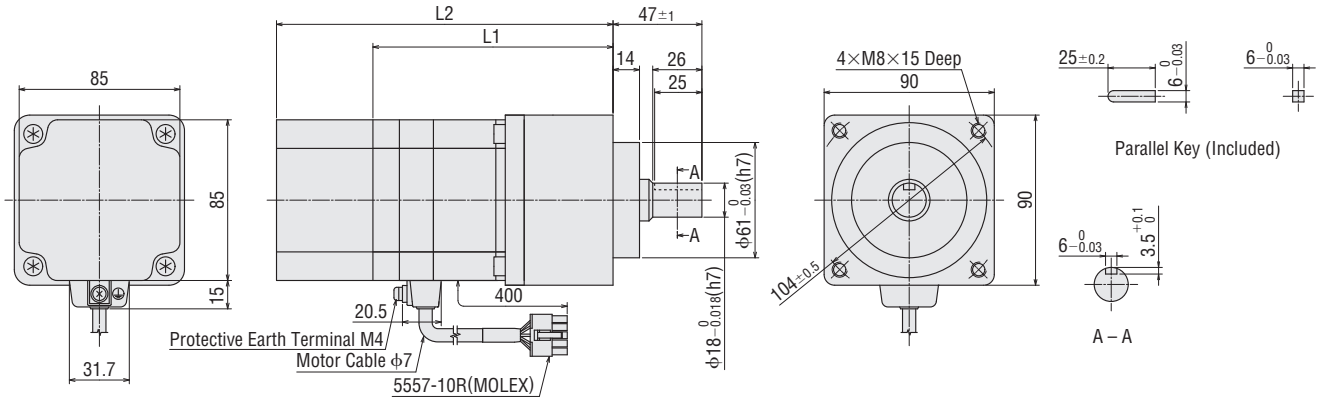
● Enter the gear ratio in the box (□) within the model name.



8 □90 mm

Model	Motor Model	Gear Ratio	L1	L2	Mass (kg)
AS98ACE-P□	ASM98ACE-P□	**5**, **7.2**, **10**	127	–	3.2
		25, **36**, **50**	163	–	4
AS98MCE-P□	ASM98MCE-P□	**5**, **7.2**, **10**	–	178	3.6
		25, **36**, **50**	–	214	4.4

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

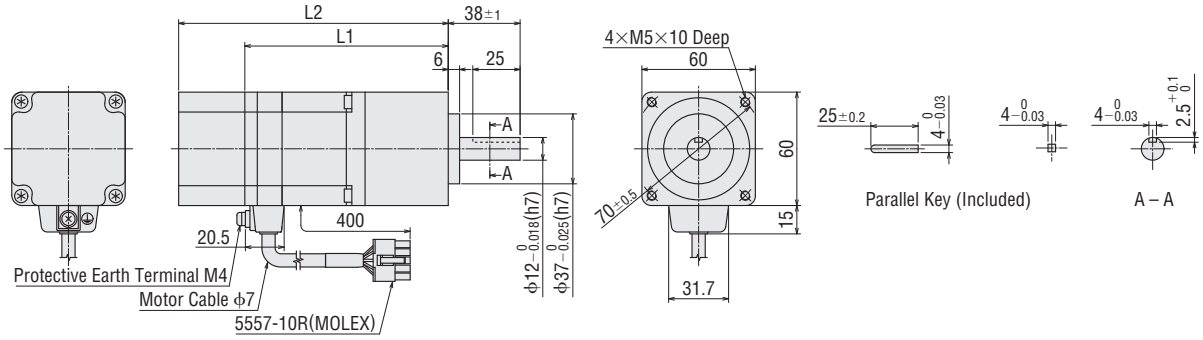


◇PN Geared Type

9 □60 mm

Model	Motor Model	Gear Ratio	L1	L2	Mass (kg)
AS66ACE-N□ **AS66ACEP-N□**	ASM66ACE-N□	**5, 7.2, 10**	107.6	–	1.5
		25, 36, 50	123.6	–	1.7
AS66MCE-N□ **AS66MCEP-N□**	ASM66MCE-N□	**5, 7.2, 10**	–	142.6	1.75
		25, 36, 50	–	158.6	1.95

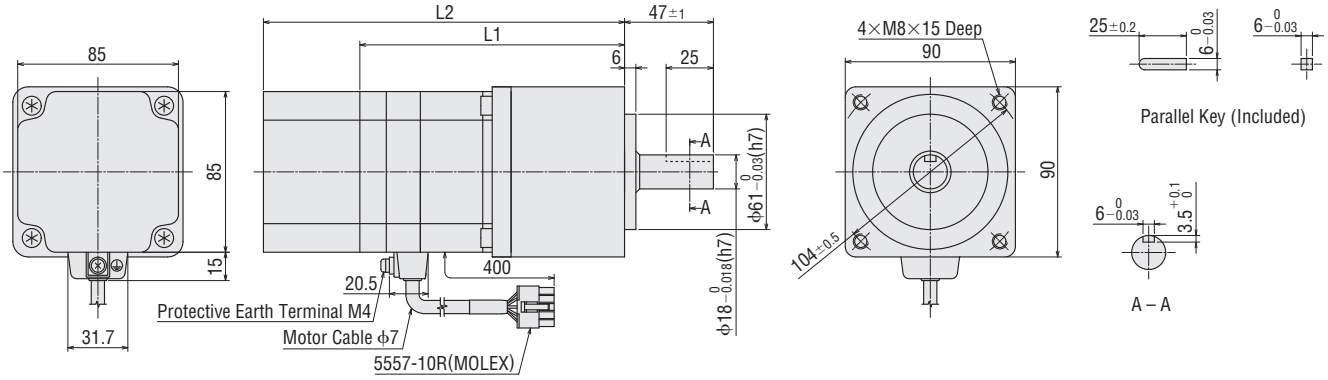
● Enter the gear ratio in the box (□) within the model name.



