

# Orientalmotor

NEW  
PRODUCTS

High-Efficiency  
Closed Loop Stepping Motor and Driver Package

**(RoHS)** RoHS-Compliant

## AR Series

Standard Type/**TH** Geared Type/**PL** Geared Type/**PN** Geared Type/Harmonic Geared Type

The **AR** Series substantially reduces heat generation from the motor through use of high-efficiency technology. With the **AR** Series, you can take advantage of the beneficial features of the stepping motor to perform quick positioning operations over a short distance repeatedly without worrying about the drive duty.



# Introducing an advanced version of $\alpha$ STEP

In addition to implementing the closed loop control based on Oriental Motor's original know-how, the **AR** Series also achieves a significant improvement in efficiency.

You can enjoy such benefits as lower heat generation, 40% less power consumption, and ability to perform high-speed, high accuracy positioning without worrying about the drive duty.

The **AR** Series opens a new future for motors.



Driver



Motor: Frame Size 85 mm  
Standard Type



Motor: Frame Size 42 mm  
**PL** Geared Type

High-Efficiency  
Closed Loop Stepping Motor and  
Driver Package

## AR Series



Standard Type

**TH** Geared Type

**PL** Geared Type



**PN** Geared Type

Harmonic Geared Type



Motor: Frame Size 60 mm  
**PN** Geared Type



Motor Cable (Included)

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## High-Efficiency Closed Loop Stepping Motor and Driver Package **AR** Series Achieved Continuous Operation.

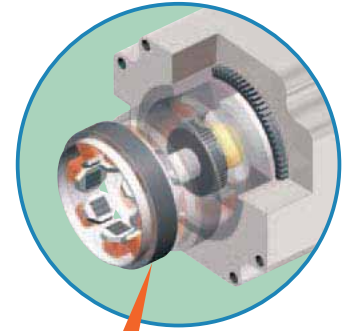


## Adopting Oriental Motor's Original Closed Loop Control

Adopting closed loop control, the motor does not lose synchronism even when subjected to abrupt load fluctuation or acceleration. A 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, **AR** Series outputs the alarm signal. The reliability of **AR** Series is as high as that of a servo motor.

### ■ Rotor Position Detection Sensor

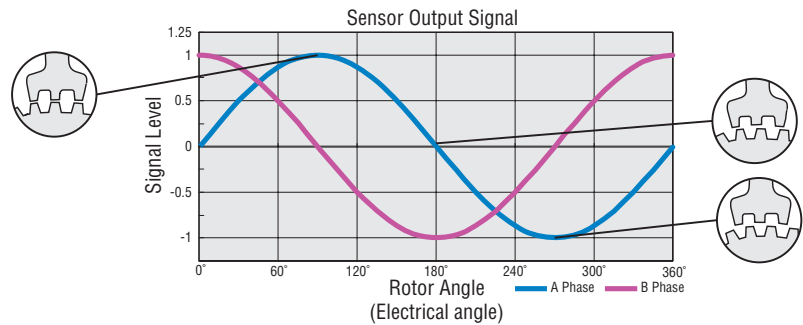
The rotor position detection sensor uses the change in inductance caused by change in the distance between the stator teeth and the teeth on the sensor rotor to detect rotor position.



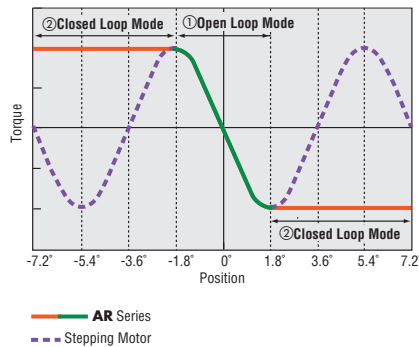
Sensor detects rotor position

### 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.

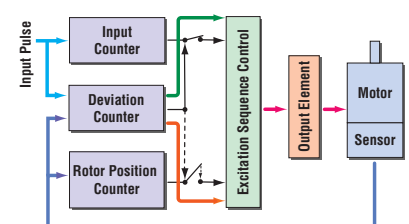


### ■ Angle-Torque Characteristics



- ① If the positioning deviation is less than  $\pm 1.8^\circ$ , the motor runs in open loop mode like a stepping motor.
- ② If the positioning deviation is  $\pm 1.8^\circ$  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.

### ■ Control Diagram



Normal (Positioning deviation is less than  $\pm 1.8^\circ$ )

Motor runs in open loop mode like a stepping motor.

If Motor Missteps (Positioning deviation is  $\pm 1.8^\circ$  or more)

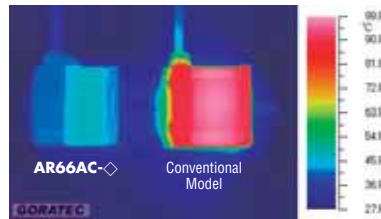
Control switches to closed loop mode to prevent loss of synchronism.

Continuous Operation is Achieved Due to the Reduction of Motor Heat Generation by Adopting High-Efficiency Technology.

### ■ Lower Heat Generation

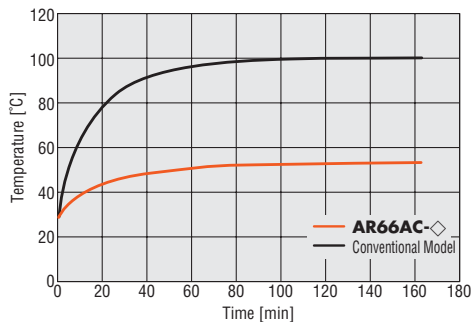
The **AR** Series adopts high-efficiency technology to achieve a significant reduction in the amount of heat generated from the motor.

#### ● Temperature Distribution by Thermography



Comparison under the same conditions

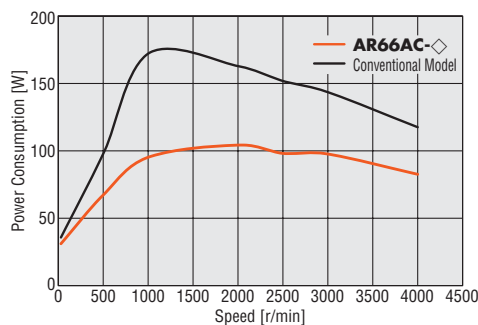
#### ● Motor Case Temperature under Same Operating Conditions



### ■ Energy-Saving

Power consumption: **40%** less than a conventional model (also by Oriental Motor)

#### ● Power Consumption



CO<sub>2</sub> emission: **40%** less\* than a conventional model (also by Oriental Motor)

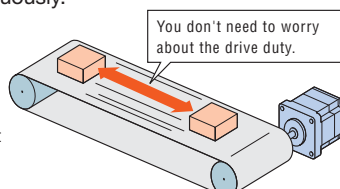
\* Assuming operation at a duty of 40%

### ■ Continuous Operation (Operation at high frequency)

The **AR** Series can be operated at high frequency. You can drive the motor continuously.

#### Note:

- If the motor is operated continuously, a heat sink of a capacity at least equivalent to an aluminum plate with a size of 250×250 mm, 6 mm thick is required.

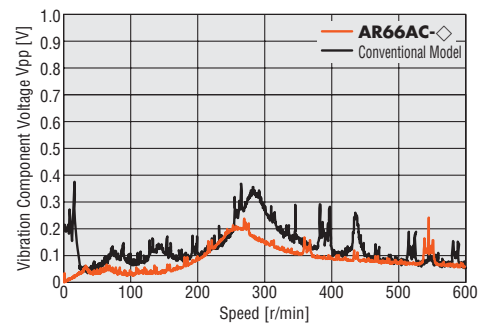


A Stepping Motor Offering Advanced Characteristics That's Also Easier to Use

### ■ Low Vibration

In addition to the microstep drive system, the **AR** Series also adopts the smooth drive function to allow for smoother movements.

The smooth drive function automatically implements microstep drive based on the same travel amount and speed used in the full-step mode, without changing the pulse input settings.

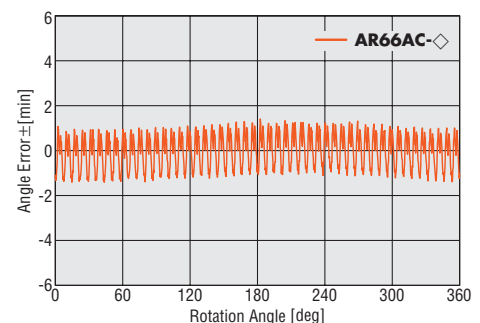


### ■ Improved Angle Accuracy

The **AR** Series uses improved current control technology to improve the stop position accuracy of the motor. The result is a greater positioning accuracy.

**AR66AC-◇**: ±3 min

Conventional Model: ±5 min



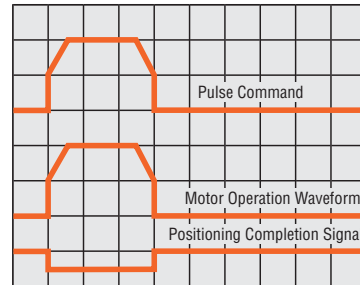
Maintaining the Advantages of the Stepping Motor, the **AR Series** is Available in Wide-Ranging Variations including the Geared Type.



Maintaining All Beneficial Features of the Stepping Motor

#### ■ High Response

The motor operates synchronously with pulse commands to achieve high response. There's no delay in operation following a pulse command.

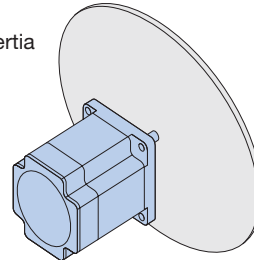


Measurement condition: Feed 1/5 rotation  
Load Inertia:  $250 \times 10^{-7}$  kg-m<sup>2</sup> (J)

#### ■ Capable of Driving Large Inertial Loads

Compared to a servo motor of the same frame size, the **AR Series** can drive larger inertial loads.

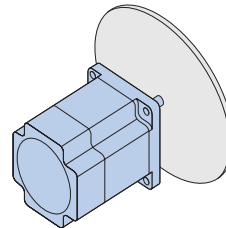
##### ● Comparison at Rotor Inertia ×30



#### AR Series

Inertia:  $22.4 \times 10^{-4}$  kg-m<sup>2</sup>  
(Rotor inertia ×30)

Load Inertia: Diameter: 169 mm  
Thickness: 10 mm  
Material: Aluminum  
Motor: Frame size: 60 mm  
Length: 90 mm



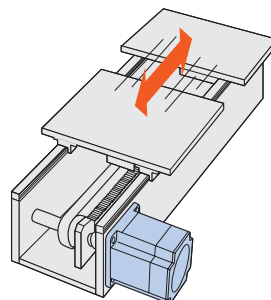
#### Conventional Servo Motor

Inertia:  $4.0 \times 10^{-4}$  kg-m<sup>2</sup>  
(Rotor inertia ×30)

Load Inertia: Diameter: 110 mm  
Thickness: 10 mm  
Material: Aluminum  
Motor: Frame size: 60 mm  
Length: 96.5 mm

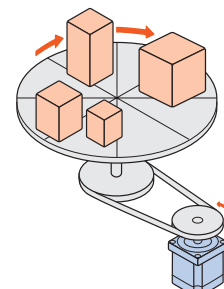
#### ■ No Tuning

With the **AR Series**, you can perform positioning quickly after a load change, etc., without adjusting the gain.



#### ■ No Hunting

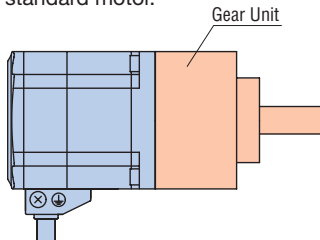
Because it uses a stepping motor, the **AR Series** does not hunt when stopping. Accordingly, the **AR Series** is ideal for applications where the equipment uses a belt-drive mechanism or otherwise has low rigidity and you don't want it to vibrate at stopping.



## Wide Variety of Geared Motors

### ■ Higher Resolution, Larger Inertial Load

To take advantage of the high accuracy of the stepping motor, the **AR** Series offers the geared type consisting of a motor assembled with a dedicated position-control gearhead having reduced backlash. The geared type allows for positioning operation at higher resolution, and supporting larger inertial load, compared to the standard motor.



**TH** Geared Type



**PL** Geared Type



**PN** Geared Type



Harmonic Geared Type

● Refer to page 9 for details of geared motors.

## Complying with Various Standards to Support Diverse Equipment Designs of Customers

### ■ Motor Protection Degree: IP54\*

The motor complies with the requirements of protection degree IP54\* (except for the motor mounting surface and connectors). This means that the enclosure prevents intrusion of dust that can otherwise inhibit normal operation.

\*Excluding double shaft models

### ■ (RoHS) RoHS-Compliant

The **AR** Series conforms to the RoHS Directive, which prohibits the use of six chemical substances including lead and cadmium.

RoHS (Restriction of Hazardous Substances) Directive:

Directive on restriction of the use of certain hazardous substances in electrical and electronic equipment (2002/95/EC).

The RoHS Directive prohibits the use of six chemical substances in electrical and electronic products sold in the EU member states. The six controlled substances are: lead, hexavalent chromium, cadmium, mercury and two specific brominated flame-retardants (PBB and PBDE).

### ■ Major Safety Standards

The **AR** Series is recognized by the UL/CSA Standards and bears the CE Mark as a proof of conformance to the Low Voltage and EMC Directives.

### ■ Complying with the Semiconductor Manufacturing Facility Standard "SEMI F47"

The **AR** Series complies with the SEMI Standard on power supply voltage drop, and accordingly this motor can be used effectively in semiconductor manufacturing apparatuses. The customer is advised to always evaluate the motor on the actual equipment.

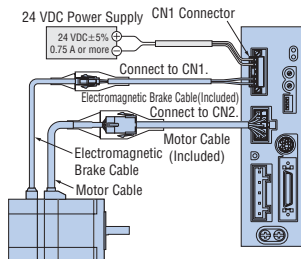
## Easy Operation, High Functions and Extended Function

### Automatically Controlled Electromagnetic Brake

The customer need not provide a separate circuit to control the electromagnetic brake. The electromagnetic brake is released when the motor is excited (= the current ON input is turned ON), and activated to hold the load in position when the excitation is cut off (= the current ON input is turned OFF).

#### Note:

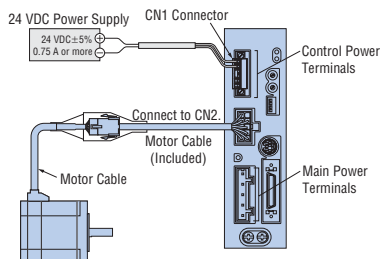
- A separate 24 VDC power supply is needed for electromagnetic brake control.



### Separation of Main Power and Control Power

The control power-input terminals are provided separately from the main power terminals. This means that even when the main power is cut off due to an emergency stop, etc., you can still detect positions and check the information on each alarm, etc., as long as the power (24 VDC) is supplied to the control power-input terminals.

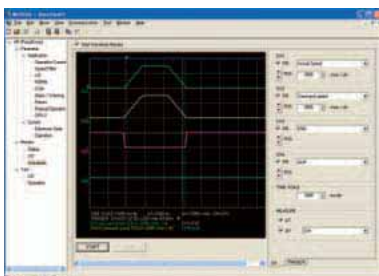
- The motor can be operated with the main power alone.



### Functional Extension to Achieve More Detailed Settings/Functions

You can combine a control module (**OPX-2A**) or data setting software (**MEXE02**) (both sold separately) to change parameters, add functions and perform various monitoring operations according to the need of your system.

- Details of extended functions → Page 54
- Monitoring of Operating Condition by Waveform



### Return Operation

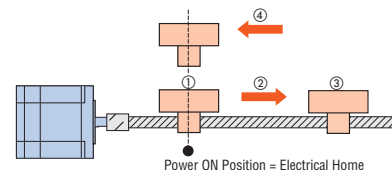
Two return operation functions are available: Return to electrical home operation and automatic return operation. With these options, you can easily set up your system to return home when the main power has been cut off due to an emergency stop, etc., or the motor excitation has been turned off.

- While the main power is cut off, the control power (24 VDC) must be supplied.

#### Return to Electrical Home Operation

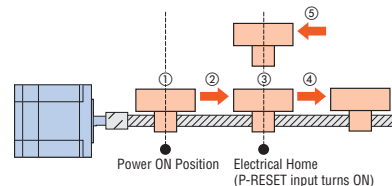
An operation in which the motor returns to the "position it had assumed when the power was turned on (= electrical home)" or "location set as the electrical home."

- Returning to the position the motor had assumed when the power was turned on (= electrical home)



- ① The power is turned on. (power ON position = electrical home) → ② Positioning operation (the work moves) → ③ After the motor stops, the RETURN input turns ON. (movement to the electrical home)

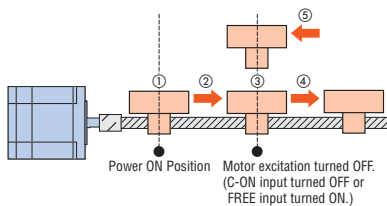
- Returning to the location set as the electrical home



- ① The power is turned on. (power ON position = electrical home) → ② Positioning operation (the work moves) → ③ After the motor stops, the P-RESET input turns ON. (electrical home position = location at ③) → ④ Positioning operation (the work moves) → ⑤ After the motor stops, the RETURN input turns ON. (movement to the electrical home)

#### Automatic Return Operation

An operation in which the motor returns to the "position at which motor excitation was turned off (= the C-ON input turned OFF or FREE input turned ON)."



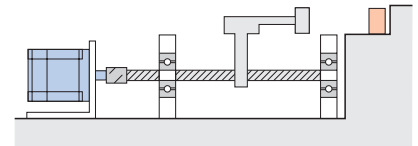
- ① The power is turned on. (power ON position = electrical home) → ② Positioning operation (the work moves) → ③ After the motor stops, the C-ON input turns OFF or FREE input turns ON. (③ = automatic return location) → ④ Move the table manually (the work moves) → ⑤ After the table stops, the C-ON input turns ON or FREE input turns OFF. (automatic return to the location at ③)

### Push-Motion Operation

You can input pulses to perform a push-motion operation where the load is continuously pressurized. The pressurizing force (motor output torque) is set by the push-motion operating current value. Using a control module (**OPX-2A**) or data setting software (**MEXE02**) (both sold separately), change the applicable parameter to "Push-motion operation," turn the T-MODE input ON, and input pulses. The motor will start push-motion operation.

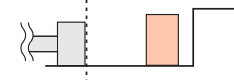
#### Notes:

- You need a control module (**OPX-2A**) or data setting software (**MEXE02**) (both sold separately) to perform push-motion operation.
- Do not perform push-motion operation with the geared type, because it may damage the motor or gearhead.



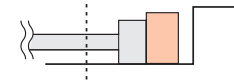
#### ① Setting of reference position (electrical home)

Turn the P-RESET input ON to set the reference position (electrical home).



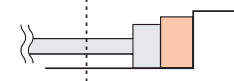
#### ② Start of push-motion operation

Select a desired push-motion operating current value, turn the T-MODE input ON, and input pulses.



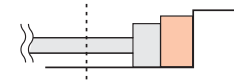
#### ③ Push-motion operation in progress

The load is pressurized. The TLC signal remains ON while the push-motion operation is in progress.



#### ④ Cancellation of push-motion operation

When the pressurization is completed, turn the T-MODE input OFF.



#### ⑤ Returning to reference position (electrical home)

Turn the RETURN input ON to return to the reference position (electrical home).





# A Full Lineup of AR Series



Standard Type



Standard Type with Electromagnetic Brake

Each "package" consists of a motor and a driver.

An electromagnetic brake is available on all types of motors.

● A cable needed for connection between the motor and driver is included.

## 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]
<b>Standard</b> 	· Basic model of AR Series	Maximum Holding Torque 4	—	0.36	4000
<b>Low backlash</b>	<b>TH Geared</b> (Parallel shaft) 	12	45	0.012	500
	<b>PL Geared</b> (Planetary) 	37	35	0.0072	360
<b>Non-backlash</b>	<b>PN Geared</b> (Planetary) 	Permissible Torque 37 Maximum Torque 60	3	0.0072	600
	<b>Harmonic Geared</b> (Harmonic drive) 	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.

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

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

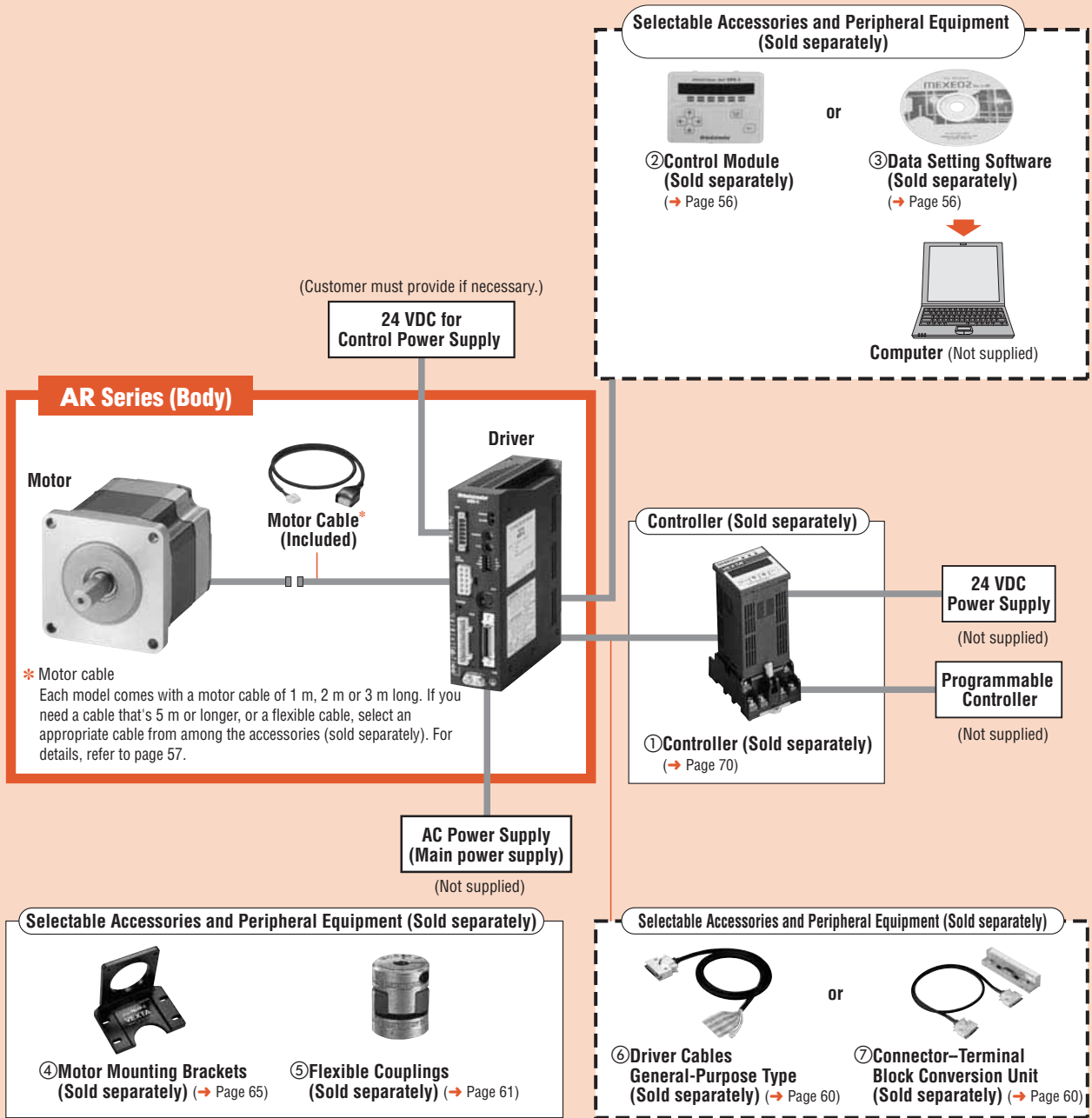
	Power Supply Voltage	Motor Type				
		Standard Type	TH Geared Type	PL Geared Type	PN Geared Type	Harmonic Geared Type
	Single-Phase 100-115 VAC	□42, □60, □85			□42, □60, □90	
	Single-Phase 200-230 VAC	□42, □60, □85			□42, □60, □90	
	Three-Phase 200-230 VAC	□42, □60, □85			□42, □60, □90	

● An electromagnetic brake is available on all types of motors.

# System Configuration

## 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.	70
②	Control Module	This control module lets you set (edit, monitor, operate) various data, enabling to extend functions. Comes with a communication cable (5 m).	56
③	Data Setting Software	This data setting software lets you set (edit, monitor, operate) various data, enabling to extend functions. Comes with a PC interface cable (5 m) and a USB cable (0.5 m).	56
④	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	65
⑤	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	61
⑥	Driver Cables General-Purpose Type	General-purpose cable for connecting the driver and controller (1 m, 2 m).	60
⑦	Connector-Terminal Block Conversion Unit	Set of terminal block and cable for connecting the driver and controller (1 m).	60

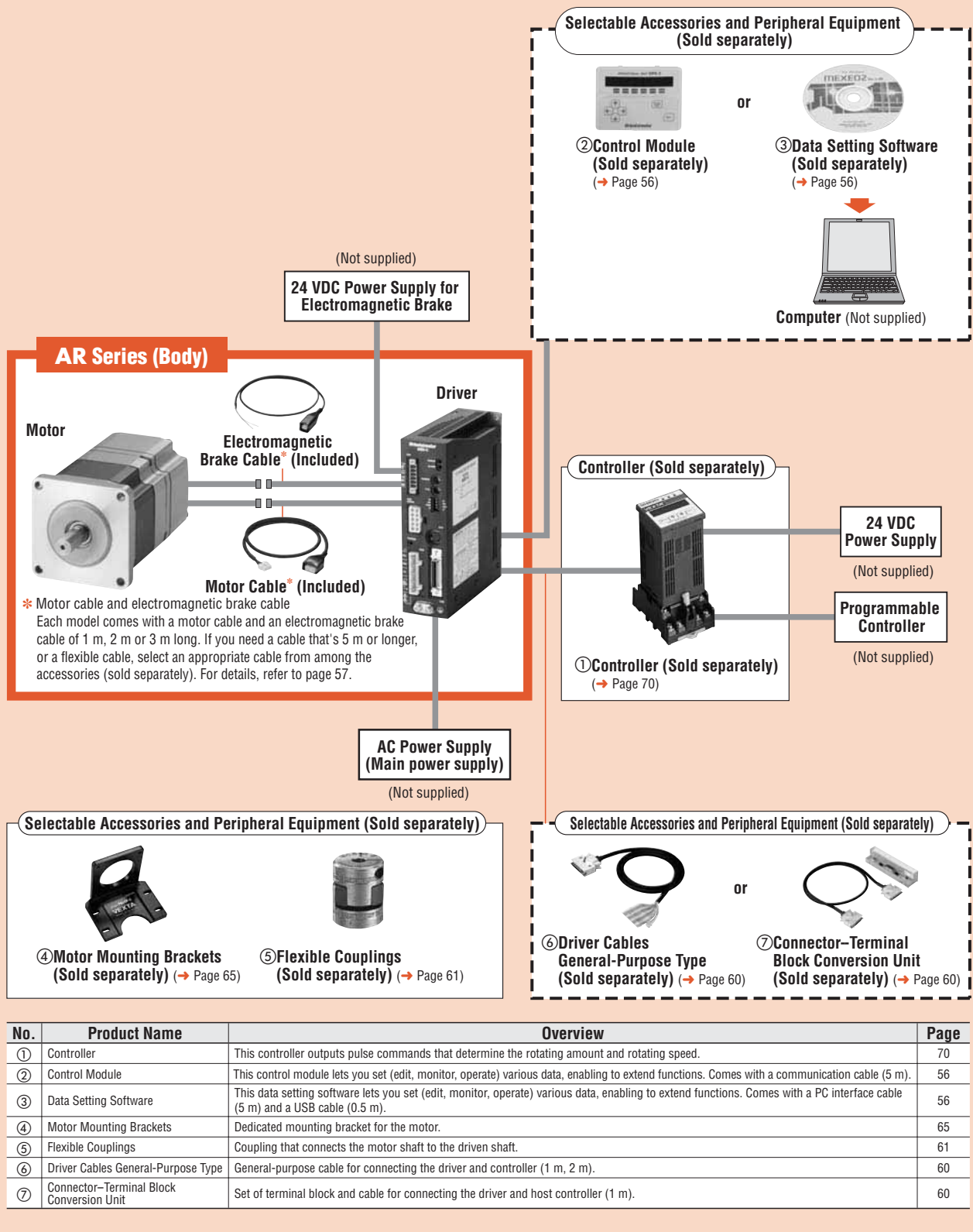
## Example of System Configuration



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

● **Standard Type with Electromagnetic Brake**

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



● **Example of System Configuration**



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

## Safety Standards and CE Marking

Product	Standards	Certification Body	Standards File No.	CE Markings
Motor	UL 1004, UL 2111 CSA C22.2 No.100 CSA C22.2 No.77	UL	E64199	Low Voltage Directives EMC Directives
	EN 60034-1	TÜV	R 50124201	
	EN 60034-5	Conform to EN Standards		
Driver	UL 508C* CSA C22.2 No.14	UL	E171462	
	EN 50178	Conform to EN Standards		
	EN 61800-5-1	TÜV	R 50124204	

\* Maximum Surrounding Air Temperature for UL: 50°C (UL 508C)

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

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

## Product Number Code

### Standard Type

**AR 6 6 M C - 1**

① ② ③ ④ ⑤ ⑥

### Geared Type

**AR 6 6 A C - N 50 - 1**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Series	<b>AR: AR Series</b>
②	Motor Frame Size	<b>4:</b> 42 mm <b>6:</b> 60 mm <b>9:</b> 85 mm
③	Motor Case Length	
④	Motor Type	<b>A:</b> Standard (Single shaft) <b>B:</b> Standard (Double shaft) <b>M:</b> Electromagnetic Brake Type
⑤	Power Supply Voltage	<b>A:</b> Single-Phase 100-115 VAC <b>C:</b> Single-Phase 200-230 VAC <b>S:</b> Three-Phase 200-230 VAC
⑥	Cable Length (Included)	<b>1:</b> 1 m <b>2:</b> 2 m <b>3:</b> 3 m

①	Series	<b>AR: AR Series</b>
②	Motor Frame Size	<b>4:</b> 42 mm <b>6:</b> 60 mm <b>9:</b> 90 mm
③	Motor Case Length	
④	Motor Type	<b>A:</b> Standard (Single shaft) <b>M:</b> Electromagnetic Brake Type
⑤	Power Supply Voltage	<b>A:</b> Single-Phase 100-115 VAC <b>C:</b> Single-Phase 200-230 VAC <b>S:</b> Three-Phase 200-230 VAC
⑥	Gearhead Type	<b>T:</b> TH Geared Type <b>P:</b> PL Geared Type <b>N:</b> PN Geared Type <b>H:</b> Harmonic Geared Type
⑦	Gear Ratio	
⑧	Cable Length (Included)	<b>1:</b> 1 m <b>2:</b> 2 m <b>3:</b> 3 m

## Product Line

### Standard Type

Power Supply Voltage	Model (Single shaft)	Model (Double shaft)
Single-Phase 100-115 VAC	<b>AR46AA</b> -◇	<b>AR46BA</b> -◇
	<b>AR66AA</b> -◇	<b>AR66BA</b> -◇
	<b>AR69AA</b> -◇	<b>AR69BA</b> -◇
	<b>AR98AA</b> -◇	<b>AR98BA</b> -◇
	<b>AR911AA</b> -◇	<b>AR911BA</b> -◇
Single-Phase 200-230 VAC	<b>AR46AC</b> -◇	<b>AR46BC</b> -◇
	<b>AR66AC</b> -◇	<b>AR66BC</b> -◇
	<b>AR69AC</b> -◇	<b>AR69BC</b> -◇
	<b>AR98AC</b> -◇	<b>AR98BC</b> -◇
	<b>AR911AC</b> -◇	<b>AR911BC</b> -◇
Three-Phase 200-230 VAC	<b>AR46AS</b> -◇	<b>AR46BS</b> -◇
	<b>AR66AS</b> -◇	<b>AR66BS</b> -◇
	<b>AR69AS</b> -◇	<b>AR69BS</b> -◇
	<b>AR98AS</b> -◇	<b>AR98BS</b> -◇
	<b>AR911AS</b> -◇	<b>AR911BS</b> -◇

● Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name. Select a desired cable length from 1 m, 2 m and 3 m.

The following items are included in each product.

Motor, Driver, Motor Cable\*, I/O Signal Connector, Connector for Regeneration Unit Input/Main Power Supply Input Terminal, 24 VDC Power Supply Input/Regeneration Unit Thermal Input, Connector Wiring Lever, Operating Manual

\* The product includes a motor cable of 1 m, 2 m or 3 m.

If you need a cable that's 5 m or longer, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 57.

### Standard Type with Electromagnetic Brake

Power Supply Voltage	Model
Single-Phase 100-115 VAC	<b>AR46MA</b> -◇
	<b>AR66MA</b> -◇
	<b>AR69MA</b> -◇
	<b>AR98MA</b> -◇
Single-Phase 200-230 VAC	<b>AR46MC</b> -◇
	<b>AR66MC</b> -◇
	<b>AR69MC</b> -◇
	<b>AR98MC</b> -◇
Three-Phase 200-230 VAC	<b>AR46MS</b> -◇
	<b>AR69MS</b> -◇
	<b>AR98MS</b> -◇

● Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name. Select a desired cable length from 1 m, 2 m and 3 m.

The following items are included in each product.

Motor, Driver, Motor Cable and Electromagnetic Brake Cable\*, I/O Signal Connector, Connector for Regeneration Unit Input/Main Power Supply Input Terminal, Connector for 24 VDC Power Supply Input/Regeneration Unit Thermal Input/Electromagnetic Brake Output Terminal, Connector Wiring Lever, Operating Manual

\* The product includes a motor cable and an electromagnetic brake cable of 1 m, 2 m or 3 m.

If you need a cable that's 5 m or longer, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 57.

## ● TH Geared Type

Power Supply Voltage	Model
Single-Phase 100-115 VAC	AR46AA-T3.6-◇
	AR46AA-T7.2-◇
	AR46AA-T10-◇
	AR46AA-T20-◇
	AR46AA-T30-◇
	AR66AA-T3.6-◇
	AR66AA-T7.2-◇
	AR66AA-T10-◇
	AR66AA-T20-◇
	AR66AA-T30-◇
	AR98AA-T3.6-◇
	AR98AA-T7.2-◇
	AR98AA-T10-◇
	AR98AA-T20-◇
	AR98AA-T30-◇
Single-Phase 200-230 VAC	AR46AC-T3.6-◇
	AR46AC-T7.2-◇
	AR46AC-T10-◇
	AR46AC-T20-◇
	AR46AC-T30-◇
	AR66AC-T3.6-◇
	AR66AC-T7.2-◇
	AR66AC-T10-◇
	AR66AC-T20-◇
	AR66AC-T30-◇
	AR98AC-T3.6-◇
	AR98AC-T7.2-◇
	AR98AC-T10-◇
	AR98AC-T20-◇
	AR98AC-T30-◇
Three-Phase 200-230 VAC	AR46AS-T3.6-◇
	AR46AS-T7.2-◇
	AR46AS-T10-◇
	AR46AS-T20-◇
	AR46AS-T30-◇
	AR66AS-T3.6-◇
	AR66AS-T7.2-◇
	AR66AS-T10-◇
	AR66AS-T20-◇
	AR66AS-T30-◇
	AR98AS-T3.6-◇
	AR98AS-T7.2-◇
	AR98AS-T10-◇
	AR98AS-T20-◇
	AR98AS-T30-◇

● Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name. Select a desired cable length from 1 m, 2 m and 3 m.

