Oriental motor

NEW PRODUCTS

High-Efficiency
Closed Loop Stepping Motor and Driver Package

RoHS RoHS-Compliant

αSTEP

AR Series

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

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

Advancing the future of motors

Introducing an advanced version of αSTEP.

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

Key benefits are lower heat generation, constant operation, up to 40% less power consumption, low vibration and improved angle accuracy.

AC Input Driver shown

Motor: Frame Size 85 mm (3.35 in.)
Standard Type

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AC Input Type

Standard Type

TH Geared Type

PN Geared Type

Harmonic Geared Type

DC Input Type

Standard Type

TH Geared Type

PN Geared Type

Harmonic Geared Type

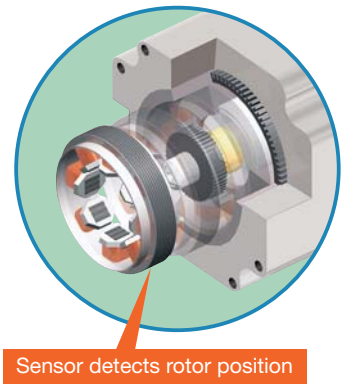
Motor: Frame Size 60 mm (2.36 in.)
PN Geared Type

Motor Cable (Included)

High-Efficiency Stepping Motor and Driver Package **AR** Series can Achieve Continuous Operation.

Using Oriental Motor's Original Closed Loop Control Technology

The **AR** Series uses our closed loop control to maintain positioning operation even during abrupt load fluctuations and accelerations. The rotor position detection sensor monitors the rotation. When an overload condition is detected, the **AR** Series will instantaneously regain control using the closed loop mode. When an overload condition continues the **AR** Series will output an alarm signal, thereby providing reliability equal to that of a servo motor.

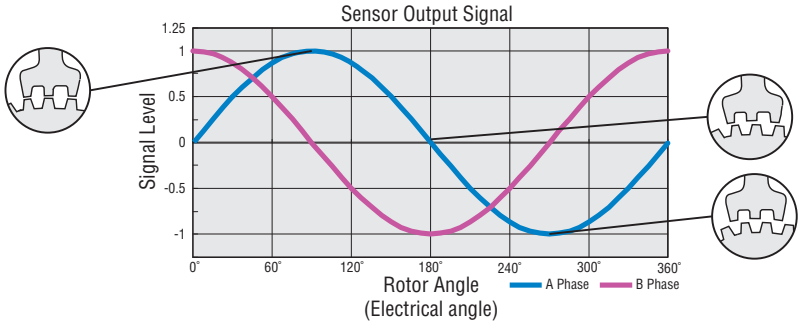


■ Rotor Position Detection Sensor

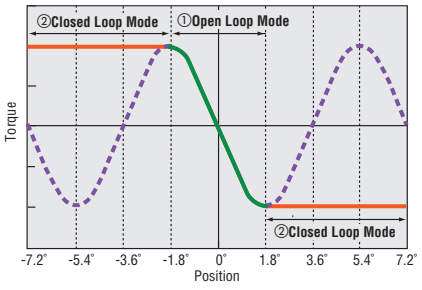
The rotor position detection sensor uses the change in inductance caused by change in the distance between the stator teeth and the teeth on the sensor rotor to detect rotor position.

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.

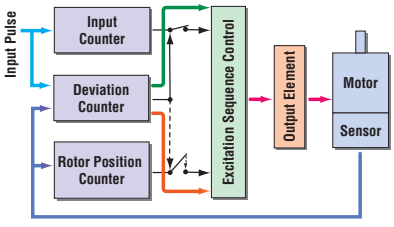


■ Angle–Torque Characteristics



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

■ Control Diagram



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

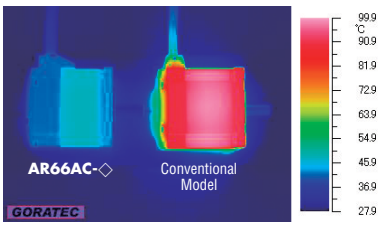
During Overload Condition (Positioning deviation is ±1.8° or more)
The closed loop mode is engaged to maintain the positioning operation.

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

■ Lower Heat Generation

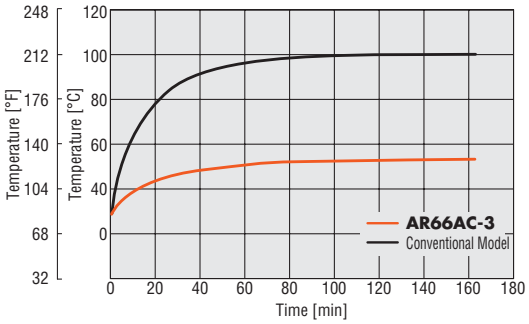
The **AR** Series utilizes high-efficiency technology to achieve a significant reduction in the amount of heat generated from the motor.

●Temperature Distribution by Thermography



Comparison under the same conditions

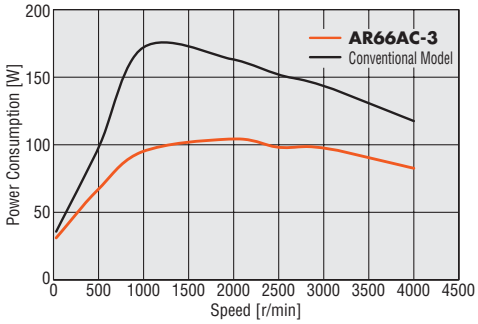
●Motor Case Temperature under Same Operating Conditions



■ Energy-Saving

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

●Power Consumption



CO_2 emission: up to **40**% less* than a conventional model (also by Oriental Motor)

*Assuming operation at a duty of 40%

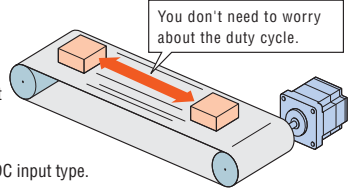
■ Continuous Operation or Operation at a high Duty Cycle

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.

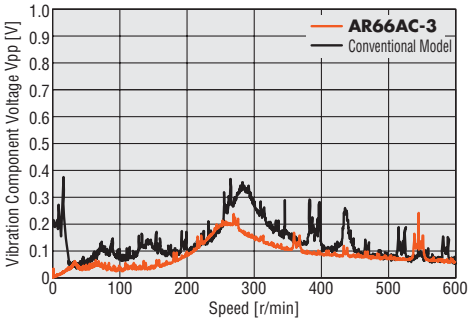
*For AC input type. 100 x 100 mm for DC input type.



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

■ Low Vibration

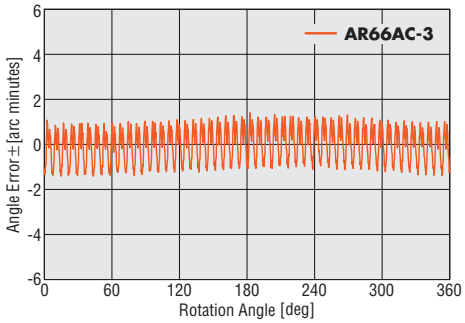
In addition to the microstep drive system, the **AR** Series also uses the smooth drive function to allow for smoother motion.
The smooth drive function automatically implements microstep drive based on the same travel amount and speed used in the full-step mode, without changing the pulse input settings.



■ Improved Angle Accuracy

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

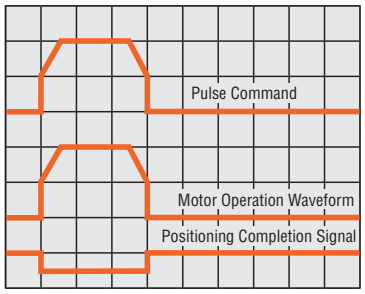
AR66AC-3: ±3 arc minutes
Conventional Model: ±5 arc minutes



Maintaining All the Beneficial Features of a Stepping Motor

■ High Response

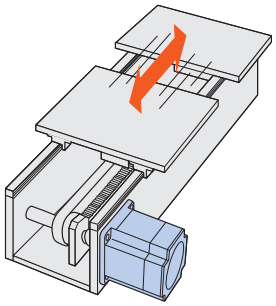
The motor operates synchronously with pulse commands to achieve high response. There's no delay in operation following a pulse command.



Measurement condition: Distance: 1/5 rotation
Load Inertia: 250×10^{-7} kg·m² [1.37×10^{-7} (oz-in²)] (J)

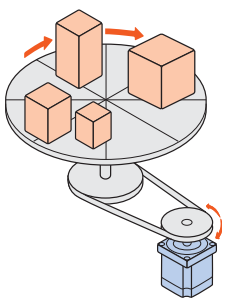
■ No Tuning

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



■ No Hunting

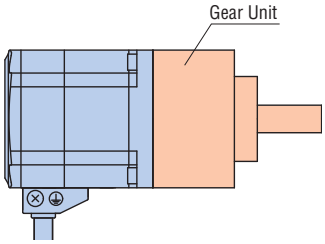
Because it uses a stepping motor, the **AR** Series does not hunt when stopped. Accordingly, the **AR** Series is ideal for applications where the equipment uses a belt-drive mechanism or otherwise has low rigidity and you don't want it to vibrate when stopping.



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 geared types 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 the ability to more larger inertial loads, compared to standard motors.



TH Geared Type

PN Geared Type

Harmonic Geared Type

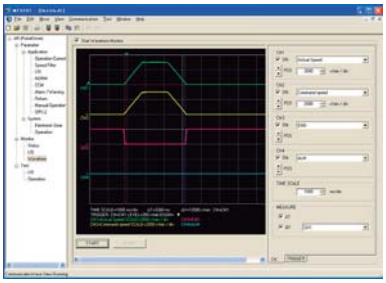
●Refer to page 8 (for AC input type) or page 42 (for DC input type) for the details of the geared motors.

■ Extended Functions to Access More Detailed Settings and 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 needs of your system.

● Details of extended functions → Page 83

●Monitoring of Operating Condition by Waveform

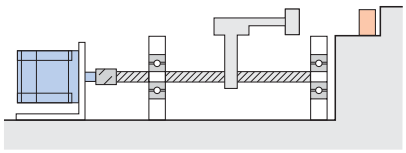


■ Push-Motion Operation

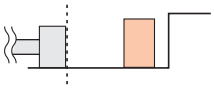
You can input pulses to perform a push-motion operation where the load is continuously has force applied to it. The amount of force (motor output torque) is set by the push-motion operating current value. Using a control module (**OPX-2A**) or data setting software (**MEXE02**) (both sold separately),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

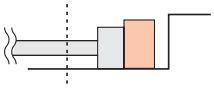


①Move to reference position



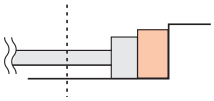
②Start of push-motion operation

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



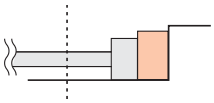
③Push-motion operation in progress

Force is applied to the load. The TLC output remains ON while the push-motion operation is in progress.



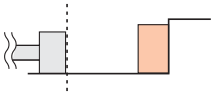
④Completion of push-motion operation

When the push-motion is completed, stop sending pulses to the driver. Turn ON the CLR input to clear the deviation counter.



⑤Returning to reference position

Input the pulses to move to the reference position and then turn OFF the T-MODE input.



■ Return Operation

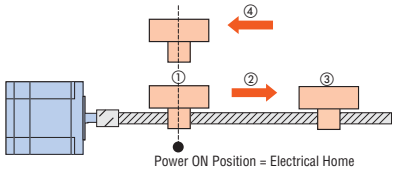
Two return operation functions are available: Return to electrical home operation and automatic return operation. With these options, you can easily set up your system to return home when the main power has been cut off due to an emergency stop, etc., or the motor excitation has been turned off.

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

●Return to Electrical Home Operation

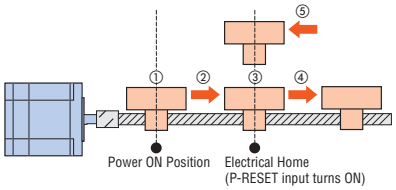
An operation in which the motor returns to the "position it had assumed when the power was turned on (= electrical home)" or "location set as the electrical home."

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



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

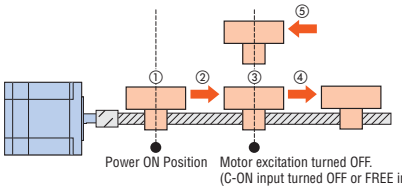
- Returning to the location set as the electrical home



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



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

AR Series AC Input Type Lineup

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 (lb-in)]	Backlash [arc min]	Basic Resolution [deg/step]	Output Shaft Speed [r/min]
Standard	· Basic model of the **AR** Series	Maximum Holding Torque 4 (35)	——	0.36	4000
Low backlash **TH** Geared (Parallel shaft)	· A wide variety of low gear ratios, high-speed operations · Gear ratios: 3.6:1, 7.2:1, 10:1, 20:1, 30:1	12 (106)	45	0.012	500
Non-backlash **PN** Geared (Planetary)	· High speed (low gear ratio), high accuracy positioning · High permissible/maximum torque · A wide variety of gear ratios for selecting the desired step angle (resolution) · Centered output shaft · Gear ratios: 5:1, 7.2:1, 10:1, 25:1, 36:1, 50:1	Permissible Torque 37 (320) Maximum Torque 60 (530)	3	0.0072	600
Non-backlash Harmonic Geared (Harmonic drive)	· High accuracy positioning · High permissible/maximum torque · High gear ratios, high resolution · Centered output shaft · Gear ratios: 50:1, 100:1	Permissible Torque 37 (320) Maximum Torque 55 (480)	0	0.0036	70

Note:

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

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

[□42 (□1.65): indicates a motor frame size of 42 mm (1.65 in.).]