10 □90 mm

Model	Motor Model	Gear Ratio	L1	L2	Mass (kg)
AS98ACE-N□ **AS98ACEP-N□**	ASM98ACE-N□	**5, 7.2, 10**	140	–	4
		25, 36, 50	163	–	4.7
AS98MCE-N□ **AS98MCEP-N□**	ASM98MCE-N□	**5, 7.2, 10**	–	191	4.4
		25, 36, 50	–	214	5.1

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

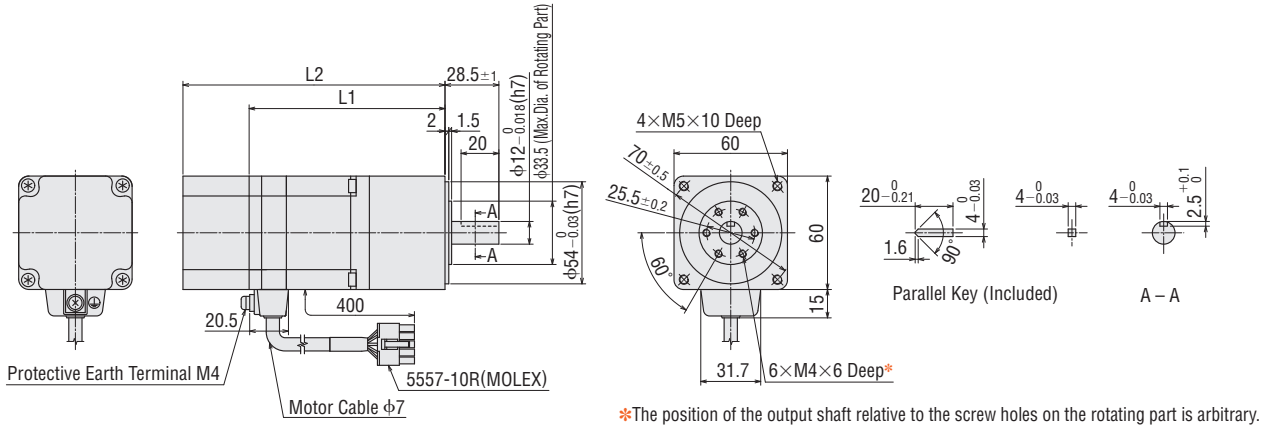


◇Harmonic Geared Type

11 □60 mm

Model	Motor Model	Gear Ratio	L1	L2	Mass (kg)
AS66ACE-H□ **AS66ACEP-H□**	ASM66ACE-H□	**50, 100**	103.6	–	1.4
AS66MCE-H□ **AS66MCEP-H□**	ASM66MCE-H□		–	138.6	1.65

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

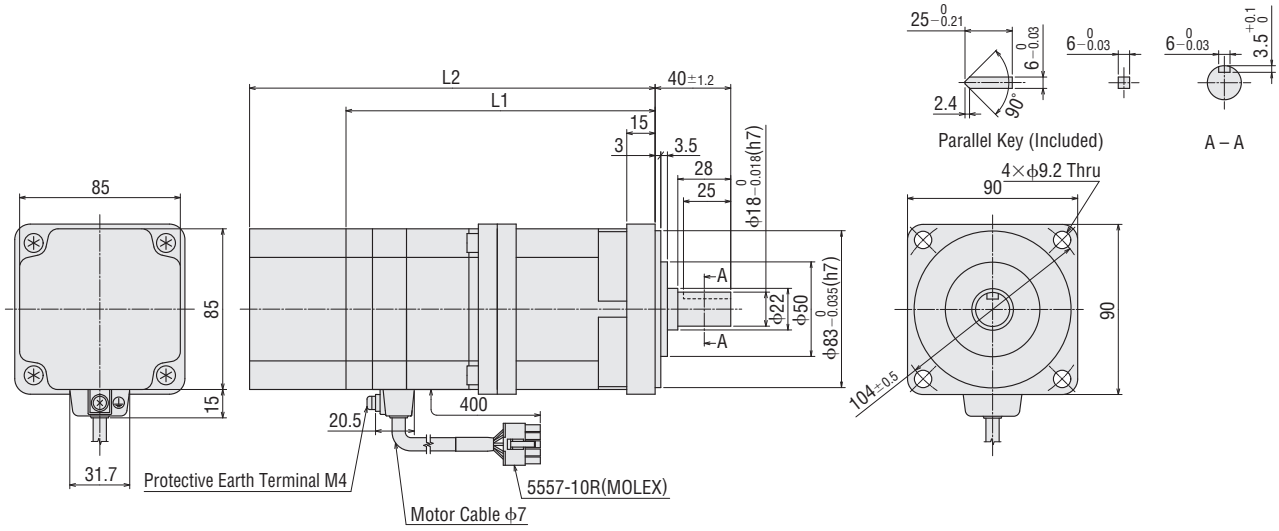


*The position of the output shaft relative to the screw holes on the rotating part is arbitrary.

12 □90 mm

Model	Motor Model	Gear Ratio	L1	L2	Mass (kg)
AS98ACE-H□ **AS98ACEP-H□**	ASM98ACE-H□	**50, 100**	163.5	–	3.9
AS98MCE-H□ **AS98MCEP-H□**	ASM98MCE-H□		–	214.5	4.3

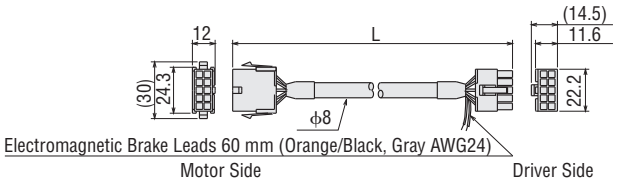
●Enter the gear ratio in the box (□) within the model name.