The following items are included in each product.

Motor, Parallel Key\*1, Driver, Motor Cable\*2, I/O Signal Connector, Connector for Regeneration Unit Input/Main Power Supply Input Terminal, 24 VDC Power Supply Input/Regeneration Unit Thermal Input, Connector Wiring Lever, Operating Manual

\*1 Only for the products with a key slot on the output shaft

\*2 The product includes a motor cable of 1 m, 2 m or 3 m.

If you need a cable that's 5 m or longer, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 57.

## ● TH Geared Type with Electromagnetic Brake

Power Supply Voltage	Model
Single-Phase 100-115 VAC	AR46MA-T3.6-◇
	AR46MA-T7.2-◇
	AR46MA-T10-◇
	AR46MA-T20-◇
	AR46MA-T30-◇
	AR66MA-T3.6-◇
	AR66MA-T7.2-◇
	AR66MA-T10-◇
	AR66MA-T20-◇
	AR66MA-T30-◇
	AR98MA-T3.6-◇
	AR98MA-T7.2-◇
	AR98MA-T10-◇
	AR98MA-T20-◇
	AR98MA-T30-◇
Single-Phase 200-230 VAC	AR46MC-T3.6-◇
	AR46MC-T7.2-◇
	AR46MC-T10-◇
	AR46MC-T20-◇
	AR46MC-T30-◇
	AR66MC-T3.6-◇
	AR66MC-T7.2-◇
	AR66MC-T10-◇
	AR66MC-T20-◇
	AR66MC-T30-◇
	AR98MC-T3.6-◇
	AR98MC-T7.2-◇
	AR98MC-T10-◇
	AR98MC-T20-◇
	AR98MC-T30-◇
Three-Phase 200-230 VAC	AR46MS-T3.6-◇
	AR46MS-T7.2-◇
	AR46MS-T10-◇
	AR46MS-T20-◇
	AR46MS-T30-◇
	AR66MS-T3.6-◇
	AR66MS-T7.2-◇
	AR66MS-T10-◇
	AR66MS-T20-◇
	AR66MS-T30-◇
	AR98MS-T3.6-◇
	AR98MS-T7.2-◇
	AR98MS-T10-◇
	AR98MS-T20-◇
	AR98MS-T30-◇

● Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name. Select a desired cable length from 1 m, 2 m and 3 m.

The following items are included in each product.

Motor, Parallel Key\*1, Driver, Motor Cable and Electromagnetic Brake Cable\*2, I/O Signal Connector, Connector for Regeneration Unit Input/Main Power Supply Input Terminal, Connector for 24 VDC Power Supply Input/Regeneration Unit Thermal Input/ Electromagnetic Brake Output Terminal, Connector Wiring Lever, Operating Manual

\*1 Only for the products with a key slot on the output shaft

\*2 The product includes a motor cable and an electromagnetic brake cable of 1 m, 2 m or 3 m.

If you need a cable that's 5 m or longer, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 57.

● **PL Geared Type**

Power Supply Voltage	Model
Single-Phase 100-115 VAC	AR46AA-P5-◇
	AR46AA-P7.2-◇
	AR46AA-P10-◇
	AR46AA-P25-◇
	AR46AA-P36-◇
	AR46AA-P50-◇
	AR66AA-P5-◇
	AR66AA-P7.2-◇
	AR66AA-P10-◇
	AR66AA-P25-◇
	AR66AA-P36-◇
	AR66AA-P50-◇
	AR98AA-P5-◇
	AR98AA-P7.2-◇
	AR98AA-P10-◇
AR98AA-P25-◇	
AR98AA-P36-◇	
AR98AA-P50-◇	
Single-Phase 200-230 VAC	AR46AC-P5-◇
	AR46AC-P7.2-◇
	AR46AC-P10-◇
	AR46AC-P25-◇
	AR46AC-P36-◇
	AR46AC-P50-◇
	AR66AC-P5-◇
	AR66AC-P7.2-◇
	AR66AC-P10-◇
	AR66AC-P25-◇
	AR66AC-P36-◇
	AR66AC-P50-◇
	AR98AC-P5-◇
	AR98AC-P7.2-◇
	AR98AC-P10-◇
AR98AC-P25-◇	
AR98AC-P36-◇	
AR98AC-P50-◇	
Three-Phase 200-230 VAC	AR46AS-P5-◇
	AR46AS-P7.2-◇
	AR46AS-P10-◇
	AR46AS-P25-◇
	AR46AS-P36-◇
	AR46AS-P50-◇
	AR66AS-P5-◇
	AR66AS-P7.2-◇
	AR66AS-P10-◇
	AR66AS-P25-◇
	AR66AS-P36-◇
	AR66AS-P50-◇
	AR98AS-P5-◇
	AR98AS-P7.2-◇
	AR98AS-P10-◇
AR98AS-P25-◇	
AR98AS-P36-◇	
AR98AS-P50-◇	

● Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name. Select a desired cable length from 1 m, 2 m and 3 m.

The following items are included in each product.

Motor, Parallel Key\*1, Driver, Motor Cable\*2, I/O Signal Connector, Connector for Regeneration Unit Input/Main Power Supply Input Terminal, 24 VDC Power Supply Input/Regeneration Unit Thermal Input, Connector Wiring Lever, Operating Manual

\*1 Only for the products with a key slot on the output shaft

\*2 The product includes a motor cable of 1 m, 2 m or 3 m.

If you need a cable that's 5 m or longer, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 57.

● **PL Geared Type with Electromagnetic Brake**

Power Supply Voltage	Model
Single-Phase 100-115 VAC	AR46MA-P5-◇
	AR46MA-P7.2-◇
	AR46MA-P10-◇
	AR46MA-P25-◇
	AR46MA-P36-◇
	AR46MA-P50-◇
	AR66MA-P5-◇
	AR66MA-P7.2-◇
	AR66MA-P10-◇
	AR66MA-P25-◇
	AR66MA-P36-◇
	AR66MA-P50-◇
	AR98MA-P5-◇
	AR98MA-P7.2-◇
	AR98MA-P10-◇
AR98MA-P25-◇	
AR98MA-P36-◇	
AR98MA-P50-◇	
Single-Phase 200-230 VAC	AR46MC-P5-◇
	AR46MC-P7.2-◇
	AR46MC-P10-◇
	AR46MC-P25-◇
	AR46MC-P36-◇
	AR46MC-P50-◇
	AR66MC-P5-◇
	AR66MC-P7.2-◇
	AR66MC-P10-◇
	AR66MC-P25-◇
	AR66MC-P36-◇
	AR66MC-P50-◇
	AR98MC-P5-◇
	AR98MC-P7.2-◇
	AR98MC-P10-◇
AR98MC-P25-◇	
AR98MC-P36-◇	
AR98MC-P50-◇	
Three-Phase 200-230 VAC	AR46MS-P5-◇
	AR46MS-P7.2-◇
	AR46MS-P10-◇
	AR46MS-P25-◇
	AR46MS-P36-◇
	AR46MS-P50-◇
	AR66MS-P5-◇
	AR66MS-P7.2-◇
	AR66MS-P10-◇
	AR66MS-P25-◇
	AR66MS-P36-◇
	AR66MS-P50-◇
	AR98MS-P5-◇
	AR98MS-P7.2-◇
	AR98MS-P10-◇
AR98MS-P25-◇	
AR98MS-P36-◇	
AR98MS-P50-◇	

● Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name. Select a desired cable length from 1 m, 2 m and 3 m.

The following items are included in each product.

Motor, Parallel Key\*1, Driver, Motor Cable and Electromagnetic Brake Cable\*2, I/O Signal Connector, Connector for Regeneration Unit Input/Main Power Supply Input Terminal, Connector for 24 VDC Power Supply Input/Regeneration Unit Thermal Input/Electromagnetic Brake Output Terminal, Connector Wiring Lever, Operating Manual

\*1 Only for the products with a key slot on the output shaft

\*2 The product includes a motor cable and an electromagnetic brake cable of 1 m, 2 m or 3 m.

If you need a cable that's 5 m or longer, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 57.

● **PN Geared Type**

Power Supply Voltage	Model
Single-Phase 100-115 VAC	AR46AA-N5-◇
	AR46AA-N7.2-◇
	AR46AA-N10-◇
	AR66AA-N5-◇
	AR66AA-N7.2-◇
	AR66AA-N10-◇
	AR66AA-N25-◇
	AR66AA-N36-◇
	AR66AA-N50-◇
	AR98AA-N5-◇
	AR98AA-N7.2-◇
	AR98AA-N10-◇
	AR98AA-N25-◇
	AR98AA-N36-◇
	AR98AA-N50-◇
Single-Phase 200-230 VAC	AR46AC-N5-◇
	AR46AC-N7.2-◇
	AR46AC-N10-◇
	AR66AC-N5-◇
	AR66AC-N7.2-◇
	AR66AC-N10-◇
	AR66AC-N25-◇
	AR66AC-N36-◇
	AR66AC-N50-◇
	AR98AC-N5-◇
	AR98AC-N7.2-◇
	AR98AC-N10-◇
	AR98AC-N25-◇
	AR98AC-N36-◇
	AR98AC-N50-◇
Three-Phase 200-230 VAC	AR46AS-N5-◇
	AR46AS-N7.2-◇
	AR46AS-N10-◇
	AR66AS-N5-◇
	AR66AS-N7.2-◇
	AR66AS-N10-◇
	AR66AS-N25-◇
	AR66AS-N36-◇
	AR66AS-N50-◇
	AR98AS-N5-◇
	AR98AS-N7.2-◇
	AR98AS-N10-◇
	AR98AS-N25-◇
	AR98AS-N36-◇
	AR98AS-N50-◇

● Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name. Select a desired cable length from 1 m, 2 m and 3 m.

The following items are included in each product.

Motor, Parallel Key, Driver, Motor Cable\*, I/O Signal Connector, Connector for Regeneration Unit Input/Main Power Supply Input Terminal, 24 VDC Power Supply Input/Regeneration Unit Thermal Input, Connector Wiring Lever, Operating Manual

\*The product includes a motor cable of 1 m, 2 m or 3 m.

If you need a cable that's 5 m or longer, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 57.

● **PN Geared Type with Electromagnetic Brake**

Power Supply Voltage	Model
Single-Phase 100-115 VAC	AR46MA-N5-◇
	AR46MA-N7.2-◇
	AR46MA-N10-◇
	AR66MA-N5-◇
	AR66MA-N7.2-◇
	AR66MA-N10-◇
	AR66MA-N25-◇
	AR66MA-N36-◇
	AR66MA-N50-◇
	AR98MA-N5-◇
	AR98MA-N7.2-◇
	AR98MA-N10-◇
	AR98MA-N25-◇
	AR98MA-N36-◇
	AR98MA-N50-◇
Single-Phase 200-230 VAC	AR46MC-N5-◇
	AR46MC-N7.2-◇
	AR46MC-N10-◇
	AR66MC-N5-◇
	AR66MC-N7.2-◇
	AR66MC-N10-◇
	AR66MC-N25-◇
	AR66MC-N36-◇
	AR66MC-N50-◇
	AR98MC-N5-◇
	AR98MC-N7.2-◇
	AR98MC-N10-◇
	AR98MC-N25-◇
	AR98MC-N36-◇
	AR98MC-N50-◇
Three-Phase 200-230 VAC	AR46MS-N5-◇
	AR46MS-N7.2-◇
	AR46MS-N10-◇
	AR66MS-N5-◇
	AR66MS-N7.2-◇
	AR66MS-N10-◇
	AR66MS-N25-◇
	AR66MS-N36-◇
	AR66MS-N50-◇
	AR98MS-N5-◇
	AR98MS-N7.2-◇
	AR98MS-N10-◇
	AR98MS-N25-◇
	AR98MS-N36-◇
	AR98MS-N50-◇

● Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name. Select a desired cable length from 1 m, 2 m and 3 m.

The following items are included in each product.

Motor, Parallel Key, Driver, Motor Cable and Electromagnetic Brake Cable\*, I/O Signal Connector, Connector for Regeneration Unit Input/Main Power Supply Input Terminal, Connector for 24 VDC Power Supply Input/Regeneration Unit Thermal Input/ Electromagnetic Brake Output Terminal, Connector Wiring Lever, Operating Manual

\*The product includes a motor cable and an electromagnetic brake cable of 1 m, 2 m or 3 m.

If you need a cable that's 5 m or longer, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 57.

● Harmonic Geared Type

Power Supply Voltage	Model
Single-Phase 100-115 VAC	AR46AA-H50-◇
	AR46AA-H100-◇
	AR66AA-H50-◇
	AR66AA-H100-◇
	AR98AA-H50-◇
	AR98AA-H100-◇
Single-Phase 200-230 VAC	AR46AC-H50-◇
	AR46AC-H100-◇
	AR66AC-H50-◇
	AR66AC-H100-◇
	AR98AC-H50-◇
	AR98AC-H100-◇
Three-Phase 200-230 VAC	AR46AS-H50-◇
	AR46AS-H100-◇
	AR66AS-H50-◇
	AR66AS-H100-◇
	AR98AS-H50-◇
	AR98AS-H100-◇

● Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name. Select a desired cable length from 1 m, 2 m and 3 m.

The following items are included in each product.

Motor, Parallel Key, Driver, Motor Cable\*, I/O Signal Connector, Connector for Regeneration Unit Input/Main Power Supply Input Terminal, 24 VDC Power Supply Input/Regeneration Unit Thermal Input, Connector Wiring Lever, Operating Manual

\* The product includes a motor cable of 1 m, 2 m or 3 m.

If you need a cable that's 5 m or longer, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 57.

● Harmonic Geared Type with Electromagnetic Brake

Power Supply Voltage	Model
Single-Phase 100-115 VAC	AR46MA-H50-◇
	AR46MA-H100-◇
	AR66MA-H50-◇
	AR66MA-H100-◇
	AR98MA-H50-◇
	AR98MA-H100-◇
Single-Phase 200-230 VAC	AR46MC-H50-◇
	AR46MC-H100-◇
	AR66MC-H50-◇
	AR66MC-H100-◇
	AR98MC-H50-◇
	AR98MC-H100-◇
Three-Phase 200-230 VAC	AR46MS-H50-◇
	AR46MS-H100-◇
	AR66MS-H50-◇
	AR66MS-H100-◇
	AR98MS-H50-◇
	AR98MS-H100-◇

● Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name. Select a desired cable length from 1 m, 2 m and 3 m.

The following items are included in each product.

Motor, Parallel Key, Driver, Motor Cable and Electromagnetic Brake Cable\*, I/O Signal Connector, Connector for Regeneration Unit Input/Main Power Supply Input Terminal, Connector for 24 VDC Power Supply Input/Regeneration Unit Thermal Input/ Electromagnetic Brake Output Terminal, Connector Wiring Lever, Operating Manual

\* The product includes a motor cable and an electromagnetic brake cable of 1 m, 2 m or 3 m.

If you need a cable that's 5 m or longer, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 57.



# Standard Type Motor Frame Size 42 mm, 60 mm, 85 mm

## Specifications RoHS



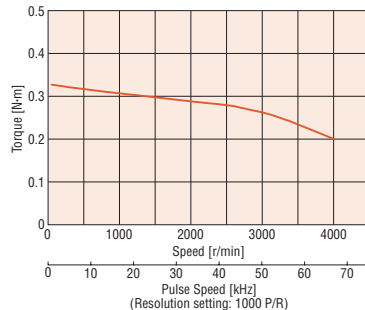
Model	Standard (Single shaft)	AR46A □-◇	AR66A □-◇	AR69A □-◇	AR98A □-◇	AR911A □-◇	
	Standard (Double shaft) <sup>*4</sup>	AR46B □-◇	AR66B □-◇	AR69B □-◇	AR98B □-◇	AR911B □-◇	
	Electromagnetic Brake	AR46M □-◇	AR66M □-◇	AR69M □-◇	AR98M □-◇	—	
Maximum Holding Torque	N·m	0.3	1.2	2	2	4	
Rotor Inertia	J: kg·m <sup>2</sup>	58×10 <sup>-7</sup> [73×10 <sup>-7</sup> ] <sup>*1</sup>	380×10 <sup>-7</sup> [500×10 <sup>-7</sup> ] <sup>*1</sup>	750×10 <sup>-7</sup> [870×10 <sup>-7</sup> ] <sup>*1</sup>	1100×10 <sup>-7</sup> [1220×10 <sup>-7</sup> ] <sup>*1</sup>	2200×10 <sup>-7</sup>	
Resolution	Resolution Setting: 1000 P/R	0.36°/Pulse					
Voltage/Frequency		Single-Phase 100-115 VAC -15~+10% 50/60 Hz					
		Single-Phase 200-230 VAC -15~+10% 50/60 Hz					
		Three-Phase 200-230 VAC -15~+10% 50/60 Hz					
Power Source	Maximum Input Current A	2.9	4.4	6.1	5.5	6.5	
	Current A	Single-Phase 100-115 VAC	1.9	2.7	3.8	3.4	4.1
		Three-Phase 200-230 VAC	1	1.4	2	1.8	2.2
Control Power Supply		24 VDC±5% 0.5 A					
Electromagnetic Brake <sup>*3</sup>	Type	Active when power is off					
	Power Supply Input	24 VDC±5% <sup>*2</sup>					
	Power Consumption W	2	6			—	
	Excitation Current A	0.08	0.25			—	
Static Friction Torque	N·m	0.15	0.6	1		—	
Mass	Motor kg	0.47 [0.62] <sup>*1</sup>	0.9 [1.2] <sup>*1</sup>	1.4 [1.7] <sup>*1</sup>	1.9 [2.5] <sup>*1</sup>	3	
	Driver kg	0.75					
Dimension No. Driver		① [④] <sup>*1</sup>	② [⑤] <sup>*1</sup>		③ [⑥] <sup>*1</sup>		
Cable		②					

How to read specifications table → Page 55

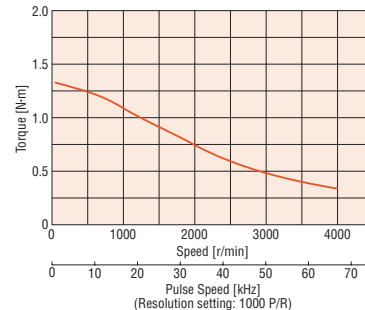
- \*1 The values inside the brackets [ ] represent the specification for the electromagnetic brake type.
- \*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC±4%.
- \*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate power supply is required for the electromagnetic brakes.
- \*4 With a double shaft model, the output shaft located on the opposite side of the motor output shaft is used to install the slit disk. Do not apply any load torque, overhung load or thrust load on this output shaft.

## Speed – Torque Characteristics How to read speed – torque characteristics → Page 55

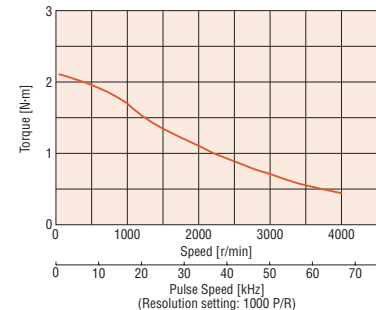
AR46 □ □-◇



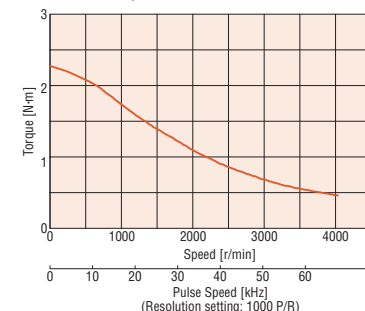
AR66 □ □-◇



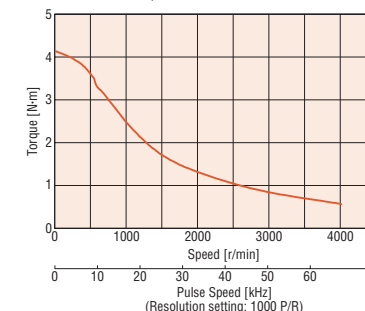
AR69 □ □-◇



AR98 □ □-◇



AR911 □ □-◇



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

- Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the model name.  
Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (<>) within the model name.

# TH Geared Type Motor Frame Size 42 mm

## Specifications RoHS



Model	Standard (Single shaft) Electromagnetic Brake	AR46A□-T3.6-◇	AR46A□-T7.2-◇	AR46A□-T10-◇	AR46A□-T20-◇	AR46A□-T30-◇
Model	Electromagnetic Brake	AR46M□-T3.6-◇	AR46M□-T7.2-◇	AR46M□-T10-◇	AR46M□-T20-◇	AR46M□-T30-◇
Maximum Holding Torque	N·m	0.35	0.7	1	1.5	
Rotor Inertia	J: kg·m <sup>2</sup>	58 × 10 <sup>-7</sup> [73 × 10 <sup>-7</sup> ] <sup>*1</sup>				
Backlash	arc min (deg)	45 (0.75)	25 (0.417)	25 (0.417)	15 (0.25)	15 (0.25)
Permissible Speed Range	r/min	0~500	0~250	0~180	0~90	0~60
Gear Ratio		1:3.6	1:7.2	1:10	1:20	1:30
Resolution	Resolution Setting: 1000 P/R	0.1 <sup>†</sup> /Pulse	0.05 <sup>†</sup> /Pulse	0.036 <sup>†</sup> /Pulse	0.018 <sup>†</sup> /Pulse	0.012 <sup>†</sup> /Pulse
Permissible Torque	N·m	0.35	0.7	1	1.5	
Power Source	Voltage/Frequency	Single-Phase 100-115 VAC -15~+10% 50/60 Hz				
		Single-Phase 200-230 VAC -15~+10% 50/60 Hz				
		Three-Phase 200-230 VAC -15~+10% 50/60 Hz				
Maximum Input Current A	Single-Phase 100-115 VAC	2.9				
	Single-Phase 200-230 VAC	1.9				
	Three-Phase 200-230 VAC	1				
Control Power Supply		24 VDC ± 5% 0.5 A				
Electromagnetic Brake <sup>*3</sup>	Type	Active when power is off				
	Power Supply Input	24 VDC ± 5% <sup>*2</sup>				
	Power Consumption W	2				
	Excitation Current A	0.08				
Static Friction Torque	N·m	0.18	0.35	0.5	0.75	
Mass	Motor	kg 0.62 [0.77] <sup>*1</sup>				
	Driver	kg 0.75				
Dimension No. Driver		7 [10] <sup>*1</sup>				
Cable		3 [2]				

How to read specifications table → Page 55

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

\*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC ± 4%.

\*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate power supply is required for the electromagnetic brakes.

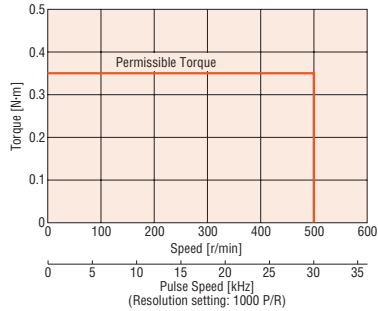
**Note:**

● 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.

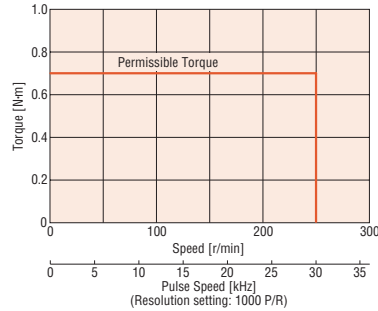
## Speed – Torque Characteristics

How to read speed – torque characteristics → Page 55

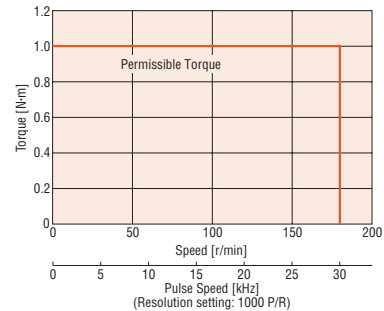
AR46□□-T3.6-◇



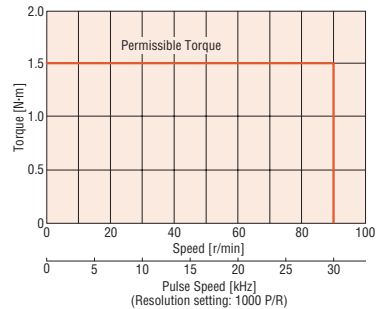
AR46□□-T7.2-◇



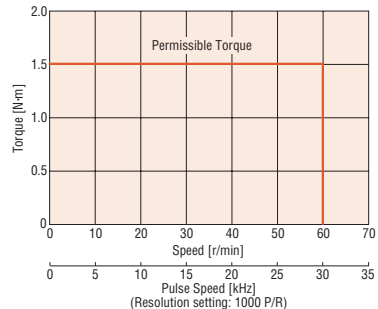
AR46□□-T10-◇



AR46□□-T20-◇



AR46□□-T30-◇



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

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

Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.

Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

# TH Geared Type Motor Frame Size 60 mm

## Specifications RoHS



Model	Standard (Single shaft) Electromagnetic Brake	AR66A□-T3.6-◇	AR66A□-T7.2-◇	AR66A□-T10-◇	AR66A□-T20-◇	AR66A□-T30-◇
Maximum Holding Torque	N·m	1.25	2.5	3	3.5	4
Rotor Inertia	J: kg·m <sup>2</sup>	$380 \times 10^{-7}$ [ $500 \times 10^{-7}$ ] <sup>*1</sup>				
Backlash	arc min (deg)	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	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
Voltage/Frequency		Single-Phase 100-115 VAC -15~+10% 50/60 Hz				
		Single-Phase 200-230 VAC -15~+10% 50/60 Hz				
		Three-Phase 200-230 VAC -15~+10% 50/60 Hz				
Power Source	Maximum Input Current A	Single-Phase 100-115 VAC 4.4				
		Single-Phase 200-230 VAC 2.7				
		Three-Phase 200-230 VAC 1.4				
Control Power Supply		24 VDC±5% 0.5 A				
Electromagnetic Brake <sup>*3</sup>	Type	Active when power is off				
	Power Supply Input	24 VDC±5% <sup>*2</sup>				
	Power Consumption W	6				
	Excitation Current A	0.25				
Static Friction Torque	N·m	0.63	1.25	1.5	1.75	2
Mass	Motor kg	1.3 [1.6] <sup>*1</sup>				
	Driver kg	0.75				
Dimension No. Driver		[8] [11] <sup>*1</sup>				
Cable		[3]				

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

\*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC±4%.

\*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate power supply is required for the electromagnetic brakes.

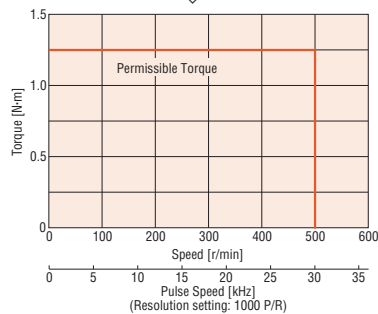
### Note:

● 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.

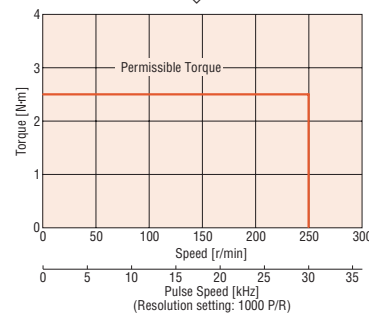
## Speed – Torque Characteristics

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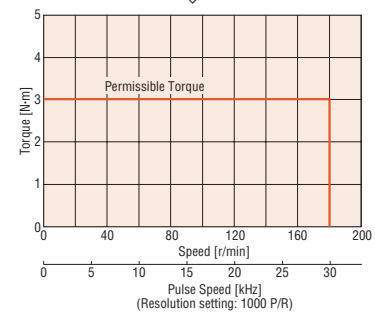
AR66□-T3.6-◇



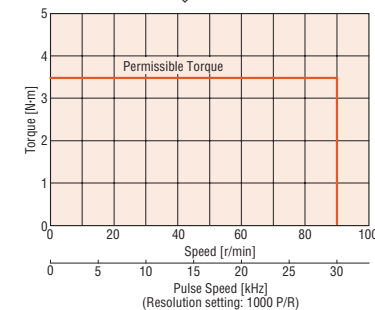
AR66□-T7.2-◇



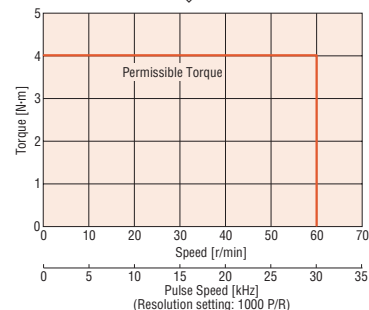
AR66□-T10-◇



AR66□-T20-◇



AR66□-T30-◇



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

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

Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.

Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

# TH Geared Type Motor Frame Size 90 mm

## Specifications RoHS



Model	Standard (Single shaft) Electromagnetic Brake	AR98A <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">□</span> -T3.6- <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">◇</span>	AR98A <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">□</span> -T7.2- <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">◇</span>	AR98A <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">□</span> -T10- <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">◇</span>	AR98A <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">□</span> -T20- <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">◇</span>	AR98A <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">□</span> -T30- <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">◇</span>
		AR98M <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">□</span> -T3.6- <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">◇</span>	AR98M <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">□</span> -T7.2- <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">◇</span>	AR98M <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">□</span> -T10- <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">◇</span>	AR98M <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">□</span> -T20- <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">◇</span>	AR98M <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">□</span> -T30- <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">◇</span>
Maximum Holding Torque	N·m	4.5		9		12
Rotor Inertia	J: kg·m <sup>2</sup>	1100×10 <sup>-7</sup> [1220×10 <sup>-7</sup> ]*1				
Backlash	arc min (deg)	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	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 100-115 VAC -15~+10% 50/60 Hz				
		Single-Phase 200-230 VAC -15~+10% 50/60 Hz				
		Three-Phase 200-230 VAC -15~+10% 50/60 Hz				
Maximum Input Current A	Single-Phase 100-115 VAC	5.5				
	Single-Phase 200-230 VAC	3.4				
	Three-Phase 200-230 VAC	1.8				
Control Power Supply		24 VDC±5% 0.5 A				
Electromagnetic Brake*3	Type	Active when power is off				
	Power Supply Input	24 VDC±5%*2				
	Power Consumption W	6				
	Excitation Current A	0.25				
Static Friction Torque	N·m	2.25		4.5		6
Mass	Motor	kg		3.1 [3.7]*1		
	Driver	kg		0.75		
Dimension No. Driver				[9] [12]*1		
	Cable			[3] [2]		

How to read specifications table → Page 55

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

\*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC±4%.

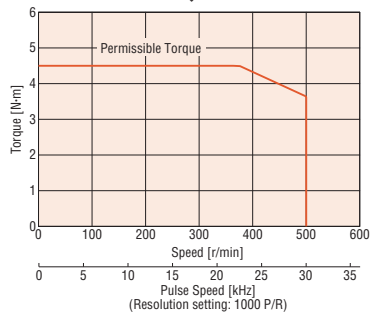
\*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate power supply is required for the electromagnetic brakes.

**Note:**

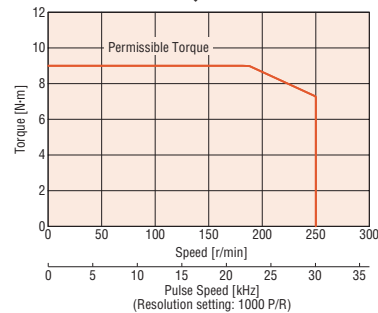
● Direction of rotation of the motor and that of the gear output shaft are the same for the gear ratios 1: 3.6, 1: 7.2 and 1: 10. It is opposite for 1: 20 and 1: 30 gear ratios.

## Speed – Torque Characteristics How to read speed – torque characteristics → Page 55

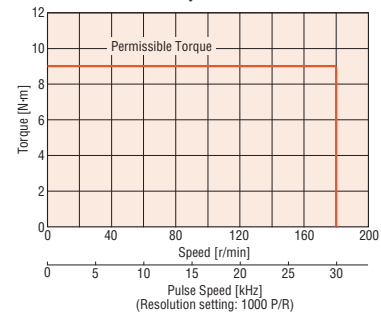
AR98□-T3.6-◇



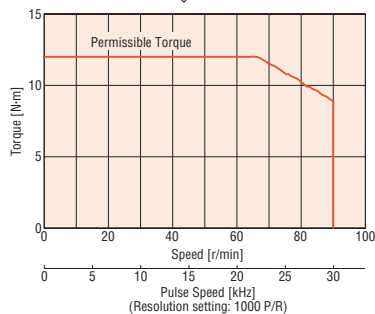
AR98□-T7.2-◇



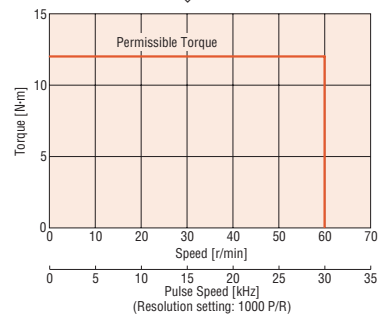
AR98□-T10-◇



AR98□-T20-◇



AR98□-T30-◇



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

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

Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.

Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

# PL Geared Type Motor Frame Size 42 mm

## Specifications RoHS



Model	Standard (Single shaft) Electromagnetic Brake	AR46A□-P5-◇	AR46A□-P7.2-◇	AR46A□-P10-◇	AR46A□-P25-◇	AR46A□-P36-◇	AR46A□-P50-◇
Maximum Holding Torque	N·m	1	1.5	2.5	3		
Rotor Inertia	J: kg·m <sup>2</sup>	$58 \times 10^{-7}$ [ $73 \times 10^{-7}$ ] <sup>*1</sup>					
Backlash	arc min (deg)	35 (0.584)					
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	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	1	1.5	2.5	3		
Voltage/Frequency		Single-Phase 100-115 VAC		-15~+10%	50/60 Hz		
		Single-Phase 200-230 VAC		-15~+10%	50/60 Hz		
		Three-Phase 200-230 VAC		-15~+10%	50/60 Hz		
Power Source	Maximum Input Current	Single-Phase 100-115 VAC	2.9				
		Single-Phase 200-230 VAC	1.9				
		Three-Phase 200-230 VAC	1				
Control Power Supply		24 VDC±5%		0.5 A			
Electromagnetic Brake <sup>*3</sup>	Type	Active when power is off					
	Power Supply Input	24 VDC±5% <sup>*2</sup>					
	Power Consumption W	2					
	Excitation Current A	0.08					
Static Friction Torque	N·m	0.5	0.75	1.25	1.5		
Mass	Motor	kg		0.63 [0.78] <sup>*1</sup>			0.75 [0.9] <sup>*1</sup>
	Driver	kg		0.75			
Dimension No. Driver		□3 □16 <sup>*1</sup>					
Cable		□1 □2					

How to read specifications table → Page 55

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

\*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC±4%.

\*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate power supply is required for the electromagnetic brakes.