	Power Supply Voltage	Motor Type			
		Standard Type	**TH** Geared Type	**PN** Geared Type	Harmonic Geared Type
	Single-Phase 100-115 VAC	□42 (□1.65) □60 (□2.36) □85 (□3.35)	□42 (□1.65) □60 (□2.36) □90 (□3.54)		
	Single-Phase 200-230 VAC	□42 (□1.65) □60 (□2.36) □85 (□3.35)	□42 (□1.65) □60 (□2.36) □90 (□3.54)		
	Three-Phase 200-230 VAC	□42 (□1.65) □60 (□2.36) □85 (□3.35)	□42 (□1.65) □60 (□2.36) □90 (□3.54)		

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

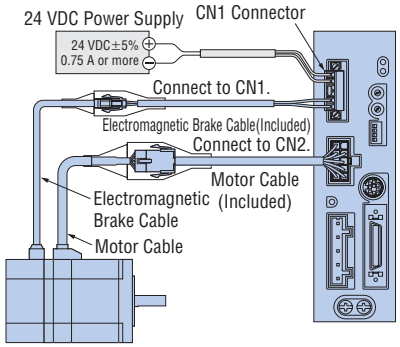
Features of the AR series AC Input Type

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:

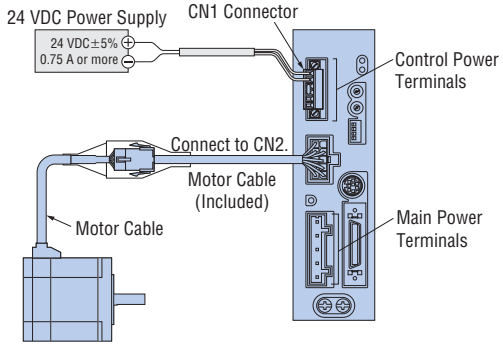
- A separate 24 VDC power supply is needed for electromagnetic brake control.



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 current position 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.



Complying with Various Standards to Support Diverse Equipment Designs

■ 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.

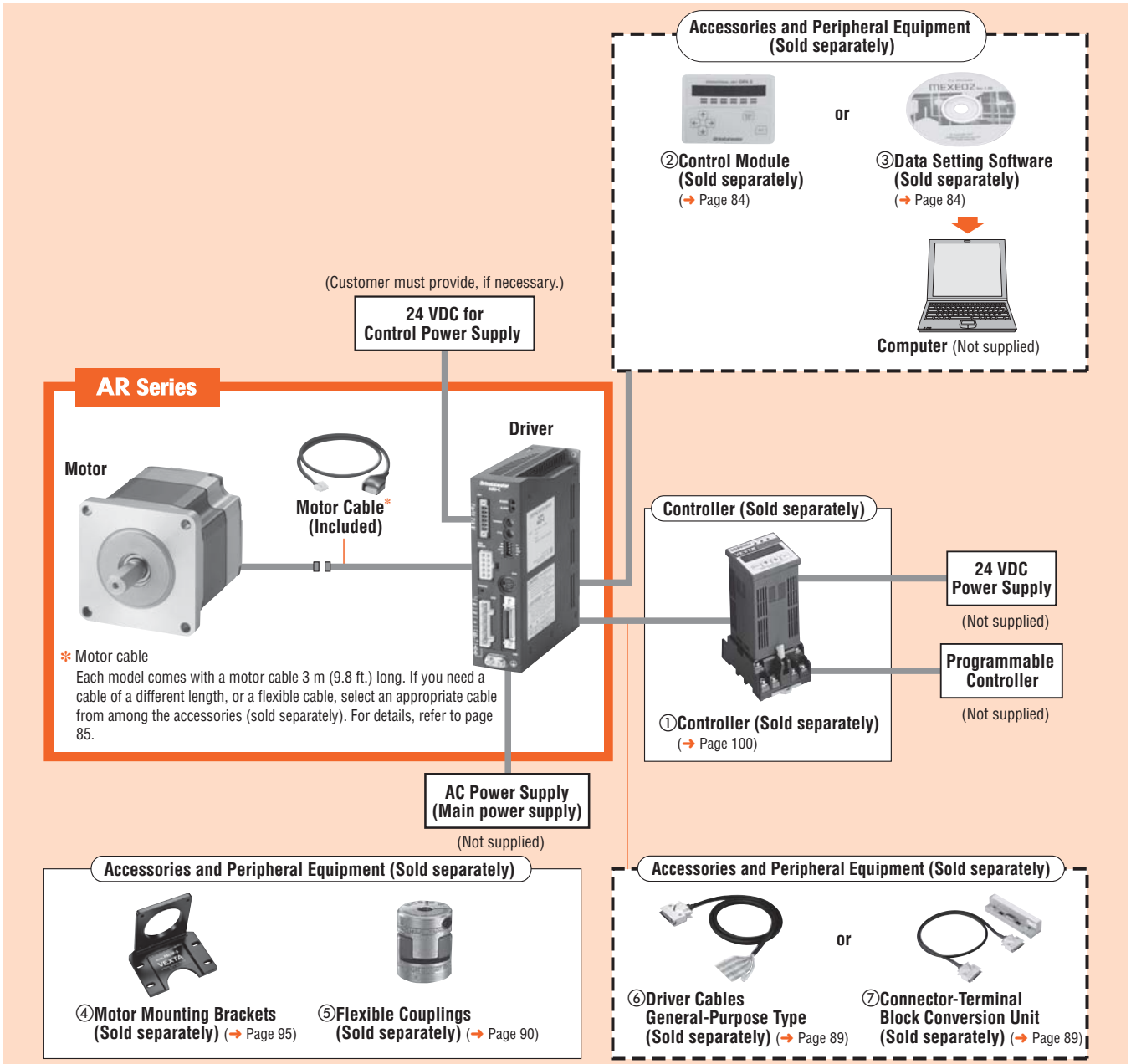
■ Complying with the Semiconductor Manufacturing Facility Standard "SEMI F47"

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.

System Configuration

Standard Type

An example of a single-axis system configuration with the **SG8030J** controller.



No.	Product Name	Overview	Page
①	Controller	This controller outputs pulse commands that determine the rotating amount and rotating speed.	100
②	Control Module	This control module lets you set (edit, monitor, operate) various data and enables extended functions. Comes with a communication cable [5 m (16.4 ft.)].	84
③	Data Setting Software	This data setting software lets you set (edit, monitor, operate) various data and enables extended functions. Comes with a PC interface cable [5 m (16.4 ft.)] and a USB cable [0.5 m (20 in.)].	84
④	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	95
⑤	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	90
⑥	Driver Cables General-Purpose Type	General-purpose cable for connecting the driver and controller [1 m (3.3 ft.), 2 m (6.6 ft.)].	89
⑦	Connector–Terminal Block Conversion Unit	Set of terminal block and cable for connecting the driver and controller [1 m (3.3 ft.)].	89

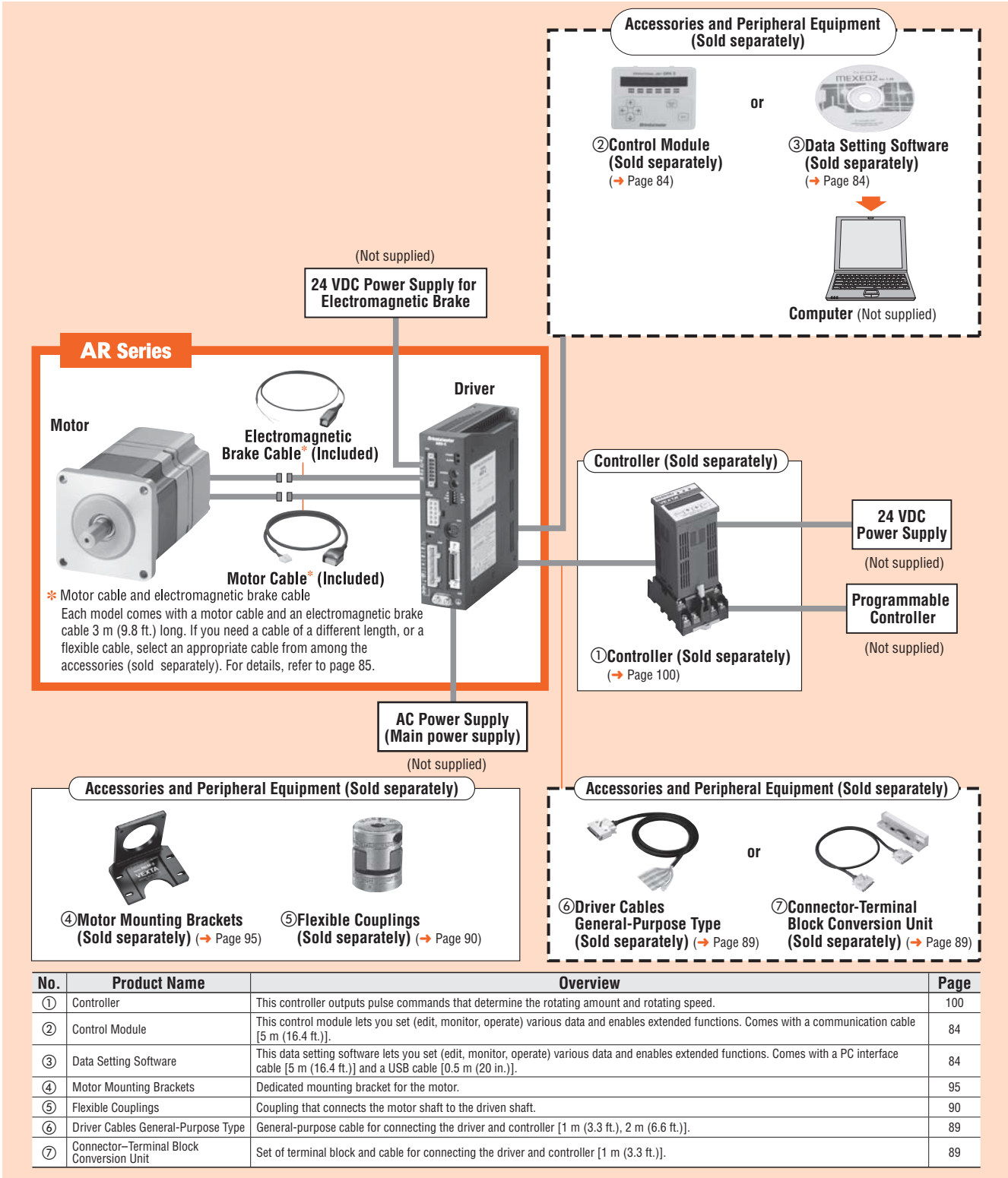
Example of System Configuration

AR Series		(Sold separately) Controller	Motor Mounting Bracket	Flexible Coupling	Connector–Terminal Block Conversion Unit [1 m (3.3 ft)]
AR66AA-3	+	SG8030J-D	PAL2P-5A	MCS300610	CC36T1

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 **SG8030J** controller.



No.	Product Name	Overview	Page
①	Controller	This controller outputs pulse commands that determine the rotating amount and rotating speed.	100
②	Control Module	This control module lets you set (edit, monitor, operate) various data and enables extended functions. Comes with a communication cable [5 m (16.4 ft.)].	84
③	Data Setting Software	This data setting software lets you set (edit, monitor, operate) various data and enables extended functions. Comes with a PC interface cable [5 m (16.4 ft.)] and a USB cable [0.5 m (20 in.)].	84
④	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	95
⑤	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	90
⑥	Driver Cables General-Purpose Type	General-purpose cable for connecting the driver and controller [1 m (3.3 ft.), 2 m (6.6 ft.)].	89
⑦	Connector–Terminal Block Conversion Unit	Set of terminal block and cable for connecting the driver and controller [1 m (3.3 ft.)].	89

●Example of System Configuration

(Sold separately)

AR Series		Controller	Motor Mounting Bracket	Flexible Coupling	Connector–Terminal Block Conversion Unit [1 m (3.3 ft.)]
AR66MA-3	+	SG8030J-D	PAL2P-5A	MCS300610	CC36T1

●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 Ambient Air Temperature for UL (UL508C) : 50°C (122°F)
- 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 A - 3
① ② ③ ④ ⑤ ⑥

①	Series	**AR**: **AR** Series
②	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.) **9**: 85 mm (3.35 in.)
③	Motor Case Length	
④	Motor Type	**A**: Standard (Single shaft) **B**: Standard (Double shaft) **M**: Electromagnetic Brake Type
⑤	Power Supply Voltage	**A**: Single-Phase 100-115 VAC **C**: Single-Phase 200-230 VAC **S**: Three-Phase 200-230 VAC
⑥	Cable Length (Included)	**3**: 3 m (9.8 ft.)