●Electromagnetic brake models must use an extension cable or flexible extension cable for an electromagnetic brake motor.
Extension cables for electromagnetic brake motor ➔ Page C-253

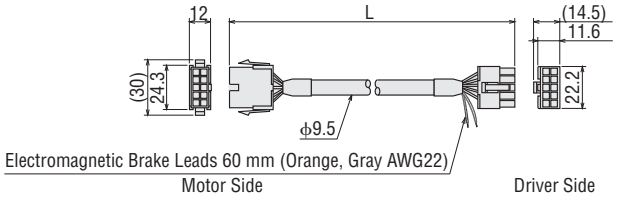
• Extension Cables for Electromagnetic Brake Motor

Model	Length L (m)
CC01AIPM	1
CC02AIPM	2
CC03AIPM	3
CC05AIPM	5
CC07AIPM	7
CC10AIPM	10
CC15AIPM	15
CC20AIPM	20



• Flexible Extension Cables for Electromagnetic Brake Motor

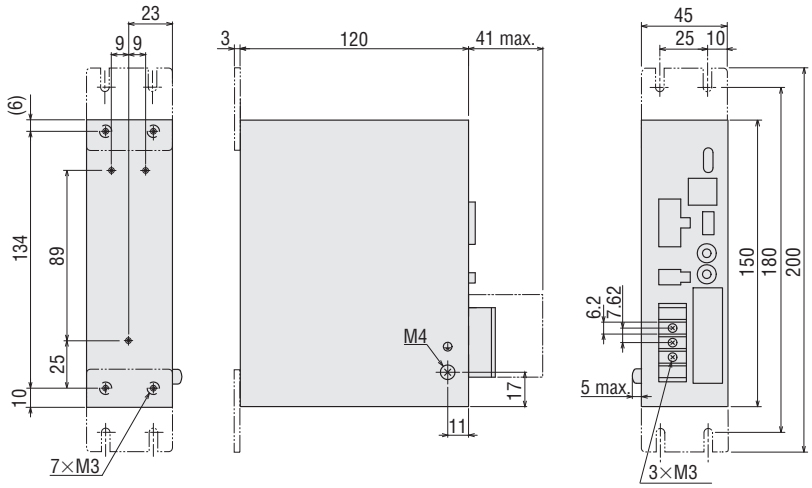
Model	Length L (m)
CC01SARM2	1
CC02SARM2	2
CC03SARM2	3
CC05SARM2	5
CC07SARM2	7
CC10SARM2	10



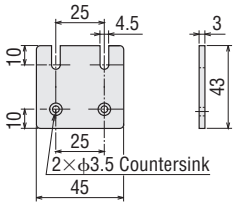
●Driver

13 Pulse Input Package (Common to all types)

Mass: 0.8 kg



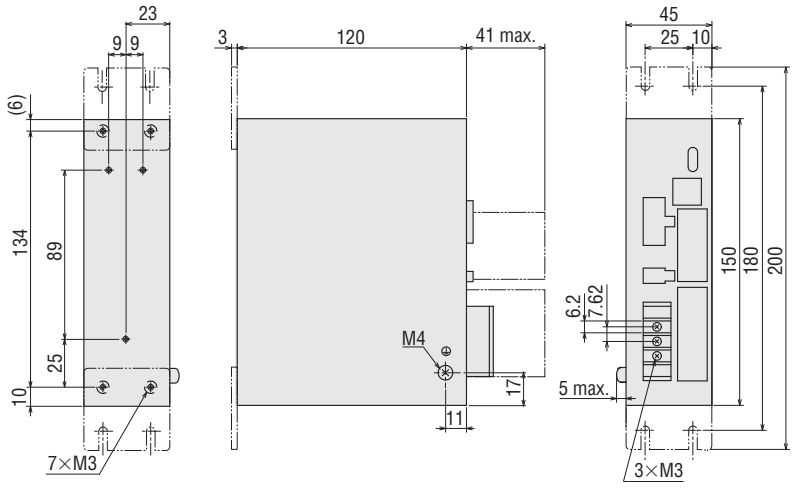
●Mounting Bracket (2 pieces, included)



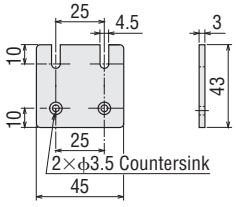
Control I/O Connector
Cover Assembly: 54331-1361 (MOLEX)
Connector: 54306-3619 (MOLEX)

14 Built-In Controller (Stored Program) Package (Common to all types)

Mass: 0.8 kg



●Mounting Bracket (2 pieces, included)

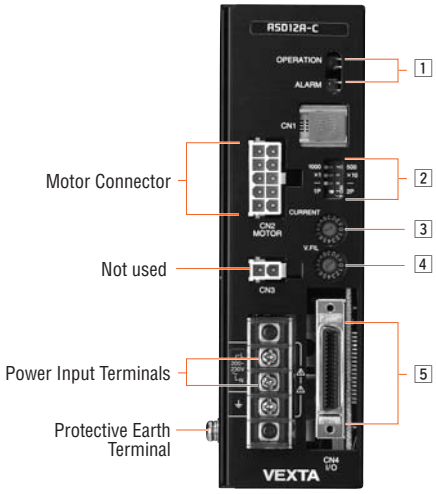


Control I/O Connector
Cover Assembly: 54331-1361 (MOLEX)
Connector: 54306-3619 (MOLEX)

Sensor Input Connector
Cover Assembly: 54331-1201 (MOLEX)
Connector: 54306-2019 (MOLEX)

Connection and Operation (Pulse Input Package)

Names and Functions of Driver Parts



1 Signal Monitor Displays

◇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 rises to approximately 85˚C.
2	Overload	The motor is operated continuously over five 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 through the inverter power element inside the driver.
6	Overspeed	The motor shaft velocity exceeds 5000 r/min. (Except geared type)
7	EEPROM data error	A motor control parameter has been damaged.
8	Sensor error	The power 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) (Factory setting) "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 (Factory setting), "2P" for the 2-pulse input mode.