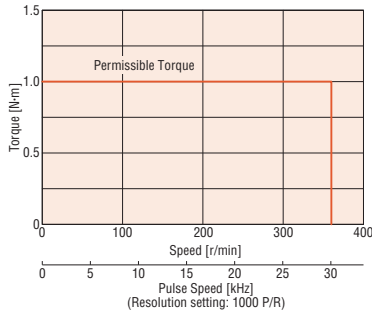
Note:

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

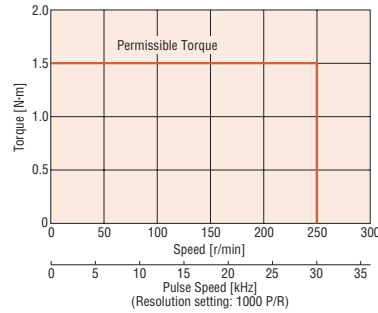
## Speed – Torque Characteristics

How to read speed – torque characteristics → Page 55

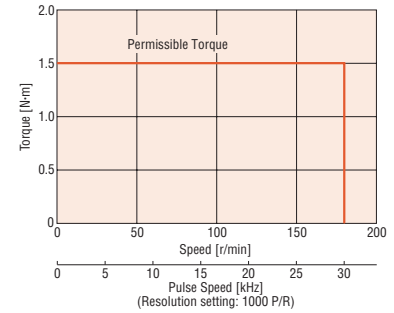
AR46□-P5-◇



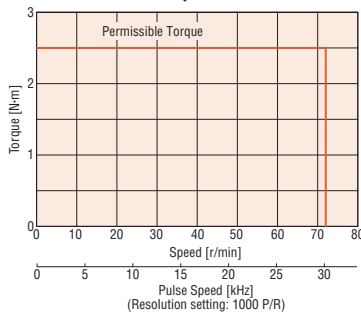
AR46□-P7.2-◇



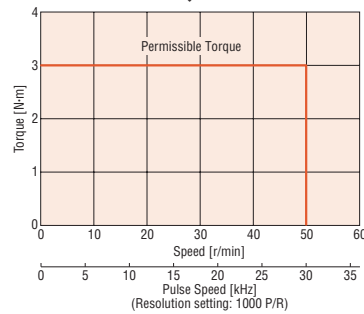
AR46□-P10-◇



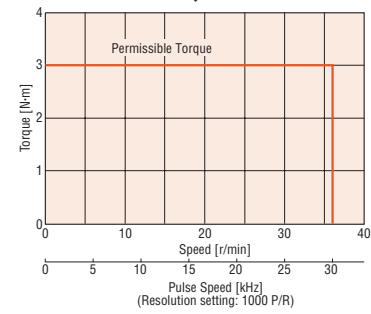
AR46□-P25-◇



AR46□-P36-◇



AR46□-P50-◇



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

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

Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.

Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

# PL Geared Type Motor Frame Size 60 mm

## Specifications RoHS



Model	Standard (Single shaft) Electromagnetic Brake	AR66A□-P5-◇	AR66A□-P7.2-◇	AR66A□-P10-◇	AR66A□-P25-◇	AR66A□-P36-◇	AR66A□-P50-◇
Model	Electromagnetic Brake	AR66M□-P5-◇	AR66M□-P7.2-◇	AR66M□-P10-◇	AR66M□-P25-◇	AR66M□-P36-◇	AR66M□-P50-◇
Maximum Holding Torque	N·m	3.5	4	5	8		
Rotor Inertia	J: kg·m <sup>2</sup>	380×10 <sup>-7</sup> [500×10 <sup>-7</sup> ]*1					
Backlash	arc min (deg)	20 (0.334)					
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	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		
Voltage/Frequency		Single-Phase 100-115 VAC -15~+10% 50/60 Hz					
		Single-Phase 200-230 VAC -15~+10% 50/60 Hz					
		Three-Phase 200-230 VAC -15~+10% 50/60 Hz					
Power Source	Maximum Input Current A	Single-Phase 100-115 VAC			4.4		
		Single-Phase 200-230 VAC			2.7		
		Three-Phase 200-230 VAC			1.4		
Control Power Supply		24 VDC±5% 0.5 A					
Electromagnetic Brake*3	Type	Active when power is off					
	Power Supply Input	24 VDC±5%*2					
	Power Consumption W	6					
	Excitation Current A	0.25					
Static Friction Torque	N·m	1.75	2	2.5	4		
	Motor kg	1.3 [1.6]*1			1.6 [1.9]*1		
Mass	Driver kg	0.75					
	Motor	[14] [17]*1					
Dimension No. Driver		[31]					
Cable		[32]					

How to read specifications table → Page 55

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

\*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC±4%.

\*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate power supply is required for the electromagnetic brakes.

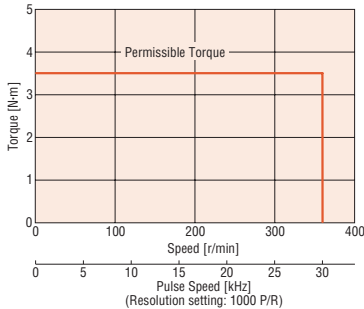
**Note:**

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

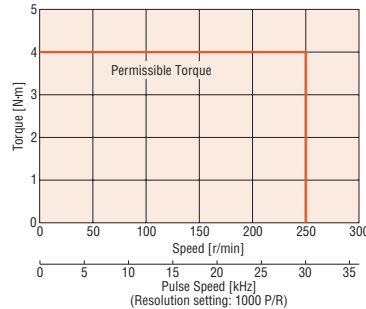
## Speed – Torque Characteristics

How to read speed – torque characteristics → Page 55

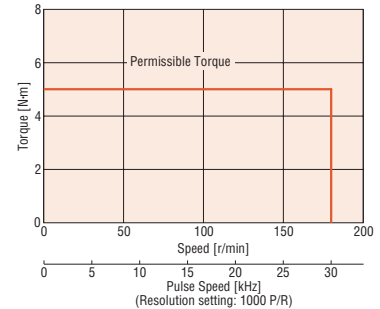
AR66□-P5-◇



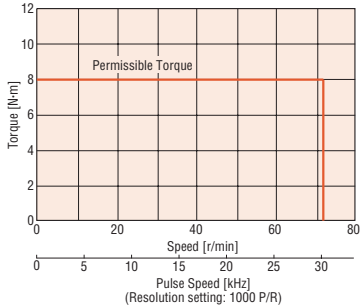
AR66□-P7.2-◇



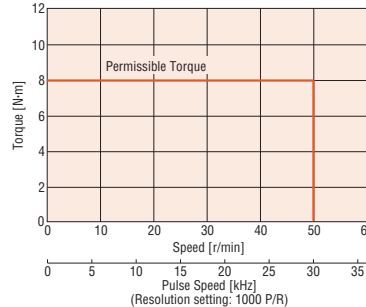
AR66□-P10-◇



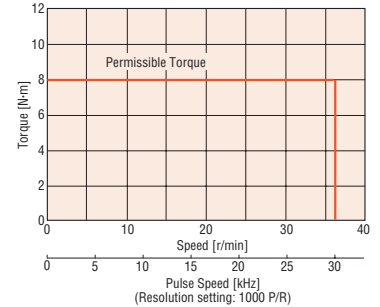
AR66□-P25-◇



AR66□-P36-◇



AR66□-P50-◇



**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.

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

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

Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.

Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

# PL Geared Type Motor Frame Size 90 mm

## Specifications RoHS



Model	Standard (Single shaft) Electromagnetic Brake	AR98A□-P5-◇	AR98A□-P7.2-◇	AR98A□-P10-◇	AR98A□-P25-◇	AR98A□-P36-◇	AR98A□-P50-◇	
Maximum Holding Torque	N·m	9	12.9	18	37			
Rotor Inertia	J: kg·m <sup>2</sup>	1100×10 <sup>-7</sup> [1220×10 <sup>-7</sup> ] <sup>*1</sup>						
Backlash	arc min (deg)	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	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			
Voltage/Frequency		Single-Phase 100-115 VAC					-15~+10%	50/60 Hz
		Single-Phase 200-230 VAC					-15~+10%	50/60 Hz
		Three-Phase 200-230 VAC					-15~+10%	50/60 Hz
Power Source	Maximum Input Current A	Single-Phase 100-115 VAC					5.5	
		Single-Phase 200-230 VAC					3.4	
		Three-Phase 200-230 VAC					1.8	
Control Power Supply		24 VDC±5%					0.5 A	
Electromagnetic Brake <sup>*3</sup>	Type	Active when power is off						
	Power Supply Input	24 VDC±5% <sup>*2</sup>						
	Power Consumption W	6						
	Excitation Current A	0.25						
Static Friction Torque	N·m	4.5	6.5	9	18.5			
Mass	Motor kg	3.3 [3.9] <sup>*1</sup>			4.1 [4.7] <sup>*1</sup>			
	Driver kg	0.75						
Dimension No. Driver		15 [18] <sup>*1</sup>						
Cable		31						

How to read specifications table → Page 55

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

\*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC±4%.

\*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate power supply is required for the electromagnetic brakes.

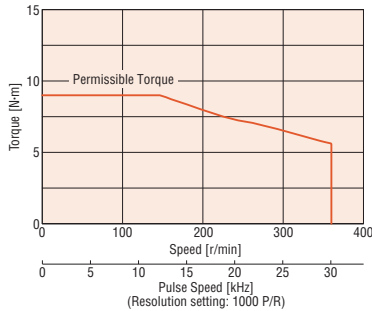
Note:

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

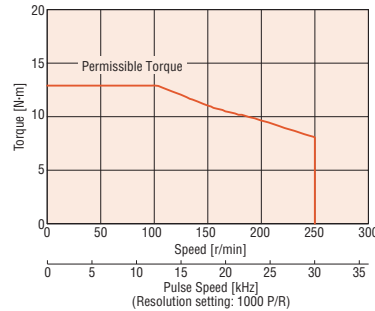
## Speed – Torque Characteristics

How to read speed – torque characteristics → Page 55

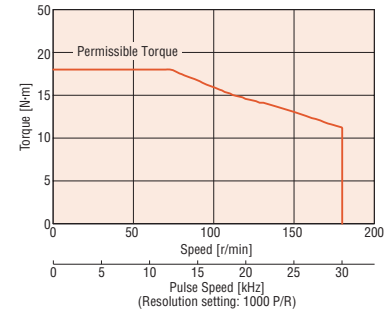
AR98□-P5-◇



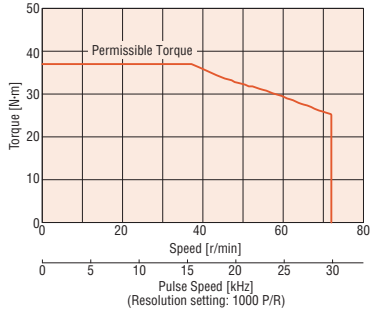
AR98□-P7.2-◇



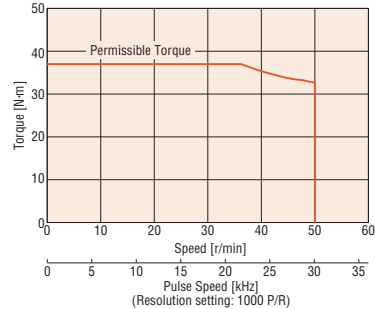
AR98□-P10-◇



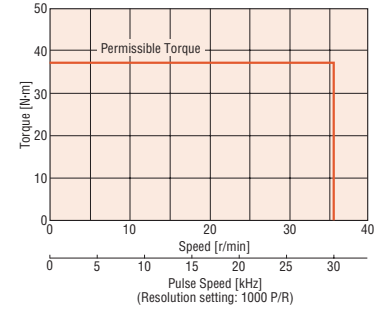
AR98□-P25-◇



AR98□-P36-◇



AR98□-P50-◇



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

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

Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.

Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

# PN Geared Type Motor Frame Size 42 mm

## Specifications RoHS



Model	Standard (Single shaft) Electromagnetic Brake	AR46A□-N5-◇ AR46M□-N5-◇	AR46A□-N7.2-◇ AR46M□-N7.2-◇	AR46A□-N10-◇ AR46M□-N10-◇
Maximum Holding Torque	N·m	1.35		1.5
Rotor Inertia	J: kg·m <sup>2</sup>	58×10 <sup>-7</sup> [73×10 <sup>-7</sup> ]*1		
Backlash	arc min (deg)	2 (0.0334)		
Angular Transmission Error	arc min (deg)	6 (0.1)		
Permissible Speed Range	r/min	0~600	0~416	0~300
Gear Ratio		1:5	1:7.2	1:10
Resolution	Resolution Setting: 1000 P/R	0.072°/Pulse	0.05°/Pulse	0.036°/Pulse
Permissible Torque	N·m	1.35		1.5
Maximum Torque*3	N·m	1.5		2
Voltage/Frequency		Single-Phase 100-115 VAC -15~+10% 50/60 Hz		
		Single-Phase 200-230 VAC -15~+10% 50/60 Hz		
		Three-Phase 200-230 VAC -15~+10% 50/60 Hz		
Power Source	Maximum Input Current A	2.9		
		1.9		
		1		
Control Power Supply		24 VDC±5% 0.5 A		
Electromagnetic Brake*4	Type	Active when power is off		
	Power Supply Input	24 VDC±5%*2		
	Power Consumption W	2		
	Excitation Current A	0.08		
Static Friction Torque	N·m	0.68		0.75
Mass	Motor kg	0.73 [0.88]*1		
	Driver kg	0.75		
Dimension No. Driver	Motor	19 [22]*1		
	Cable	31		
	Cable	32		

How to read specifications table → Page 55

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

\*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC±4%.

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

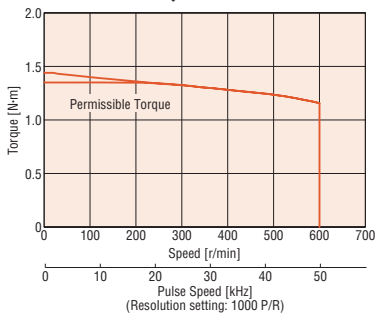
\*4 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate power supply is required for the electromagnetic brakes.

Note:

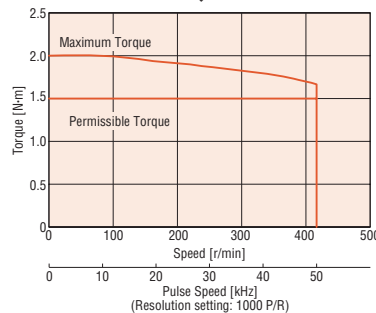
- Direction of rotation of the motor shaft and that of the gear output shaft are the same.

## Speed – Torque Characteristics How to read speed – torque characteristics → Page 55

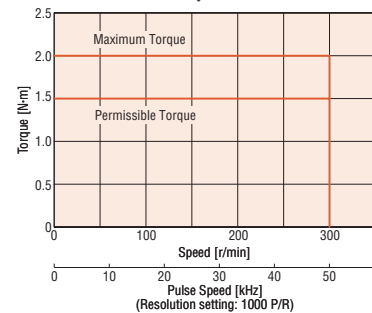
AR46□-N5-◇



AR46□-N7.2-◇



AR46□-N10-◇



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

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

Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.

Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.



# PN Geared Type Motor Frame Size 60 mm

## Specifications RoHS



Model	Standard (Single shaft) Electromagnetic Brake	AR66A□-N5-◇ AR66M□-N5-◇	AR66A□-N7.2-◇ AR66M□-N7.2-◇	AR66A□-N10-◇ AR66M□-N10-◇	AR66A□-N25-◇ AR66M□-N25-◇	AR66A□-N36-◇ AR66M□-N36-◇	AR66A□-N50-◇ AR66M□-N50-◇
Maximum Holding Torque	N·m	3.5	4	5	8		
Rotor Inertia	J: kg·m <sup>2</sup>	380×10 <sup>-7</sup> [500×10 <sup>-7</sup> ]*1					
Backlash	arc min (deg)	2 (0.034°)			3 (0.05°)		
Angular Transmission Error	arc min (deg)	5 (0.0834°)					
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	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 100-115 VAC -15~+10% 50/60 Hz					
		Single-Phase 200-230 VAC -15~+10% 50/60 Hz					
		Three-Phase 200-230 VAC -15~+10% 50/60 Hz					
Control Power Supply	Maximum Input Current A	Single-Phase 100-115 VAC 4.4					
		Single-Phase 200-230 VAC 2.7					
		Three-Phase 200-230 VAC 1.4					
Electromagnetic Brake*4	Type	Active when power is off					
	Power Supply Input	24 VDC±5%*2					
	Power Consumption W	6					
Static Friction Torque	Excitation Current A	0.25					
	N·m	1.75	2	2.5	4		
Mass	Motor kg	1.5 [1.8]*1			1.73 [2]*1		
	Driver kg	0.75					
Dimension No.	Motor	20 [23]*1					
	Driver	31					
	Cable	32					

How to read specifications table → Page 55

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

\*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC±4%.

\*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 power supply is required for the electromagnetic brakes.

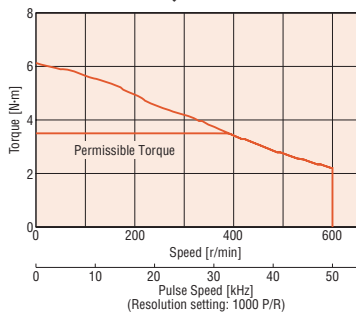
**Note:**

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

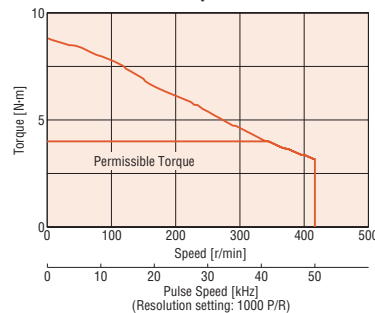
## Speed – Torque Characteristics

How to read speed – torque characteristics → Page 55

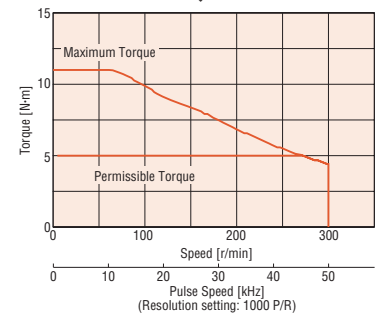
AR66□-N5-◇



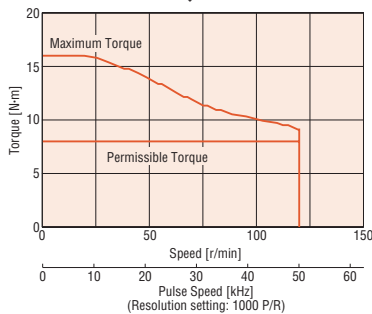
AR66□-N7.2-◇



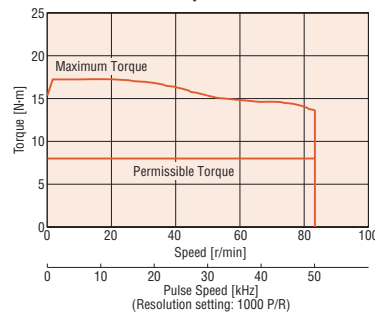
AR66□-N10-◇



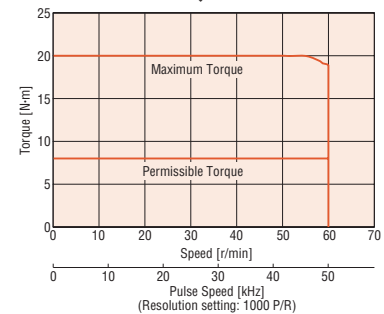
AR66□-N25-◇



AR66□-N36-◇



AR66□-N50-◇



**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.
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.
- Enter **A** (single shaft) or **M** (electromagnetic brake) in the box (□) within the model name.  
Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (<>) within the model name.

Features  
Lineup  
System Configuration  
Safety Standards and CE Marking  
Product Line  
Specifications and Characteristics  
Dimensions  
Connection and Operation  
List of Motor and Driver Combinations  
Extended Functions  
How to Read Specifications and Characteristics  
Accessories  
Installation  
Controller

# PN Geared Type Motor Frame Size 90 mm

## Specifications RoHS



Model	Standard (Single shaft) Electromagnetic Brake	AR98A□-N5-◇	AR98A□-N7.2-◇	AR98A□-N10-◇	AR98A□-N25-◇	AR98A□-N36-◇	AR98A□-N50-◇
Maximum Holding Torque	N·m	10	14	20	37		
Rotor Inertia	J: kg·m <sup>2</sup>	1100×10 <sup>-7</sup> [1220×10 <sup>-7</sup> ]*1					
Backlash	arc min (deg)	2 (0.034)				3 (0.05)	
Angular Transmission Error	arc min (deg)	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	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 100-115 VAC -15~+10% 50/60 Hz					
		Single-Phase 200-230 VAC -15~+10% 50/60 Hz					
		Three-Phase 200-230 VAC -15~+10% 50/60 Hz					
Maximum Input Current A	Single-Phase 100-115 VAC	5.5					
	Single-Phase 200-230 VAC	3.4					
	Three-Phase 200-230 VAC	1.8					
Control Power Supply		24 VDC±5% 0.5 A					
Electromagnetic Brake*4	Type	Active when power is off					
	Power Supply Input	24 VDC±5%*2					
	Power Consumption W	6					
	Excitation Current A	0.25					
Static Friction Torque	N·m	4.5	6.5	9	18.5		
Mass	Motor kg	3.8 [4.4]*1				4.5 [5.1]*1	
	Driver kg	0.75					
Dimension No.	Motor	21 [24]*1					
	Driver	31					
	Cable	32					

How to read specifications table → Page 55

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

\*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC±4%.

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

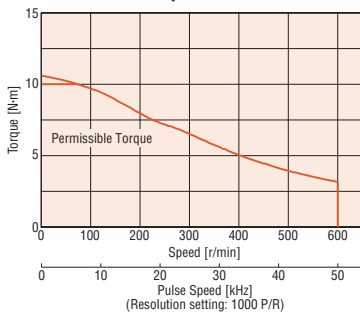
\*4 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate power supply is required for the electromagnetic brakes.

### Note:

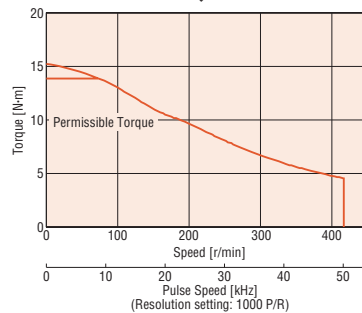
- Direction of rotation of the motor shaft and that of the gear output shaft are the same.

## Speed – Torque Characteristics How to read speed – torque characteristics → Page 55

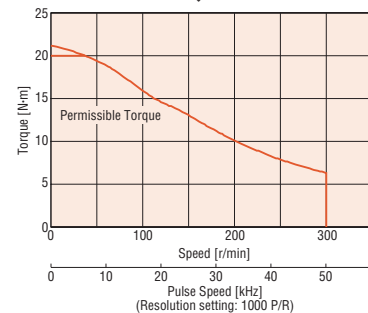
AR98□-N5-◇



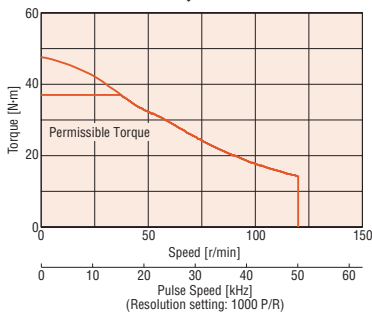
AR98□-N7.2-◇



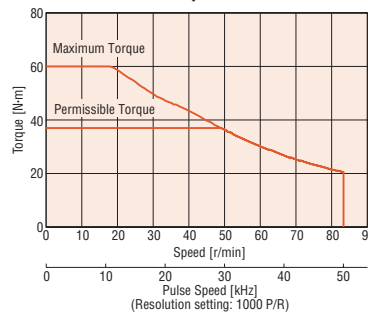
AR98□-N10-◇



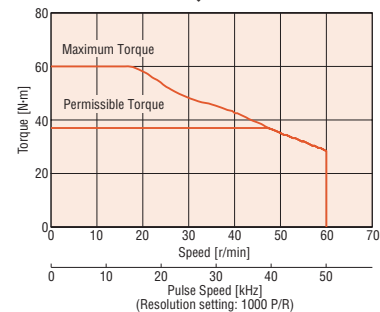
AR98□-N25-◇



AR98□-N36-◇



AR98□-N50-◇



### 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.
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.
- Enter **A** (single shaft) or **M** (electromagnetic brake) in the box (□) within the model name.  
Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

# Harmonic Geared Type Motor Frame Size 42 mm, 60 mm, 90 mm

## Specifications RoHS



Model	Standard (Single shaft) Electromagnetic Brake	AR46A□-H50◇	AR46A□-H100◇	AR66A□-H50◇	AR66A□-H100◇	AR98A□-H50◇	AR98A□-H100◇
		AR46M□-H50◇	AR46M□-H100◇	AR66M□-H50◇	AR66M□-H100◇	AR98M□-H50◇	AR98M□-H100◇
Maximum Holding Torque	N·m	3.5	5	5.5	8	25	37
Rotor Inertia	J: kg·m <sup>2</sup>	75×10 <sup>-7</sup> [90×10 <sup>-7</sup> ]*1		415×10 <sup>-7</sup> [535×10 <sup>-7</sup> ]*1		1300×10 <sup>-7</sup> [1420×10 <sup>-7</sup> ]*1	
Permissible Speed Range	r/min	0~70		0~35		0~70	
Gear Ratio		1:50		1:100		1:50	
Resolution	Resolution Setting: 1000 P/R	0.0072°/Pulse		0.0036°/Pulse		0.0072°/Pulse	
Permissible Torque	N·m	3.5	5	5.5	8	25	37
Maximum Torque	N·m	8.3	11	18	28	35	55
Lost Motion (Load torque)	arc min	1.5 max. (±0.16 N·m)		1.5 max. (±0.2 N·m)		0.7 max. (±0.28 N·m)	
Power Source	Voltage/Frequency	Single-Phase 100-115 VAC -15~+10% 50/60 Hz					
		Single-Phase 200-230 VAC -15~+10% 50/60 Hz					
		Three-Phase 200-230 VAC -15~+10% 50/60 Hz					
Maximum Input Current A	Single-Phase 100-115 VAC	2.9		4.4		5.5	
	Single-Phase 200-230 VAC	1.9		2.7		3.4	
	Three-Phase 200-230 VAC	1		1.4		1.8	
Control Power Supply		24 VDC±5% 0.5 A					
Electromagnetic Brake*3	Type	Active when power is off					
	Power Supply Input	24 VDC±5%*2					
	Power Consumption W	2		6			
Static Friction Torque	N·m	1.75		2.5		2.8	
		2.5		4		12.5	
Mass	Motor kg	0.68 [0.83]*1		1.41 [1.71]*1		4 [4.6]*1	
	Driver kg	0.75					
Dimension No.	Motor	25 [28]*1		26 [29]*1		27 [30]*1	
	Driver	31					
	Cable	32					

How to read specifications table → Page 55

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

\*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC±4%.

\*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate power supply is required for the electromagnetic brakes.

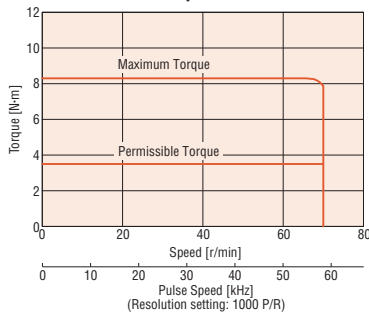
### Note:

- 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.

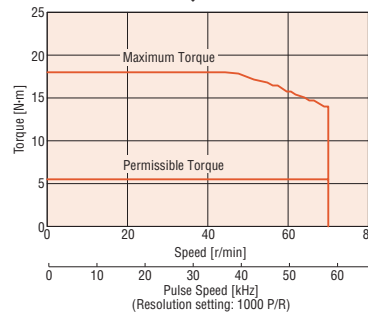
## Speed – Torque Characteristics

How to read speed – torque characteristics → Page 55

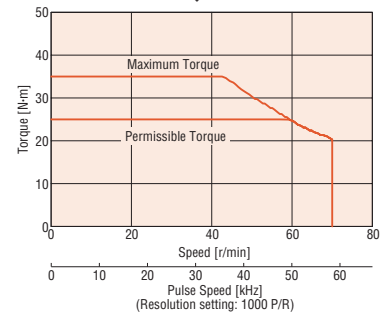
AR46□-H50◇



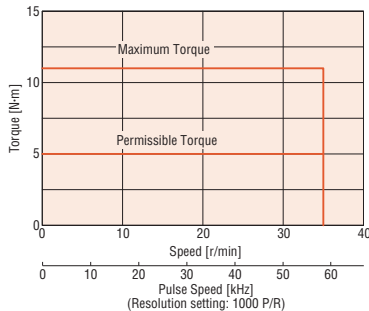
AR66□-H50◇



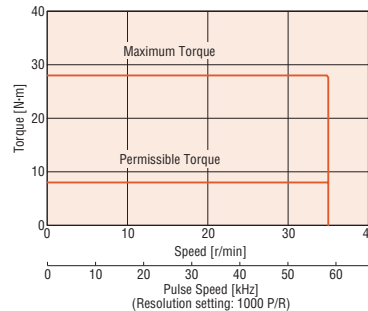
AR98□-H50◇



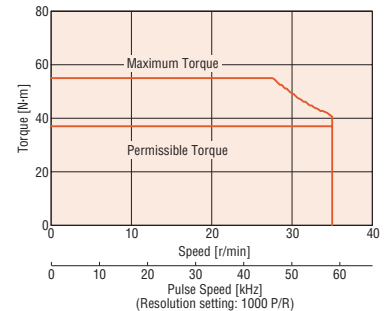
AR46□-H100◇



AR66□-H100◇



AR98□-H100◇



### 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.
- 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%.
- Enter **A** (single shaft) or **M** (electromagnetic brake) in the box (□) within the model name.  
Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

## Driver Specifications

Speed and Positioning Control Command	Pulse input
Maximum Input Pulse Frequency	When the host controller is line driver output: 500 kHz (When the pulse duty is 50%) When the host controller is open-collector output: 250 kHz (When the pulse duty is 50%)*
Protective Functions	When the following protective functions are activated, an alarm signal is output and the motor stops automatically. Overheat, Overload, Overspeed, Command pulse error, Regeneration unit overheat, Overvoltage protection, Main power supply error, Undervoltage, Excessive position deviation error at current on, Excessive position deviation error at current off, Overcurrent protection, Drive circuit error, Operation data error, Electronic gear setting error, Sensor error during operation, Initial sensor error, Initial rotor rotation error, Motor combination error, EEPROM error
Input Signals	Photocoupler input Input resistance: 3 kΩ Input signal voltage: 4.75 to 26.4 V (C-ON, FREE, CS, RETURN, P-RESET, CLR/ALM-RST, CCM, M0, M1, M2) Photocoupler input Input resistance: 200 Ω Input signal voltage: 3 to 5.25 V (CW/PLS, CCW/DIR) Photocoupler input Input resistance: 2.7 kΩ Input signal voltage: 21.6 to 26.4 V (CW24V/PLS24V, CCW24V/DIR24V)
Output Signals	Photocoupler, Open-collector output External use condition: 30 VDC maximum, 10 mA maximum (READY, TLC, END, TIM2, WNG, ALM) Line driver output External use condition: Connect a terminal resistor of 100 Ω or more between the driver and the input of the line receiver. (TIM1, ASG, BSG)
Other Functions	<ul style="list-style-type: none"> <li>Motor resolution setting function (4 levels) · Current setting function (16 levels) · Velocity filter function (16 levels)</li> <li>Pulse input setting function (1-pulse input, 2-pulse input) · Current control mode function</li> </ul>
Extended Functions (When the control module <b>(OPX-2A)</b> or data setting software <b>(MEXE02)</b> (both sold separately) is used)	<ul style="list-style-type: none"> <li>Push-motion operation function (8 current levels; desired levels can be set within a range of 0 to 100%)</li> <li>Motor resolution setting function (electronic gear)</li> <li>Alarm code output function (3 bits) · Current setting function (16 levels; desired levels can be set within a range of 0 to 100%)</li> <li>Velocity filter function (16 levels; desired levels can be set within a range of 0 to 200 ms) · Current ON (C-ON) signal logic setting function</li> <li>Positioning completion (END) signal width setting function · Positioning completion (END) signal offset setting function</li> <li>Standstill current setting function · Return operation setting function (starting speed, acceleration/deceleration time, operating speed)</li> <li>JOG operation · Setting function (starting speed, acceleration/deceleration time, operating speed)</li> <li><b>OPX-2A</b> display setting function (gear output shaft speed, speed code display, setting change prohibition)</li> <li>Pulse input setting function (2-pulse, 1-pulse, logical, phase difference, multiplication)</li> <li>Smooth drive cancellation · Motor excitation position setting function at power ON</li> <li>Excitation position reset operation function at current ON · Motor direction setting function</li> <li>Warning output setting function (excessive position deviation, overheat, overvoltage, main power, undervoltage, overload, overspeed, operation data error, electronic gear setting error)</li> </ul>

\* Value applies when an accessory driver cable general-purpose type **(CC36D1-1)** is used. **Driver cable general-purpose type** → Page 60

## General Specifications

Specifications	Motor	Driver
Insulation Class	Class B (130°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: · PE terminal – Power supply terminal · Signal I/O terminal – Power supply 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 1.5 kV 50 Hz or 60 Hz	Sufficient to withstand the following for 1 minute: · PE terminal – Power supply terminal 1.8 kV 50 Hz or 60 Hz · Signal I/O terminal – Power supply terminal 1.5 kV 50 Hz or 60 Hz
Operating Environment (In operation)	Ambient Temperature –10~+50°C (non-freezing)*1: Standard type, <b>TH, PL, PN</b> geared type 0~+40°C (non-freezing)*1: Harmonic geared type	0~+50°C (non-freezing)*2
	Ambient Humidity	85% or less (non-condensing)
	Atmosphere	No corrosive gases, dust, water or oil
Degree of Protection	Standard type (Single shaft), Geared type: IP54 (Excluding the mounting surface and connector) Standard type (Double shaft): IP20	IP20
Stop Position Accuracy	<b>AR46</b> : ±4 arc minutes (±0.067°) <b>AR66, AR69, AR98, AR911</b> : ±3 arc minutes (±0.05°)	
Shaft Runout	0.05 T.I.R. (mm)*3	—
Concentricity	0.075 T.I.R. (mm)*3	—
Perpendicularity	0.075 T.I.R. (mm)*3	—

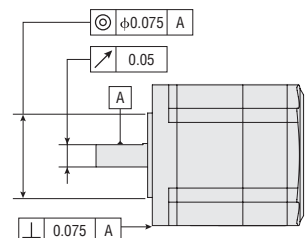
\*1 When a heat sink of a capacity at least equivalent to an aluminum plate with a size of 250×250 mm, 6 mm thick is installed.

\*2 When a heat sink of a capacity at least equivalent to an aluminum plate with a size of 200×200 mm, 2 mm thick is installed.

\*3 T.I.R. (Total Indicator Reading): The total dial gauge reading when the measurement section is rotated one revolution centered on the reference axis center.

### Note:

● Do not measure insulation resistance or perform the dielectric strength test while the motor and driver are connected.