Geared Type

AR 6 6 A A - N 50 - 3
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Series	**AR**: **AR** Series
②	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.) **9**: 90 mm (3.54 in.)
③	Motor Case Length	
④	Motor Type	**A**: Standard (Single shaft) **M**: Electromagnetic Brake Type
⑤	Power Supply Voltage	**A**: Single-Phase 100-115 VAC **C**: Single-Phase 200-230 VAC **S**: Three-Phase 200-230 VAC
⑥	Gearhead Type	**T**: **TH** Geared Type **N**: **PN** Geared Type **H**: Harmonic Geared Type
⑦	Gear Ratio	
⑧	Cable Length (Included)	**3**: 3 m (9.8 ft.)

Product Line

Standard Type

Power Supply Voltage	Model (Single shaft)	Model (Double shaft)
Single-Phase 100-115 VAC	**AR46AA-3**	**AR46BA-3**
	AR66AA-3	**AR66BA-3**
	AR69AA-3	**AR69BA-3**
	AR98AA-3	**AR98BA-3**
	AR911AA-3	**AR911BA-3**
Single-Phase 200-230 VAC	**AR46AC-3**	**AR46BC-3**
	AR66AC-3	**AR66BC-3**
	AR69AC-3	**AR69BC-3**
	AR98AC-3	**AR98BC-3**
	AR911AC-3	**AR911BC-3**
Three-Phase 200-230 VAC	**AR46AS-3**	**AR46BS-3**
	AR66AS-3	**AR66BS-3**
	AR69AS-3	**AR69BS-3**
	AR98AS-3	**AR98BS-3**
	AR911AS-3	**AR911BS-3**

The following items are included in each product.

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

* Each product comes with a motor cable 3 m (9.8 ft.) long.
If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

Standard Type with Electromagnetic Brake

Power Supply Voltage	Model
Single-Phase 100-115 VAC	**AR46MA-3**
	AR66MA-3
	AR69MA-3
	AR98MA-3
Single-Phase 200-230 VAC	**AR46MC-3**
	AR66MC-3
	AR69MC-3
	AR98MC-3
Three-Phase 200-230 VAC	**AR46MS-3**
	AR66MS-3
	AR69MS-3
	AR98MS-3

The following items are included in each product.

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

* Each product comes with a motor cable and an electromagnetic brake cable 3 m (9.8 ft.) long.
If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

●TH Geared Type

Power Supply Voltage	Model
Single-Phase 100-115 VAC	**AR46AA-T3.6-3**
	AR46AA-T7.2-3
	AR46AA-T10-3
	AR46AA-T20-3
	AR46AA-T30-3
	AR66AA-T3.6-3
	AR66AA-T7.2-3
	AR66AA-T10-3
	AR66AA-T20-3
	AR66AA-T30-3
	AR98AA-T3.6-3
	AR98AA-T7.2-3
	AR98AA-T10-3
	AR98AA-T20-3
	AR98AA-T30-3
Single-Phase 200-230 VAC	**AR46AC-T3.6-3**
	AR46AC-T7.2-3
	AR46AC-T10-3
	AR46AC-T20-3
	AR46AC-T30-3
	AR66AC-T3.6-3
	AR66AC-T7.2-3
	AR66AC-T10-3
	AR66AC-T20-3
	AR66AC-T30-3
	AR98AC-T3.6-3
	AR98AC-T7.2-3
	AR98AC-T10-3
	AR98AC-T20-3
	AR98AC-T30-3
Three-Phase 200-230 VAC	**AR46AS-T3.6-3**
	AR46AS-T7.2-3
	AR46AS-T10-3
	AR46AS-T20-3
	AR46AS-T30-3
	AR66AS-T3.6-3
	AR66AS-T7.2-3
	AR66AS-T10-3
	AR66AS-T20-3
	AR66AS-T30-3
	AR98AS-T3.6-3
	AR98AS-T7.2-3
	AR98AS-T10-3
	AR98AS-T20-3
	AR98AS-T30-3

The following items are included in each product.

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

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

*2 Each product comes with a motor cable 3 m (9.8 ft.) long.

If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

●TH Geared Type with Electromagnetic Brake

Power Supply Voltage	Model
Single-Phase 100-115 VAC	**AR46MA-T3.6-3**
	AR46MA-T7.2-3
	AR46MA-T10-3
	AR46MA-T20-3
	AR46MA-T30-3
	AR66MA-T3.6-3
	AR66MA-T7.2-3
	AR66MA-T10-3
	AR66MA-T20-3
	AR66MA-T30-3
	AR98MA-T3.6-3
	AR98MA-T7.2-3
	AR98MA-T10-3
	AR98MA-T20-3
	AR98MA-T30-3
Single-Phase 200-230 VAC	**AR46MC-T3.6-3**
	AR46MC-T7.2-3
	AR46MC-T10-3
	AR46MC-T20-3
	AR46MC-T30-3
	AR66MC-T3.6-3
	AR66MC-T7.2-3
	AR66MC-T10-3
	AR66MC-T20-3
	AR66MC-T30-3
	AR98MC-T3.6-3
	AR98MC-T7.2-3
	AR98MC-T10-3
	AR98MC-T20-3
	AR98MC-T30-3
Three-Phase 200-230 VAC	**AR46MS-T3.6-3**
	AR46MS-T7.2-3
	AR46MS-T10-3
	AR46MS-T20-3
	AR46MS-T30-3
	AR66MS-T3.6-3
	AR66MS-T7.2-3
	AR66MS-T10-3
	AR66MS-T20-3
	AR66MS-T30-3
	AR98MS-T3.6-3
	AR98MS-T7.2-3
	AR98MS-T10-3
	AR98MS-T20-3
	AR98MS-T30-3

The following items are included in each product.

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

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

* 2 Each product comes with a motor cable and an electromagnetic brake cable 3 m (9.8 ft.) long.

If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

●PN Geared Type

Power Supply Voltage	Model
Single-Phase 100-115 VAC	**AR46AA-N5-3**
	AR46AA-N7.2-3
	AR46AA-N10-3
	AR66AA-N5-3
	AR66AA-N7.2-3
	AR66AA-N10-3
	AR66AA-N25-3
	AR66AA-N36-3
	AR66AA-N50-3
	AR98AA-N5-3
	AR98AA-N7.2-3
	AR98AA-N10-3
	AR98AA-N25-3
	AR98AA-N36-3
	AR98AA-N50-3
Single-Phase 200-230 VAC	**AR46AC-N5-3**
	AR46AC-N7.2-3
	AR46AC-N10-3
	AR66AC-N5-3
	AR66AC-N7.2-3
	AR66AC-N10-3
	AR66AC-N25-3
	AR66AC-N36-3
	AR66AC-N50-3
	AR98AC-N5-3
	AR98AC-N7.2-3
	AR98AC-N10-3
	AR98AC-N25-3
	AR98AC-N36-3
	AR98AC-N50-3
Three-Phase 200-230 VAC	**AR46AS-N5-3**
	AR46AS-N7.2-3
	AR46AS-N10-3
	AR66AS-N5-3
	AR66AS-N7.2-3
	AR66AS-N10-3
	AR66AS-N25-3
	AR66AS-N36-3
	AR66AS-N50-3
	AR98AS-N5-3
	AR98AS-N7.2-3
	AR98AS-N10-3
	AR98AS-N25-3
	AR98AS-N36-3
	AR98AS-N50-3

The following items are included in each product.

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

* Each product comes with a motor cable of 3 m (9.8 ft.) long.

If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

●PN Geared Type with Electromagnetic Brake

Power Supply Voltage	Model
Single-Phase 100-115 VAC	**AR46MA-N5-3**
	AR46MA-N7.2-3
	AR46MA-N10-3
	AR66MA-N5-3
	AR66MA-N7.2-3
	AR66MA-N10-3
	AR66MA-N25-3
	AR66MA-N36-3
	AR66MA-N50-3
	AR98MA-N5-3
	AR98MA-N7.2-3
	AR98MA-N10-3
	AR98MA-N25-3
	AR98MA-N36-3
	AR98MA-N50-3
Single-Phase 200-230 VAC	**AR46MC-N5-3**
	AR46MC-N7.2-3
	AR46MC-N10-3
	AR66MC-N5-3
	AR66MC-N7.2-3
	AR66MC-N10-3
	AR66MC-N25-3
	AR66MC-N36-3
	AR66MC-N50-3
	AR98MC-N5-3
	AR98MC-N7.2-3
	AR98MC-N10-3
	AR98MC-N25-3
	AR98MC-N36-3
	AR98MC-N50-3
Three-Phase 200-230 VAC	**AR46MS-N5-3**
	AR46MS-N7.2-3
	AR46MS-N10-3
	AR66MS-N5-3
	AR66MS-N7.2-3
	AR66MS-N10-3
	AR66MS-N25-3
	AR66MS-N36-3
	AR66MS-N50-3
	AR98MS-N5-3
	AR98MS-N7.2-3
	AR98MS-N10-3
	AR98MS-N25-3
	AR98MS-N36-3
	AR98MS-N50-3

The following items are included in each product.

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

* Each product comes with a motor cable and an electromagnetic brake cable 3 m (9.8 ft.) long.

If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

Harmonic Geared Type

Power Supply Voltage	Model
Single-Phase 100-115 VAC	**AR46AA-H50-3**
	AR46AA-H100-3
	AR66AA-H50-3
	AR66AA-H100-3
	AR98AA-H50-3
	AR98AA-H100-3
Single-Phase 200-230 VAC	**AR46AC-H50-3**
	AR46AC-H100-3
	AR66AC-H50-3
	AR66AC-H100-3
	AR98AC-H50-3
	AR98AC-H100-3
Three-Phase 200-230 VAC	**AR46AS-H50-3**
	AR46AS-H100-3
	AR66AS-H50-3
	AR66AS-H100-3
	AR98AS-H50-3
	AR98AS-H100-3

The following items are included in each product.
Motor, Shaft Parallel Key, Driver, Motor Cable*, I/O Signal Connector, Regeneration Unit/Main Power Supply Connector, 24 VDC Power Supply/Regeneration Unit Thermal Input Connector, Connector Wiring Lever, Operating Manual
* Each product comes with a motor cable of 3 m (9.8 ft.) long.
If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

Harmonic Geared Type with Electromagnetic Brake

Power Supply Voltage	Model
Single-Phase 100-115 VAC	**AR46MA-H50-3**
	AR46MA-H100-3
	AR66MA-H50-3
	AR66MA-H100-3
	AR98MA-H50-3
	AR98MA-H100-3
Single-Phase 200-230 VAC	**AR46MC-H50-3**
	AR46MC-H100-3
	AR66MC-H50-3
	AR66MC-H100-3
	AR98MC-H50-3
	AR98MC-H100-3
Three-Phase 200-230 VAC	**AR46MS-H50-3**
	AR46MS-H100-3
	AR66MS-H50-3
	AR66MS-H100-3
	AR98MS-H50-3
	AR98MS-H100-3

The following items are included in each product.
Motor, Shaft Parallel Key, Driver, Motor Cable and Electromagnetic Brake Cable*, I/O Signal Connector, Regeneration Unit/Main Power Supply Connector, 24 VDC Power Supply/Regeneration Unit Thermal Input/Electromagnetic Brake Output Connector, Connector Wiring Lever, Operating Manual
* Each product comes with a motor cable and an electromagnetic brake cable 3 m (9.8 ft.) long.
If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

How to Read the Specifications Table

	Model		AR46A□-3	AR46A□-N5-3
		Standard (Single shaft)	AR46A□-3	AR46A□-N5-3
		Standard (Double shaft)*4	AR46B□-3	–
		Electromagnetic Brake	AR46M□-3	AR46M□-N5-3
①	Maximum Holding Torque	N·m (oz-in)	0.3 (42)	1.35 (11.9 lb-in)
②	Rotor Inertia J	kg·m² (oz-in²)	58×10^{-7} (0.32) [73×10^{-7} (0.4)]*1	58×10^{-7} (0.32) [73×10^{-7} (0.4)]*1
③	Backlash	arc min (deg)	–	2 (0.034°)
④	Angular Transmission Error	arc min (deg)	–	6 (0.1°)
⑤	Permissible Speed Range	r/min	–	0~600
⑥	Gear Ratio		–	5:1
⑦	Resolution	Resolution Setting: 1000 P/R	0.36°/Pulse	0.072°/Pulse
⑧	Permissible Torque	N·m (lb-in)	–	1.35 (11.9)
⑨	Maximum Torque*5	N·m (lb-in)	–	1.5 (13.2)
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	
		Maximum Input Current A: Single-Phase 200-230 VAC	1.9	
		Maximum Input Current A: Three-Phase 200-230 VAC	1	
⑪	Control Power Supply		24 VDC±5% 0.5 A	
	Electromagnetic Brake*3	Type	Active when the power is off	
		Power Supply Input	24 VDC±5%*2	
		Power Consumption W	2	
		Excitation Current A	0.08	
⑫	Static Friction Torque	N·m (oz-in)	0.15 (21)	0.68 (6 lb-in)
	Mass	Motor kg (lb.)	0.47 (1.03) [0.62 (1.36)]*1	0.73 (1.61) [0.88 (1.94)]*1
		Driver kg (lb.)	0.75 (1.65)	
	Dimension No.	Motor	1 [4]*1	19 [22]*1
		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 (65.6 ft.) 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.