Notes:

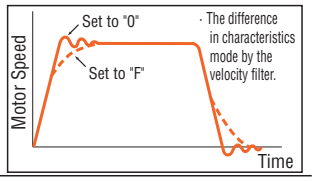
- Always turn the power off before switching resolution or pulse input, and turn it on again after you have made the change.
- If the resolution select switch is set to "×10," it cannot control the resolution selected by the input terminals. It will always be "×10."

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.



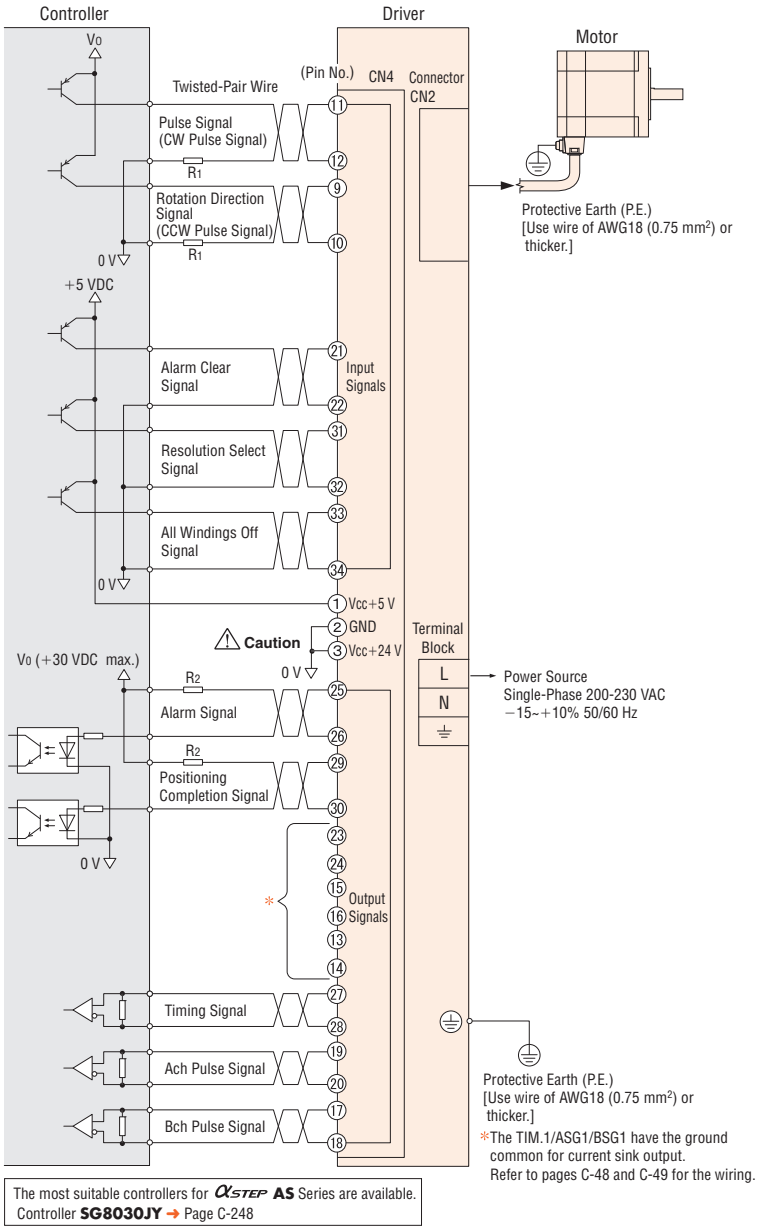
5 Input/Output Signals

Indication	Input/Output	Pin No.	Signal	Signal Name
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	$\overline{\text{DIR.}}$ ($\overline{\text{CCW}}$)	
		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	
		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 C-47

*Signal names in parentheses represent the setting in 2-pulse input mode.
The factory setting is the 1-pulse input mode.

●Connection Diagrams



The most suitable controllers for αSTEP **AS** Series are available.
Controller **SG8030JY** ➜ Page C-248

◇Input Signal Connection

- Pulse Signal/Rotation Direction Signal
  Signals can be connected directly when 5 VDC is supplied. If the signals are used at a voltage exceeding 5 VDC, be sure to provide an external resistor to prevent the current exceeding 20 mA from flowing. 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.
- All Windings Off Signal/Resolution Select Signal/Alarm Clear Signal
  Keep the input signal voltage to 5 VDC. If these specifications are exceeded, the internal components may be damaged.

◇Output Signal Connection

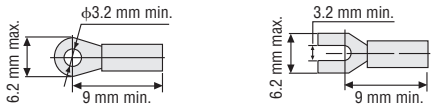
- Use output signals at 30 VDC or less and 15 mA or less.
  If these specifications are exceeded, the internal components may be damaged. Check the specification of the connected equipment. If the current exceeds 15 mA, connect an external resistor R_2.

◇Notes on Wiring

- Use multi-core, twisted-pair shielded wires of AWG28 (0.08 mm²) or thicker for the control I/O signal line (CN4), and keep wiring as short as possible (within 2 m).
- Note that as the length of the pulse signal line increases, the maximum transmission frequency decreases. **Technical reference** ➜ Page F-46
- When it is necessary to have a connection more than 0.4 m between motor and driver, the accessory extension cable or flexible extension cable must be used. Electromagnetic brake motor models must use an electromagnetic brake extension cable or flexible extension cable (sold separately).
  Extension cables for electromagnetic brake motor ➜ Page C-253
  Always use the motor cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.
- Use a 3-core cable of AWG18 (0.75 mm²) or thicker for the power supply line.
- Provide a minimum distance of 300 mm between the control I/O signal lines and power lines (AC lines, motor lines and other large-current circuits). Do not run the control I/O signal lines in the same duct as power lines or bundle them with power lines.
- To ground the driver, lead the ground conductor from the protective earth terminal (M4) and connect the ground conductor to provide a common ground point.