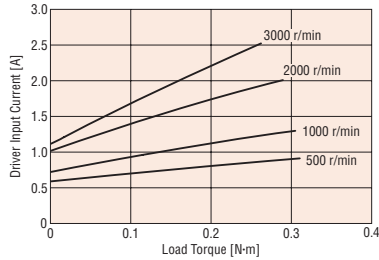
## Load Torque – Driver Input Current Characteristics

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

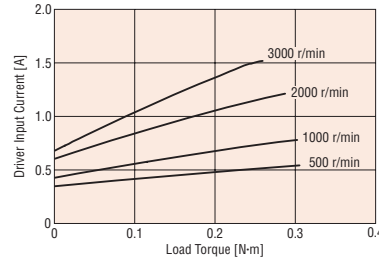
$$\text{Motor shaft speed} = \text{Gear output shaft speed} \times \text{Gear ratio [r/min]}$$

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

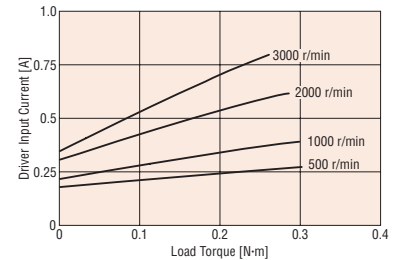
**AR46□A**



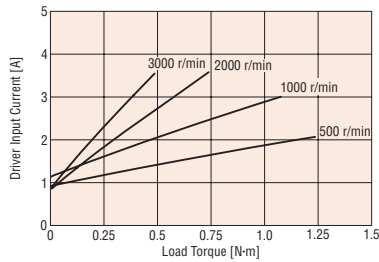
**AR46□C**



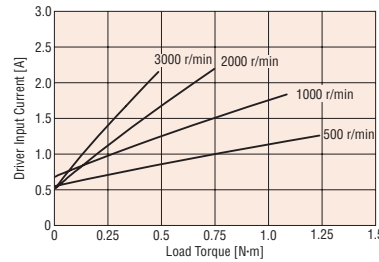
**AR46□S**



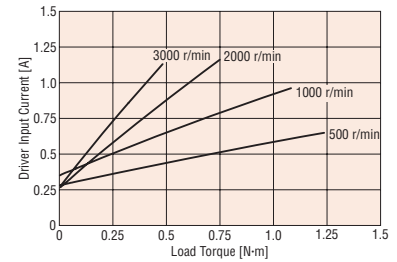
**AR66□A**



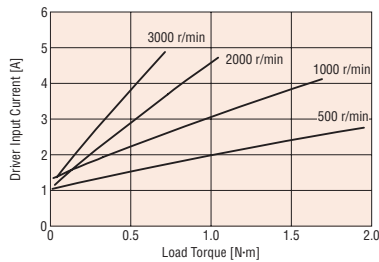
**AR66□C**



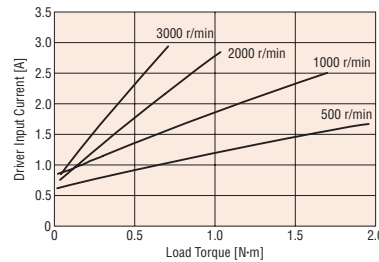
**AR66□S**



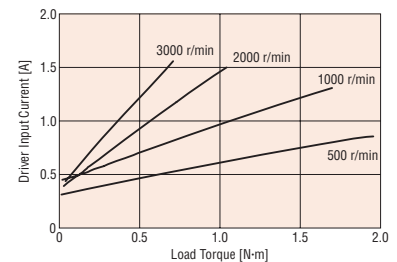
**AR69□A**



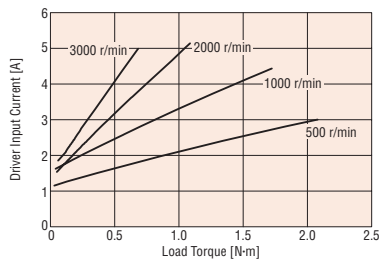
**AR69□C**



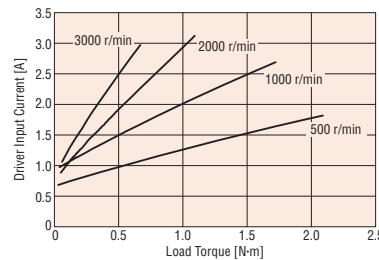
**AR69□S**



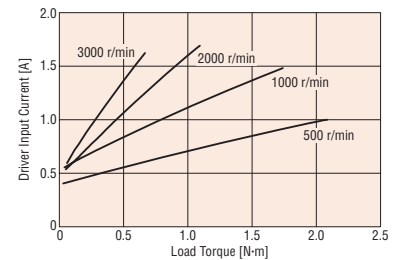
**AR98□A**



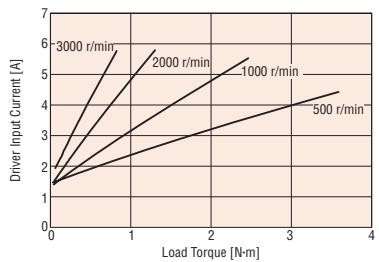
**AR98□C**



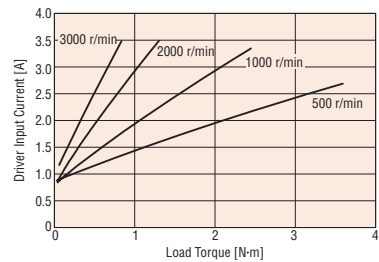
**AR98□S**



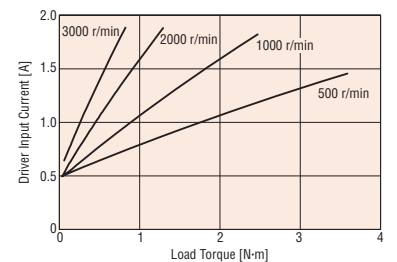
**AR911□A**



**AR911□C**



**AR911□S**



**Common to Each Type**

**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	AR46A □-◇ AR46B □-◇*	-	35	44	58	85	-	4.6
	6.1							
	AR66A □-◇ AR66B □-◇*		90	100	130	180	270	8.8
	AR66M □-◇							11.8
	AR69A □-◇ AR69B □-◇*							13.7
	AR69M □-◇		260	290	340	390	480	16.7
	AR98A □-◇ AR98B □-◇*							18
	AR98M □-◇							24
	AR911A □-◇ AR911B □-◇*							29
	TH Geared Type		AR46 □-T □-◇ AR66 □-T □-◇ AR98 □-T □-◇	3.6, 7.2, 10, 20, 30	10	14	20	30
70		80	100		120	150	40	
220		250	300		350	400	100	
PL Geared Type	AR46 □-P □-◇ AR46 □-P □-◇	5, 7.2, 10 25, 36, 50	73	84	100	123	-	50
	AR66 □-P5-◇		109	127	150	184	-	
	AR66 □-P □-◇ AR66 □-P □-◇	7.2, 10 25, 36, 50	200	220	250	280	320	100
	AR66 □-P □-◇		250	270	300	340	390	
	AR98 □-P □-◇ AR98 □-P25-◇	5, 7.2, 10 -	480	540	600	680	790	300
	AR98 □-P36-◇		850	940	1050	1190	1380	
	AR98 □-P50-◇	-	930	1030	1150	1310	1520	100
	AR46 □-N □-◇ AR66 □-N5-◇ AR66 □-N □-◇	5, 7.2, 10 -	100	120	150	190	-	
	AR66 □-N □-◇		200	220	250	280	320	
	PN Geared Type	AR66 □-N □-◇ AR66 □-N □-◇	7.2, 10 25, 36, 50	250	270	300	340	390
AR66 □-N □-◇		330		360	400	450	520	
AR98 □-N5-◇ AR98 □-N □-◇		7.2, 10 -	480	520	550	580	620	300
AR98 □-N □-◇			480	540	600	680	790	
AR98 □-N25-◇ AR98 □-N36-◇ AR98 □-N50-◇		- - -	850	940	1050	1110	1190	
AR98 □-N □-◇		-	930	1030	1150	1220	1300	
AR98 □-N □-◇		-	1050	1160	1300	1380	1490	
Harmonic Geared Type	AR46 □-H □-◇ AR66 □-H □-◇ AR98 □-H □-◇	50, 100	180	220	270	360	510	220
	320		370	440	550	720	450	
	1090		1150	1230	1310	1410	1300	

\*With a double shaft model, the output shaft located on the opposite side of the motor output shaft is used to install the slit disk. Do not apply any load torque, overhung load or thrust load on this output shaft.

● Enter **A** (single shaft) or **M** (electromagnetic brake) in the box (□) within the model name.  
 Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
 Enter the gear ratio in the box (■) within the model name.  
 Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

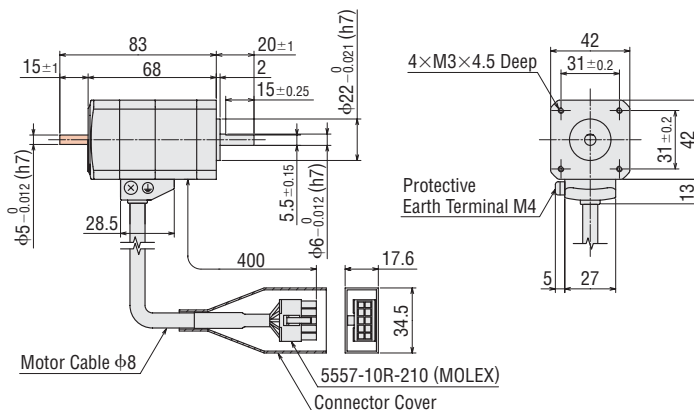
## Dimensions (Unit = mm)

### Motor

#### Standard Type

##### 1 □42 mm

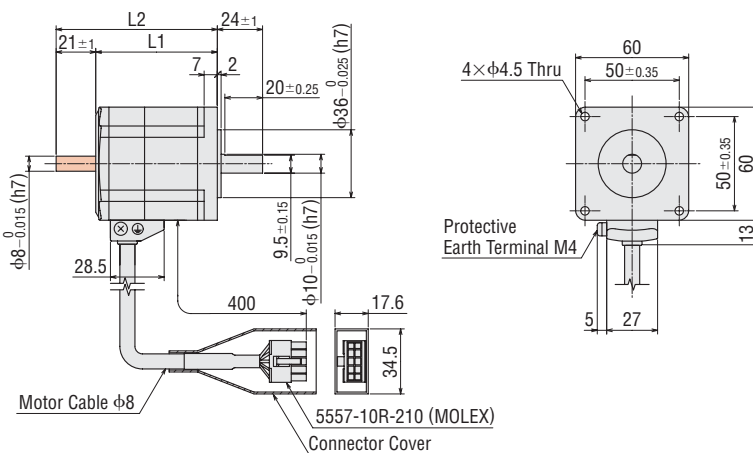
Model	Motor Model	Mass kg
<b>AR46A</b> □-◇	ARM46AC	0.47
<b>AR46B</b> □-◇	ARM46BC	



● These dimensions are for double shaft models. For single shaft models, ignore the shaded ( ) areas.

##### 2 □60 mm

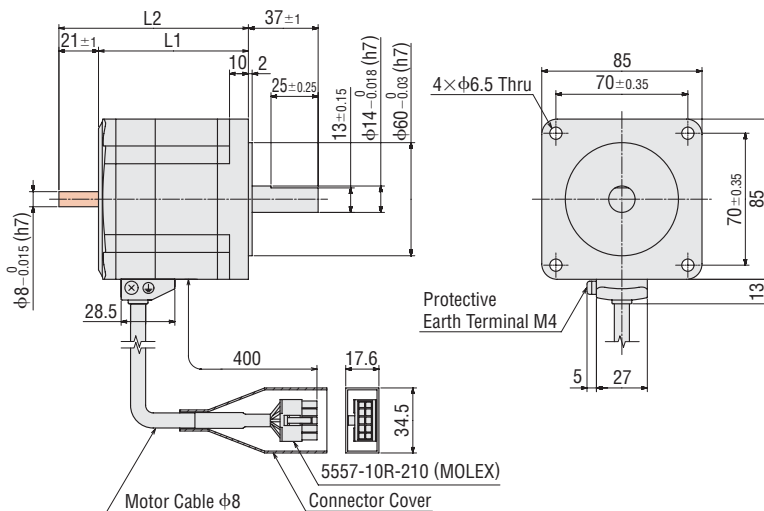
Model	Motor Model	L1	L2	Mass kg
<b>AR66A</b> □-◇	ARM66AC	64.5	-	0.9
<b>AR66B</b> □-◇	ARM66BC		85.5	
<b>AR69A</b> □-◇	ARM69AC	90	-	1.4
<b>AR69B</b> □-◇	ARM69BC		111	



● These dimensions are for double shaft models. For single shaft models, ignore the shaded ( ) areas.

##### 3 □85 mm

Model	Motor Model	L1	L2	Mass kg
<b>AR98A</b> □-◇	ARM98AC	79.5	-	1.9
<b>AR98B</b> □-◇	ARM98BC		100.5	
<b>AR911A</b> □-◇	ARM911AC	109.5	-	3.0
<b>AR911B</b> □-◇	ARM911BC		130.5	



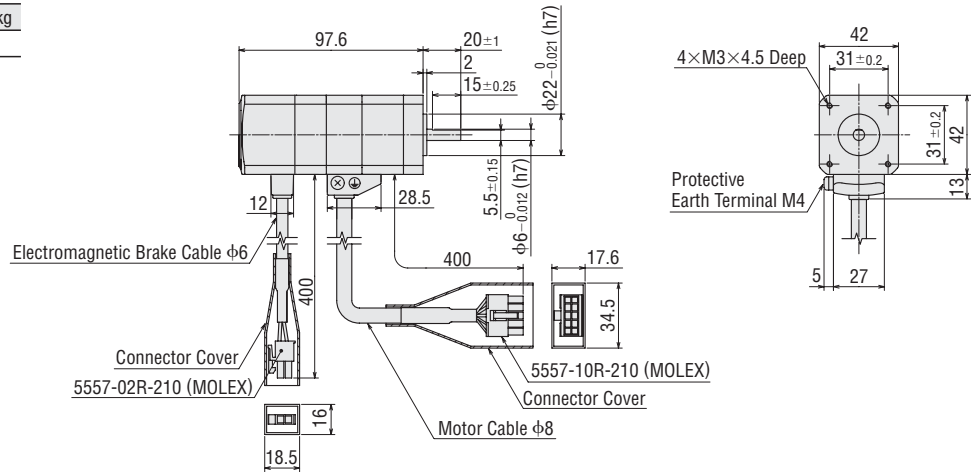
● These dimensions are for double shaft models. For single shaft models, ignore the shaded ( ) areas.

● Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

◆ Standard Type with Electromagnetic Brake

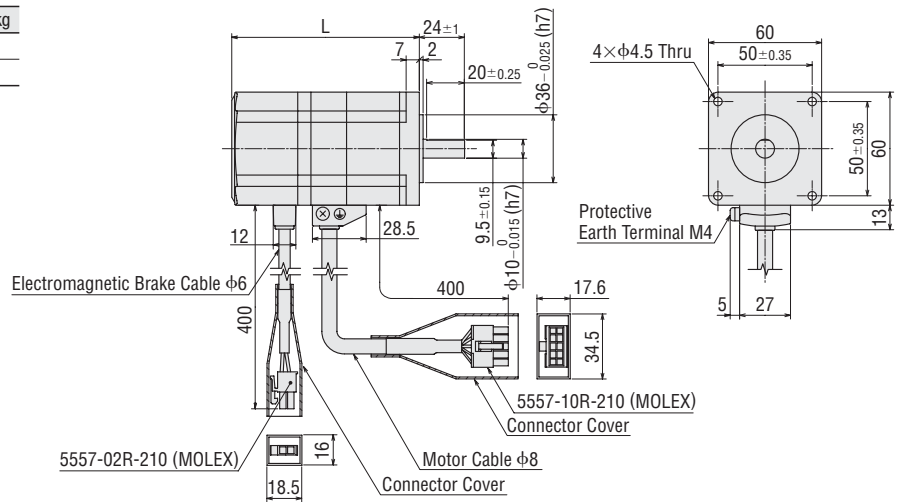
4 □ 42 mm

Model	Motor Model	Mass kg
<b>AR46M</b> □ ◇	ARM46MC	0.62



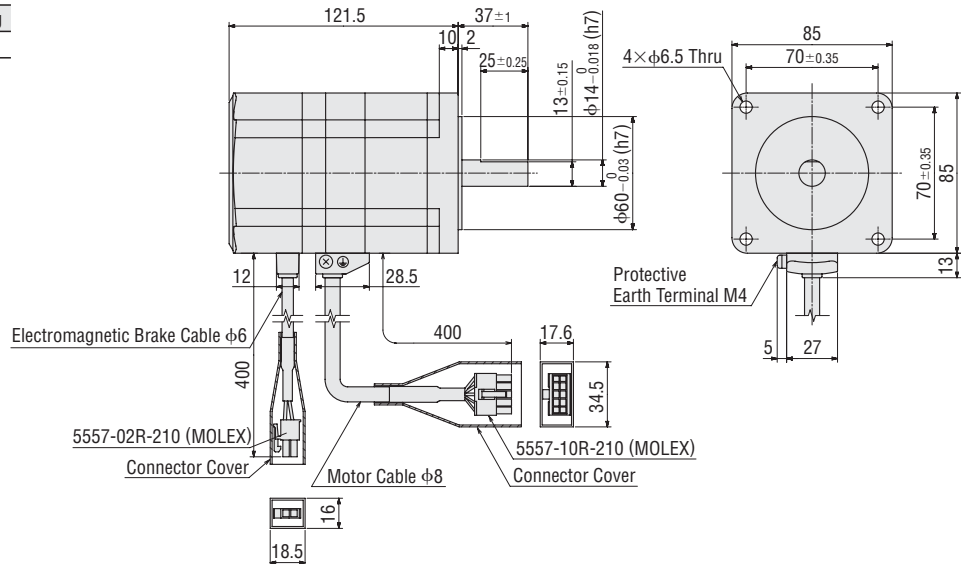
5 □ 60 mm

Model	Motor Model	L	Mass kg
<b>AR66M</b> □ ◇	ARM66MC	99.5	1.2
<b>AR69M</b> □ ◇	ARM69MC	125	1.7



6 □ 85 mm

Model	Motor Model	Mass kg
<b>AR98M</b> □ ◇	ARM98MC	2.5



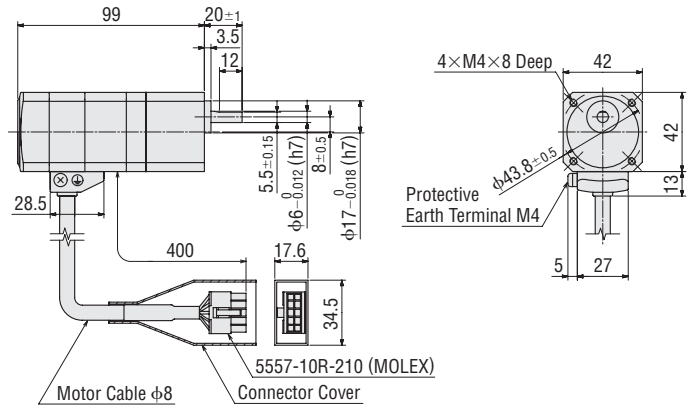
● Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
 Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.



◇ TH Geared Type

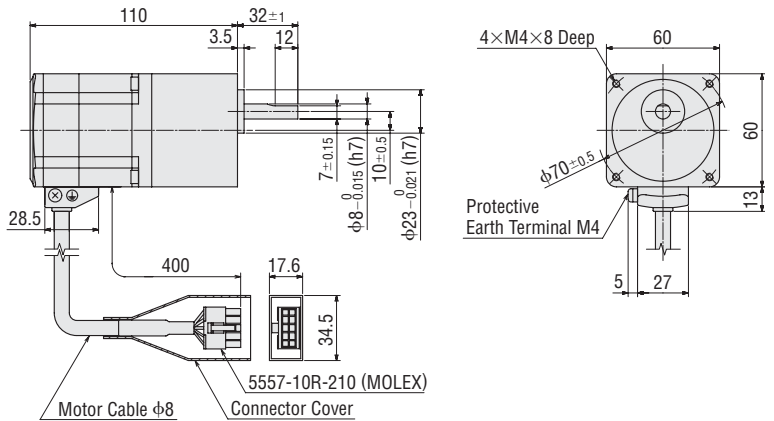
7 □ 42 mm

Model	Motor Model	Gear Ratio	Mass kg
AR46A □ -T □ -◇	ARM46AC-T □	<b>3.6, 7.2, 10, 20, 30</b>	0.62



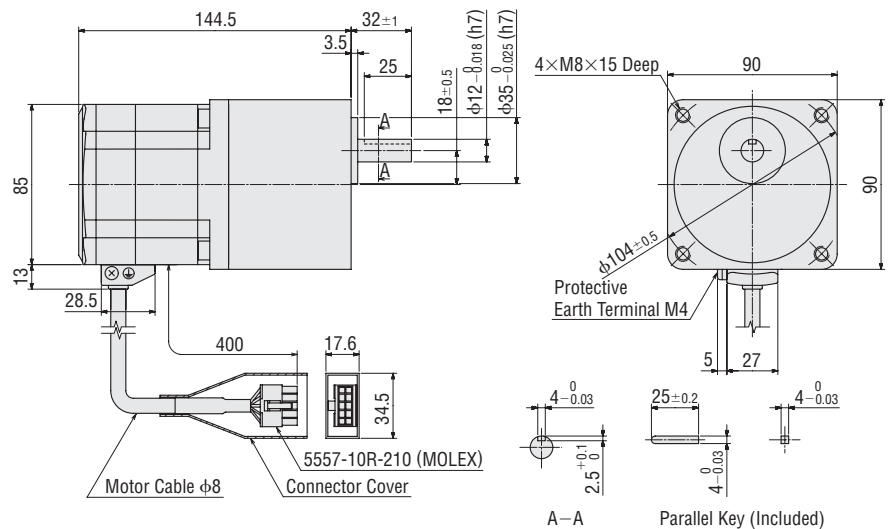
8 □ 60 mm

Model	Motor Model	Gear Ratio	Mass kg
AR66A □ -T □ -◇	ARM66AC-T □	<b>3.6, 7.2, 10, 20, 30</b>	1.3



9 □ 90 mm

Model	Motor Model	Gear Ratio	Mass kg
AR98A □ -T □ -◇	ARM98AC-T □	<b>3.6, 7.2, 10, 20, 30</b>	3.1



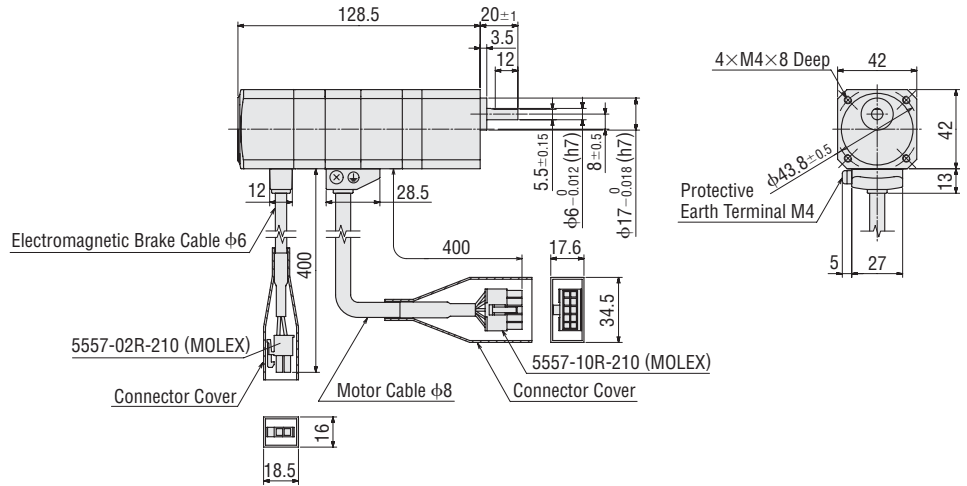
● Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
 Enter the gear ratio in the box (■) within the model name.  
 Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

Features  
 Lineup  
 System Configuration  
 Safety Standards and CE Marking  
 Product Line  
 Specifications and Characteristics  
 Dimensions  
 Connection and Operation  
 List of Motor and Driver Combinations  
 Extended Functions  
 How to Read Specifications and Characteristics  
 Accessories  
 Installation  
 Controller

◆ TH Geared Type with Electromagnetic Brake

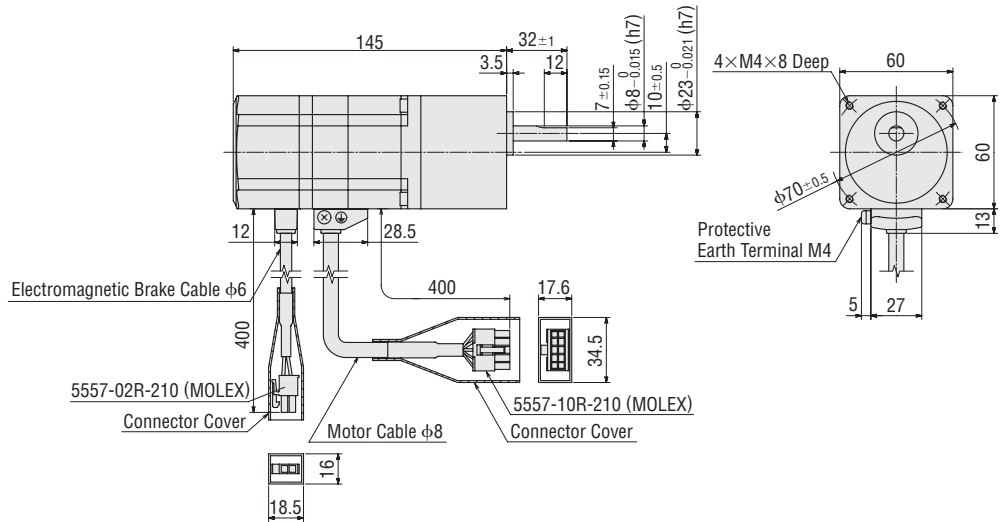
10 □ 42 mm

Model	Motor Model	Gear Ratio	Mass kg
<b>AR46M</b> □-T □-◇	ARM46MC-T □	<b>3.6, 7.2, 10, 20, 30</b>	0.77



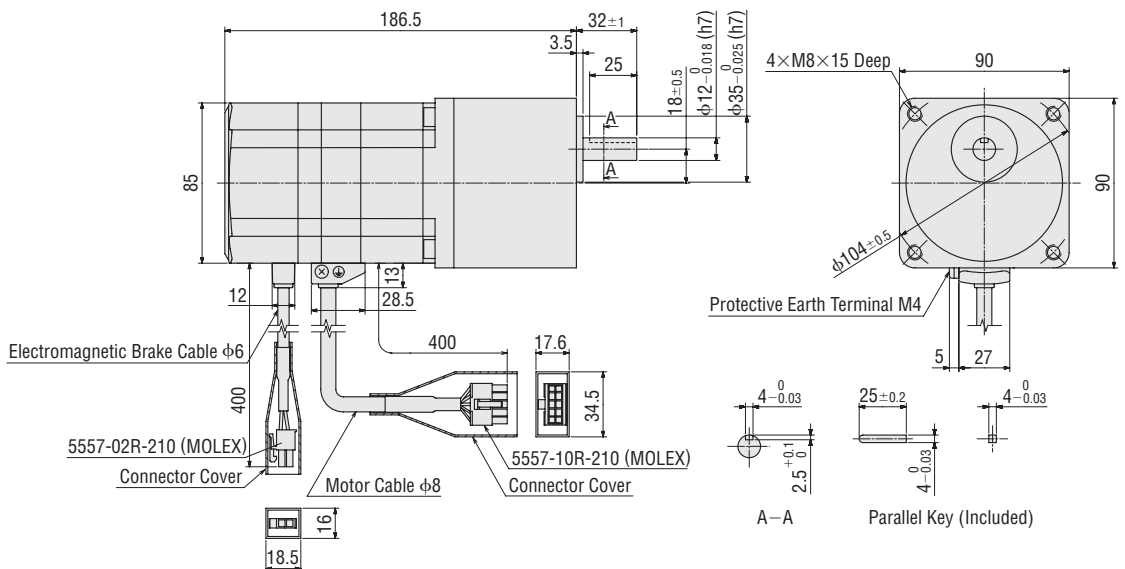
11 □ 60 mm

Model	Motor Model	Gear Ratio	Mass kg
<b>AR66M</b> □-T □-◇	ARM66MC-T □	<b>3.6, 7.2, 10, 20, 30</b>	1.6



12 □ 90 mm

Model	Motor Model	Gear Ratio	Mass kg
<b>AR98M</b> □-T □-◇	ARM98MC-T □	<b>3.6, 7.2, 10, 20, 30</b>	3.7

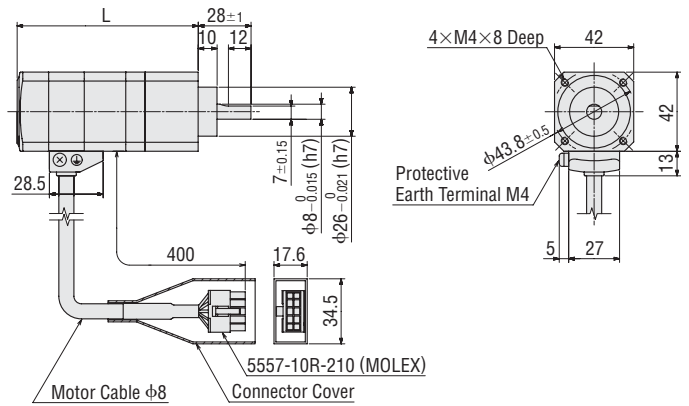


- Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.
- Enter the gear ratio in the box (■) within the model name.
- Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

◇ PL Geared Type

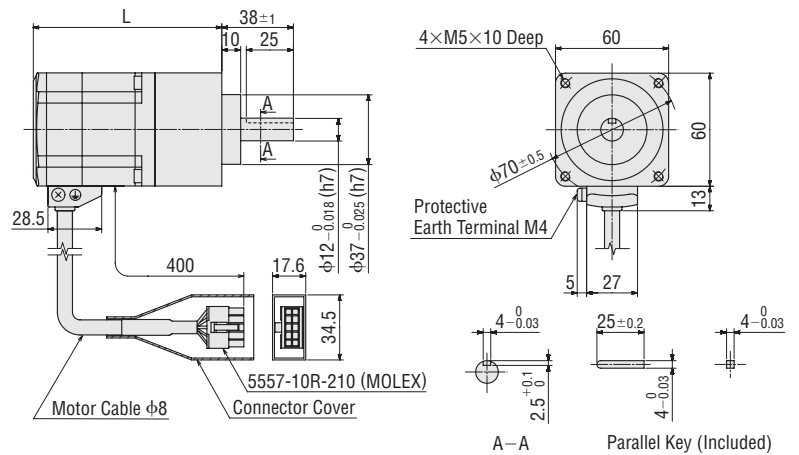
13 □ 42 mm

Model	Motor Model	Gear Ratio	L	Mass kg
<b>AR46A</b> □ -P □ -◇	ARM46AC-P □	<b>5, 7, 2, 10</b>	96	0.63
		<b>25, 36, 50</b>	119.5	0.75



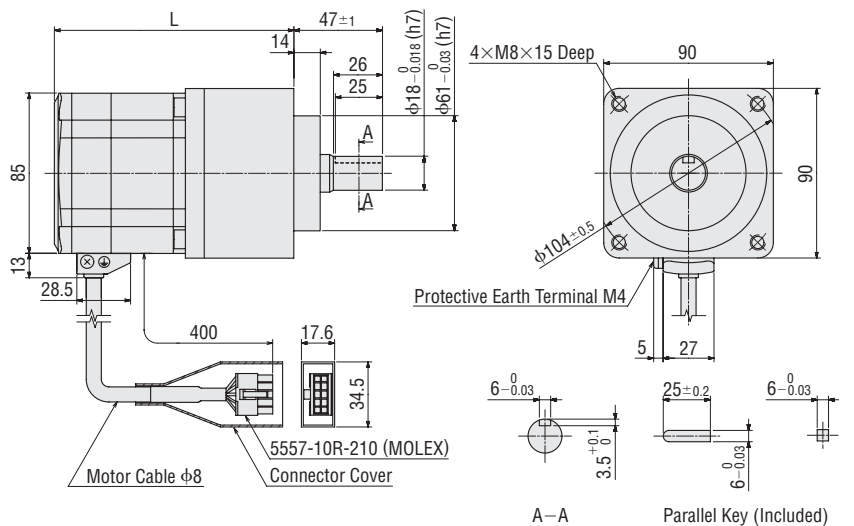
14 □ 60 mm

Model	Motor Model	Gear Ratio	L	Mass kg
<b>AR66A</b> □ -P □ -◇	ARM66AC-P □	<b>5, 7, 2, 10</b>	100	1.3
		<b>25, 36, 50</b>	125	1.6



15 □ 90 mm

Model	Motor Model	Gear Ratio	L	Mass kg
<b>AR98A</b> □ -P □ -◇	ARM98AC-P □	<b>5, 7, 2, 10</b>	127	3.3
		<b>25, 36, 50</b>	163	4.1



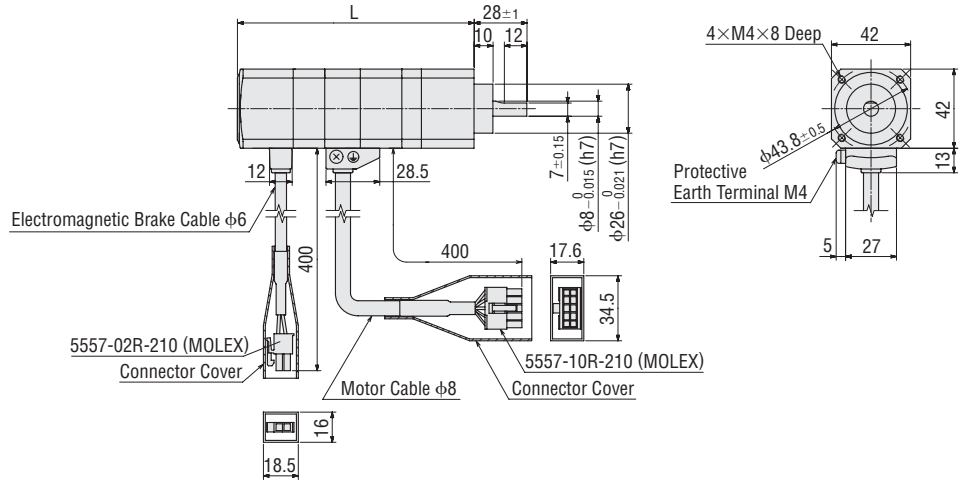
● Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
 Enter the gear ratio in the box (■) within the model name.  
 Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

Features  
 Lineup  
 System Configuration  
 Safety Standards and CE Marking  
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◆ PL Geared Type with Electromagnetic Brake