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

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

③Backlash
The play of gear output shaft when the motor shaft is fixed. With bidirectional positioning, the positioning accuracy is affected.

④Angular 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.

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

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

⑦Resolution
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.

⑧Permissible Torque
The permissible torque represents the torque value limited by the mechanical strength of the gearhead 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.

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

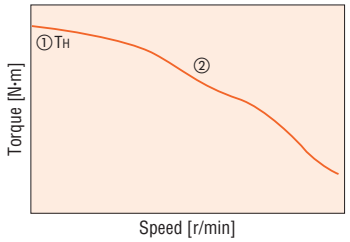
⑩Power Source
The current value of the power input is the maximum input current value. (The input current varies according to the rotation speed.)

⑪Control Power
Required to separate the main power from the control power.

⑫Static Friction Torque
The electromagnetic brake specifications. This is the maximum holding torque at which the electromagnetic brake can hold the position of the load.

How to Read Speed – Torque Characteristics

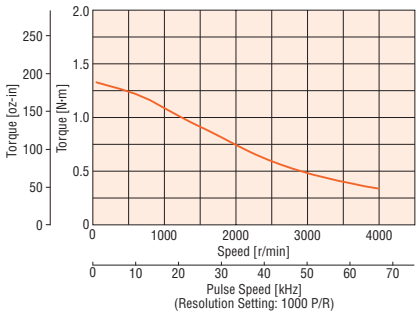
The graph below is the characteristics that indicate the relationship between the speed and torque when a stepping motor is driven. The required speed and torque is always used when selecting a stepping motor. On the graph, the horizontal axis expresses the speed at the motor output shaft while the vertical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



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

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

The following figure shows the speed – torque characteristics of the **AR** Series **AR66AA-3**.



● 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 (212°F).

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

Specifications RoHS

Model							
		Standard (Single shaft)	AR46A□-3	AR66A□-3	AR69A□-3	AR98A□-3	AR911A□-3
		Standard (Double shaft)*4	AR46B□-3	AR66B□-3	AR69B□-3	AR98B□-3	AR911B□-3
		Electromagnetic Brake	AR46M□-3	AR66M□-3	AR69M□-3	AR98M□-3	–
Maximum Holding Torque		N·m (oz-in)	0.3 (42)	1.2 (170)	2 (280)		4 (560)
Rotor Inertia J		kg·m² (oz-in²)	58×10^{-7} (0.32)[73×10^{-7} (0.4)]*1	380×10^{-7} (2.1) [500×10^{-7} (2.7)]*1	750×10^{-7} (4.1) [870×10^{-7} (4.8)]*1	1100×10^{-7} (6) [1220×10^{-7} (6.7)]*1	2200×10^{-7} (12)
Resolution	Resolution Setting: 1000 P/R		0.36°/Pulse				
Power Source	Voltage/Frequency		Single-Phase 100-115 VAC −15~+10% 50/60 Hz				
			Single-Phase 200-230 VAC −15~+10% 50/60 Hz				
			Three-Phase 200-230 VAC −15~+10% 50/60 Hz				
	Maximum Input Current A	Single-Phase 100-115 VAC	2.9	4.4	6.1	5.5	6.5
		Single-Phase 200-230 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*3		Type	Active when the power is off				–
		Power Supply Input	24 VDC±5%*2 0.1A	24 VDC±5%*2 0.3A			–
		Power Consumption W	2	6			–
		Excitation Current A	0.08	0.25			–
	Static Friction Torque	N·m (oz-in)	0.15 (21)	0.6 (85)	1 (142)		–
Mass		Motor kg (lb.)	0.47 (1.03) [0.62 (1.36)]*1	0.9 (1.98) [1.2 (2.6)]*1	1.4 (3.1) [1.7 (3.7)]*1	1.9 (4.2) [2.5 (5.5)]*1	3 (6.6)
		Driver kg (lb.)	0.75 (1.65)				
Dimension No.	Motor		1 [4]*1	2 [5]*1		3 [6]*1	
	Driver		25				
	Cable		26				

How to read specifications table ➜ Page 16

*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 (65.6 ft.) or longer, use a power supply of 24 VDC±4%.

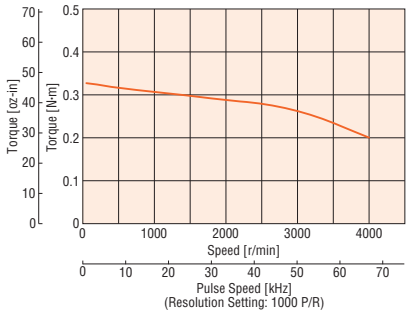
*3 The electromagnetic brakes are for holding the position when the power is off. They cannot be used to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

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

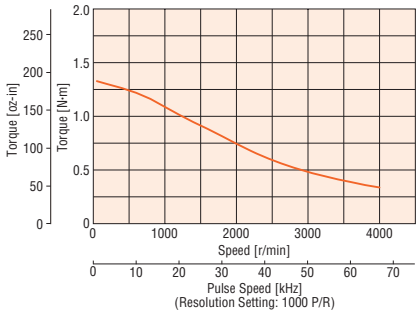
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 16

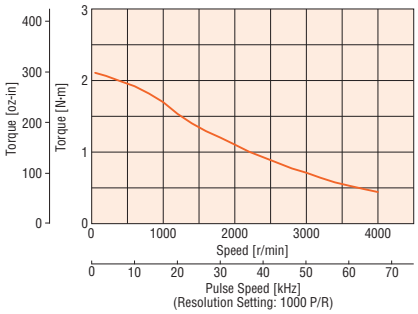
AR46□□-3



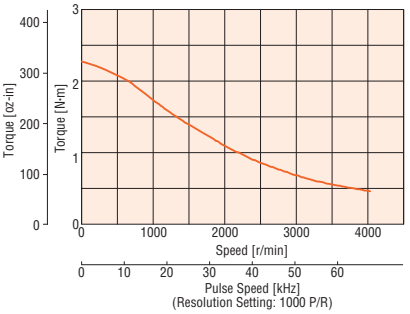
AR66□□-3



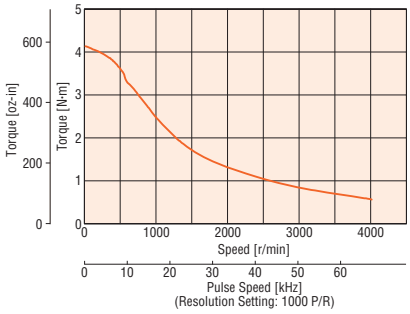
AR69□□-3



AR98□□-3



AR911□□-3



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 (212°F).
- 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**, **C** or **S**) in the box (□) within the model name.

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

Specifications RoHS

Model		Standard (Single shaft)	AR46A□-T3.6-3	AR46A□-T7.2-3	AR46A□-T10-3	AR46A□-T20-3	AR46A□-T30-3
		Electromagnetic Brake	AR46M□-T3.6-3	AR46M□-T7.2-3	AR46M□-T10-3	AR46M□-T20-3	AR46M□-T30-3
Maximum Holding Torque		N·m (lb-in)	0.35 (3.0)	0.7 (6.1)	1 (8.8)	1.5 (13.2)	
Rotor Inertia J		kg·m^2 (oz-in^2)	58×10^{-7} (0.32) [73×10^{-7} (0.4)]*1				
Backlash		arc min (deg)	45 (0.75°)	25 (0.417°)		15 (0.25°)	
Permissible Speed Range		r/min	0～500	0～250	0～180	0～90	0～60
Gear Ratio			3.6:1	7.2:1	10:1	20:1	30:1
Resolution		Resolution Setting: 1000 P/R	0.1°/Pulse	0.05°/Pulse	0.036°/Pulse	0.018°/Pulse	0.012°/Pulse
Permissible Torque		N·m (lb-in)	0.35 (3.0)	0.7 (6.1)	1 (8.8)	1.5 (13.2)	
Power Source	Voltage/Frequency		Single-Phase 100-115 VAC −15～+10% 50/60 Hz				
			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*3		Type	Active when the power is off				
		Power Supply Input	24 VDC±5%*2 0.1 A				
		Power Consumption W	2				
		Excitation Current A	0.08				
	Static Friction Torque	N·m (lb-in)	0.18 (1.59)	0.35 (3.0)	0.5 (4.4)	0.75 (6.6)	
Mass		Motor kg (lb.)	0.62 (1.36) [0.77 (1.69)]*1				
		Driver kg (lb.)	0.75 (1.65)				
Dimension No.	Motor		7 [10]*1				
	Driver		25				
	Cable		26				

How to read specifications table ➜ Page 16

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

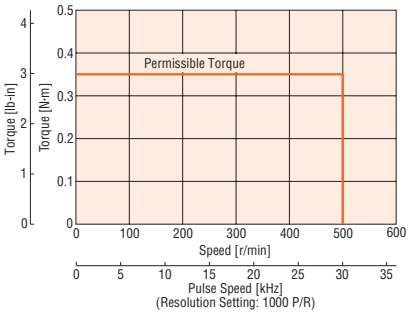
Note:

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

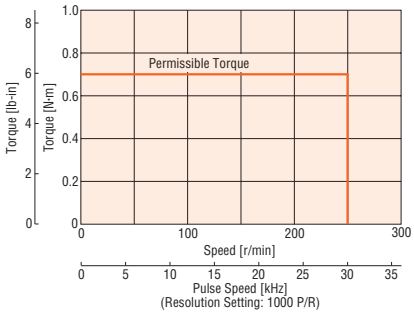
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 16

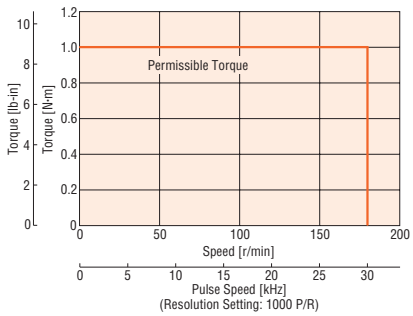
AR46□□-T3.6-3



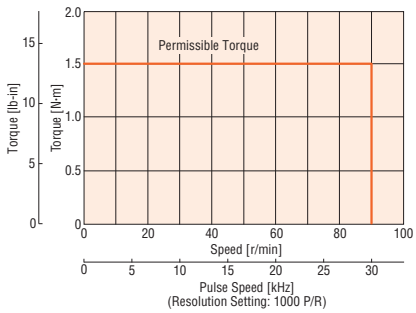
AR46□□-T7.2-3



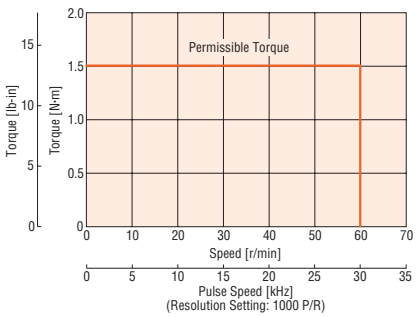
AR46□□-T10-3



AR46□□-T20-3



AR46□□-T30-3



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 (212°F).
- 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**, **C** or **S**) in the box (□) within the model name.

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

Specifications RoHS

Model		Standard (Single shaft)	AR66A□-T3.6-3	AR66A□-T7.2-3	AR66A□-T10-3	AR66A□-T20-3	AR66A□-T30-3
		Electromagnetic Brake	AR66M□-T3.6-3	AR66M□-T7.2-3	AR66M□-T10-3	AR66M□-T20-3	AR66M□-T30-3
Maximum Holding Torque		N·m (lb-in)	1.25 (11.0)	2.5 (22)	3 (26)	3.5 (30)	4 (35)
Rotor Inertia J		kg·m^2 (oz-in^2)	380×10^{-7} (2.1) [500×10^{-7} (2.7)]*1				
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			3.6:1	7.2:1	10:1	20:1	30:1
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 (lb-in)	1.25 (11.0)	2.5 (22)	3 (26)	3.5 (30)	4 (35)
Power Source	Voltage/Frequency		Single-Phase 100-115 VAC −15～+10% 50/60 Hz				
			Single-Phase 200-230 VAC −15～+10% 50/60 Hz				
			Three-Phase 200-230 VAC −15～+10% 50/60 Hz				
	Maximum Input Current A	Single-Phase 100-115 VAC	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 the power is off				
		Power Supply Input	24 VDC±5%*2 0.3 A				
		Power Consumption W	6				
		Excitation Current A	0.25				
	Static Friction Torque	N·m (lb-in)	0.63 (5.5)	1.25 (11.0)	1.5 (13.2)	1.75 (15.4)	2 (17.7)
Mass		Motor kg (lb.)	1.3 (2.9) [1.6 (3.5)]*1				
		Driver kg (lb.)	0.75 (1.65)				
Dimension No.	Motor		8 [11]*1				
	Driver		25				
	Cable		26				

How to read specifications table ➜ Page 16

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

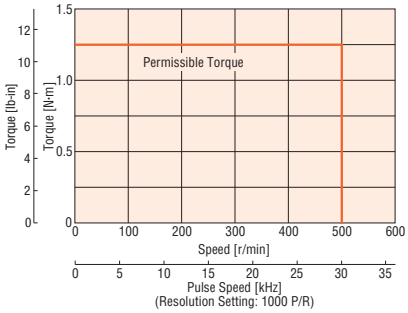
Note:

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

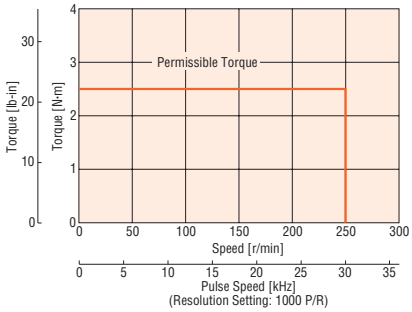
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 16

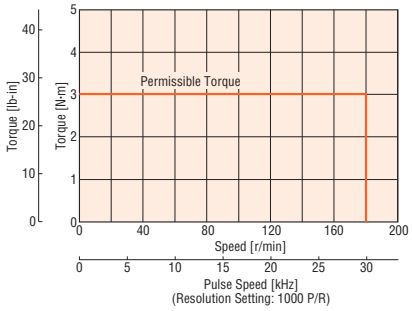
AR66□□-T3.6-3



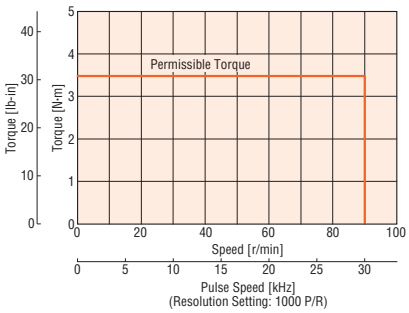
AR66□□-T7.2-3



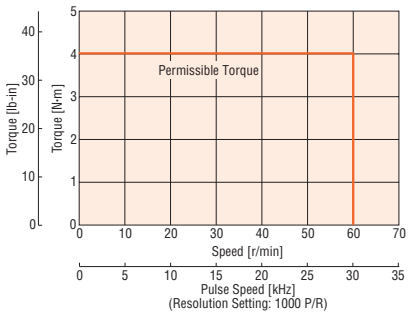
AR66□□-T10-3



AR66□□-T20-3



AR66□□-T30-3



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 (212°F).
- 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**, **C** or **S** in the box (■) within the model name.