⚠Caution:
Connect the power supply for "Timing" signal output and "Pulse" signal output to 5 VDC. Pin No.③ of the CN4 should be grounded.
Description of input/output signals ➜ Page C-47

◇Recommended Crimp Terminals



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

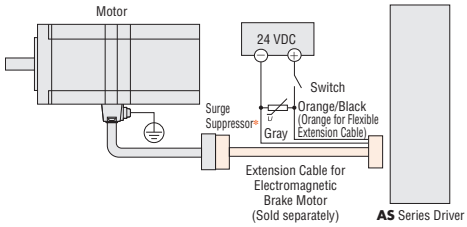
■Connecting the Electromagnetic Brake to Power Supply

Connect the electromagnetic brake to the power supply using a cable of at least AWG24 (0.2 mm²). The power supply input to the electromagnetic brake is 24 VDC ±5% 0.3 A minimum and therefore must be independent of the driver's power supply for signal control.

Notes:

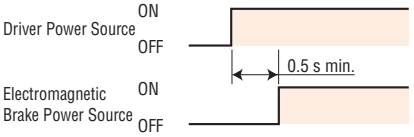
- Applying a voltage that exceeds the specifications will cause the electromagnetic brake to generate a great amount of heat, resulting in motor temperature rises and possible damage to the motor. Conversely, if voltage is too low, the electromagnetic brake may not release.
- To protect the switch contacts and prevent noise, always connect the surge suppressor. (*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.

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) to +24 V, and the gray lead wire (60 mm) to the ground (GND).



Timing Chart for Electromagnetic Brake Operation

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



●Description of Input/Output Signals

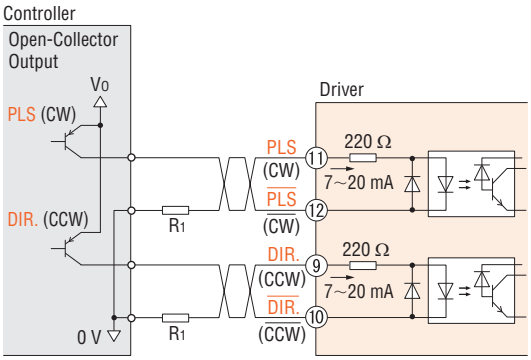
Indication of Input/Output Signal "ON""OFF"

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

Photocoupler OFF ON

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

◇Input Circuit and Sample Connection

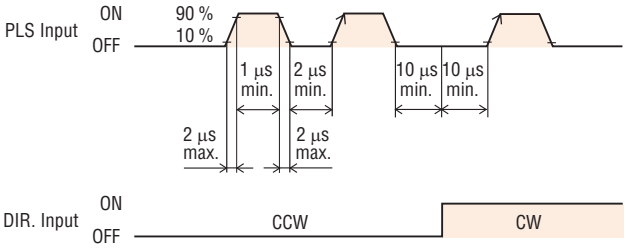


● The colored characters indicate signals under the 1-pulse input mode, while the black characters indicate signals under the 2-pulse input mode.

Note:

● The external resistor is not needed when V_o 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 a voltage exceeding 5 VDC is applied without the external resistor, the internal components may be damaged.

◇Pulse Waveform Characteristics



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

◇Pulse Input Mode

• 1-Pulse Input Mode

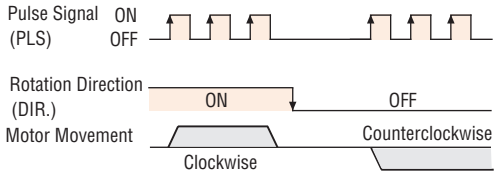
The 1-pulse input mode uses "Pulse" (PLS) and "Rotation Direction" (DIR.) signals. CW is selected by inputting DIR. signal at low level (with the input photocoupler ON), CCW by inputting at high level (with the input photocoupler OFF).

Note:

● The factory setting is 1-pulse input mode.

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

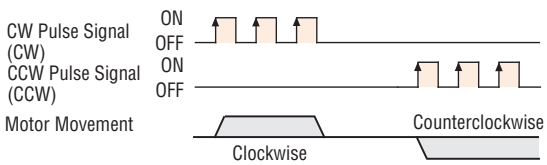
1-Pulse Input Mode



• 2-Pulse Input Mode

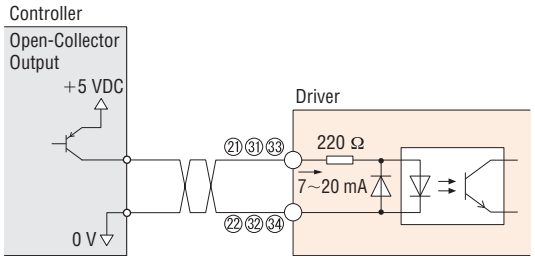
The 2-pulse input mode uses "CW" and "CCW" pulses. When "CW" pulses are input, the motor's output shaft rotates clockwise when the motor is viewed facing the shaft; when "CCW" pulses are input, the shaft rotates counterclockwise.

2-Pulse Input Mode



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

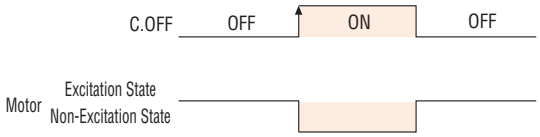
◇Input Circuit and Sample Connection



◇All Windings Off (C.OFF) Input Signal

Pin No.㉝, ㉞

This controller power source offers 5 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 5 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

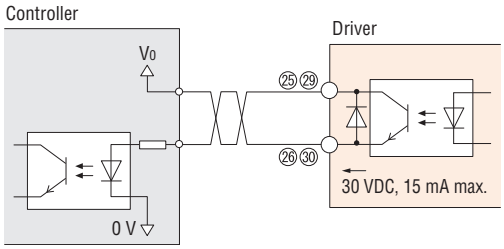
This controller power source offers 5 VDC. This signal is used for canceling the alarm without turning off power to the driver when a protective function has been activated.