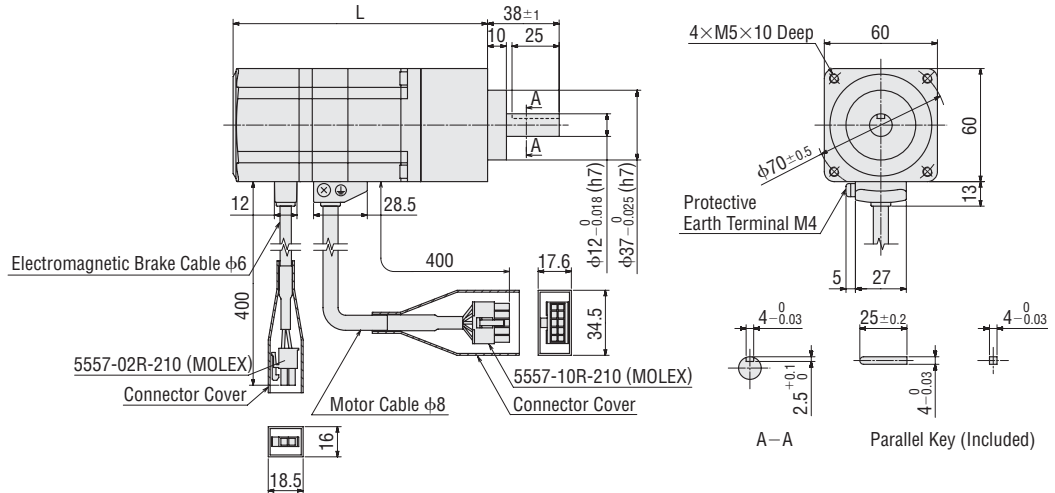
16 □42 mm

Model	Motor Model	Gear Ratio	L	Mass kg
AR46M□-P□-◇	ARM46MC-P□	5, 7.2, 10	125.5	0.78
		25, 36, 50	149	0.9



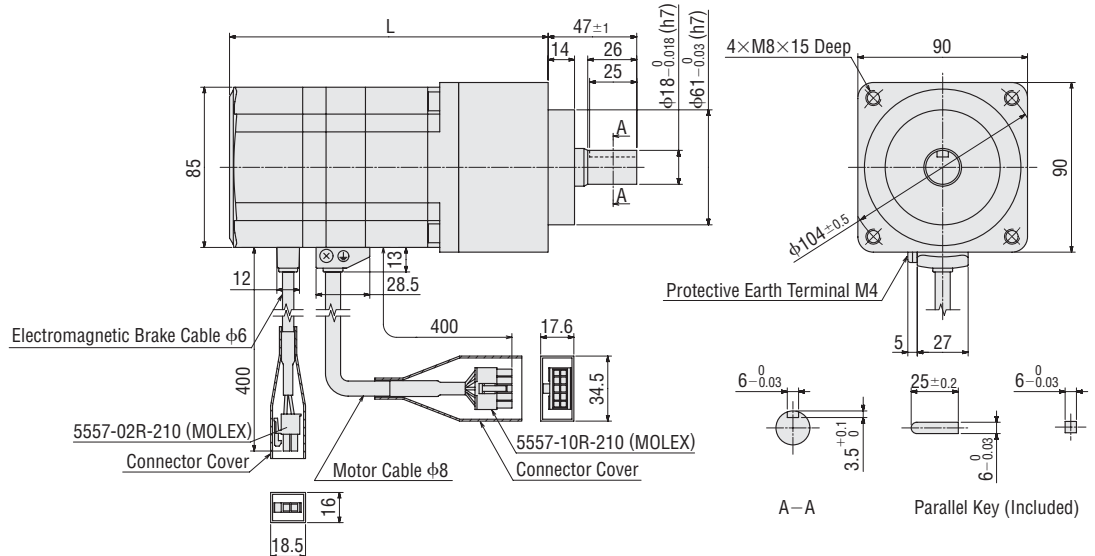
17 □60 mm

Model	Motor Model	Gear Ratio	L	Mass kg
AR66M□-P□-◇	ARM66MC-P□	5, 7.2, 10	135	1.6
		25, 36, 50	160	1.9



18 □90 mm

Model	Motor Model	Gear Ratio	L	Mass kg
AR98M□-P□-◇	ARM98MC-P□	5, 7.2, 10	169	3.9
		25, 36, 50	205	4.7

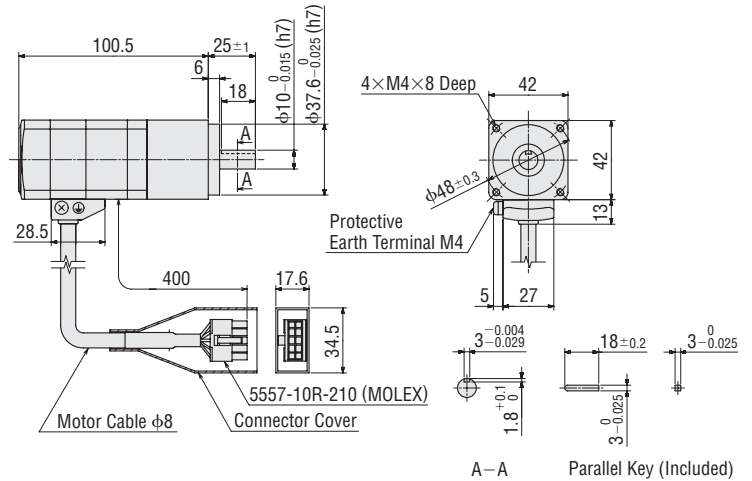


● Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
 Enter the gear ratio in the box (■) within the model name.  
 Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

◇ PN Geared Type

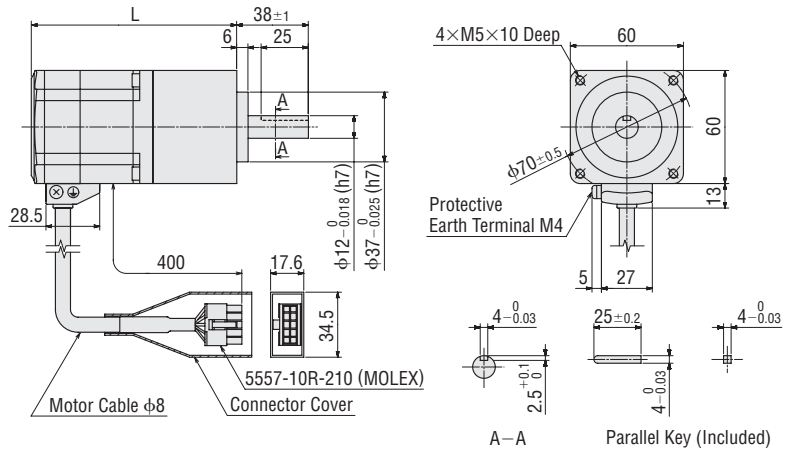
19 □ 42 mm

Model	Motor Model	Gear Ratio	Mass kg
AR46A- <input type="checkbox"/> -N- <input type="checkbox"/> -◇	ARM46AC-N- <input type="checkbox"/>	<b>5, 7, 2, 10</b>	0.73



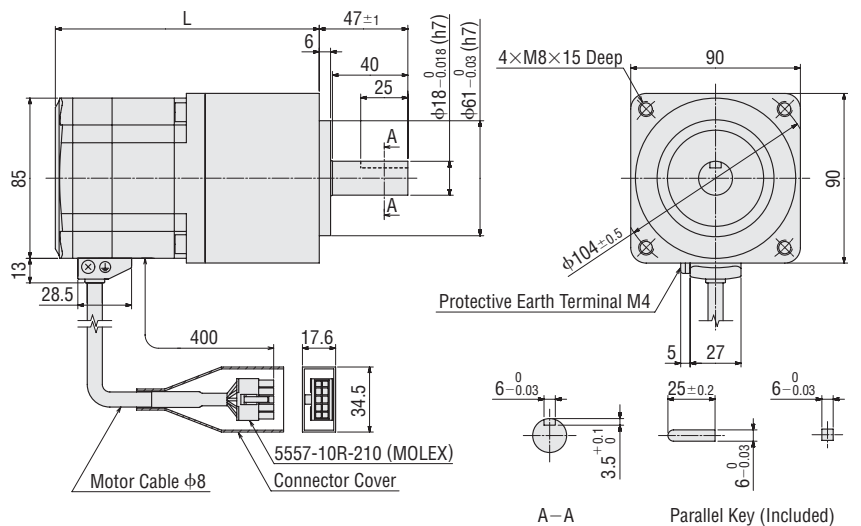
20 □ 60 mm

Model	Motor Model	Gear Ratio	L	Mass kg
AR66A- <input type="checkbox"/> -N- <input type="checkbox"/> -◇	ARM66AC-N- <input type="checkbox"/>	<b>5, 7, 2, 10</b>	109	1.5
		<b>25, 36, 50</b>	125	1.73



21 □ 90 mm

Model	Motor Model	Gear Ratio	L	Mass kg
AR98A- <input type="checkbox"/> -N- <input type="checkbox"/> -◇	ARM98AC-N- <input type="checkbox"/>	<b>5, 7, 2, 10</b>	140	3.8
		<b>25, 36, 50</b>	163	4.5



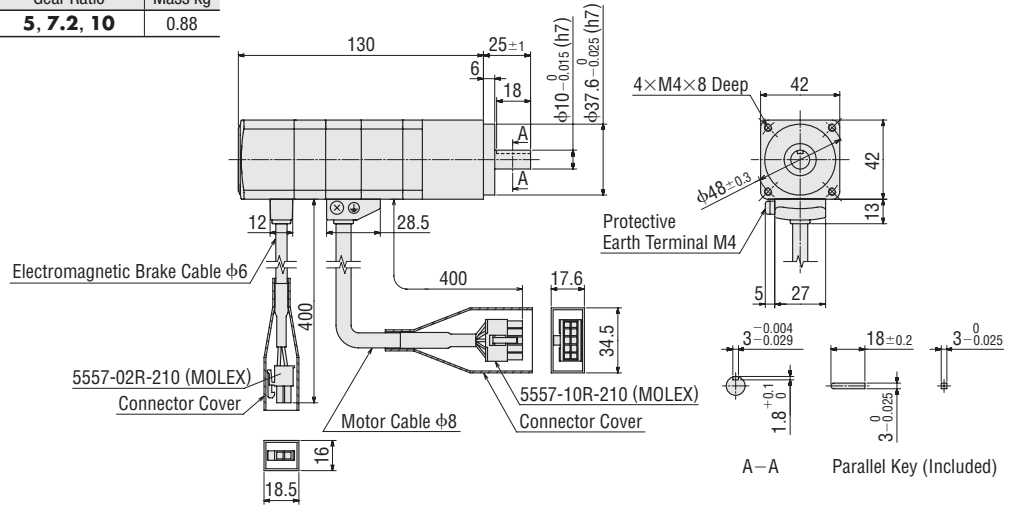
- Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.
- Enter the gear ratio in the box (■) within the model name.
- Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

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### ◆ PN Geared Type with Electromagnetic Brake

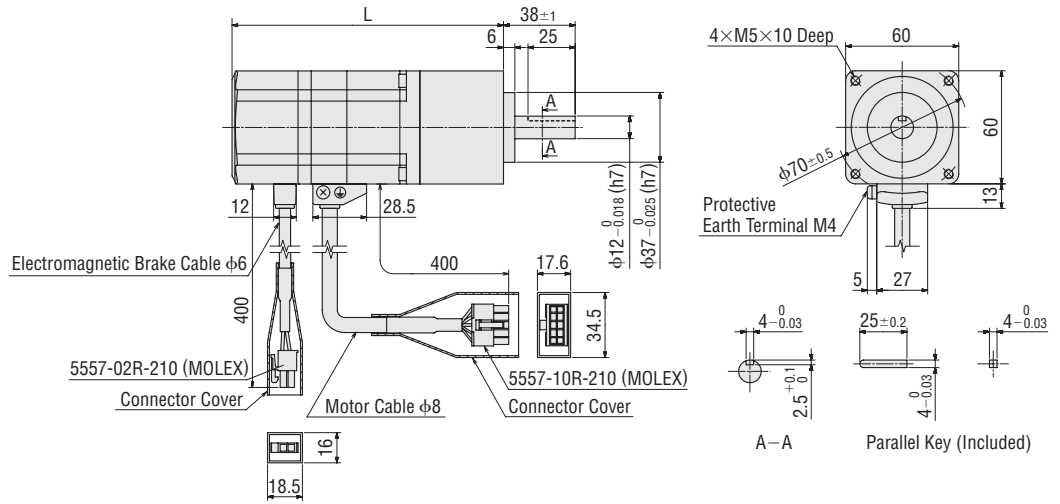
22 □42 mm

Model	Motor Model	Gear Ratio	Mass kg
AR46M□-N□-◇	ARM46MC-N□	<b>5, 7.2, 10</b>	0.88



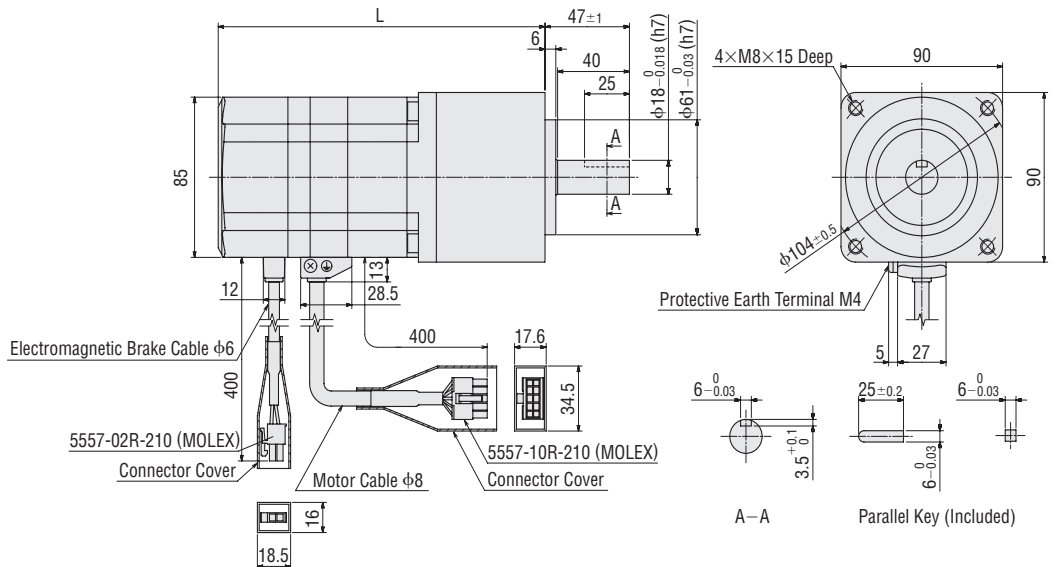
23 □60 mm

Model	Motor Model	Gear Ratio	L	Mass kg
AR66M□-N□-◇	ARM66MC-N□	<b>5, 7.2, 10</b>	144	1.8
		<b>25, 36, 50</b>	160	2.0



24 □90 mm

Model	Motor Model	Gear Ratio	L	Mass kg
AR98M□-N□-◇	ARM98MC-N□	<b>5, 7.2, 10</b>	182	4.4
		<b>25, 36, 50</b>	205	5.1

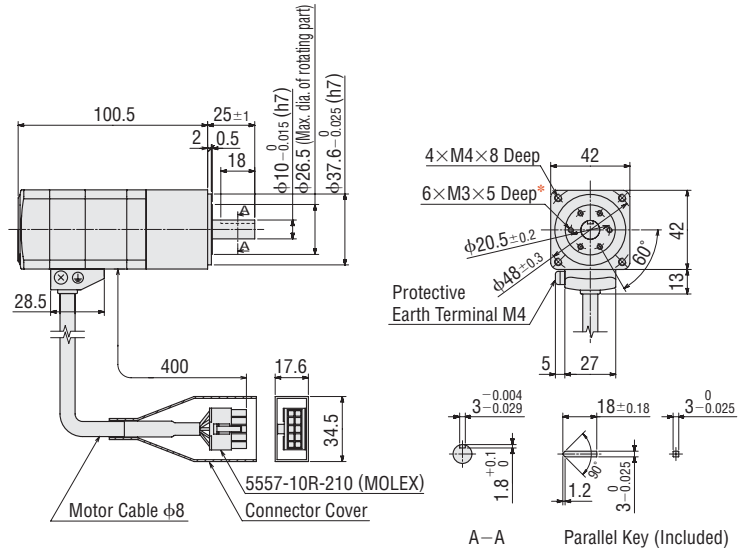


- Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.
- Enter the gear ratio in the box (■) within the model name.
- Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

◇ Harmonic Geared Type

25 □ 42 mm

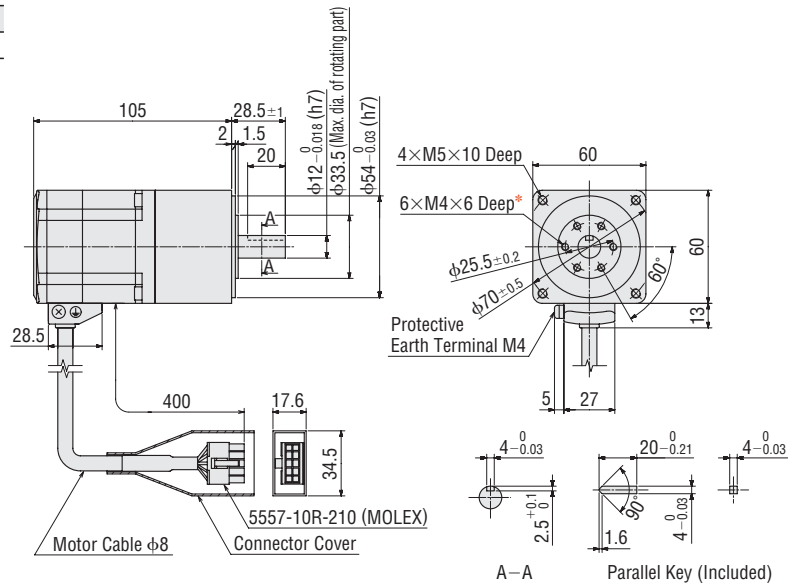
Model	Motor Model	Gear Ratio	Mass kg
AR46A □-H □-◇	ARM46AC-H □	<b>50, 100</b>	0.68



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

26 □ 60 mm

Model	Motor Model	Gear Ratio	Mass kg
AR66A □-H □-◇	ARM66AC-H □	<b>50, 100</b>	1.41



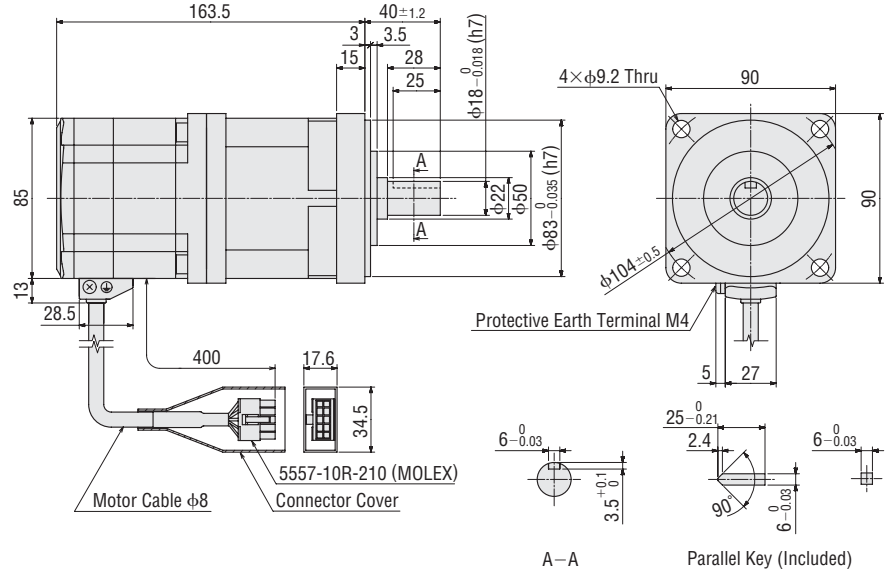
\* The position of the output shaft relative to the screw holes on the rotating part is arbitrary.

● Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
 Enter the gear ratio in the box (□) within the model name.  
 Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

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27 □ 90 mm

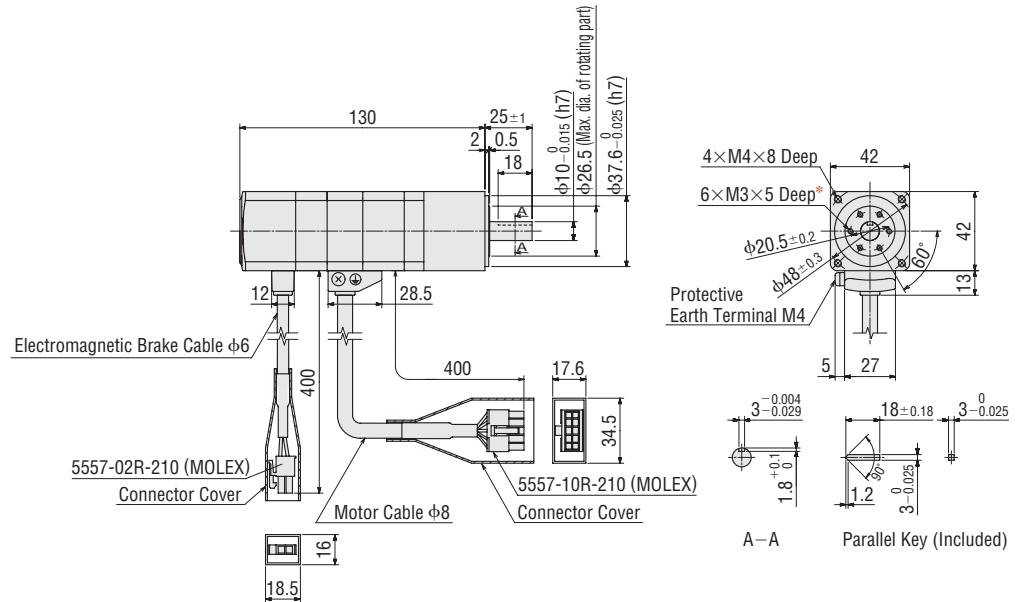
Model	Motor Model	Gear Ratio	Mass kg
AR98A □-H □-◇	ARM98AC-H □	50, 100	4.0



◇ Harmonic Geared Type with Electromagnetic Brake

28 □ 42 mm

Model	Motor Model	Gear Ratio	Mass kg
AR46M □-H □-◇	ARM46MC-H □	50, 100	0.83



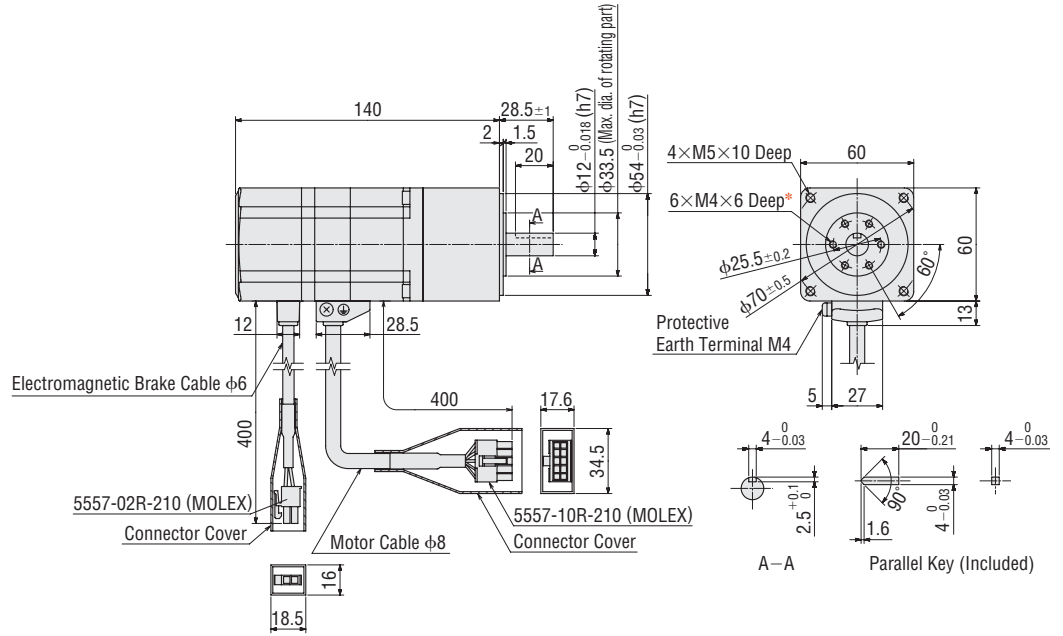
\*The position of the output shaft relative to the screw holes on the rotating part is arbitrary.

- Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.
- Enter the gear ratio in the box (□) within the model name.
- Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.



29 □ 60 mm

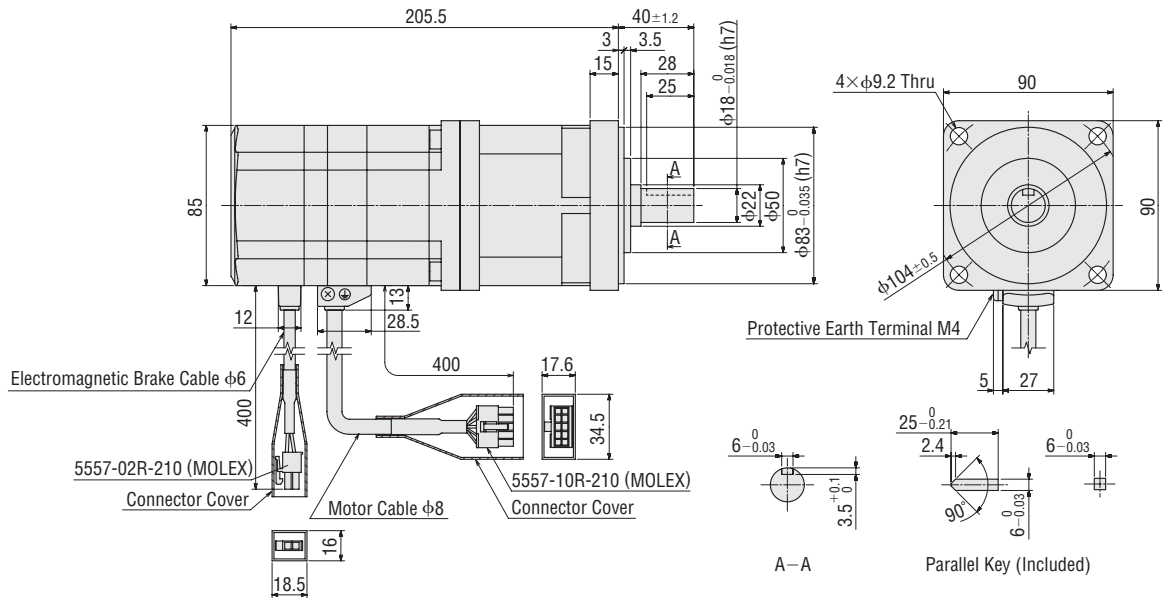
Model	Motor Model	Gear Ratio	Mass kg
<b>AR66M</b> □-H □-◇	ARM66MC-H □	<b>50, 100</b>	1.71



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

30 □ 90 mm

Model	Motor Model	Gear Ratio	Mass kg
<b>AR98M</b> □-H □-◇	ARM98MC-H □	<b>50, 100</b>	4.6



● Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
 Enter the gear ratio in the box (□) within the model name.  
 Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (<math>\langle \rangle</math>) within the model name.

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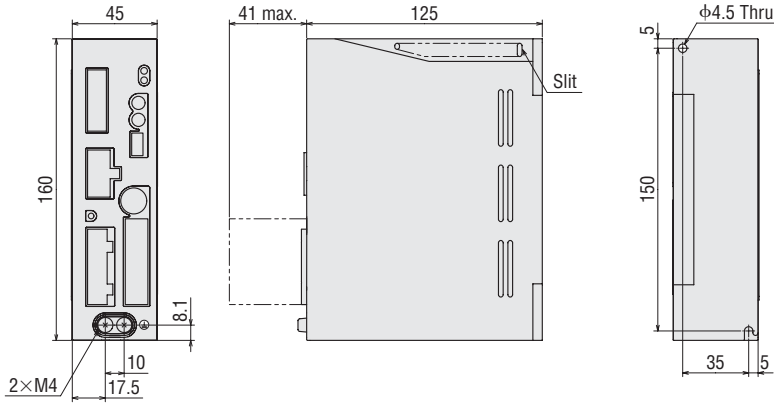
Installation

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● Driver

31 Common to All Types

Mass: 0.75 kg

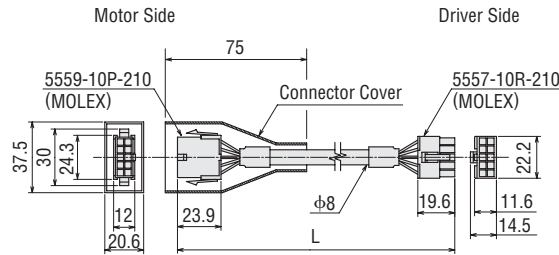


- Control I/O Connector (CN5)  
Cover Assembly: 54331-1361 (MOLEX)  
Connector: 54306-3619 (MOLEX)
- Connector for Regeneration Unit Input/Main Power Supply Input Terminal (CN3)  
Connector: 54928-0570 (MOLEX)
- Connector for 24 VDC Power Supply Input/Regeneration Unit Thermal Input/ Electromagnetic Brake Output Terminal (CN1)  
Connector: MC1.5/6-STF-3.5 (PHOENIX CONTACT)

● 32 Motor Cable (Included), Electromagnetic Brake Cable (Included)

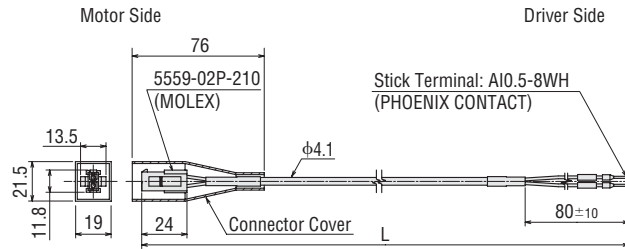
● Motor Cables

Cable Type	Length L (m)
Motor Cable 1 m	1
Motor Cable 2 m	2
Motor Cable 3 m	3



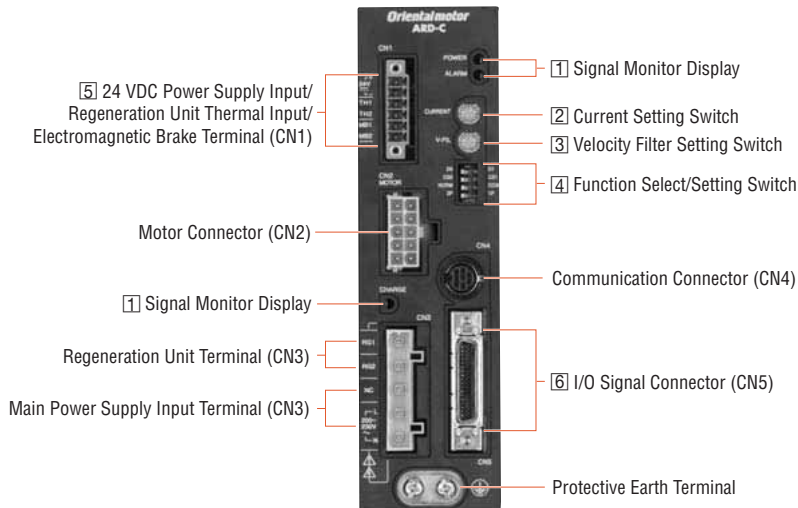
● Electromagnetic Brake Cables (Only for electromagnetic brake type)

Cable Type	Length L (m)
Electromagnetic Brake Cable 1 m	1
Electromagnetic Brake Cable 2 m	2
Electromagnetic Brake Cable 3 m	3



# Connection and Operation

## Names and Functions of Driver Parts



### 1 Signal Monitor Displays

#### LED Displays

Indication	Color	Function	When Activated
POWER	Green	Power supply indication	Lights when main power or 24 VDC power is on.
ALARM	Red	Alarm indication	Blinks when protective functions are activated.
CHARGE	Red	Power supply indication	Lights when main power is on.

#### Alarms

Blink Count	Function	When Activated
2	Overheat protection	The temperature inside the driver rises above 85°C.
	Overload protection	When the cumulative sum of times during which the load torque exceeded the maximum torque exceeds the overload detection time. (Default value: 5 seconds)
	Overspeed	The motor output shaft speed exceeds 4500 r/min.
	Command pulse error	The command pulse value becomes abnormal.
	Regeneration unit overheat	The thermostat for regeneration unit signal is activated.
3	Overvoltage protection	The primary voltage of the driver's inverter exceeds the upper limit.
	Main power supply error	The main power is cut off when an operation command is input.
	Undervoltage	The primary voltage of the driver's inverter drops below the lower limit.
4	Excessive position deviation error at current on	The position deviation exceeds the overflow revolutions. (Default value: 3 revolutions)
	Excessive position deviation error at current off	The current is turned on even though the position deviation when the current is turned off was equal to or greater than the permissible value. (Default value: 100 revolutions or more)
5	Overcurrent protection	An excessive current flows through the inverter power element inside the driver.
	Drive circuit error	The power cable of the motor is disconnected.
7	Operation data error	Return to electrical home operation is performed while an operation data error warning is present.
	Electronic gear setting error	The resolution set by the electronic gear is outside the specified range.
8	Sensor error during operation	A sensor error occurs while the motor is rotating.
	Initial sensor error	The power source is turned on when the motor cable is not connected to the driver.
	Initial rotor rotation error	The main power is turned on while the motor is rotating.
	Motor combination error	A motor not supported by the driver is connected.
9	EEPROM error	A motor control parameter is damaged.

### 2 Current Setting Switch

Indication	Switch Name	Function
CURRENT	Current setting switch	This switch adjusts the operating current. It is used to limit the torque and temperature rise. A desired current can be set as a percentage (%) of the rated output current. The factory setting is "F."

### 3 Velocity Filter Setting Switch

Indication	Switch Name	Function
V-FIL	Velocity filter setting switch	<p>This switch adjusts the motor response. Adjust the switch if you want to suppress motor vibration or cause the motor to start/stop smoothly. "0" and "F" correspond to the minimum and maximum velocity filter settings, respectively. The factory setting is "1."</p> <p>The difference in characteristics made by the velocity filter</p>

#### 4 Function Select/Setting Switches

Indication	Switch Name	Function
D0/D1	Resolution select switch	These switches are used to set the resolution per rotation of the motor output shaft. "D0" "CS0" → 1000 pulse (0.36°/step) [Factory setting] "D0" "CS1" → 10000 pulse (0.036°/step) "D1" "CS0" → 500 pulse (0.72°/step) "D1" "CS1" → 5000 pulse (0.072°/step)
CS0/CS1		
NORM/CCM	Control mode select switch	This switch toggles the driver between the normal mode and current control mode. In the current control mode, noise and vibration can be reduced although the motor synchronicity drops. "NORM": Normal mode [Factory setting] "CCM": Current control mode
2P/1P	Pulse input mode switch	The settings of this switch are compatible with the following two types of pulse input modes: "1P" for the 1-pulse input mode, "2P" for the 2-pulse input mode (factory setting).