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

Specifications RoHS

Model		Standard (Single shaft)	AR98A□-T3.6-3	AR98A□-T7.2-3	AR98A□-T10-3	AR98A□-T20-3	AR98A□-T30-3
		Electromagnetic Brake	AR98M□-T3.6-3	AR98M□-T7.2-3	AR98M□-T10-3	AR98M□-T20-3	AR98M□-T30-3
Maximum Holding Torque		N·m (lb-in)	4.5 (39)	9 (79)		12 (106)	
Rotor Inertia J		kg·m^2 (oz-in^2)	1100×10^{-7} (6.0) [1220×10^{-7} (6.7)]*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			3.6:1	7.2:1	10:1	20:1	30:1
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 (lb-in)	4.5 (39)	9 (79)		12 (106)	
Power Source	Voltage/Frequency		Single-Phase 100-115 VAC −15～+10% 50/60 Hz				
			Single-Phase 200-230 VAC −15～+10% 50/60 Hz				
			Three-Phase 200-230 VAC −15～+10% 50/60 Hz				
	Maximum Input Current A	Single-Phase 100-115 VAC	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 the power is off				
		Power Supply Input	24 VDC±5%*2 0.3 A				
		Power Consumption W	6				
		Excitation Current A	0.25				
	Static Friction Torque	N·m (lb-in)	2.25 (19.9)	4.5 (39)		6 (53)	
Mass		Motor kg (lb.)	3.1 (6.8) [3.7 (8.1)]*1				
		Driver kg (lb.)	0.75 (1.65)				
Dimension No.	Motor		9 [12]*1				
	Driver		25				
	Cable		26				

How to read specifications table ➜ Page 16

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

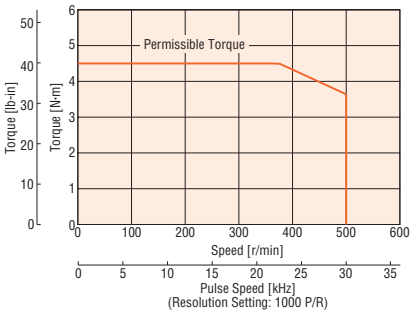
Note:

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

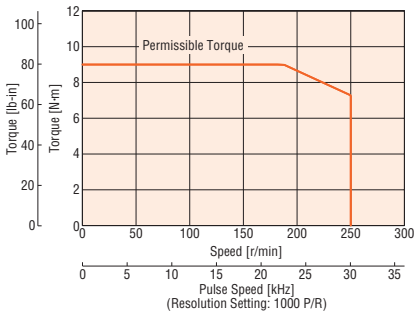
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 16

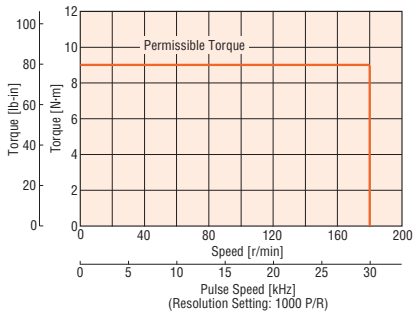
AR98□□-T3.6-3



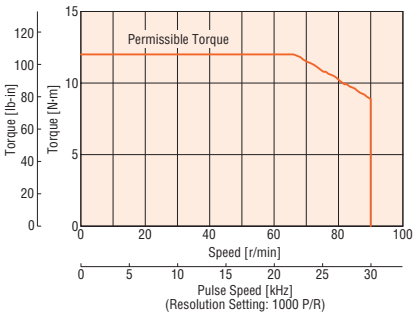
AR98□□-T7.2-3



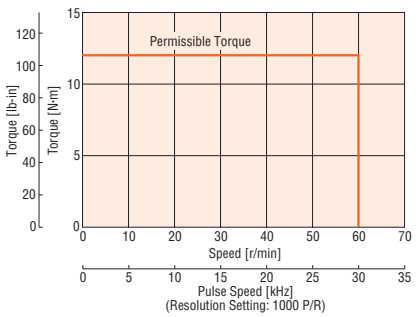
AR98□□-T10-3



AR98□□-T20-3



AR98□□-T30-3



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 (212°F).
- 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**, **C** or **S**) in the box (□) within the model name.

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

Specifications RoHS

Model		Standard (Single shaft)	AR46A□-N5-3	AR46A□-N7.2-3	AR46A□-N10-3
		Electromagnetic Brake	AR46M□-N5-3	AR46M□-N7.2-3	AR46M□-N10-3
Maximum Holding Torque		N·m (lb-in)	1.35 (11.9)	1.5 (13.2)	
Rotor Inertia J		kg·m² (oz-in²)	58×10^{-7} (0.32) [73×10^{-7} (0.4)]*1		
Backlash		arc min (deg)	2 (0.034°)		
Angular Transmission Error		arc min (deg)	6 (0.1°)		
Permissible Speed Range		r/min	0～600	0～416	0～300
Gear Ratio			5:1	7.2:1	10:1
Resolution		Resolution Setting: 1000 P/R	0.072°/Pulse	0.05°/Pulse	0.036°/Pulse
Permissible Torque		N·m (lb-in)	1.35 (11.9)	1.5 (13.2)	
Maximum Torque*3		N·m (lb-in)	1.5 (13.2)	2 (17.7)	
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*4		Type	Active when the power is off		
		Power Supply Input	24 VDC±5%*2 0.1 A		
		Power Consumption W	2		
		Excitation Current A	0.08		
	Static Friction Torque	N·m (lb-in)	0.68 (6.0)	0.75 (6.6)	
Mass		Motor kg (lb.)	0.73 (1.61) [0.88 (1.94)]*1		
		Driver kg (lb.)	0.75 (1.65)		
Dimension No.	Motor		13 [16]*1		
	Driver		25		
	Cable		26		

How to read specifications table ➜ Page 16

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

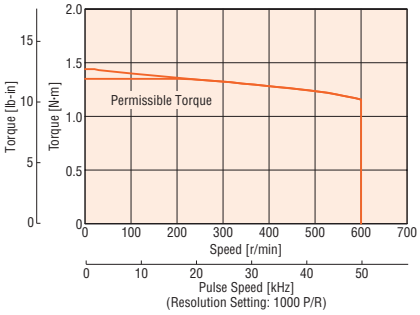
Note:

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

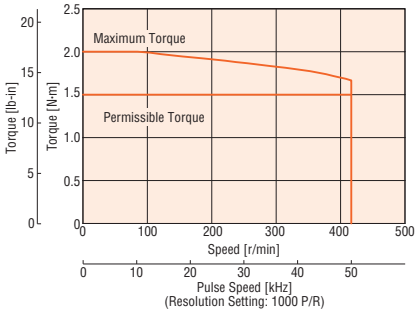
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 16

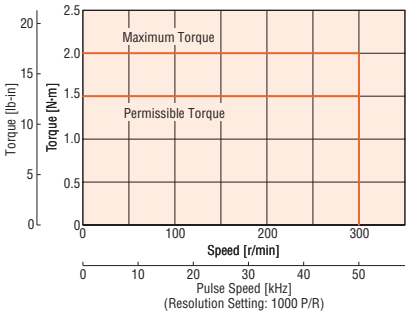
AR46□□-N5-3



AR46□□-N7.2-3



AR46□□-N10-3



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 (212°F).
- 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**, **C** or **S**) in the box (□) within the model name.

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

Specifications RoHS

Model		Standard (Single shaft)	AR66A□-N5-3	AR66A□-N7.2-3	AR66A□-N10-3	AR66A□-N25-3	AR66A□-N36-3	AR66A□-N50-3
		Electromagnetic Brake	AR66M□-N5-3	AR66M□-N7.2-3	AR66M□-N10-3	AR66M□-N25-3	AR66M□-N36-3	AR66M□-N50-3
Maximum Holding Torque		N·m (lb-in)	3.5 (30)	4 (35)	5 (44)	8 (70)		
Rotor Inertia J		kg·m^2 (oz-in^2)	380×10^{-7} (2.1) [500×10^{-7} (2.7)]*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			5:1	7.2:1	10:1	25:1	36:1	50:1
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 (lb-in)	3.5 (30)	4 (35)	5 (44)	8 (70)		
Maximum Torque*3		N·m (lb-in)	7 (61)	9 (79)	11 (97)	16 (141)	20 (177)	
Power Source	Voltage/Frequency		Single-Phase 100-115 VAC −15～+10% 50/60 Hz					
			Single-Phase 200-230 VAC −15～+10% 50/60 Hz					
			Three-Phase 200-230 VAC −15～+10% 50/60 Hz					
	Maximum Input Current A	Single-Phase 100-115 VAC	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*4		Type	Active when the power is off					
		Power Supply Input	24 VDC±5%*2 0.3 A					
		Power Consumption W	6					
		Excitation Current A	0.25					
	Static Friction Torque	N·m (lb-in)	1.75 (15.4)	2 (17.7)	2.5 (22)	4 (35)		
Mass		Motor kg (lb.)	1.5 (3.3) [1.8 (4)]*1			1.73 (3.8) [2 (4.4)]*1		
		Driver kg (lb.)	0.75 (1.65)					
Dimension No.	Motor		14 [17]*1					
	Driver		25					
	Cable		26					

How to read specifications table ➜ Page 16

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

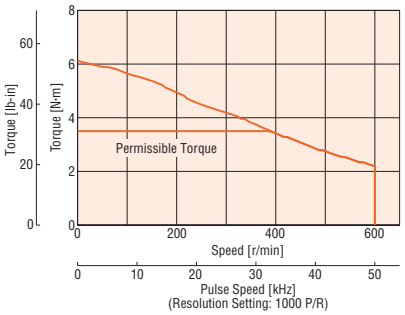
Note:

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

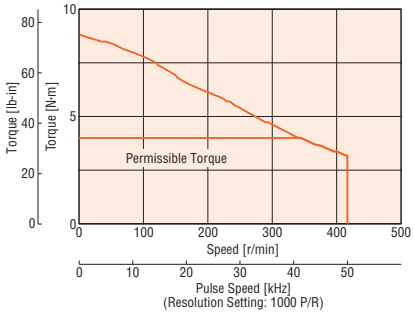
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 16

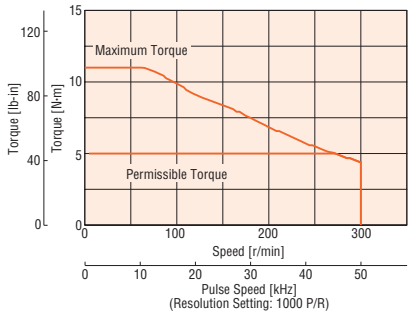
AR66□□-N5-3



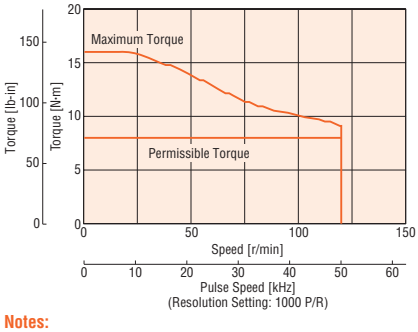
AR66□□-N7.2-3



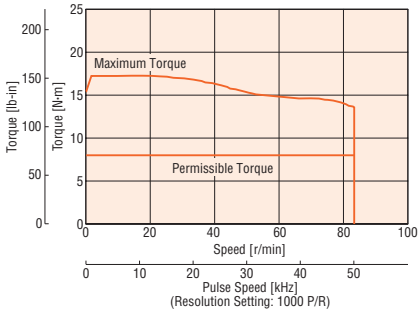
AR66□□-N10-3



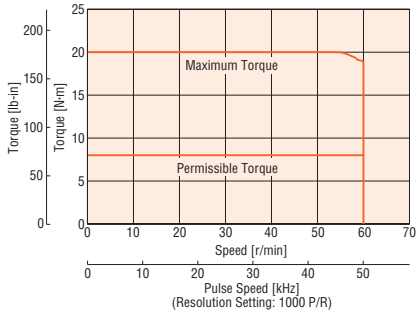
AR66□□-N25-3



AR66□□-N36-3



AR66□□-N50-3



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 (212°F).
- 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**, **C** or **S**) in the box (□) within the model name.