Note:

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

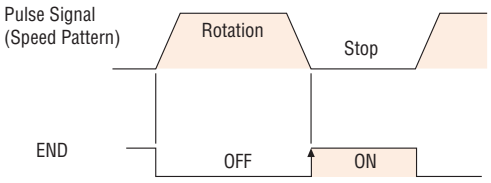
Positioning Completion (END) Output Signal
Alarm (ALARM) Output Signal

◇Output Circuit and Sample Connection



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

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.

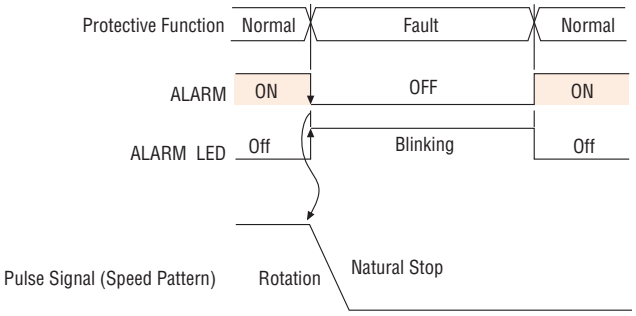


Note:
- The END signal flashes during operation with a pulse input frequency of 500 Hz or less.

◇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 protective functions has been activated. When an abnormality such as an overload or over current is detected, the "Alarm" signal will be 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.

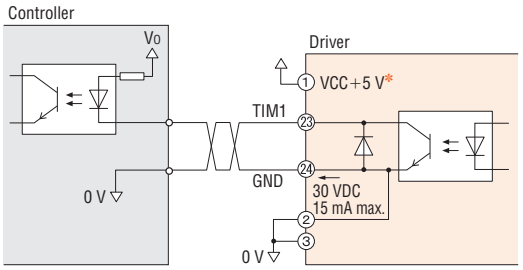


Notes:
- The "Alarm" output uses positive logic (normal close), all other outputs use negative logic (normal open).
- The ALARM indicator lights (not blinks) when system error protective function has been activated.

Timing (TIM.1, TIM.2) Output Signal

◇Output Circuit and Sample Connection

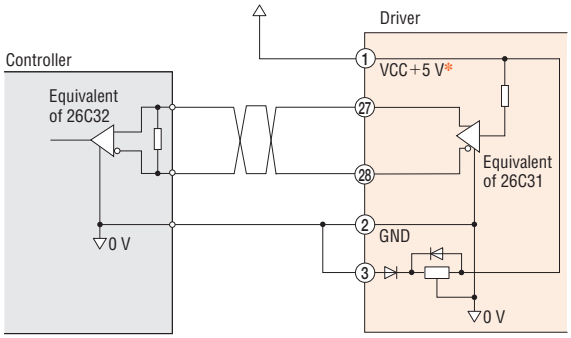
Open-Collector Output



*Power supply for "Timing" signal output should be connected to 5 VDC.

Circuits for use with 30 VDC, 15 mA maximum.

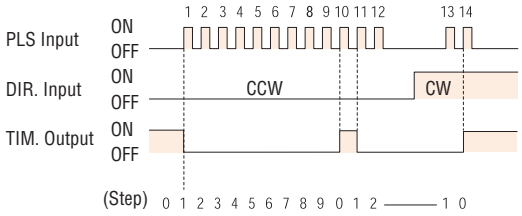
Line Driver Output



*Power supply for "Timing" signal output should be connected to 5 VDC.

◇Timing (TIM.1, TIM.2) Output Signal
Pin No.㉓, ㉔, ㉗, ㉘

When the "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.

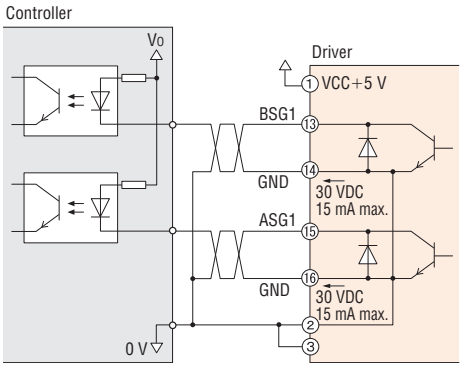


Notes:
- A precise "Timing" signal output cannot be obtained when the speed of the pulse input frequency is over 500 Hz.
- When the "Timing" signal output is used, 5 VDC power supply is necessary.

Quadrature (ASG1/BSG1, ASG2/BSG2) Output Signal

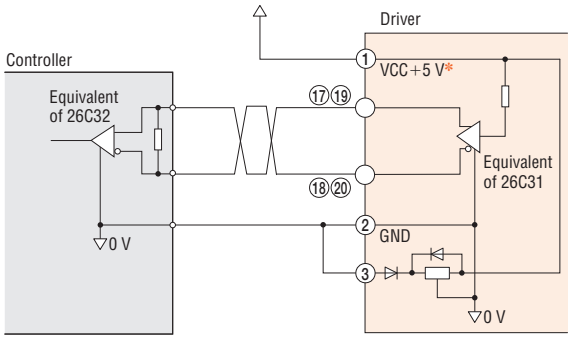
◇Output Circuit and Sample Connection

Open-Collector Output



Circuit for use with 30 VDC, 15 mA maximum.

Line Driver Output



*Power supply for "Quadrature" signal output should be connected to 5 VDC.

◇Quadrature (ASG1/BSG1, ASG2/BSG2) Output Signal

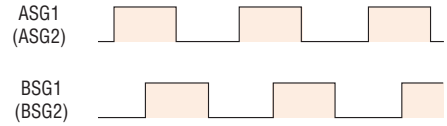
Pin No.⑬~⑳

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 "Quadrature" signal output accuracy is, regardless of resolution, within ±0.36° (repetition accuracy: within ±0.09°).
- When the "Quadrature" signal output is used, 5 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.