#### 5 24 VDC Power Supply Input/Regeneration Unit Thermal Input/Electromagnetic Brake Terminal (CN1)

Indication	I/O	Terminal Name	Description
24V+	Input	24 VDC power supply input terminal+	Connect a power supply to these terminals if you want to supply the control power separately from the main power. Supply of the control power is optional. If you are using an electromagnetic brake motor, connect a power supply to these terminals as the electromagnetic brake power.
24V-		24 VDC power supply input terminal-	
TH1		Regeneration unit thermal input terminal	Connect the accessory regeneration unit <b>RGB100</b> (sold separately). If no regeneration unit is used, short the TH1 and TH2 terminals of CN1.
TH2		Regeneration unit thermal input terminal	
MB1	Output	Electromagnetic brake terminal-	Connect the lead wires from the electromagnetic brake.
MB2		Electromagnetic brake terminal+	

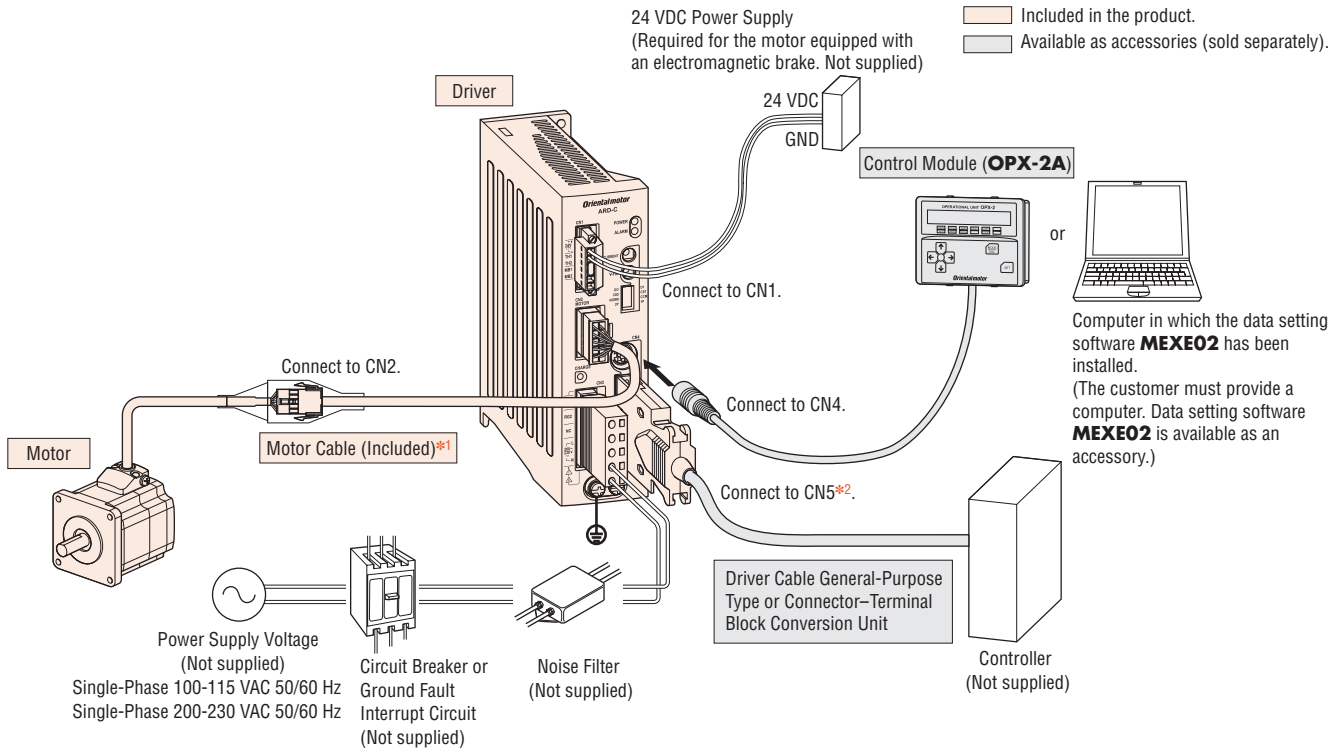
#### 6 I/O Signal Connector (CN5, 36 pins)

Indication	I/O	Pin No.	Signal		Signal Name		
			Positioning Operation	Push-Motion Operation*	Positioning Operation	Push-Motion Operation*	
CN5	-	1	-	-	-	-	
	Output	2	GND			Ground connection	
		3	ASG+			Encoder A-phase pulse output (line driver)	
		4	ASG-				
		5	BSG+			Encoder B-phase pulse output (line driver)	
		6	BSG-				
		7	TIM1+			Timing output (line driver)	
		8	TIM1-				
		9	ALM+			Alarm output	
		10	ALM-				
		11	WNG+			Warning output	
		12	WNG-				
		13	END+			Positioning completion output	
		14	END-				
		15	READY+/ALO+*			Operation ready complete output/Alarm code output 0*	
		16	READY-/ALO-*				
		17	TLC+/AL1+*			Torque limiting output /Alarm code output 1*	
		18	TLC-/AL1-*				
		19	TIM2+/AL2+*			Timing output (open-collector)/Alarm code output 2*	
		20	TIM2-/AL2-*				
		21	GND				Ground connection
		22	IN-COM				Input signal common
	23	C-ON				Current on input	
	24	CLR/ALM-RST				Deviation counter clear input/Alarm reset input	
	25	CCM				Current control mode ON input	
	Input	26	CS	T-MODE*		Resolution select input	Push-motion operation ON*
		27	-	MO*		-	Push-current setting select input*
		28	RETURN	M1*		Return to electrical home operation	
		29	P-RESET	M2*		Position reset input	
		30	FREE			Excitation OFF, electromagnetic brake release	
		31	CW+/PLS+			CW pulse input/Pulse input (+5 V/line driver)	
		32	CW-/PLS-				
		33	CW+24/PLS+24 V			CW pulse input/Pulse input (+24 V)	
		34	CCW+24/DIR+24 V			CCW pulse input/Rotation direction input (+24 V)	
		35	CCW+/DIR+			CCW pulse input/Rotation direction input (+5 V/line driver)	
		36	CCW-/DIR-				

\* The signal will become effective if the applicable setting has been changed using the accessory control module **OPX-2A** or the data setting software **MEXE02** (both sold separately).

## ● Connection Diagram

### ◇ Connection to Peripheral Equipment



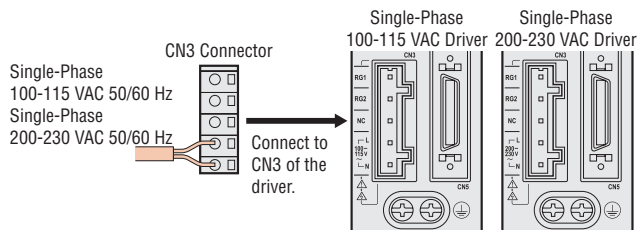
- \*1 A cable of 1 m, 2 m or 3 m long is supplied. If you need a motor cable that's 5 m or longer, or a flexible motor cable, select an appropriate cable from among the accessories (sold separately).
- \*2 Each model comes with a control I/O connector (CN5), but you must select the driver cable general-purpose type or connector-terminal block conversion unit, both of which are provided as accessories (sold separately).

### ◇ Connecting a Main Power Supply

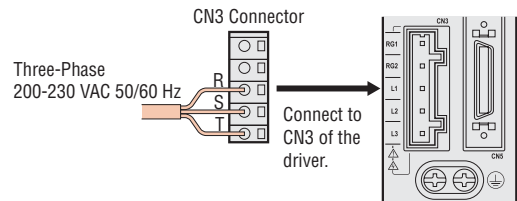
Use the following cable for the power supply line;

- Single-phase 100-115 VAC: 3-core cable [AWG16 to 14 (1.25 to 2.0 mm<sup>2</sup>)]
- Single-phase 200-230 VAC: 3-core cable [AWG16 to 14 (1.25 to 2.0 mm<sup>2</sup>)]
- Three-phase 200-230 VAC: 4-core cable [AWG16 to 14 (1.25 to 2.0 mm<sup>2</sup>)]

• Single-Phase 100-115 VAC, Single-Phase 200-230 VAC

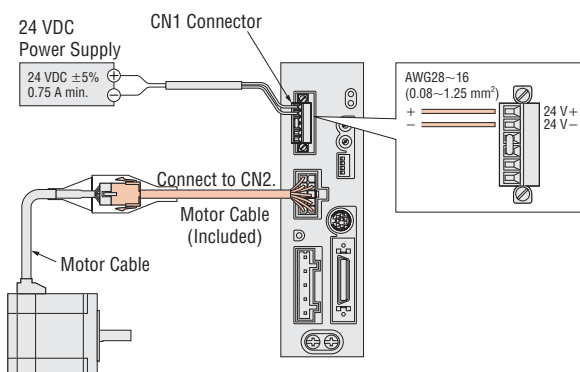


• Three-Phase 200-230 VAC



### ◇ Connecting the Control Power Supply

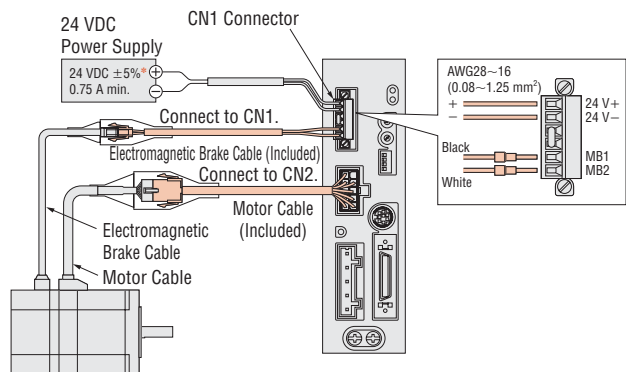
Provide a 24 VDC power supply if you want to supply the control power separately from the main power. Supply of the control power is optional.



### ◇ Connecting the Electromagnetic Brake

Provide a 24 VDC power supply.

Control power for the electromagnetic brake motor is separated from the main power.

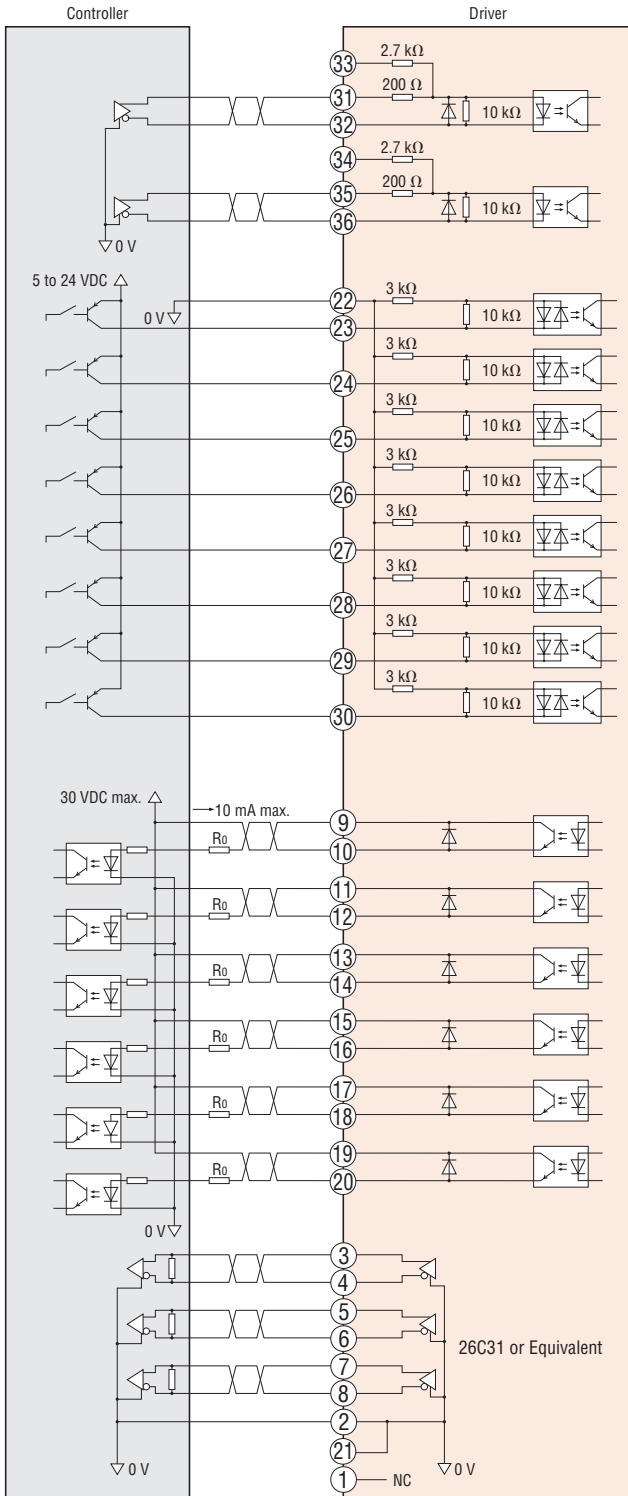


- \* If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC ±4%.

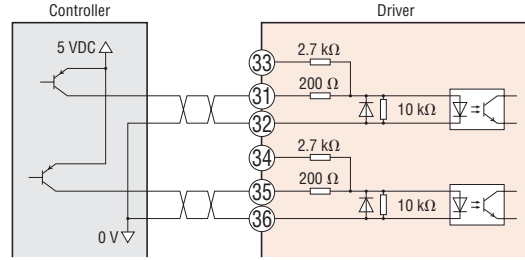
◇ Connecting to a Host Controller

● Connecting to a Current Source Output Circuit

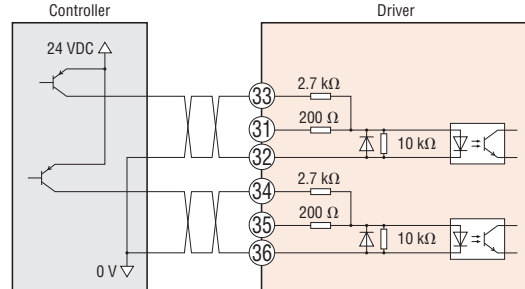
When pulse input is of line driver type



When pulse input is of 5 V type



When pulse input is of 24 V type



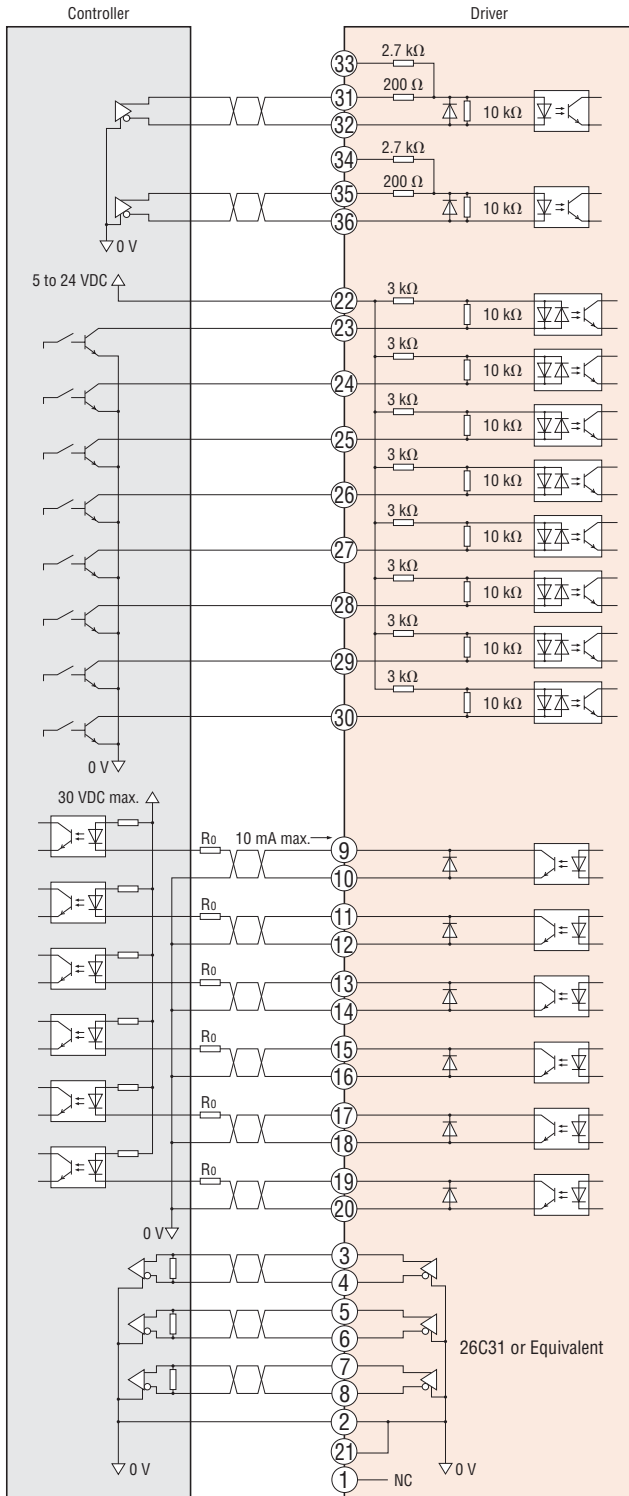
Notes:

- Use output signals at 30 VDC or less. If the current exceeds 10 mA, connect an external resistor  $R_o$ .
- Connect a terminal resistor of 100  $\Omega$  or more between the input of the line receiver terminals.
- Use a multi-core, twisted-pair shielded wire of AWG28 to 26 (0.08 to 0.14 mm<sup>2</sup>) for the control input/output signal line (CN5), 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.
- 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.

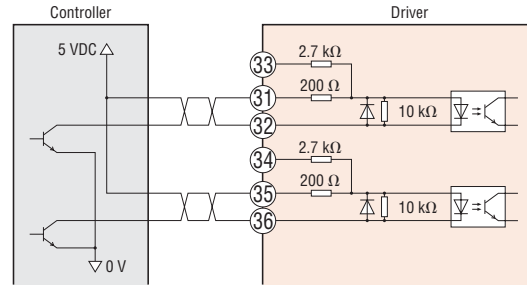
◇ Connecting to a Host Controller

● Connecting to a Current Sink Output Circuit

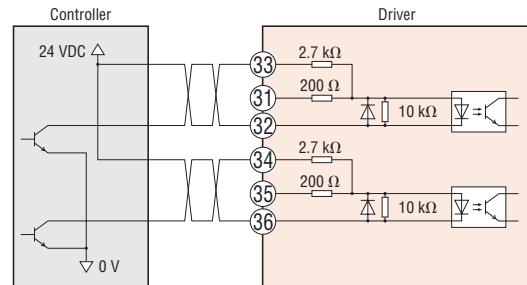
When pulse input is of line driver type



When pulse input is of 5 V type



When pulse input is of 24 V type



**Notes:**

- Use output signals at 30 VDC or less. If the current exceeds 10 mA, connect an external resistor  $R_o$ .
- Connect a terminal resistor of 100  $\Omega$  or more between the input of the line receiver terminals.
- Use a multi-core, twisted-pair shielded wire of AWG28 to 26 (0.08 to 0.14 mm<sup>2</sup>) for the control input/output signal line (CN5), 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.
- 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.

## ● Description of Input/Output Signals

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

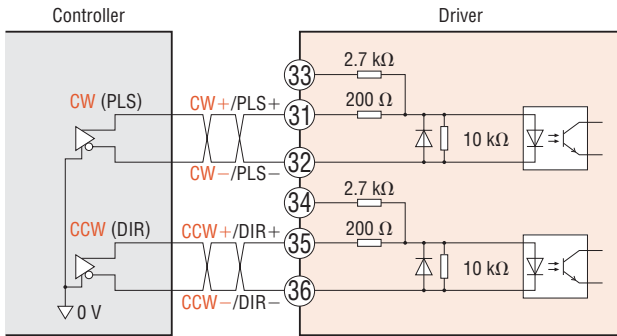
Input (output) "ON" indicates that the current is sent into the photocoupler (transistor) inside the driver. Input (output) "OFF" indicates that the current is not sent into the photocoupler (transistor) inside the driver. The input/output remains "OFF" if nothing is connected.

Photocoupler OFF ON

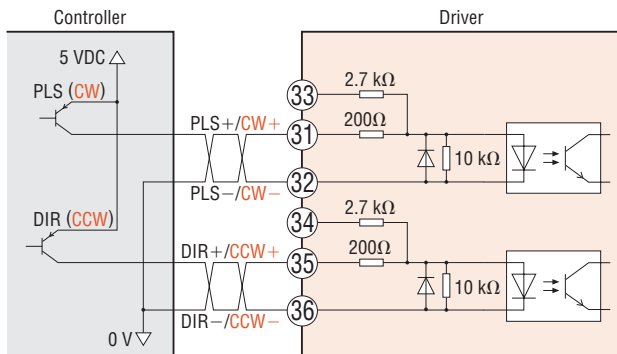
## PLS (CW) and DIR (CCW) Pulse Input Signal

### ◇ Input Circuit and Sample Connection

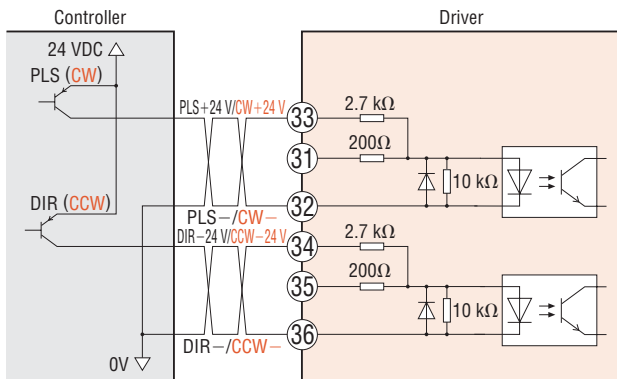
#### ● Line Driver Output



#### ● When Using 5 VDC

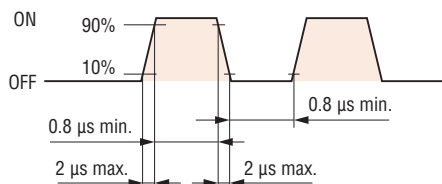


#### ● When Using 24 VDC



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

### ◇ Pulse Waveform Characteristics

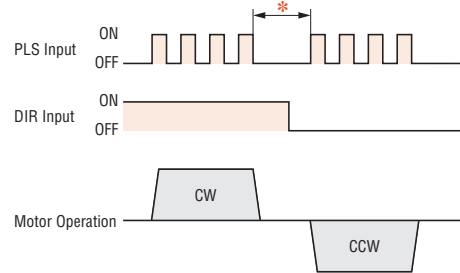


● For pulse signals, use input pulse waveforms like those shown in the figure above.

### ◇ Pulse Input Mode

#### ● 1-Pulse Input Mode

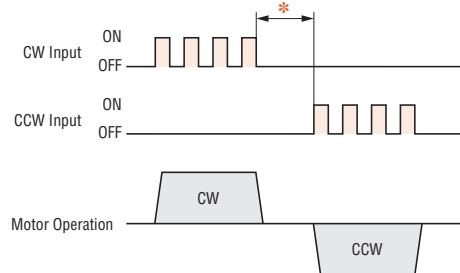
When the PLS input is turned ON while the DIR input is ON, the motor will rotate by one step in CW direction. When the PLS input is turned ON while the DIR input is OFF, the motor will rotate by one step in CCW direction.



\* The minimum interval time needed for switching the rotation direction will vary, depending on the operating speed and size of the load. Do not shorten the interval time any more than is necessary.

#### ● 2-Pulse Input Mode

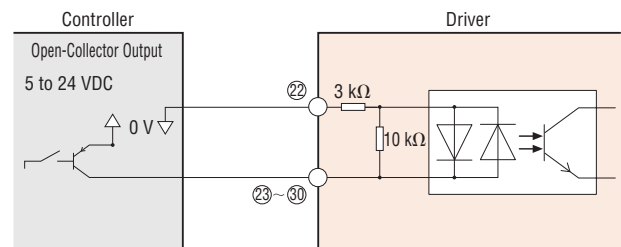
When the CW input is turned ON, the motor will rotate by one step in CW direction. When the CCW input is turned ON, the motor will rotate by one step in CCW direction.



\* The minimum interval time needed for switching the rotation direction will vary, depending on the operating speed and size of the load. Do not shorten the interval time any more than is necessary.

## Control Input Signals

### ◇ Input Circuit and Sample Connection



### ◇ Current ON (C-ON) Input

#### Pin No. 23

This signal is used to excite the motor. If an electromagnetic brake motor is used, the electromagnetic brake will be released after the motor is excited.

With the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), you can change the signal logic. Moreover, you can set the automatic return operation to be performed after the C-ON input has been turned ON. When the C-ON input is turned ON, the motor automatically returns to the position where it was stopped.

#### Note:

● When operating the motor, be sure to turn the C-ON input ON.



### ◇ Excitation OFF, Electromagnetic Brake Release (FREE) Input Pin No. ③①

This signal is used to put the motor in a non-excitation (free) state. It is used when turning the motor shaft externally or when positioning manually.

When the FREE input is turned ON, current supplied to the motor will be cut off. When the FREE input is turned OFF, current will be supplied to the motor. If an electromagnetic brake motor is used, when the FREE input is turned ON, the electromagnetic brake will be released and current supplied to the motor will be cut off.

With the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), you can set the automatic return operation to be performed after the FREE input has been turned OFF. When the FREE input is turned OFF, the motor automatically returns to the position where it was stopped.

#### Note:

- When operating the motor, be sure to turn the FREE input OFF.

### ◇ Resolution Select (CS) Input/Push-Motion Operation ON (T-MODE) Input Pin No. ②⑥

#### CS Input Setting (Factory setting)

This signal is used to switch the resolution.

Resolutions can be switched when combined with the resolution select switches (D0/D1).

With the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), you can change the basic settings of the resolution.

Resolution Select Switch	CS Input OFF	CS Input ON
D0	The CS0 setting is selected. Factory setting: 1000 P/R	The CS1 setting is selected. Factory setting: 10000 P/R
D1	The CS0 setting is selected. Factory setting: 500 P/R	The CS1 setting is selected. Factory setting: 5000 P/R

#### Notes:

- While the resolution select switch (CS0/CS1) is set to "CS0," the CS input becomes effective.
- While the resolution select switch (CS0/CS1) is set to "CS1," the CS input is ignored and the CS1 setting is maintained.

#### T-MODE Input Setting

When "push-motion operation" is selected with the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), the push-motion operation ON (T-MODE) input will become effective. When the T-MODE input is turned ON and pulses are input, the motor will start a push-motion operation.

### ◇ Push-Current Setting Selection (M0) Input Pin No. ②⑦

#### Factory Setting

Signals are not assigned at the time of shipment.

#### M0 Input Setting

When "push-motion operation" is selected with the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), the push-current setting select (M0) input will become effective. The setting data can be selected via the combination of M0, M1 and M2 inputs.

### ◇ Return to Electrical Home Operation (RETURN) Input/ Push-Current Setting Select (M1) Input Pin No. ②⑧

#### RETURN Input (Factory setting)

This signal is used to start a return to electrical home operation. The electrical home position can be changed freely using the P-RESET input.

Initial setting is at the position when the power is turned ON.

#### M1 Input Setting

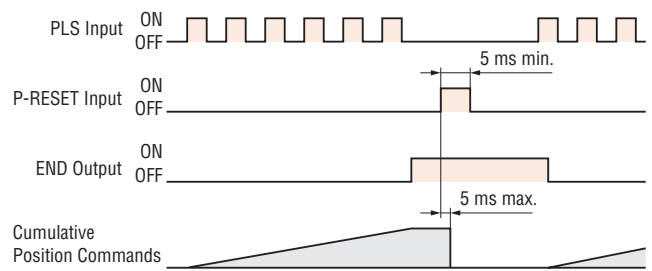
When "push-motion operation" is selected with the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), the push-current setting select (M1) input will become effective. The setting data can be selected via the combination of M0, M1 and M2 inputs.

### ◇ Position Reset (P-RESET) Input/Push-Current Setting Select (M2) Input Pin No. ②⑨

#### P-RESET Input (Factory setting)

This signal is used to set the electrical home.

When the P-RESET input is turned ON, the electrical home position will be set. Input this signal while the motor is at standstill.



#### M2 Input Setting

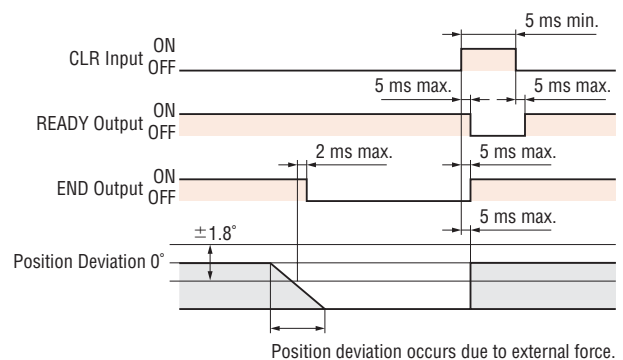
When "push-motion operation" is selected with the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), the push-current setting select (M2) input will become effective. The setting data can be selected via the combination of M0, M1 and M2 inputs.

### ◇ Deviation Counter Clear (CLR)/Alarm Reset (ALM-RST) Input Pin No. ②④

Normally, this signal is used to clear the position deviation counter. If an alarm generates, the CLR/ALM-RST input will function as an input signal for resetting the alarm.

#### Deviation Counter Clear (CLR) Input

This signal is used to clear the position deviation counter.



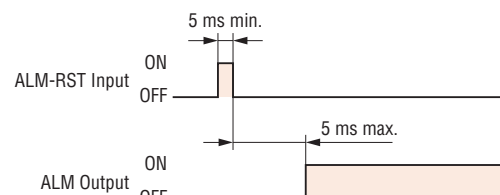
#### Notes:

- Pulse input is disabled while the CLR input is ON.
- When the CLR input is turned ON during the automatic return operation and return to electrical home operation, the motor will stop.

#### Alarm Reset (ALM-RST) Input

This signal is used for clearing the alarm when a protective function has been activated.

Resolve the cause and turn on the alarm reset input.



#### Note:

- The following alarms cannot be cleared. To clear the alarm, first resolve the cause and check for safety, and then turn power on again.
  - Regeneration unit overheat
  - Initial sensor error
  - Initial rotor rotation error
  - Motor combination error
  - EEPROM data error

### ◇ Current Control Mode ON (CCM) Input Pin No. ②⑤

The control mode will change from the normal mode to the current control mode.

In the current control mode, noise and vibration can be reduced although the motor synchronicity drops.

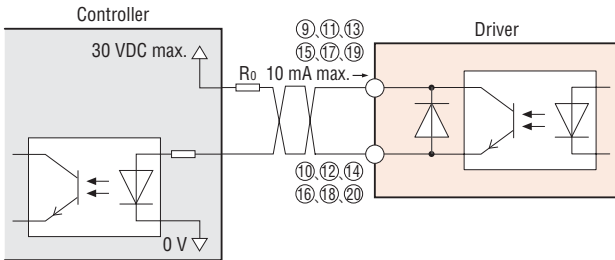
#### Notes:

- Switch the mode while the motor is at standstill.
- The CCM input becomes effective, when the control mode switch is set to "NORM."

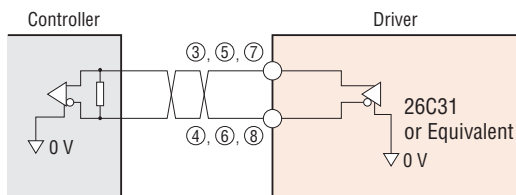
## Control Output Signals

### ◇ Output Circuit and Sample Connection

- Operation Ready Complete (READY)/Alarm Code 0 (AL0) Output
- Torque Limiting (TLC)/Alarm Code 1 (AL1) Output
- Positioning Completion (END) Output
- Warning (WNG) Output
- Alarm (ALM) Output
- Timing (TIM2)/Alarm Code 2 (AL2) Output



- Encoder (ASG, BSG) Signal Output
- Timing (TIM1) Signal Output



● Be sure to connect pin 2 or 21 of the driver to the GND.

### ◇ Operation Ready Complete (READY) Output/ Alarm Code 0 (AL0) Output

Pin No. ⑮, ⑯

#### READY Output Setting (Factory setting)

This signal will be output when the driver becomes ready. Input pulse signals after the READY output has turned ON.

#### AL0 Output Setting

When the settings are changed with the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), the alarm code 0 (AL0) output will become effective. This signal will be output when the protective function is activated and an alarm generates. The protective function that activated can be checked via the combination of AL0, AL1 and AL2 outputs.

### ◇ Torque Limiting (TLC)/Alarm Code 1 (AL1) Output

Pin No. ⑰, ⑱

#### TLC Output Setting (Factory setting)

This signal will be output when the torque characteristic exceeds the specified range. If a torque limit is set using the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), this signal will be output when the torque limit is reached.

#### AL1 Output Setting

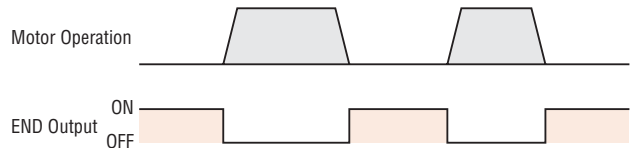
When the settings are changed with the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), the alarm code 1 (AL1) output will become effective. This signal will be output when the protective function is activated and the alarm generates. The protective function that activated can be checked via the combination of AL0, AL1 and AL2 outputs.

### ◇ Position Completion (END)

Pin No. ⑲, ⑳

When the motor has completed its movement, the END output will turn ON. Specifically, the END output will turn ON when the rotor position falls within  $\pm 1.8^\circ$  of the command position while no pulse signal is input.

You can set a desired output condition for the END output using the control module **OPX-2A** or data setting software **MEXE02** (both sold separately).



### ◇ Timing (TIM1) Output

Pin No. ⑦, ⑧

#### Timing (TIM2) Output/Alarm Code 2 (AL2) Output

Pin No. ⑲, ⑳

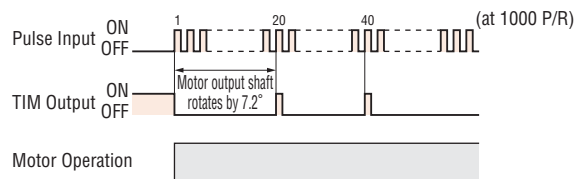
### TIM1 Output, TIM2 Output Setting (Factory setting)

The TIM output will turn ON every time the motor output shaft rotates by  $7.2^\circ$ .

This signal can be used to detect the home position with greater precision.

Two types of TIM outputs are available: the open-collector output (TIM2 output) and the line driver output (TIM1 output). Change the TIM output according to the pulse input mode of the host controller.

When the settings of the TIM2 output are changed with the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), the alarm code (AL2) output will become effective.



#### Notes:

- The TIM1 output will not turn ON properly unless the pulse speed is 10 kHz or less. The TIM2 output will not turn ON properly unless the pulse speed is 500 Hz or less.
- When changing the resolution using the CS input, do so while the TIM output is ON and the motor is at standstill. If the CS input is turned ON/OFF when one or both of these conditions are unsatisfied, the TIM output will not turn ON even after the motor output shaft rotates by  $7.2^\circ$ .

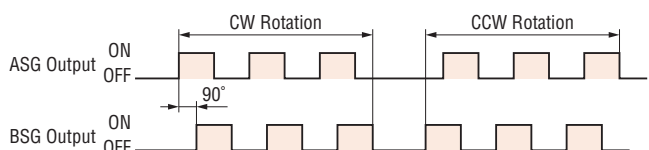
#### AL2 Output Setting

When the settings are changed with the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), the alarm code 2 (AL2) output will become effective. This signal will be output when the protective function is activated and the alarm generates. The protective function that activated can be checked via the combination of AL0, AL1 and AL2 outputs.

### ◇ A-Phase Pulse (ASG)/B-Phase Pulse (BSG) Output

Pin No. ③, ④, ⑤, ⑥

A counter or similar device can be connected to monitor the position of the motor. You can monitor the motor position by counting the ASG output pulses. The BSG output has a  $90^\circ$  phase difference with respect to the ASG output. You can determine the motor rotation direction by detecting the BSG output level at the rise of the ASG output. The number of output pulses per motor rotation varies depending on the resolution effective when the power was turned on.