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

Specifications RoHS

Model		Standard (Single shaft)	AR98A□-N5-3	AR98A□-N7.2-3	AR98A□-N10-3	AR98A□-N25-3	AR98A□-N36-3	AR98A□-N50-3
		Electromagnetic Brake	AR98M□-N5-3	AR98M□-N7.2-3	AR98M□-N10-3	AR98M□-N25-3	AR98M□-N36-3	AR98M□-N50-3
Maximum Holding Torque		N·m (lb-in)	10 (88)	14 (123)	20 (177)	37 (320)		
Rotor Inertia J		kg·m^2 (oz-in^2)	1100×10^{-7} (6) [1220×10^{-7} (6.7)]*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			5:1	7.2:1	10:1	25:1	36:1	50:1
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 (lb-in)	10 (88)	14 (123)	20 (177)	37 (320)		
Maximum Torque*3		N·m (lb-in)	28 (240)	35 (300)		56 (490)	60 (530)	
Power Source	Voltage/Frequency		Single-Phase 100-115 VAC −15～+10% 50/60 Hz					
			Single-Phase 200-230 VAC −15～+10% 50/60 Hz					
			Three-Phase 200-230 VAC −15～+10% 50/60 Hz					
	Maximum Input Current A	Single-Phase 100-115 VAC	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 the power is off					
		Power Supply Input	24 VDC±5%*2 0.3 A					
		Power Consumption W	6					
		Excitation Current A	0.25					
	Static Friction Torque	N·m (lb-in)	4.5 (39)	6.5 (57)	9 (79)	18.5 (163)		
Mass		Motor kg (lb.)	3.8 (8.4) [4.4 (9.7)]*1			4.5 (9.9) [5.1 (11.2)]*1		
		Driver kg (lb.)	0.75 (1.65)					
Dimension No.	Motor		15 [18]*1					
	Driver		25					
	Cable		26					

How to read specifications table ➜ Page 16

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

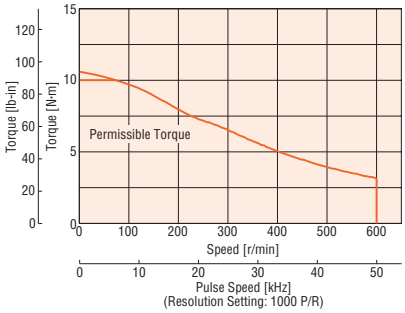
Note:

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

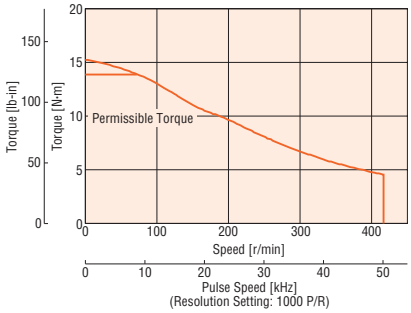
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 16

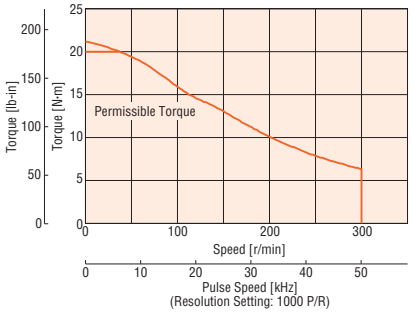
AR98□□-N5-3



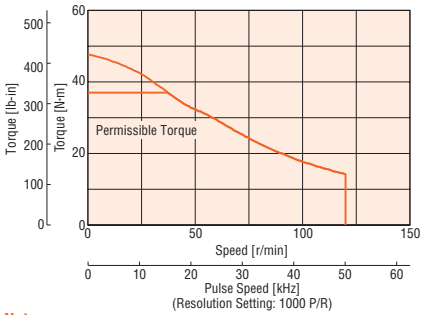
AR98□□-N7.2-3



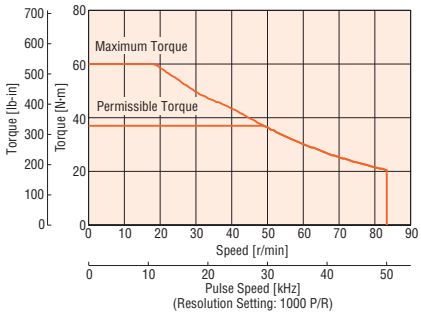
AR98□□-N10-3



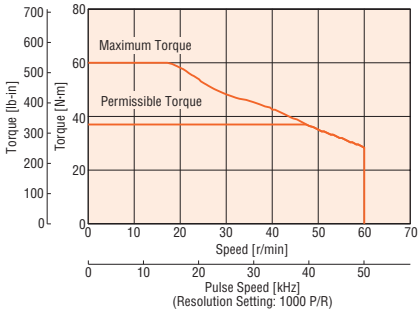
AR98□□-N25-3



AR98□□-N36-3



AR98□□-N50-3



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 (212°F).
- 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**, **C** or **S**) in the box (□) within the model name.

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

Specifications RoHS

Model	Standard (Single shaft)	AR46A□-H50-3	AR46A□-H100-3	AR66A□-H50-3	AR66A□-H100-3	AR98A□-H50-3	AR98A□-H100-3
	Electromagnetic Brake	AR46M□-H50-3	AR46M□-H100-3	AR66M□-H50-3	AR66M□-H100-3	AR98M□-H50-3	AR98M□-H100-3
Maximum Holding Torque	N·m (lb-in)	3.5 (30)	5 (44)	5.5 (48)	8 (70)	25 (220)	37 (320)
Rotor Inertia J	kg·m² (oz-in²)	75×10^{-7} (0.41) [90×10^{-7} (0.49)]*1		415×10^{-7} (2.3) [535×10^{-7} (2.9)]*1		1300×10^{-7} (7.1) [1420×10^{-7} (7.8)]*1	
Permissible Speed Range	r/min	0～70	0～35	0～70	0～35	0～70	0～35
Gear Ratio		50:1	100:1	50:1	100:1	50:1	100:1
Resolution	Resolution Setting: 1000 P/R	0.0072°/Pulse	0.0036°/Pulse	0.0072°/Pulse	0.0036°/Pulse	0.0072°/Pulse	0.0036°/Pulse
Permissible Torque	N·m (lb-in)	3.5 (30)	5 (44)	5.5 (48)	8 (70)	25 (220)	37 (320)
Maximum Torque	N·m (lb-in)	8.3 (73)	11 (97)	18 (159)	28 (240)	35 (300)	55 (480)
Lost Motion (Load torque)	arc min	1.5 max. (±0.16 N·m)	1.5 max. (±0.2 N·m)	0.7 max. (±0.28 N·m)	0.7 max. (±0.39 N·m)	1.5 max. (±1.2 N·m)	
Power Source	Voltage/Frequency	Single-Phase 100-115 VAC −15～+10% 50/60 Hz					
		Single-Phase 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	
	Maximum Input Current A: Single-Phase 200-230 VAC	1.9		2.7		3.4	
	Maximum Input Current A: 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 the power is off					
	Power Supply Input	24 VDC±5%*2 0.1 A		24 VDC±5%*2 0.3 A			
	Power Consumption W	2		6			
	Excitation Current A	0.08		0.25			
	Static Friction Torque N·m (lb-in)	1.75 (15.4)	2.5 (22)	2.8 (24)	4 (35)	12.5 (110)	18.5 (163)
Mass	Motor kg (lb.)	0.68 (1.5) [0.83 (1.83)]*1		1.41 (3.1) [1.71 (3.8)]*1		4 (8.8) [4.6 (10.1)]*1	
	Driver kg (lb.)	0.75 (1.65)					
Dimension No.	Motor	19 [22]*1		20 [23]*1		21 [24]*1	
	Driver	25					
	Cable	26					

How to read specifications table ➜ Page 16

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

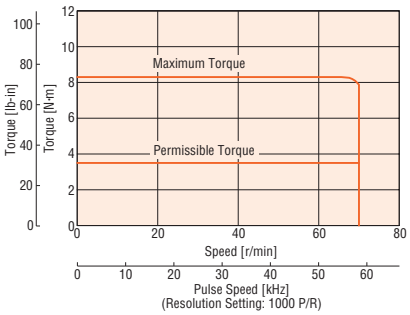
Note:

- 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.

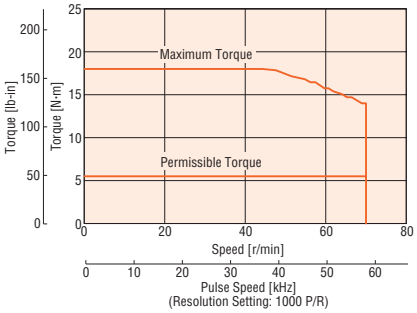
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 16

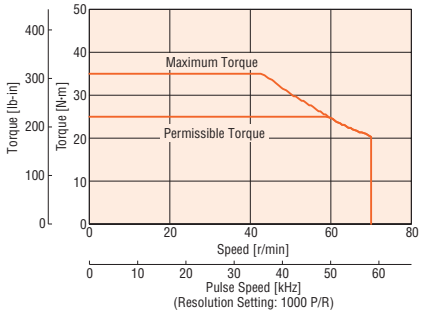
AR46□□-H50-3



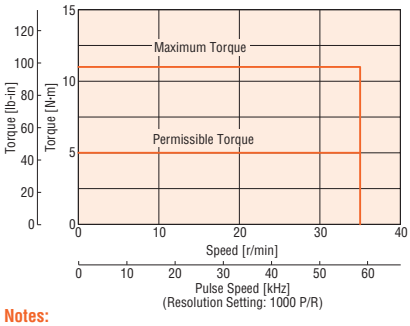
AR66□□-H50-3



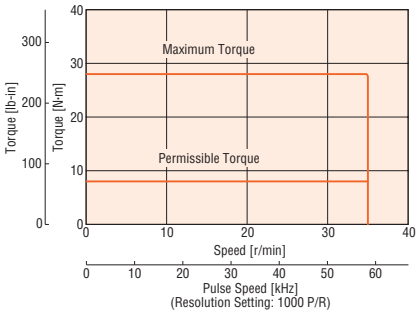
AR98□□-H50-3



AR46□□-H100-3



AR66□□-H100-3



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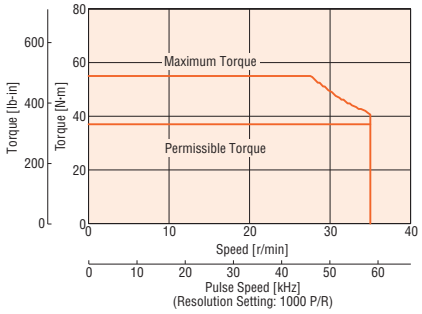


Notes:

- 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 (212°F).
- In order to prevent fatigue of the gear grease in the harmonic gear, keep the temperature of the gear case under 70°C (158°F).
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.
- Enter **A** (single shaft) or **M** (electromagnetic brake) in the box (□) within the model name.
  Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name.