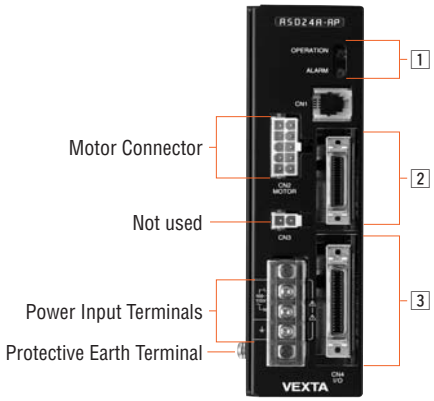
◇Pulse Waveform Characteristics



(Clockwise Rotation of Motor)

Connection and Operation [Built-In Controller (Stored Program) Package]

Names and Functions of Driver Parts



1 Signal Monitor Displays

◇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.	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	External 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.	
	External 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 have 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.

Features C-12 / System Configuration C-18 / Product Line C-22

2 Limit Sensor Input Communication Signals (CN5)

Connector	Pin No.	Input/Output	Signal	Signal Name
CN5	1	Input	COM1	Common terminal for input signals
	2		COM2	Common terminal 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	Common terminal for input signals
	12		COM2	Common terminal 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	Common terminal for input signals
	20		COM2	Common terminal for input signals

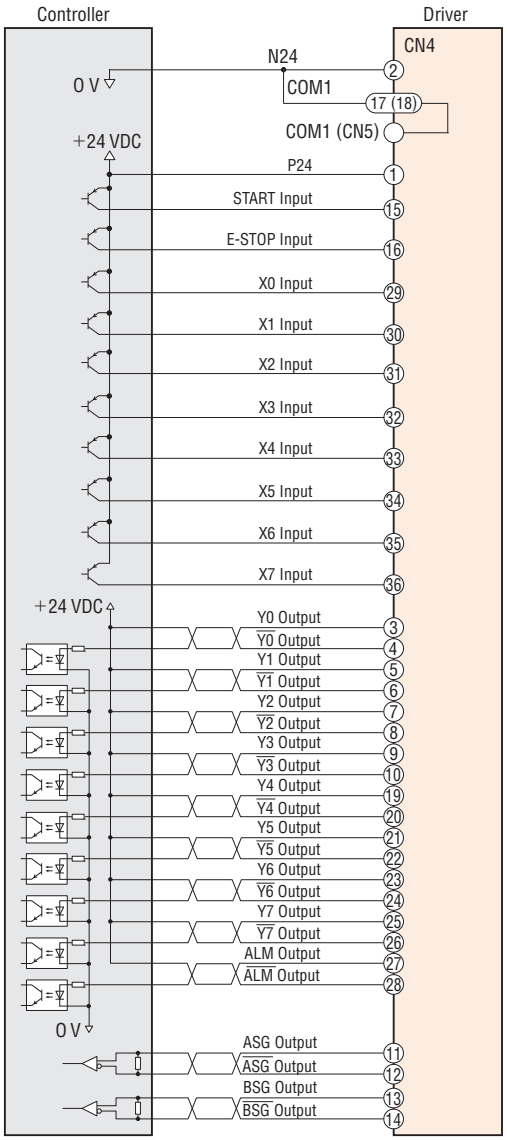
3 I/O Signals (CN4)

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	External stop
	17		COM1	Common terminal 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

●Connection Diagrams

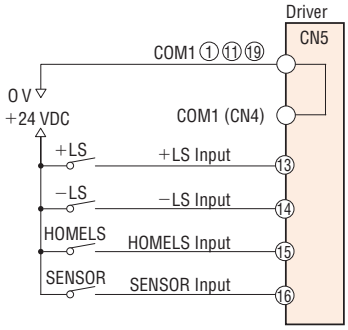


X0 to X7: General Input*1
Y0 to Y7: General Output*2

*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

◇Limit Sensor (CN5)



◇Notes on Wiring

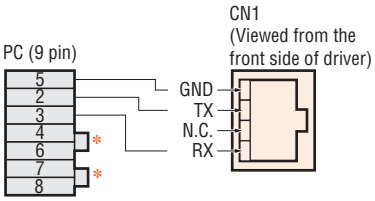
- Use input signals at 24 VDC±10%.
- Use output signals at 30 VDC or below and at 4 to 8 mA.
- Use a shielded cable with a wire of a size ranging between AWG24 (0.2 mm²) and AWG22 (0.3 mm²) for the driver signal cable (I/O signals, limit sensors signals), and keep it as short as possible.
- Keep the control I/O signal line at least 300 mm 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 accessory cable for IP65 rated motor (sold separately) for connection between the IP65 rated motor and the driver.
- Use a 3-core cable of AWG18 (0.75 mm²) or thicker for the power supply line. Provide a minimum distance of 300 mm between the control I/O signal lines and power lines (AC lines, motor lines and other large-current circuits).
- Do not guide the control I/O signal lines in the same duct as power lines or bundle them 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 earth terminal (M4) and connect the ground conductor to a cable of AWG18 (0.75 mm²) or thicker to provide a common ground point.