#### Notes:

- The ASG output and BSG output are subject to a maximum delay of 0.1 ms with respect to motor operation. Use these outputs to check the position at which the motor is stopped.
- Connect a terminal resistor of 100  $\Omega$  or more between the input of the line receiver terminals.

### ◇ Warning (WNG) Output

Pin No. ⑪, ⑫

You can cause a warning to generate before a corresponding alarm does. To use the WNG output, the output condition must be changed using the control module **OPX-2A** or data setting software **MEXE02** (both sold separately).

### ◇ Alarm (ALM) Output

Pin No. ⑨, ⑩

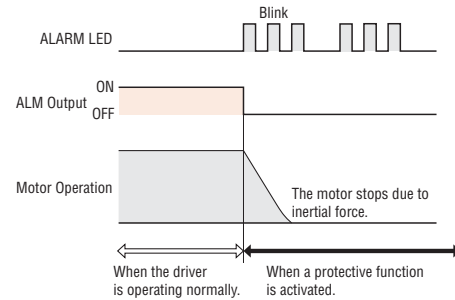
When a protective function is activated, the ALM output will turn OFF. At the same time, the ALARM LED of the driver will blink and the motor current will be cut off. In the case of an electromagnetic brake motor, the electromagnetic brake will switch to the holding mode and the motor current will be cut off.

Set the host controller so that it will stop motor operation commands upon detection of an OFF status of the ALM output. You can check the cause of the alarm by counting the number of times the ALARM LED blinks.

To cancel the alarm, first resolve the cause and check for safety, and then input an "Alarm Reset" (ALM-RST) signal or reset power. Wait at least 10 seconds before turning on the power.

### Note:

- In the case of operation data errors, the current will not be cut off and the electromagnetic brake will not be held even after these errors occur.

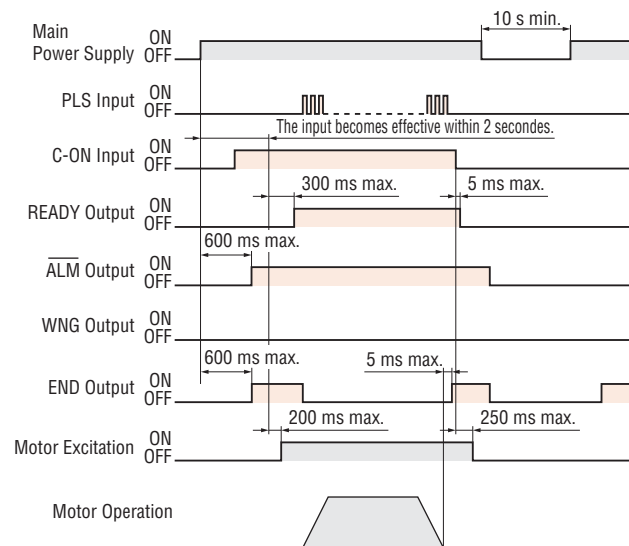


### ● Timing Charts

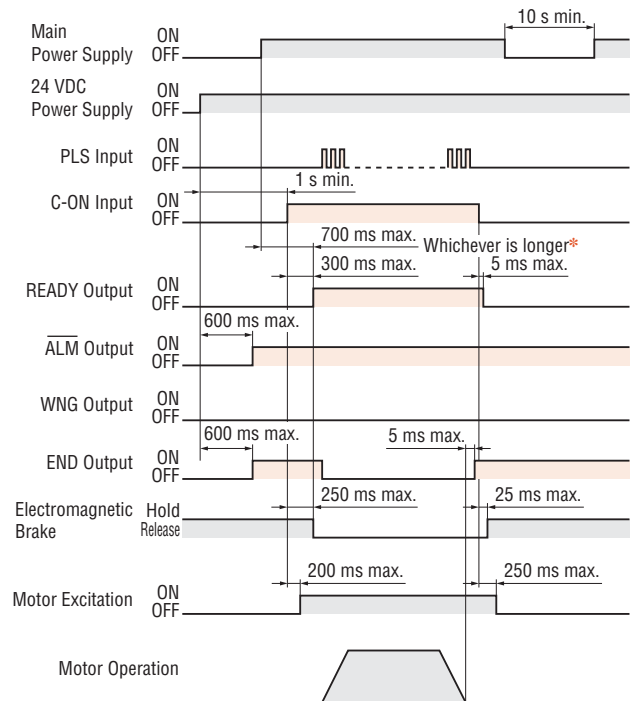
#### ◇ Power Supply Input

Turn ON the main power supply and turn the C-ON input ON. The motor will be excited. The READY output will turn ON and pulse input will be enabled.

#### ● Not Using 24 VDC Power Supply

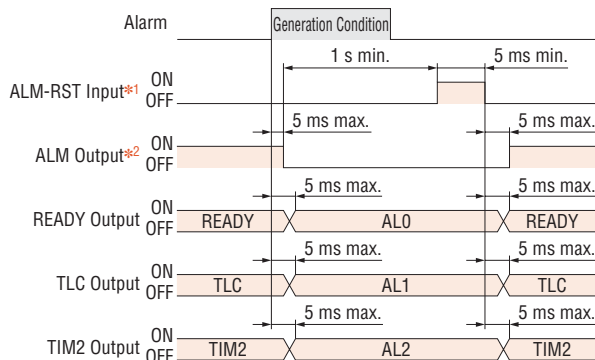


#### ● Using 24 VDC Power Supply



\*The specific time varies depending on the timing at which the C-ON input is turned ON.

#### ◇ AL0/AL1/AL2 Output



\*1 Alarms are reset at the ON → OFF edge of the signal. To reset an alarm, always resolve the cause of the alarm and then input this signal.

\*2 The signal logic is normally closed. The signal remains ON in a normal condition, and turns OFF when an alarm generates.

# List of Motor and Driver Combinations

Model names for motor and driver combinations are shown below.

## ● Single-Phase 100-115 VAC

Type	Model	Motor Model	Driver Model
Standard Type	AR46□A-◇*1	ARM46□C	ARD-A
	AR66□A-◇*1	ARM66□C	
	AR69□A-◇*1	ARM69□C	
	AR98□A-◇*1	ARM98□C	
	AR911□A-◇*2	ARM911□C	
TH Geared Type	AR46□A-T3.6-◇	ARM46□C-T3.6	ARD-A
	AR46□A-T7.2-◇	ARM46□C-T7.2	
	AR46□A-T10-◇	ARM46□C-T10	
	AR46□A-T20-◇	ARM46□C-T20	
	AR46□A-T30-◇	ARM46□C-T30	
	AR66□A-T3.6-◇	ARM66□C-T3.6	
	AR66□A-T7.2-◇	ARM66□C-T7.2	
	AR66□A-T10-◇	ARM66□C-T10	
	AR66□A-T20-◇	ARM66□C-T20	
	AR66□A-T30-◇	ARM66□C-T30	
	AR98□A-T3.6-◇	ARM98□C-T3.6	
	AR98□A-T7.2-◇	ARM98□C-T7.2	
	AR98□A-T10-◇	ARM98□C-T10	
	AR98□A-T20-◇	ARM98□C-T20	
	AR98□A-T30-◇	ARM98□C-T30	
PL Geared Type	AR46□A-P5-◇	ARM46□C-P5	ARD-A
	AR46□A-P7.2-◇	ARM46□C-P7.2	
	AR46□A-P10-◇	ARM46□C-P10	
	AR46□A-P25-◇	ARM46□C-P25	
	AR46□A-P36-◇	ARM46□C-P36	
	AR46□A-P50-◇	ARM46□C-P50	
	AR66□A-P5-◇	ARM66□C-P5	
	AR66□A-P7.2-◇	ARM66□C-P7.2	
	AR66□A-P10-◇	ARM66□C-P10	
	AR66□A-P25-◇	ARM66□C-P25	
	AR66□A-P36-◇	ARM66□C-P36	
	AR66□A-P50-◇	ARM66□C-P50	
	AR98□A-P5-◇	ARM98□C-P5	
	AR98□A-P7.2-◇	ARM98□C-P7.2	
	AR98□A-P10-◇	ARM98□C-P10	
AR98□A-P25-◇	ARM98□C-P25		
AR98□A-P36-◇	ARM98□C-P36		
AR98□A-P50-◇	ARM98□C-P50		
PN Geared Type	AR46□A-N5-◇	ARM46□C-N5	ARD-A
	AR46□A-N7.2-◇	ARM46□C-N7.2	
	AR46□A-N10-◇	ARM46□C-N10	
	AR66□A-N5-◇	ARM66□C-N5	
	AR66□A-N7.2-◇	ARM66□C-N7.2	
	AR66□A-N10-◇	ARM66□C-N10	
	AR66□A-N25-◇	ARM66□C-N25	
	AR66□A-N36-◇	ARM66□C-N36	
	AR66□A-N50-◇	ARM66□C-N50	
	AR98□A-N5-◇	ARM98□C-N5	
	AR98□A-N7.2-◇	ARM98□C-N7.2	
	AR98□A-N10-◇	ARM98□C-N10	
	AR98□A-N25-◇	ARM98□C-N25	
	AR98□A-N36-◇	ARM98□C-N36	
	AR98□A-N50-◇	ARM98□C-N50	
Harmonic Geared Type	AR46□A-H50-◇	ARM46□C-H50	ARD-A
	AR66□A-H50-◇	ARM66□C-H50	
	AR66□A-H100-◇	ARM66□C-H100	
	AR98□A-H50-◇	ARM98□C-H50	
	AR98□A-H100-◇	ARM98□C-H100	

## ● Single-Phase 200-230 VAC

Type	Model	Motor Model	Driver Model
Standard Type	AR46□C-◇*1	ARM46□C	ARD-C
	AR66□C-◇*1	ARM66□C	
	AR69□C-◇*1	ARM69□C	
	AR98□C-◇*1	ARM98□C	
	AR911□C-◇*2	ARM911□C	
TH Geared Type	AR46□C-T3.6-◇	ARM46□C-T3.6	ARD-C
	AR46□C-T7.2-◇	ARM46□C-T7.2	
	AR46□C-T10-◇	ARM46□C-T10	
	AR46□C-T20-◇	ARM46□C-T20	
	AR46□C-T30-◇	ARM46□C-T30	
	AR66□C-T3.6-◇	ARM66□C-T3.6	
	AR66□C-T7.2-◇	ARM66□C-T7.2	
	AR66□C-T10-◇	ARM66□C-T10	
	AR66□C-T20-◇	ARM66□C-T20	
	AR66□C-T30-◇	ARM66□C-T30	
	AR98□C-T3.6-◇	ARM98□C-T3.6	
	AR98□C-T7.2-◇	ARM98□C-T7.2	
	AR98□C-T10-◇	ARM98□C-T10	
	AR98□C-T20-◇	ARM98□C-T20	
	AR98□C-T30-◇	ARM98□C-T30	
PL Geared Type	AR46□C-P5-◇	ARM46□C-P5	ARD-C
	AR46□C-P7.2-◇	ARM46□C-P7.2	
	AR46□C-P10-◇	ARM46□C-P10	
	AR46□C-P25-◇	ARM46□C-P25	
	AR46□C-P36-◇	ARM46□C-P36	
	AR46□C-P50-◇	ARM46□C-P50	
	AR66□C-P5-◇	ARM66□C-P5	
	AR66□C-P7.2-◇	ARM66□C-P7.2	
	AR66□C-P10-◇	ARM66□C-P10	
	AR66□C-P25-◇	ARM66□C-P25	
	AR66□C-P36-◇	ARM66□C-P36	
	AR66□C-P50-◇	ARM66□C-P50	
	AR98□C-P5-◇	ARM98□C-P5	
	AR98□C-P7.2-◇	ARM98□C-P7.2	
	AR98□C-P10-◇	ARM98□C-P10	
AR98□C-P25-◇	ARM98□C-P25		
AR98□C-P36-◇	ARM98□C-P36		
AR98□C-P50-◇	ARM98□C-P50		
PN Geared Type	AR46□C-N5-◇	ARM46□C-N5	ARD-C
	AR46□C-N7.2-◇	ARM46□C-N7.2	
	AR46□C-N10-◇	ARM46□C-N10	
	AR66□C-N5-◇	ARM66□C-N5	
	AR66□C-N7.2-◇	ARM66□C-N7.2	
	AR66□C-N10-◇	ARM66□C-N10	
	AR66□C-N25-◇	ARM66□C-N25	
	AR66□C-N36-◇	ARM66□C-N36	
	AR66□C-N50-◇	ARM66□C-N50	
	AR98□C-N5-◇	ARM98□C-N5	
	AR98□C-N7.2-◇	ARM98□C-N7.2	
	AR98□C-N10-◇	ARM98□C-N10	
	AR98□C-N25-◇	ARM98□C-N25	
	AR98□C-N36-◇	ARM98□C-N36	
	AR98□C-N50-◇	ARM98□C-N50	
Harmonic Geared Type	AR46□C-H50-◇	ARM46□C-H50	ARD-C
	AR66□C-H50-◇	ARM66□C-H50	
	AR66□C-H100-◇	ARM66□C-H100	
	AR98□C-H50-◇	ARM98□C-H50	
	AR98□C-H100-◇	ARM98□C-H100	

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

Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

\*1 Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the model names of **AR46**□□-◇, **AR66**□□-◇, **AR69**□□-◇ and **AR98**□□-◇.

\*2 Enter **A** (single shaft) or **B** (double shaft) in the box (□) within the model name of **AR911**□□-◇.

● Three-Phase 200-230 VAC

Type	Model	Motor Model	Driver Model
Standard Type	AR46□S-◇*1	ARM46□C	ARD-S
	AR66□S-◇*1	ARM66□C	
	AR69□S-◇*1	ARM69□C	
	AR98□S-◇*1	ARM98□C	
	AR911□S-◇*2	ARM911□C	
TH Geared Type	AR46□S-T3.6-◇	ARM46□C-T3.6	ARD-S
	AR46□S-T7.2-◇	ARM46□C-T7.2	
	AR46□S-T10-◇	ARM46□C-T10	
	AR46□S-T20-◇	ARM46□C-T20	
	AR46□S-T30-◇	ARM46□C-T30	
	AR66□S-T3.6-◇	ARM66□C-T3.6	
	AR66□S-T7.2-◇	ARM66□C-T7.2	
	AR66□S-T10-◇	ARM66□C-T10	
	AR66□S-T20-◇	ARM66□C-T20	
	AR66□S-T30-◇	ARM66□C-T30	
	AR98□S-T3.6-◇	ARM98□C-T3.6	
	AR98□S-T7.2-◇	ARM98□C-T7.2	
	AR98□S-T10-◇	ARM98□C-T10	
	AR98□S-T20-◇	ARM98□C-T20	
AR98□S-T30-◇	ARM98□C-T30		
PL Geared Type	AR46□S-P5-◇	ARM46□C-P5	ARD-S
	AR46□S-P7.2-◇	ARM46□C-P7.2	
	AR46□S-P10-◇	ARM46□C-P10	
	AR46□S-P25-◇	ARM46□C-P25	
	AR46□S-P36-◇	ARM46□C-P36	
	AR46□S-P50-◇	ARM46□C-P50	
	AR66□S-P5-◇	ARM66□C-P5	
	AR66□S-P7.2-◇	ARM66□C-P7.2	
	AR66□S-P10-◇	ARM66□C-P10	
	AR66□S-P25-◇	ARM66□C-P25	
	AR66□S-P36-◇	ARM66□C-P36	
	AR66□S-P50-◇	ARM66□C-P50	
	AR98□S-P5-◇	ARM98□C-P5	
	AR98□S-P7.2-◇	ARM98□C-P7.2	
	AR98□S-P10-◇	ARM98□C-P10	
	AR98□S-P25-◇	ARM98□C-P25	
	AR98□S-P36-◇	ARM98□C-P36	
	AR98□S-P50-◇	ARM98□C-P50	
PN Geared Type	AR46□S-N5-◇	ARM46□C-N5	ARD-S
	AR46□S-N7.2-◇	ARM46□C-N7.2	
	AR46□S-N10-◇	ARM46□C-N10	
	AR66□S-N5-◇	ARM66□C-N5	
	AR66□S-N7.2-◇	ARM66□C-N7.2	
	AR66□S-N10-◇	ARM66□C-N10	
	AR66□S-N25-◇	ARM66□C-N25	
	AR66□S-N36-◇	ARM66□C-N36	
	AR66□S-N50-◇	ARM66□C-N50	
	AR98□S-N5-◇	ARM98□C-N5	
	AR98□S-N7.2-◇	ARM98□C-N7.2	
	AR98□S-N10-◇	ARM98□C-N10	
	AR98□S-N25-◇	ARM98□C-N25	
	AR98□S-N36-◇	ARM98□C-N36	
AR98□S-N50-◇	ARM98□C-N50		
Harmonic Geared Type	AR46□S-H50-◇	ARM46□C-H50	ARD-S
	AR46□S-H100-◇	ARM46□C-H100	
	AR66□S-H50-◇	ARM66□C-H50	
	AR66□S-H100-◇	ARM66□C-H100	
	AR98□S-H50-◇	ARM98□C-H50	
AR98□S-H100-◇	ARM98□C-H100		

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

Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.

\*1 Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the model names of **AR46**□□-◇, **AR66**□□-◇, **AR69**□□-◇ and **AR98**□□-◇.

\*2 Enter **A** (single shaft) or **B** (double shaft) in the box (□) within the model name of **AR911**□□-◇.

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# Extended Functions

With the accessory control module **OPX-2A** or data setting software **MEXE02** (both sold separately), extended functions of the **AR** Series are available. You can change the internal parameters of the driver, perform test operation and monitor the operation.



Control Module (**OPX-2A**)  
→ Page 56

Data Setting Software (**MEXE02**)  
→ Page 56

## Parameter Setting

You can set the advanced settings of the signals and change the generation condition of the alarm.

Parameter Category	Parameter Name	Description	
Application Parameter	Operating current	Current value assigned to the operating current setting switch	
	Speed filter	Filter time constant assigned to the speed filter setting switch	
	I/O	Input signal mode	Positioning operation/push-motion operation switching
		Alarm code signal enabled/disabled	
		C-ON signal logic	
		Output condition for END signal (output width)	
	Normal mode	Standstill current in the normal mode	
		Speed difference gain in the normal mode	
	Current control mode	Position loop gain in the current control mode	
		Speed loop gain in the current control mode	
		Speed loop integral time constant in the current control mode	
		Damping control enabled/disabled in the current control mode	
		Damping control vibration frequency in the current control mode	
	Alarm/Warning	Operation data error warning enabled/disabled	
		Generation condition of excessive position deviation alarm at current on	
		Generation condition of excessive position deviation alarm at current off	
		Generation condition of overload alarm	
		Generation condition of excessive position deviation warning	
		Generation condition of overvoltage warning	
		Generation condition of undervoltage warning	
Generation condition of overheat warning			
Generation condition of overload warning			
Generation condition of overspeed warning			
Return to electrical home operation	Operating speed for return to electrical home operation		
	Acceleration/deceleration rate for return to electrical home operation		
	Starting speed for return to electrical home operation		
Test operation	Operating speed for test operation		
	Acceleration/deceleration rate for test operation		
	Starting speed for test operation		
Control module	Speed monitor display. Show the speed on the control module with a sign or as an absolute value		
	Gear ratio for geared motor used for speed monitor		
System Parameter (Becomes effective after the power is cycled)	Electronic gear	Resolution assigned to each resolution switch	
	Operation setting	Pulse input mode	
Smooth drive enabled/disabled			
Initial motor excitation position at power on. Detected position/electrical angle 0° switching			
Automatic return operation at current ON enabled/disabled			
	Motor rotation direction		

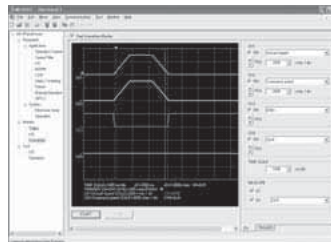
## Monitoring

You can monitor various signals, alarms and motor speeds/positions, and also perform test operation.

Function	Available Functions
Monitoring	Monitor positions Monitor speeds Monitor I/Os
Waveform monitoring*	Monitor positions* Monitor speeds* Measure waveforms* Save waveforms*
Test	Perform test operation (JOG operation) Monitor conditions during test operation Perform return to electrical home operation Forcibly turn output signals ON/OFF
Alarm	Check information on alarms that generated Check alarm history (10 most recent alarms) Clear alarm history Cancel
Warning	Check information on warnings that generated Check warning history (10 most recent warnings) Clear warning history

### Waveform Monitoring\*

You can monitor various signals and motor speeds/positions using waveforms.



### Other

Electrical home reset  
Parameter initialization

\* This function is available only when the data setting software (**MEXE02**) is used.

# How to Read Specifications Table

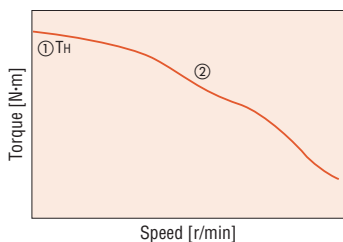
Model	Standard (Single shaft)	AR46A□-◇	AR46A□-N5-◇
	Standard (Double shaft) <sup>*4</sup>	AR46B□-◇	—
	Electromagnetic Brake	AR46M□-◇	AR46M□-N5-◇
① Maximum Holding Torque	N·m	0.3	1.35
② Rotor Inertia	J: kg·m <sup>2</sup>	58×10 <sup>-7</sup> [73×10 <sup>-7</sup> ] <sup>*1</sup>	58×10 <sup>-7</sup> [73×10 <sup>-7</sup> ] <sup>*1</sup>
③ Backlash	arc min (deg)	—	2 (0.0334°)
④ Angular Transmission Error	arc min (deg)	—	6 (0.1°)
⑤ Permissible Speed Range	r/min	—	0~600
⑥ Gear Ratio		—	1~5
⑦ Resolution	Resolution Setting: 1000 P/R	0.36°/Pulse	0.072°/Pulse
⑧ Permissible Torque	N·m	—	1.35
⑨ Maximum Torque <sup>*5</sup>	N·m	—	1.5
⑩ Power Source	Voltage/Frequency	Single-Phase 100-115 VAC	-15%~+10% 50/60 Hz
		Single-Phase 200-230 VAC	-15%~+10% 50/60 Hz
		Three-Phase 200-230 VAC	-15%~+10% 50/60 Hz
Maximum Input Current A	Single-Phase 100-115 VAC	2.9	
	Single-Phase 200-230 VAC	1.9	
	Three-Phase 200-230 VAC	1	
⑪ Control Power Supply		24 VDC ±5% 0.5 A	
Electromagnetic Brake <sup>*3</sup>	Type	Active when power is off	
	Power Supply Input	24 VDC ±65% <sup>*2</sup>	
	Power Consumption W	2	
	Excitation Current A	0.08	
⑫ Static Friction Torque	N·m	0.15	0.68
	Motor kg	0.47 [0.62] <sup>*1</sup>	0.73 [0.88] <sup>*1</sup>
Mass	Driver kg	0.75	
	Motor	[1] [4] <sup>*1</sup>	[19] [22] <sup>*1</sup>
Dimension No.	Driver	[31]	[31]
	Cable	[32]	[32]

- \*1 The values inside the brackets [ ] represent the specification for the electromagnetic brake type.
- \*2 If the distance between the motor and driver is extended to 20 m or longer, use a power supply of 24 VDC ±4%.
- \*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used for braking. Also, a separate power supply is required for the electromagnetic brakes.
- \*4 With a double shaft model, the output shaft located on the opposite side of the motor output shaft is used to install the slit disk. Do not apply any load torque, overhung load or thrust load on this output shaft.
- \*5 The value of maximum torque is for gear. For output torque for geared motor, refer to the speed – torque characteristics.

- ① **Maximum Holding Torque**  
The holding torque is the maximum holding power (torque) the stepping motor has when power (rated current) is being supplied but the motor is not rotating (with consideration given to the permissible strength of the gear when applicable). At motor standstill, the driver's "Automatic Current Cutback" function reduces the maximum holding torque by approximately 50%.
- ② **Rotor Inertia**  
This refers to the inertia of rotor inside the motor. This is necessary when the required torque (acceleration torque) for the motor needs is calculated.
- ③ **Backlash**  
The play of gear output shaft when the motor shaft is fixed. When positioning in bi-direction, the positioning accuracy is affected.
- ④ **Angular Transmission Error (PN geared type only)**  
Angular transmission error is the difference between the theoretical angle of rotation of the output shaft, as calculated from the input pulse count, and actual angle of rotation.
- ⑤ **Permissible Speed Range**  
This is the rotation speed that the motor can be operated at with the gear output shaft.
- ⑥ **Gear Ratio**  
This is the ratio in rotation speed between the input speed from the motor and the speed of the gear output shaft. For example, the gear ratio 1:10 is that when the input speed from the motor is 10 r/min, the gear output shaft is 1 r/min.
- ⑦ **Resolution**  
The resolution is the angular distance (in degrees) that the motor moves at the input of one pulse from the driver. It differs depending on the motor structure and excitation system.
- ⑧ **Permissible Torque**  
The permissible torque represents the torque value limited by the mechanical strength of the gear when operated at a constant speed. For the types excluding **PN** and Harmonic geared type, the total torque including acceleration/deceleration torque should not exceed this value.
- ⑨ **Maximum Torque (PN geared, harmonic geared type only)**  
This is the maximum torque that can be used instantaneously (for a short time). During acceleration/deceleration, the motor can be operated up to this value.
- ⑩ **Power Source**  
The current value of the power input is the maximum input current value. (The input current varies according to the rotation speed.)
- ⑪ **Control Power**  
Required to separate the main power from the control power.
- ⑫ **Static Friction Torque**  
The electromagnetic brake specifications. This is the maximum holding torque at which the electromagnetic brake can hold the position.

# How to Read Speed – Torque Characteristics

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



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

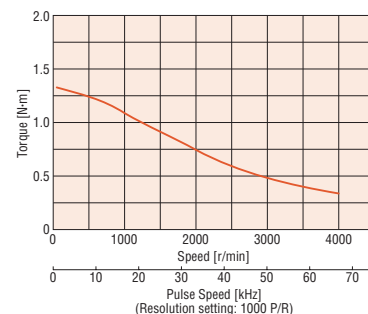
## ① Maximum Holding Torque

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

## ② Pullout Torque

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

The following figure shows the speed – torque characteristics of the **AR Series AR66AA-◇**.



- 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.

# Accessories (Sold separately)

## Control Module RoHS

Extended functions of the **AR** Series are available. You can change the internal parameters or set the push-motion operation.



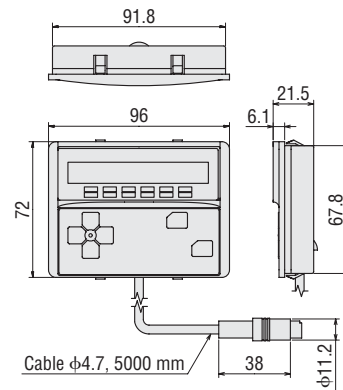
### Product Line

Model
<b>OPX-2A</b>

### Dimensions (Unit = mm)

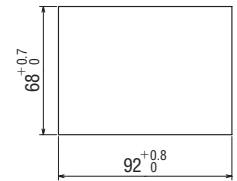
#### Control Module

Mass: 0.25 kg



#### Panel Cut-Out for Control Module

(Thickness of the mounting plate: 1 to 3 mm)



## Data Setting Software RoHS

Extended functions of the **AR** Series are available. You can change the internal parameters or set the push-motion operation using a PC.



### Product Line

Model
<b>MEXE02</b>

(PC interface cable of 5 m and USB cable of 0.5 m are included)

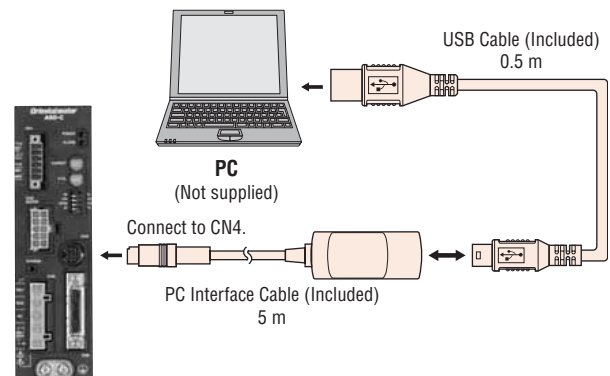
### Operating Software

Windows® 2000 Professional, Service Pack 4 or later  
Windows® XP Home Edition, Service Pack 2 or later  
Windows® XP Professional, Service Pack 2 or later

### Computer

CPU	Pentium III 500 MHz or more (The OS must be supported.)
Display Resolution	XGA (1024 × 768) or higher resolution video adapter and monitor
Memory	Windows® 2000: 128 MB or more (192 MB or more is recommended.) Windows® XP Home Edition or Professional: 256 MB or more
Free Hard Disk Space	Free disk space of 160 MB or more
USP Port	USB 1 port
Disk Device	CD-ROM drive

### Connection between Computer and Driver





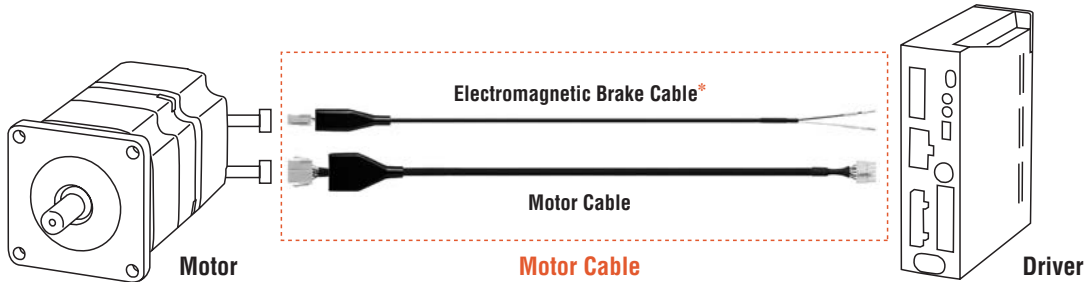
# Motor Cables RoHS

## Extension Cables RoHS

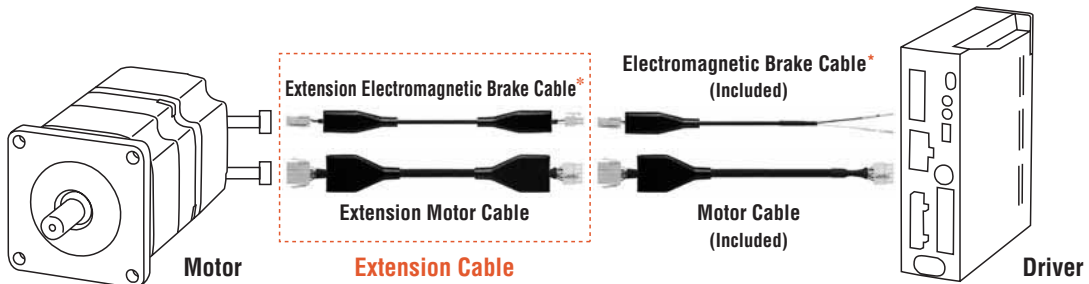
The **AR** Series comes with a cable of 1 m, 2 m or 3 m for a connection between the motor and driver. When it is necessary to have a connection more than 5 m between motor and driver, the motor cable or extension cable must be used. Use a flexible motor cable if the cable will be flexed.

### System Configuration

#### Using a Motor Cable (Not using a cable included in the **AR** Series)



#### Using an Extension Cable (Using a cable included in the **AR** Series)



\* Electromagnetic brake cable and extension electromagnetic cable are for electromagnetic brake motors.

**Note:**

- Keep the cable length below 30 m when connecting a cable included in the **AR** Series and an extension cable.

### Type of Cables

#### Motor Cables

Cable Category	Cable Type	Contents
Standard Cable	Motor Cable	Motor Cable
	Cable set for electromagnetic brake motor	Motor cable Electromagnetic brake motor
Flexible Cable	Flexible motor cable	Flexible motor cable
	Flexible cable set for electromagnetic brake motor	Flexible motor cable Flexible electromagnetic brake cable

#### Extension Cables

Cable Category	Cable Type	Contents
Standard Extension Cable	Extension motor cable	Extension motor cable
	Extension cable set for electromagnetic brake motor	Extension motor cable Extension electromagnetic brake cable
Flexible Extension Cable	Flexible extension motor cable	Flexible extension motor cable
	Flexible extension cable set for electromagnetic brake motor	Flexible extension motor cable Flexible extension electromagnetic brake cable

● Flexible Cable: A flexible cable offering excellent flexibility. Use this cable when the cable is bent and flexed.

● Cable Set for Electromagnetic Brake Motor: Choose the cable set for electromagnetic brake motor consisting of a motor cable and an electromagnetic brake cable for electromagnetic brake motors.