Driver Specifications

Speed and Positioning Control Command	Pulse input
Maximum Input Pulse Frequency	When the host controller is a line driver output: 500 kHz (When the pulse duty is 50%) When the host controller is an 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 will coast to a stop.
	Overheat, Overload, Overspeed, Command pulse error, Regeneration unit overheat, Overvoltage, Main power supply error, Undervoltage, Overflow rotation during current on, Overflow rotation during current off, Overcurrent, Drive circuit error, Abnormal operation data, 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	· Motor resolution setting function (4 levels) · Current setting function (16 levels) · Velocity filter function (16 levels) · Pulse input setting function (2-pulse input, 1-pulse input) · Current control mode function
Extended Functions [When the control module (**OPX-2A**) or data setting software (**MEXE02**) (both sold separately) is used]	· Push-motion operation function (8 current levels; desired levels can be set within a range of 0 to 100%) · Motor resolution setting function (electronic gear) · Alarm code output function (3 bits) · Current setting function (16 levels; desired levels can be set within a range of 0 to 100%) · Velocity filter function (16 levels; desired levels can be set within a range of 0 to 200 ms) · Current ON (C-ON) input logic setting function · Positioning completion (END) signal width setting function · Positioning completion (END) signal offset setting function · Standstill current setting function · Return operation setting function (starting speed, acceleration/deceleration rate, operating speed) · JOG operation setting function (starting speed, acceleration/deceleration rate, operating speed) · **OPX-2A** display setting function (gear output shaft speed, speed code display, setting change prohibition) · Pulse input setting function (2-pulse, 1-pulse, logic, phase difference, multiplication) · Smooth drive cancellation · Motor excitation position setting function at power ON · Excitation position reset operation function at current ON · Motor rotation direction setting function · Warning output setting function (overflow rotation during current on, overflow rotation during current off, overheat, overvoltage, main power supply error, undervoltage, overload, overspeed, abnormal operation data, electronic gear setting error)

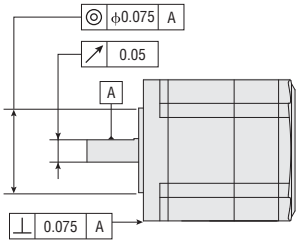
*Value applies when an accessory driver cable general-purpose type (**CC36D1-1**) is used. **Driver cable general-purpose type** ➜ Page 89

General Specifications

Item		Motor	Driver
Insulation Class		Class B [130˚C (266˚F)]	–
Insulation Resistance		100 MΩ or more when 500 VDC megger is applied between the following places: · Case – Motor and sensor windings · Case – Electromagnetic brake windings	100 MΩ or more when 500 VDC megger is applied between the following places: · PE terminal – Power supply terminal · Signal I/O terminal – Power supply terminal
Dielectric Strength		Sufficient to withstand the following for 1 minute: · Case – Motor and sensor windings 1.5 kVAC 50 Hz or 60 Hz · Case – Electromagnetic brake windings 1.5 kVAC 50 Hz or 60 Hz	Sufficient to withstand the following for 1 minute: · PE terminal – Power supply terminal 1.8 kVAC 50 Hz or 60 Hz · Signal I/O terminal – Power supply terminal 1.5 kVAC 50 Hz or 60 Hz
Operating Environment	Ambient Temperature	−10～+50°C (+14～+122°F) (non-freezing)*1: Standard type, **TH**, **PN** geared type 0～+40°C (+32～+104°F) (non-freezing)*1: Harmonic geared type	0～+50°C (+32～+122°F) (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		**AR46**: ±4 arc minutes (±0.067°) **AR66**, **AR69**, **AR98**, **AR911**: ±3 arc minutes (±0.05°)	
Shaft Runout		0.05 mm (0.002 in.) T.I.R. *3	–
Concentricity		0.075 mm (0.003 in.) T.I.R. *3	–
Perpendicularity		0.075 mm (0.003 in.) T.I.R. *3	–

*1 When a heat sink of a capacity at least equivalent to an aluminum plate with a size of 250×250 mm (9.84×9.84 in.), 6 mm (0.24 in.) 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 (7.87×7.87 in.), 2 mm (0.08 in.) 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.



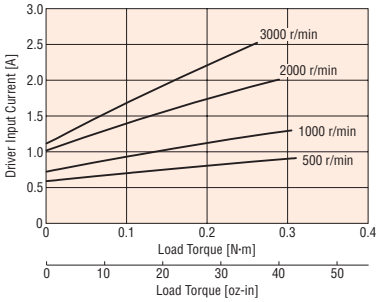
Load Torque – Driver Input Current Characteristics

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.

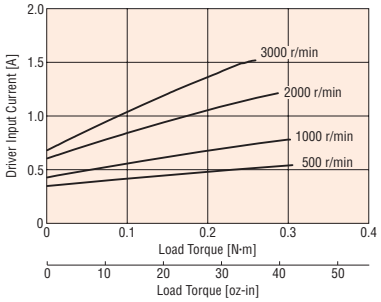
Motor shaft speed [r/min] = Gear output shaft speed×Gear ratio

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

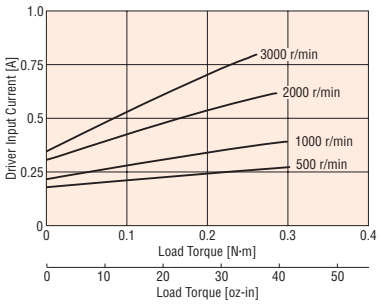
AR46□A



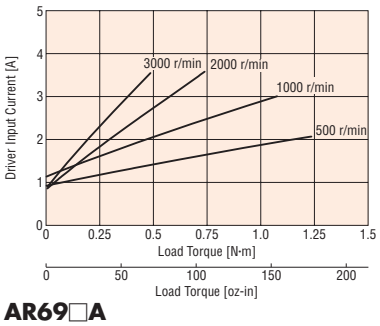
AR46□C



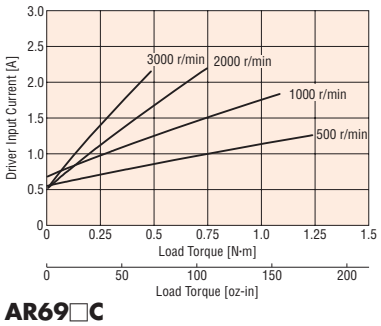
AR46□S



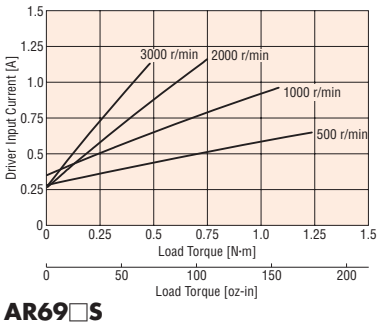
AR66□A



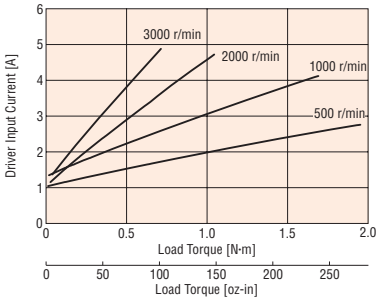
AR66□C



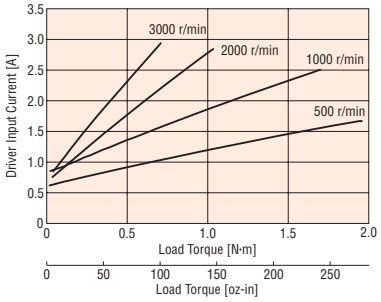
AR66□S



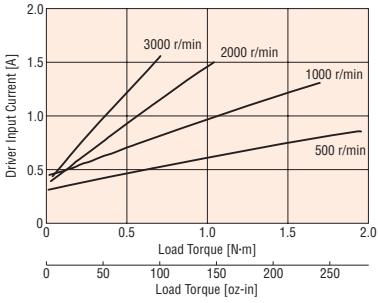
AR69□A



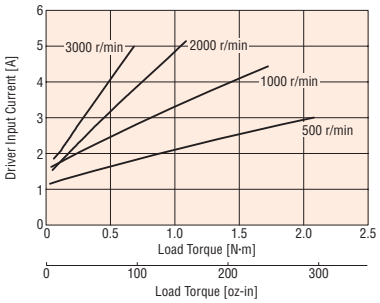
AR69□C



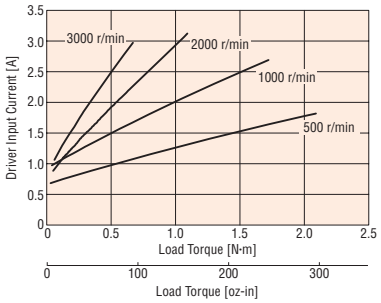
AR69□S



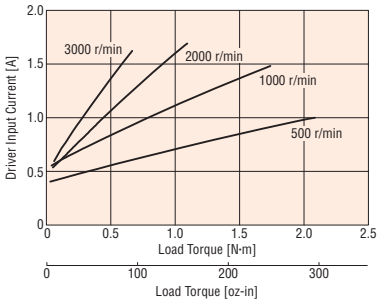
AR98□A



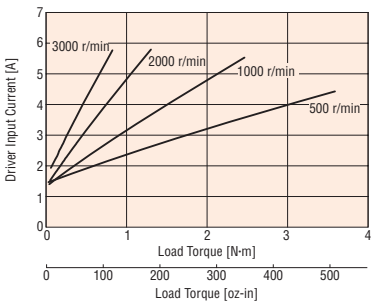
AR98□C



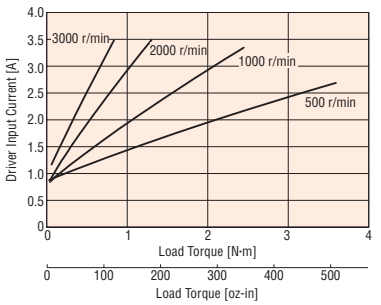
AR98□S



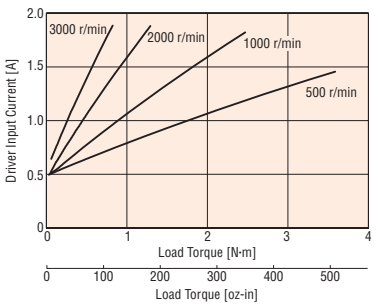
AR911□A



AR911□C



AR911□S



Permissible Overhung Load and Permissible Thrust Load

Unit = N (lb.)

Type	Model	Gear Ratio	Permissible Overhung Load (Distance from Shaft End) 0 mm (0 in.)	5 mm (0.2 in.)	10 mm (0.39 in.)	15 mm (0.59 in.)	20 mm (0.79 in.)	Permissible Thrust Load
Standard Type	**AR46A□-3** **AR46B□-3***	–	35 (7.8)	44 (9.9)	58 (13.0)	85 (19.1)	–	4.6 (1.03)
	AR46M□-3							6.1 (1.37)
	AR66A□-3 **AR66B□-3***		90 (20)	100 (22)	130 (29)	180 (40)	270 (60)	8.8 (1.98)
	AR66M□-3							11.8 (2.6)
	AR69A□-3 **AR69B□-3***							13.7 (3.0)
	AR69M□-3							16.7 (3.7)
	AR98A□-3 **AR98B□-3***		260 (58)	290 (65)	340 (76)	390 (87)	480 (108)	18 (4.0)
	AR98M□-3							24 (5.4)
	AR911A□-3 **AR911B□-3***							29 (6.5)
TH Geared Type	**AR46□□-T■-3**	**3.6**, **7.2**, **10**, **20**, **30**	10 (2.2)	14 (3.1)	20 (4.5)	30 (6.7)	–	15 (3.3)
	AR66□□-T■-3		70 (15.7)	80 (18.0)	100 (22)	120 (27)	150 (33)	40 (9.0)
	AR98□□-T■-3		220 (49)	250 (56)	300 (67)	350 (78)	400 (90)	100 (22)
PN Geared Type	**AR46□□-N■-3**	**5**, **7.2**, **10**	100 (22)	120 (27)	150 (33)	190 (42)	–	100 (22)
	AR66□□-N5-3	**5**	200 (45)	220 (49)	250 (56)	280 (63)	320 (72)	
	AR66□□-N■-3	**7.2**, **10**	250 (56)	270 (60)	300 (67)	340 (76)	390 (87)	
	AR66□□-N■-3	**25**, **36**, **50**	330 (74)	360 (81)	400 (90)	450 (101)	520 (117)	
	AR98□□-N5-3	**5**	480 (108)	520 (117)	550 (123)	580 (130)	620 (139)	300 (67)
	AR98□□-N■-3	**7.2**, **10**	480 (108)	540 (121)	600 (135)	680 (153)	790 (177)	
	AR98□□-N25-3	**25**	850 (191)	940 (210)	1050 (230)	1110 (240)	1190 (260)	
	AR98□□-N36-3	**36**	930 (200)	1030 (230)	1150 (250)	1220 (270)	1300 (290)	
	AR98□□-N50-3	**50**	1050 (230)	1160 (260)	1300 (290)	1380 (310)	1490 (330)	
Harmonic Geared Type	**AR46□□-H■-3**	**50**, **100**	180 (40)	220 (49)	270 (60)	360 (81)	510 (114)	220 (49)
	AR66□□-H■-3		320 (72)	370 (83)	440 (99)	550 (123)	720 (162)	450 (101)
	AR98□□-H■-3		1090 (240)	1150 (250)	1230 (270)	1310 (290)	1410 (310)	1300 (290)

*With a double shaft model, the output shaft located on the opposite side of the motor output shaft is used to install a slit disk or similar device. 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**, **C** or **S**) in the box (□) within the model name.
Enter the gear ratio in the box (■) within the model name.

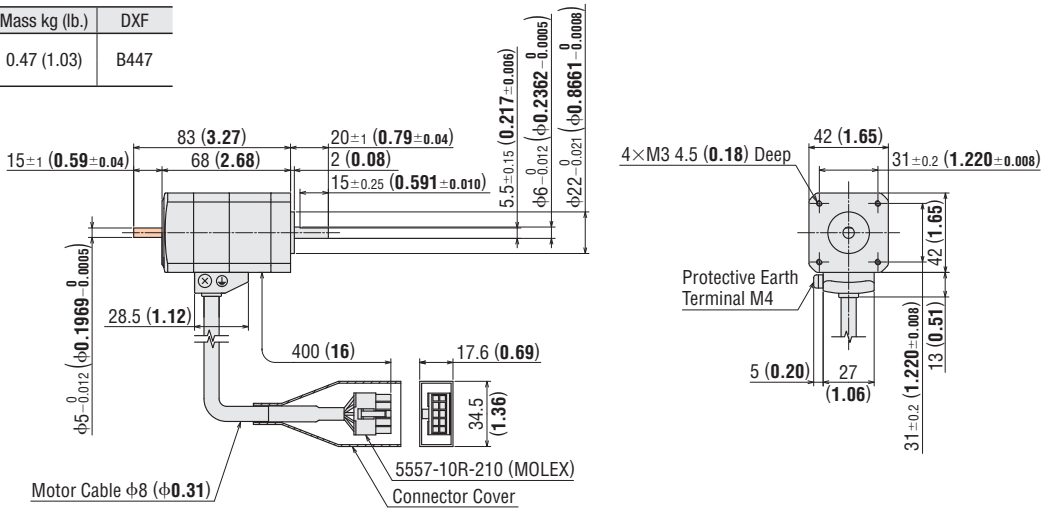
Dimensions Unit = mm (inch)

Motor

◇Standard Type

1 □42 mm (□1.65 in.)