◇Recommended Crimp Terminals

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

◇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

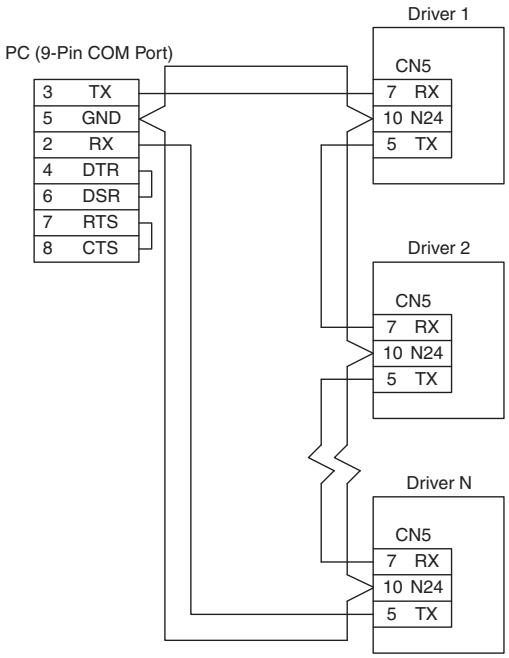
Item	Description
Electrical Characteristics	In conformance with RS-232C.
Transmission Method	Start-stop asynchronous method, NRZ (non-return to Zero), full-duplex
Data Length	8 bits, 1 stop bit, no parity
Transmission Speed	9600 bps
Protocol	TTY (CR+LF)
Connector Specification	Modular (4 lines, 4 pins)

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.

●Description of Daisy Chain Connections

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.
- Do not use the RS-232C communication port (CN1).

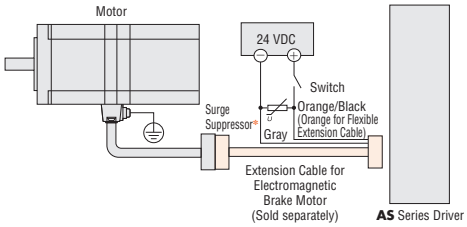
■Connecting the Electromagnetic Brake to Power Supply

Connect the electromagnetic brake to the power supply using a cable of at least AWG24 (0.2 mm²). The power supply input to the electromagnetic brake is 24 VDC ±5% 0.3 A minimum and therefore must be independent of the driver's power supply for signal control.

Notes:

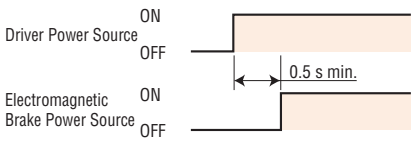
- Applying a voltage that exceeds the specifications will cause the electromagnetic brake to generate a great amount of heat, resulting in motor temperature rises and possible damage to the motor. Conversely, if voltage is too low, the electromagnetic brake may not release.
- To protect the switch contacts and prevent noise, always connect the surge suppressor. (✻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 leadwire 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.

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) to +24 V, and the gray lead wire (60 mm) to the ground (GND).



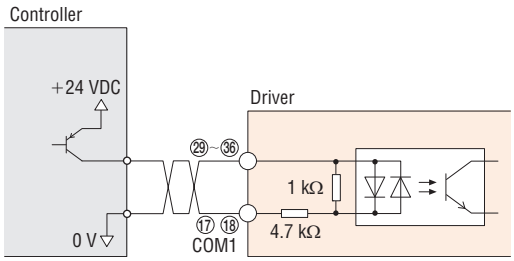
Timing Chart for Electromagnetic Brake Operation

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



●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 normal 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.

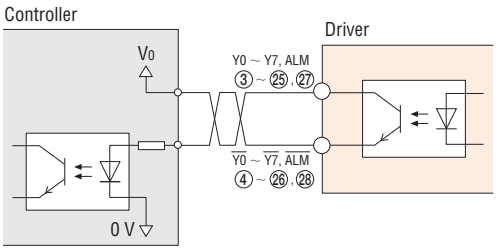
ACL input·····INACL command
PAUSE input·····INPAUSE command
MSTOP input·····INMSTOP command
RESTART input···INRESTART command

◇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.

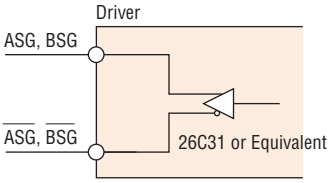
◇Y0 to Y7 Output

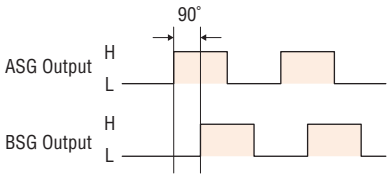
The Y0 through Y7 outputs can be used as output ports for general signals. The status of each port can be read using an OUT command or OUTx command.
The general signals assignable to the Y0 through Y7 outputs are listed below. Use the corresponding command to assign each signal.

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.

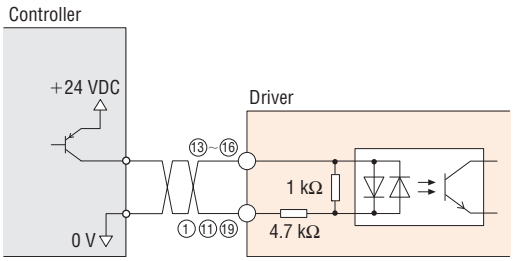
◇ALM Output

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.

●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 (overtravel) 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 normal 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 normal 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 seeking 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 seeking, it cannot be used during continuous operation.

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 (Stored Program) Package		
		Model	Motor Model	Driver Model	Model	Motor Model	Driver Model
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	
		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	
	PL Geared Type	**AS66□CE-P5**	ASM66□CE-P5	ASD12A-C	–	–	–
		AS66□CE-P7.2	ASM66□CE-P7.2		–	–	–
		AS66□CE-P10	ASM66□CE-P10		–	–	–
		AS66□CE-P25	ASM66□CE-P25	ASD12B-C	–	–	–
		AS66□CE-P36	ASM66□CE-P36	ASD12C-C	–	–	–
		AS66□CE-P50	ASM66□CE-P50		–	–	–
		AS98□CE-P5	ASM98□CE-P5	ASD16A-C	–	–	–
		AS98□CE-P7.2	ASM98□CE-P7.2		–	–	–
		AS98□CE-P10	ASM98□CE-P10		–	–	–
		AS98□CE-P25	ASM98□CE-P25		–	–	–
		AS98□CE-P36	ASM98□CE-P36	ASD16B-C	–	–	–
		AS98□CE-P50	ASM98□CE-P50		–	–	–
	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	

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

Features C-12 / System Configuration C-18 / Product Line C-22