## Product Line

- ◇ Motor Cables
- Motor Cables



Motor Cable

Model	Length L (m)
<b>CC050VAF</b>	5
<b>CC070VAF</b>	7
<b>CC100VAF</b>	10
<b>CC150VAF</b>	15
<b>CC200VAF</b>	20
<b>CC300VAF</b>	30

- Flexible Motor Cables



Flexible Motor Cable

Model	Length L (m)
<b>CC010VAR</b>	1
<b>CC020VAR</b>	2
<b>CC030VAR</b>	3
<b>CC050VAR</b>	5
<b>CC070VAR</b>	7
<b>CC100VAR</b>	10
<b>CC150VAR</b>	15
<b>CC200VAR</b>	20
<b>CC300VAR</b>	30

- ◇ Extension Cables

- Extension Motor Cables



Extension Motor Cable

Model	Length L (m)
<b>CC010VAFT</b>	1
<b>CC020VAFT</b>	2
<b>CC030VAFT</b>	3
<b>CC050VAFT</b>	5
<b>CC070VAFT</b>	7
<b>CC100VAFT</b>	10
<b>CC150VAFT</b>	15
<b>CC200VAFT</b>	20

- Flexible Extension Motor Cables



Flexible Extension Motor Cable

Model	Length L (m)
<b>CC010VART</b>	1
<b>CC020VART</b>	2
<b>CC030VART</b>	3
<b>CC050VART</b>	5
<b>CC070VART</b>	7
<b>CC100VART</b>	10
<b>CC150VART</b>	15
<b>CC200VART</b>	20

- Cable Set for Electromagnetic Brake Motor



Motor Cable



Electromagnetic Brake Cable

Model	Length L (m)
<b>CC050VAFB</b>	5
<b>CC070VAFB</b>	7
<b>CC100VAFB</b>	10
<b>CC150VAFB</b>	15
<b>CC200VAFB</b>	20
<b>CC300VAFB</b>	30

- Flexible Cable Set for Electromagnetic Brake Motor



Flexible Motor Cable



Flexible Electromagnetic Brake Cable

Model	Length L (m)
<b>CC010VARB</b>	1
<b>CC020VARB</b>	2
<b>CC030VARB</b>	3
<b>CC050VARB</b>	5
<b>CC070VARB</b>	7
<b>CC100VARB</b>	10
<b>CC150VARB</b>	15
<b>CC200VARB</b>	20
<b>CC300VARB</b>	30

- Extension Cable Set for Electromagnetic Brake Motor



Extension Motor Cable



Extension Electromagnetic Brake Cable

Model	Length L (m)
<b>CC010VAFBT</b>	1
<b>CC020VAFBT</b>	2
<b>CC030VAFBT</b>	3
<b>CC050VAFBT</b>	5
<b>CC070VAFBT</b>	7
<b>CC100VAFBT</b>	10
<b>CC150VAFBT</b>	15
<b>CC200VAFBT</b>	20

- Flexible Extension Cable Set for Electromagnetic Brake Motor



Flexible Extension Motor Cable



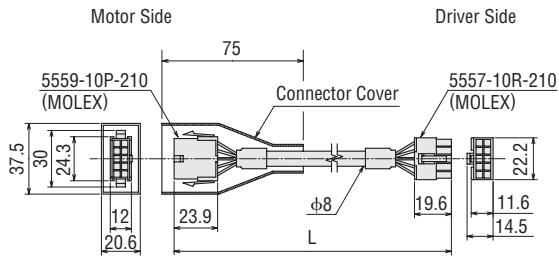
Flexible Extension Electromagnetic Brake Cable

Model	Length L (m)
<b>CC010VARBT</b>	1
<b>CC020VARBT</b>	2
<b>CC030VARBT</b>	3
<b>CC050VARBT</b>	5
<b>CC070VARBT</b>	7
<b>CC100VARBT</b>	10
<b>CC150VARBT</b>	15
<b>CC200VARBT</b>	20

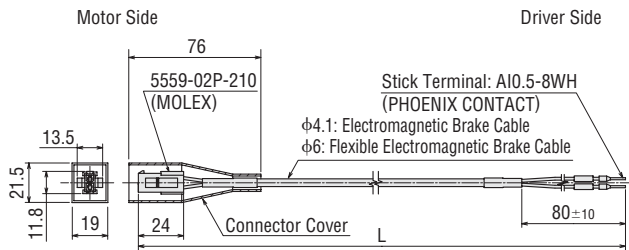
## Dimensions (Unit = mm)

### ● Motor Cables

#### ◇ Motor Cable, Flexible Motor Cable

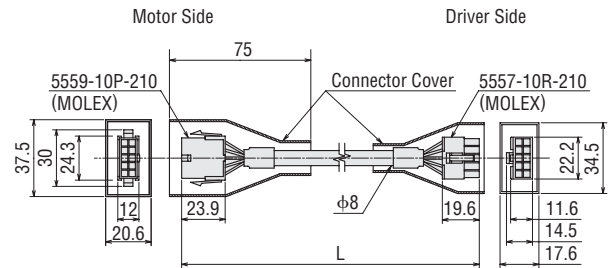


#### ◇ Electromagnetic Brake Cable, Flexible Electromagnetic Brake Cable

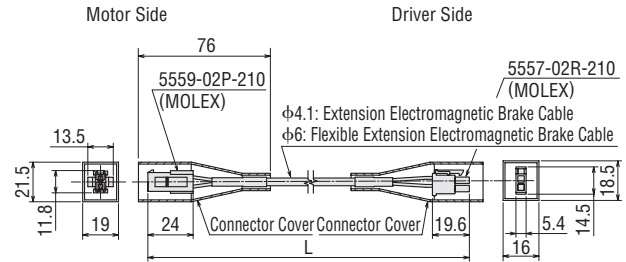


### ● Extension Cables

#### ◇ Extension Motor Cable, Flexible Extension Motor Cable

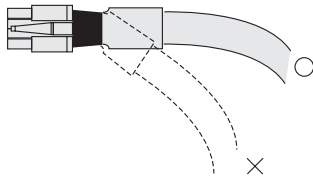


#### ◇ Extension Electromagnetic Brake Cable, Flexible Extension Electromagnetic Brake Cable

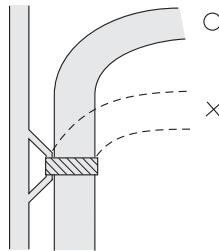


## Notes on Use of a Flexible Cable

① Do not allow the cable to bend at the cable connector.

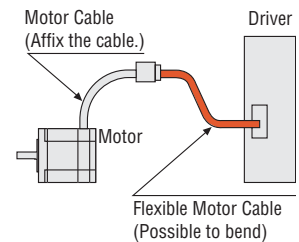


② Keep the bending radius to 60 mm or more.

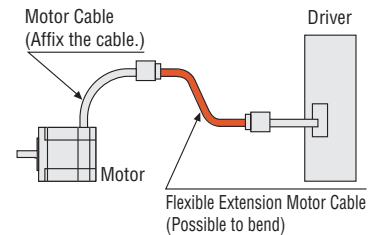


③ The motor cable and extension motor cable are not a flexible cable. If the cable is to be bent, bend it at the flexible motor cable or flexible extension motor cable.

#### · Flexible Motor Cable



#### · Flexible Extension Motor Cable



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# Driver Cables

## 1 General-Purpose Type RoHS



This is a shielded cable equipped with, at one end of the cable, the half-pitch connector that snaps into the driver.

### Notes:

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

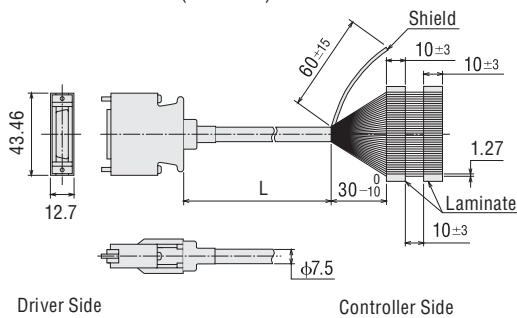
### Product Line

Model	Applicable Connector	Length L (m)
CC36D1-1	CN5 (36 pins)	1
CC36D2-1		2

### Dimensions (Unit = mm)

#### CC36D1-1, CC36D2-1

Conductor: AWG28 (0.08 mm<sup>2</sup>)



## 2 Connector – Terminal Block Conversion Unit RoHS



CC36T1

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

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

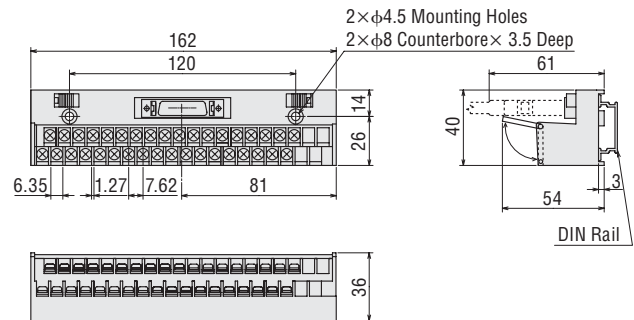
### Product Line

Model	Applicable Connector	Length (m)
CC36T1	CN5 (36 pins)	1

### Dimensions (Unit = mm)

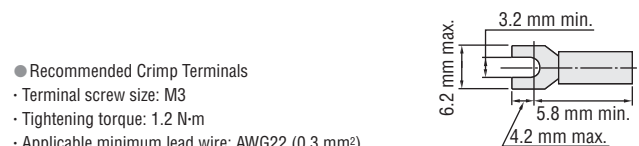
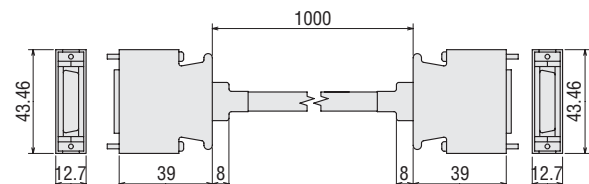
#### CC36T1

CAD B438



#### Terminal Block Pin No.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----



- Recommended Crimp Terminals
  - Terminal screw size: M3
  - Tightening torque: 1.2 N·m
  - Applicable minimum lead wire: AWG22 (0.3 mm<sup>2</sup>)

### Note:

- Round terminals cannot be used.



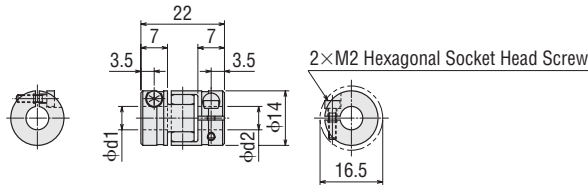
# Specifications

Model	Dimensions							Normal Torque N·m	Mass g	Inertia kg·m <sup>2</sup>	Static Torsion Spring Constant N·m/rad	Permissible Eccentricity mm	Permissible Declination deg	Permissible End Play mm
	Outer Diameter φA mm	Length W mm	Shaft Hole Diameter d1 H7 mm	Shaft Hole Diameter d2 H7 mm	Key Slot Tolerance b/t mm	L mm	Screw Used M							
MCS140406 MCS140506 MCS140606	14	22	4 5 6	6 6 6	-	7	M2	2.0	6.7	0.184×10 <sup>-6</sup>	22.9	0.06	0.9	+0.6 0
MCS200506 MCS200606 MCS2006F04 MCS200608 MCS200610	20	30	5 6 6 6	6 6 6.35 8 10	-	10	M2.5	5.0	19.8	1.059×10 <sup>-6</sup>	51.6	0.08	0.9	+0.8 0
MCS300606 MCS3006F04 MCS300608 MCS300610 MCS30F0408 MCS30F0410 MCS300808 MCS300810 MCS300812 MCS301010 MCS301012 MCS301014 MCS301214 MCS301414 MCS301416	30	35	6 6 6 6 6.35 6.35 8 8 8 10 10 10 10 12 12 14 14 14	6 6.35 8 8 8 10 10 10 12 12 12 14 14 14 16	-	11	M3	12.5	44.6	6.057×10 <sup>-6</sup>	171.9	0.09	0.9	+1 0
MCS400808 MCS400810 MCS400812 MCS400815 MCS401010 MCS401012 MCS401015 MCS401212 MCS401215	40	66	8 8 8 8 10 10 10 12 12 12	8 10 12 15 10 12 15 12 12 15	φ8 b : 2±0.0125 t : 1 <sup>+0.1</sup> <sub>0</sub> φ10 b : 3±0.0125 t : 1.4 <sup>+0.1</sup> <sub>0</sub> φ12 b : 4±0.015 t : 1.8 <sup>+0.1</sup> <sub>0</sub> φ14 b : 5±0.015 t : 2.3 <sup>+0.1</sup> <sub>0</sub> φ15 b : 5±0.015 t : 2.3 <sup>+0.1</sup> <sub>0</sub>	25	M6	17.0	139	42.29×10 <sup>-6</sup>	859.5	0.06	0.9	+1.2 0
MCS551212 MCS551214 MCS551215 MCS551216	55	78	12 12 12 12	12 12 15 16	φ16 b : 5±0.015 t : 2.3 <sup>+0.1</sup> <sub>0</sub> φ18 b : 6±0.015 t : 2.8 <sup>+0.1</sup> <sub>0</sub>	30	M6	60.0	282	109.1×10 <sup>-6</sup>	2063	0.1	0.9	+1.4 0
MCS651618 MCS651818 MCS651820 MCS651825	65	90	16 18 18 18	18 18 20 25	φ20 b : 6±0.015 t : 2.8 <sup>+0.1</sup> <sub>0</sub> φ25 b : 8±0.018 t : 3.3 <sup>+0.2</sup> <sub>0</sub>	35	M8	160	535	417.1×10 <sup>-6</sup>	3438	0.11	0.9	11.5 0

## Dimensions (Unit = mm)

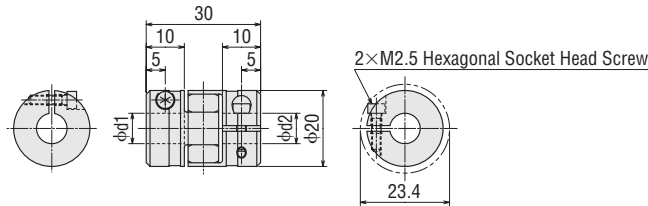
### MCS14

Mass: 6.7 g



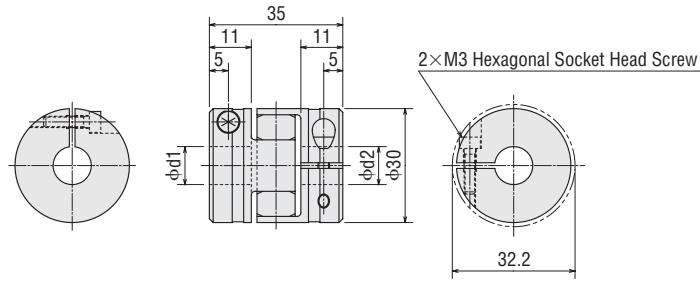
### MCS20

Mass: 19.8 g



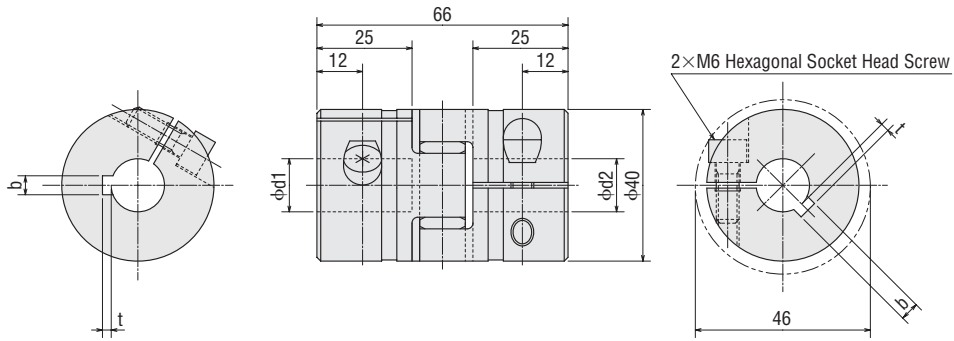
### MCS30

Mass: 44.6 g



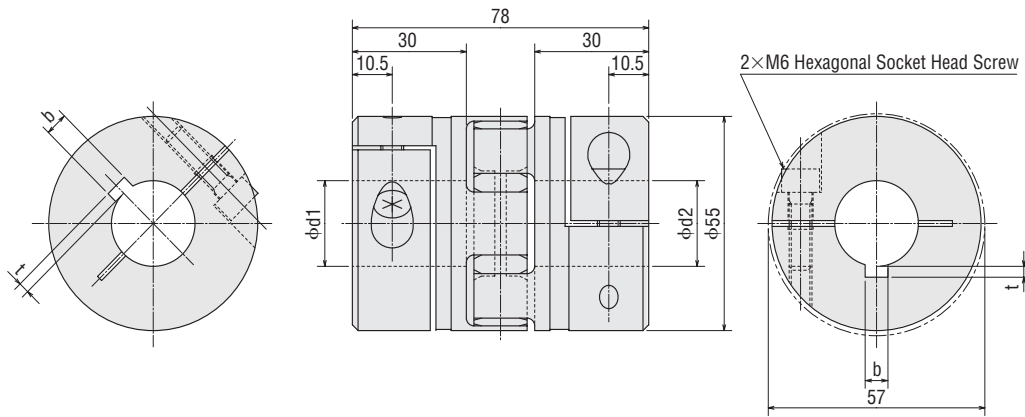
### MCS40

Mass: 139 g



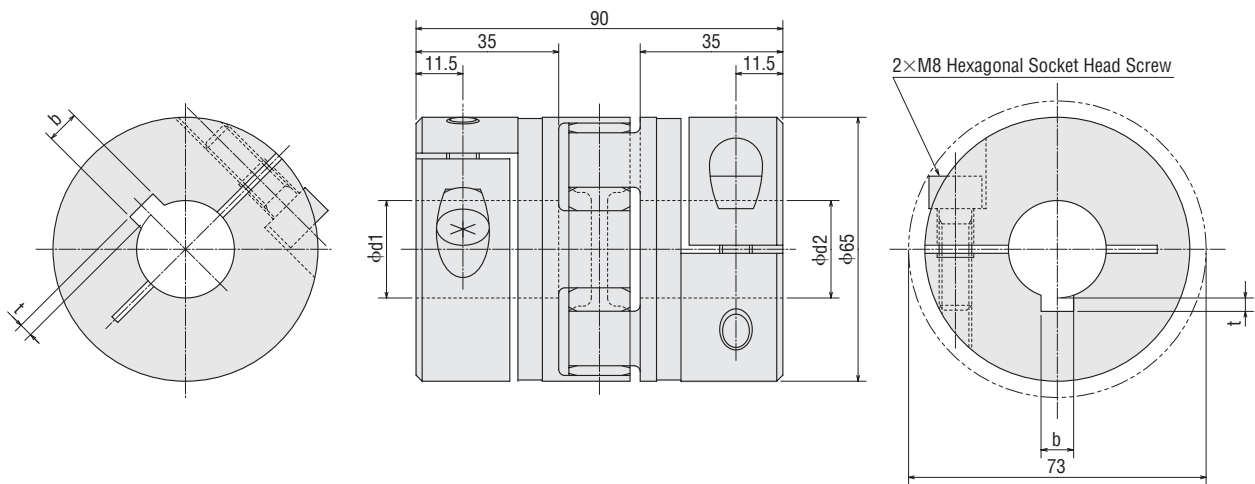
### MCS55

Mass: 282 g



### MCS65

Mass: 535 g



Features

Lineup

System Configuration

Safety Standards and CE Marking

Product Line

Specifications and Characteristics

Dimensions

Connection and Operation

List of Motor and Driver Combinations

Extended Functions

How to Read Specifications and Characteristics

Accessories

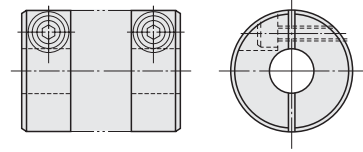
Installation

Controller

## Mounting to a Shaft

### Clamp Type

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

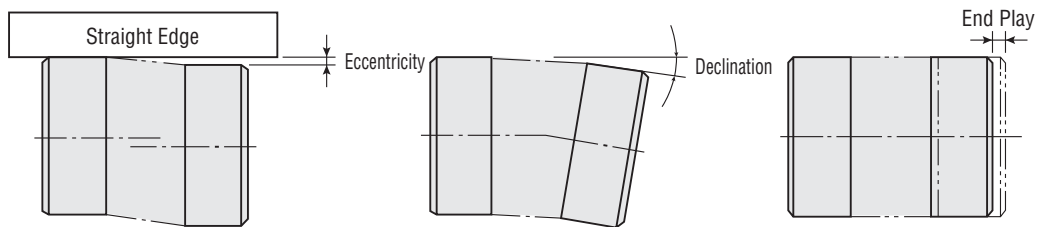


Type		MCS14	MCS20	MCS30	MCS40	MCS55	MCS65
Tightening Torque	N·m	0.37	0.76	1.34	10.5	10.5	25.0

## Alignment Adjustment

Flexible couplings tolerate misalignment of the axis center and transfer rotational angle and torque, but produce vibration when the permissible value for misalignment is exceeded. This can dramatically shorten the coupling's service life. This requires alignment adjustment.

Misalignment of the axis center includes eccentricity (parallel error of both centers), declination (angular error of both centers) and end play (shaft movement in the axial direction). To keep misalignment within the permissible value, always check and adjust the alignment. To increase the service life of the coupling, we recommend keeping misalignment below 1/3 of the permissible value.



### Notes:

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



# Motor Mounting Brackets RoHS

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

## Product Line

### Standard Type

Material: Aluminum alloy

Model	Applicable Product
<b>PAF0P</b>	<b>AR46</b> □ □ -◇
<b>PAL0P</b>	<b>AR46</b> □ □ -◇
<b>PAL2P-5</b>	<b>AR66</b> □ □ -◇
	<b>AR69</b> □ □ -◇
<b>PAL4P-5</b>	<b>AR98</b> □ □ -◇
	<b>AR91 1</b> □ □ -◇*

- Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the model name.  
Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.
- The mounting bracket base is built with holes large enough to allow for alignment adjustments in the horizontal direction.
- These mounting brackets can be perfectly fitted to the pilot of the stepping motors. (Except for **PAL0P**)
- \* Enter **A** (single shaft) or **B** (double shaft) in the box (□) within the model name of **AR91 1** □ □ -◇.

#### Note:

- They cannot be used with geared stepping motors.

### Geared Type

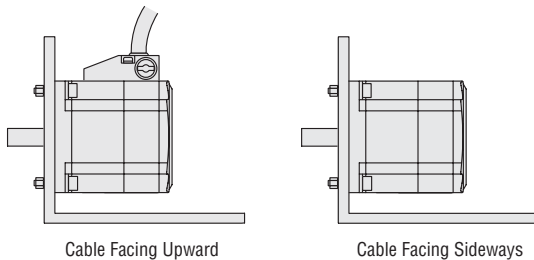
Material: Aluminum alloy

Model	Applicable Product
<b>SOLOB</b>	<b>AR46</b> □ □ - <b>T</b> -◇
	<b>AR46</b> □ □ - <b>P</b> -◇
<b>SOL2A</b>	<b>AR66</b> □ □ - <b>T</b> -◇
<b>SOL2B</b>	<b>AR66</b> □ □ - <b>P</b> -◇
<b>SOL5B</b>	<b>AR98</b> □ □ - <b>T</b> -◇
	<b>AR98</b> □ □ - <b>P</b> -◇

- Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the model name.  
Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.
- The mounting bracket base is built with holes large enough to allow for alignment adjustments in the horizontal direction.
- No screws are supplied for installing **SOLOB** and **SOL5B**. Appropriate screws must be purchased separately.

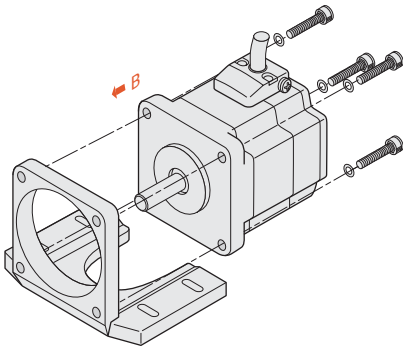
## Motor Installation Direction

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



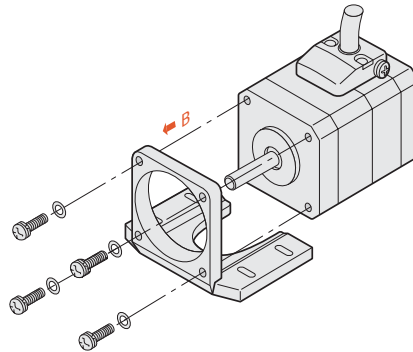
## Mounting the Motor

### 1 PAL2P-5, PAL4P-5



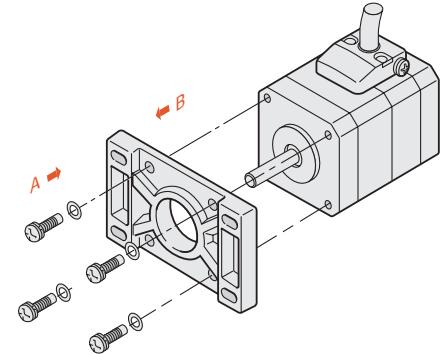
- ① Use the screws to secure the motor to the mounting bracket.
- ② Attach the motor from the direction shown by the arrow (B).

### 2 PAL0P, SOLOB, SOL2A, SOL2B, SOL5B



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

### 3 PAFOP

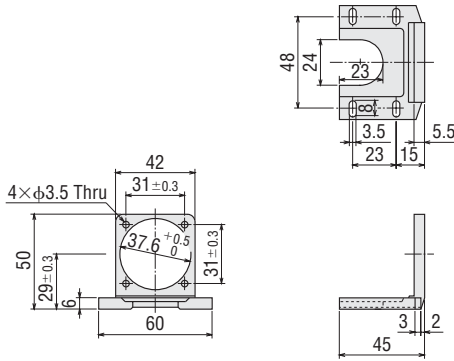


- ① Use the screws to secure the motor to the mounting bracket.
- ② Motor can be attached from either side (A, B).

## Dimensions (Unit = mm)

### PAL0P

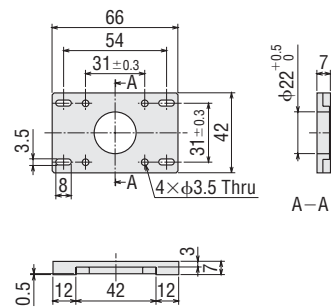
Mass: 35 g  
CAD B139



- Screws (Included)  
M3 Length 7 mm -- 4 pieces

### PAFOP

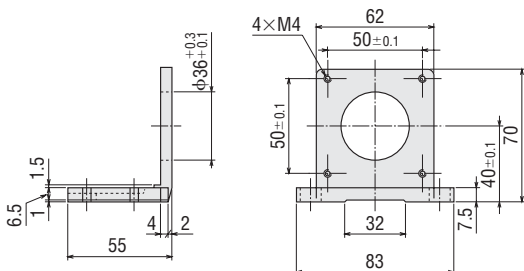
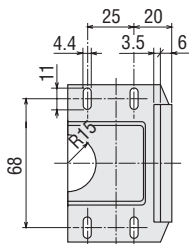
Mass: 30 g  
CAD B140



- Screws (Included)  
M3 Length 7 mm -- 4 pieces

### PAL2P-5

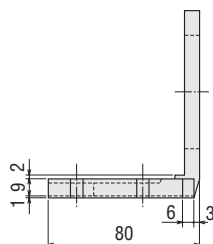
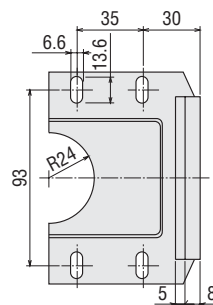
Mass: 110 g  
CAD B143



- Screws (Included)  
M4 Length 12 mm -- 4 pieces

### PAL4P-5

Mass: 250 g  
CAD B145

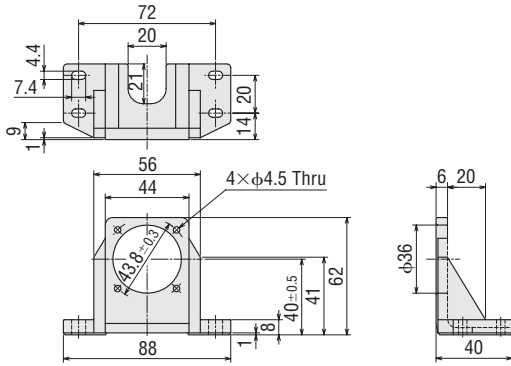


- Screws (Included)  
M5 Length 16 mm -- 4 pieces

### SOL0B

Mass: 85 g

CAD B267



### SOL2A

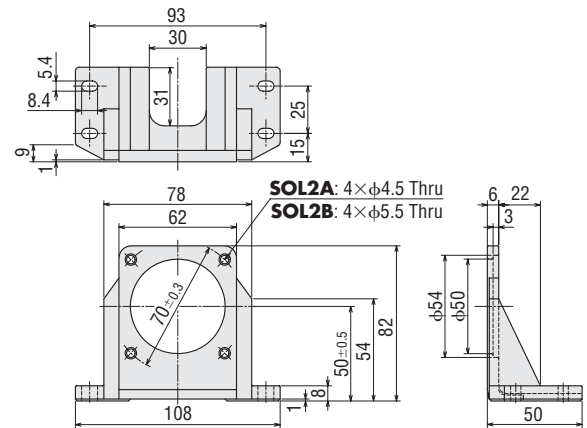
Mass: 120 g

CAD B268

### SOL2B

Mass: 120 g

CAD B269

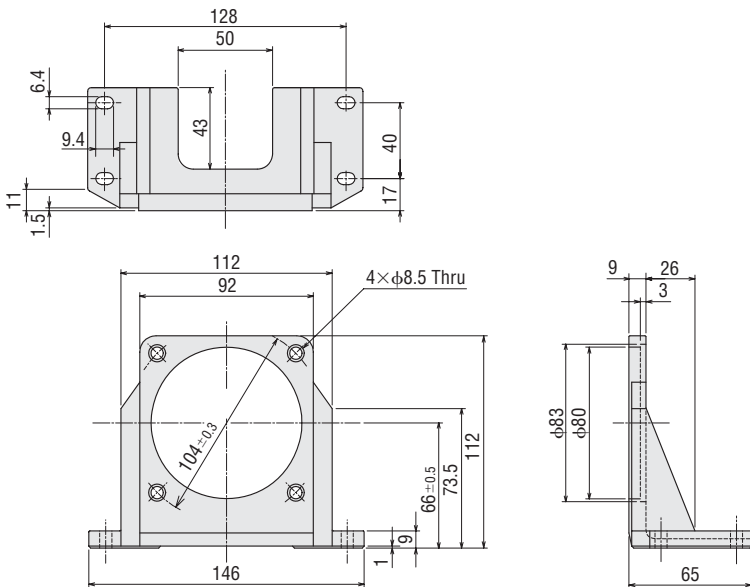


- Screws (Included)  
M4 Length 12 mm (**SOL2A**) ... 4 pieces  
M5 Length 15 mm (**SOL2B**) ... 4 pieces

### SOL5B

Mass: 270 g

CAD B271



## Regeneration Unit RoHS

Use this unit if your system requires quick acceleration during a vertical operation, or must drive a large inertial load at high speed, and an overvoltage alarm has been output.



### Product Line

Model
<b>RGB100</b>

Features

Lineup

System Configuration

Safety Standards and CE Marking

Product Line

Specifications and Characteristics

Dimensions

Connection and Operation

List of Motor and Driver Combinations

Extended Functions

How to Read Specifications and Characteristics

Accessories

Installation

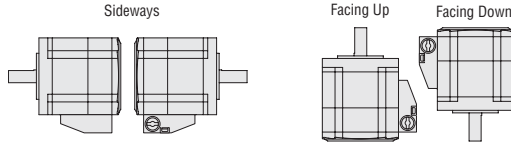
Controller

# Installation

## Motor Installation

### Installation Direction

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



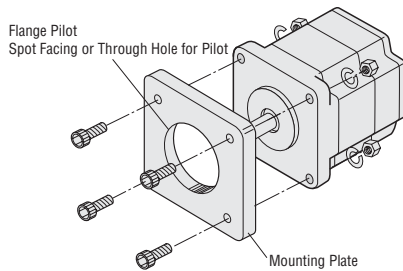
#### Notes:

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

### Installation Method

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

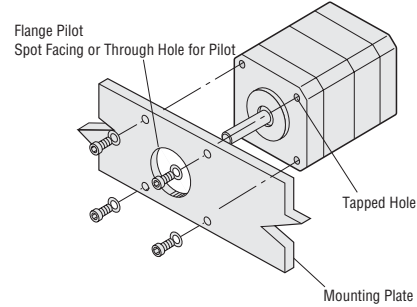
#### Installation Method for Through Hole Type



Model	Thickness of the Mounting Plate
AR66□□-◇ AR69□□-◇	5 mm min.
AR98□□-◇ AR911□□-◇*1	8 mm min.
AR98□□-H□-◇*2	12 mm min.

- Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the model name.  
Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
Enter the gear ration in the box (■) within the model name.  
Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.
- \*1 Enter **A** (single shaft) or **B** (double shaft) in the box (□) within the model name of **AR911□□-◇**.
- \*2 Enter **A** (single shaft) or **M** (electromagnetic brake) in the box (□) within the model name of **AR98□□-H□-◇**.

#### Installation Method for Tapped Hole Type



Model	Thickness of the Mounting Plate
AR46□□-◇*	3 mm min.
AR46□□-T□-◇ AR46□□-P□-◇ AR46□□-N□-◇ AR46□□-H□-◇ AR66□□-T□-◇ AR66□□-P□-◇ AR66□□-N□-◇ AR66□□-H□-◇ AR98□□-T□-◇ AR98□□-P□-◇ AR98□□-N□-◇	5 mm min.
	8 mm min.
	12 mm min.

- Enter **A** (single shaft) or **M** (electromagnetic brake) in the box (□) within the model name.  
Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.  
Enter the gear ration in the box (■) within the model name.  
Enter the length of included cable **1** (1 m), **2** (2 m) or **3** (3 m) in the box (◇) within the model name.
- \* Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the model name of **AR46□□-◇**.

### Installation Conditions

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

- Indoors (This product is designed and manufactured to be installed within another device.)
- Ambient temperature:  $-10$  to  $+50^{\circ}\text{C}$  (non-freezing)\*  
: Standard type, **TH/PL/PN** geared type  
:  $0$  to  $+40^{\circ}\text{C}$  (non-freezing)\*  
: Harmonic geared type
- \* When a heat sink of a capacity at least equivalent to an aluminum plate with a size of  $250 \times 250$  mm, 6 mm thick is installed.
- Ambient humidity: 85% or less (non-condensing)
- Not exposed to explosive, flammable or corrosive gases
- Not exposed to direct sunlight
- Not exposed to dust
- Not exposed to water or oil
- A place where heat can escape easily
- Not exposed to continuous vibration or excessive impact

#### Notes:

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

## Driver Installation

### Installation Direction and Method

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

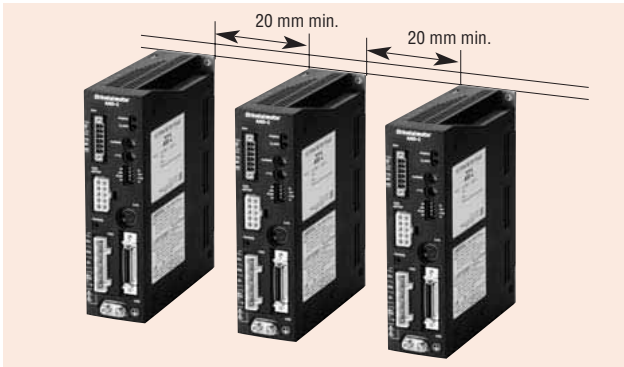


- Firmly install on a metal plane that has good heat conductivity, such as iron or aluminum 2 mm or more in thickness.
- To directly install the driver without using the mounting brackets and screws provided, pay particular attention to the length of the screws used for the tapped holes. For the **AR** Series, the use of screw that would penetrate 4 mm or more through the surface of the driver may cause damage to the driver.

### Using Multiple Axes

When using multiple stepping motor axes, driver temperature rise will cause ambient temperatures to rise. At least 20 mm must be allowed between driver units and at least 25 mm between drivers and other equipment or structures.

Install a forced-air cooling fan if ambient temperatures exceed 50 °C.



### Installation Conditions

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

- Indoors (This product is designed and manufactured to be installed within another device.)
- Ambient temperature: 0 to +50°C (non-freezing)\*
  - \*When a heat sink of a capacity at least equivalent to an aluminum plate with a size of 200×200 mm, 2 mm thick is installed.
- Ambient humidity: 85% or less (non-condensing)
- Not exposed to explosive, flammable or corrosive gases
- Not exposed to direct sunlight
- Not exposed to dust
- Not exposed to water or oil
- A place where heat can escape easily
- Not exposed to continuous vibration or excessive impact

#### Notes:

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

# Controller (Sold separately)

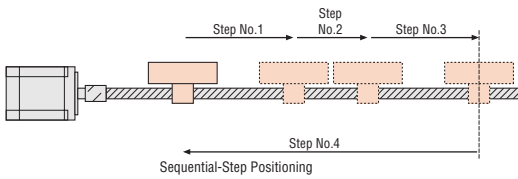
## Controller for Stepping Motor

### SG8030JY RoHS

#### Features

All operations including data setting can easily be performed using the four touch pads on the top panel. In addition, the number of signal lines is reduced to a minimum for easy connection.

- Jerk Limiting Control Function Suppresses Motor Drive Vibrations
- Sequential-Step Positioning Operation/External Signal Operation Possible
- Maximum Oscillation Frequency 200 kHz
- 1-Pulse Output/2-Pulse Output Mode Select Possible



DIN Rail Mounting Model



Recessed Mounting Model

#### Product Line

Type	Model
DIN Rail Mounting Model	<b>SG8030JY-D</b>
Recessed Mounting Model	<b>SG8030JY-U</b>

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

Specifications are subject to change without notice.  
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# Orientalmotor

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