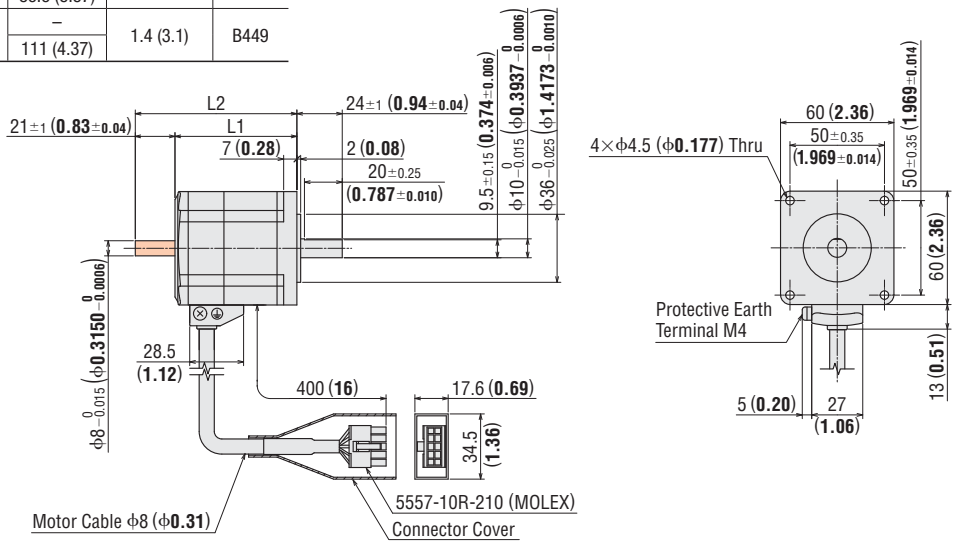
Model	Motor Model	Mass kg (lb.)	DXF
AR46A□-3	ARM46AC	0.47 (1.03)	B447
AR46B□-3	ARM46BC		



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

2 □60 mm (□2.36 in.)

Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
AR66A□-3	ARM66AC	64.5 (2.54)	–	0.9 (1.98)	B448
AR66B□-3	ARM66BC		85.5 (3.37)		
AR69A□-3	ARM69AC	90 (3.54)	–	1.4 (3.1)	B449
AR69B□-3	ARM69BC		111 (4.37)		

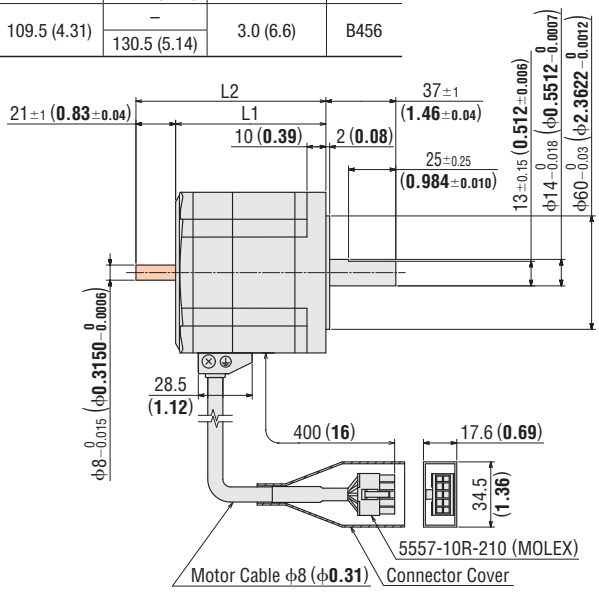


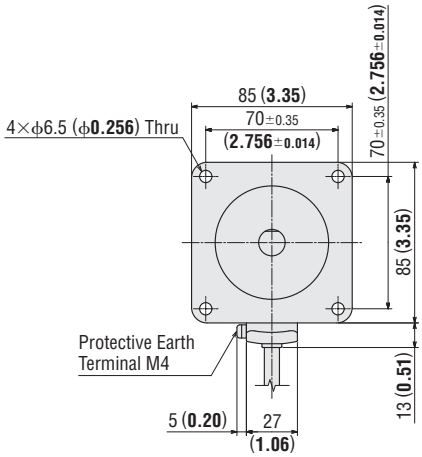
● These dimensions are for double shaft models. For single shaft models, ignore the shaded ( ) areas.

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

3 □85 mm (□3.35 in.)

Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
AR98A□-3	ARM98AC	79.5 (3.13)	–	1.9 (4.2)	B455
AR98B□-3	ARM98BC		100.5 (3.96)		
AR911A□-3	ARM911AC	109.5 (4.31)	–	3.0 (6.6)	B456
AR911B□-3	ARM911BC		130.5 (5.14)		



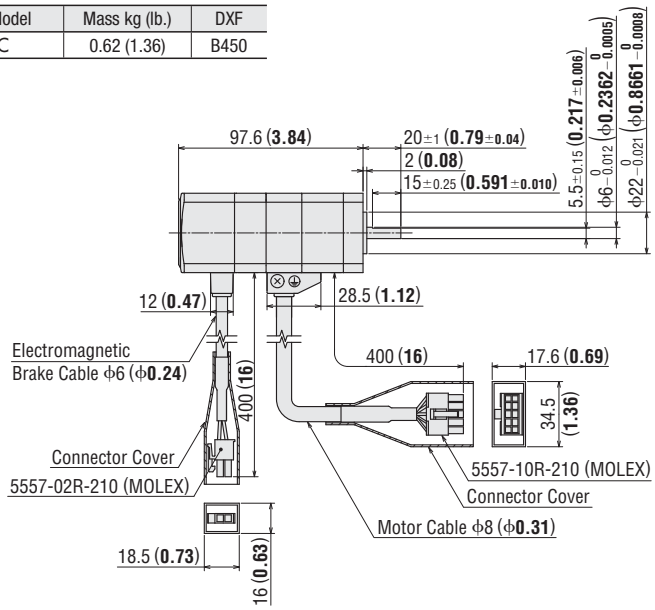


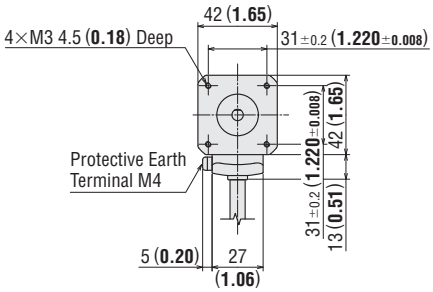
● These dimensions are for double shaft models. For single shaft models, ignore the shaded (▭) areas.

◇Standard Type with Electromagnetic Brake

4 □42 mm (□1.65 in.)

Model	Motor Model	Mass kg (lb.)	DXF
AR46M□-3	ARM46MC	0.62 (1.36)	B450

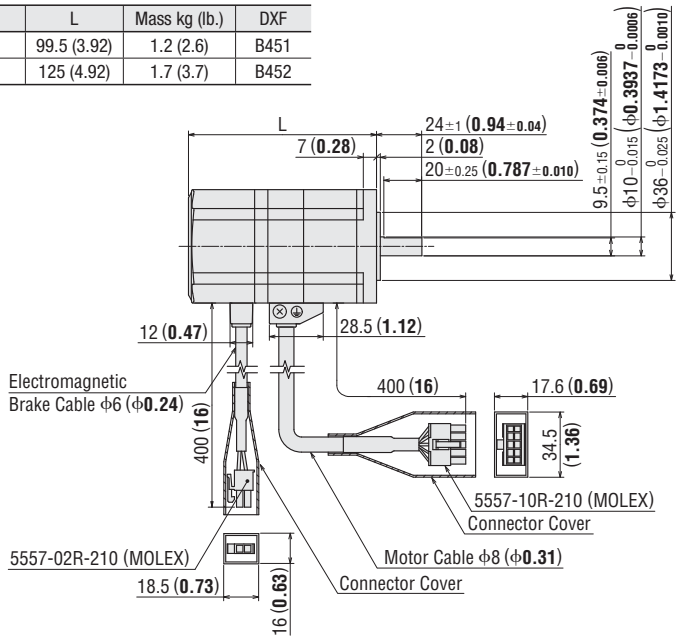


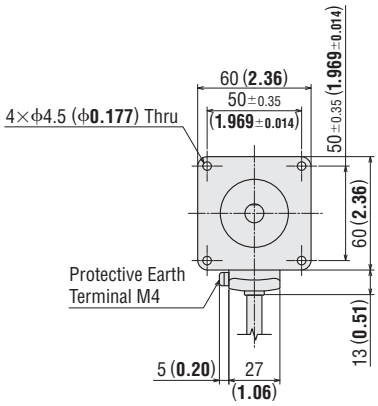


● Enter the power supply voltage (**A**, **C** or **S**) in the box (▭) within the model name.

5 □60 mm (□2.36 in.)

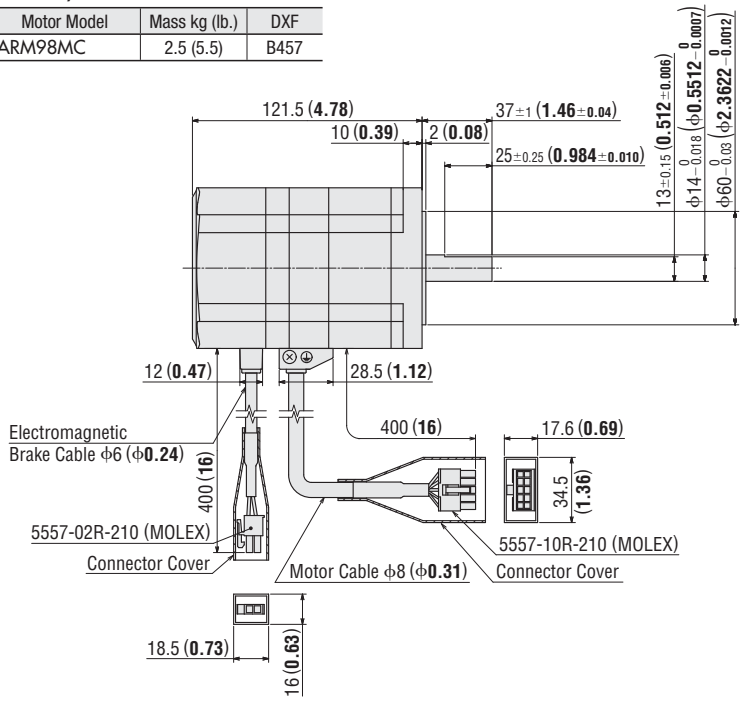
Model	Motor Model	L	Mass kg (lb.)	DXF
AR66M□-3	ARM66MC	99.5 (3.92)	1.2 (2.6)	B451
AR69M□-3	ARM69MC	125 (4.92)	1.7 (3.7)	B452

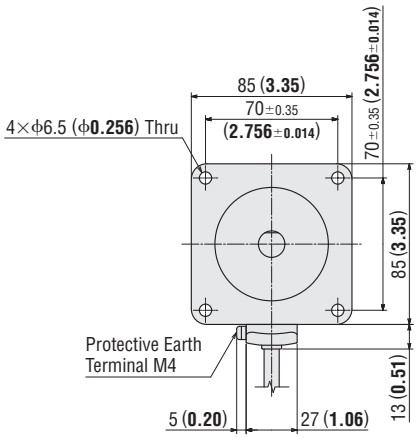




6 □85 mm (□3.35 in.)

Model	Motor Model	Mass kg (lb.)	DXF
AR98M□-3	ARM98MC	2.5 (5.5)	B457



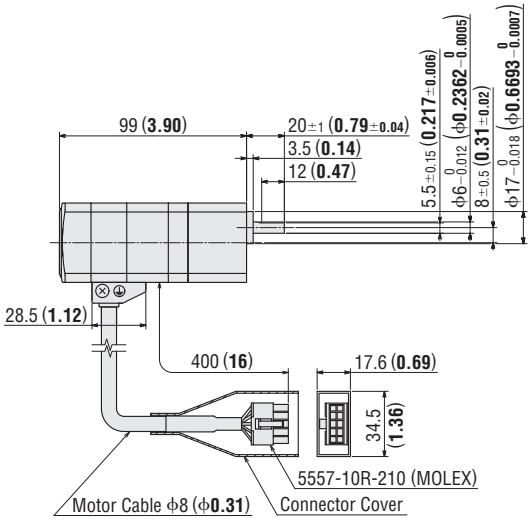


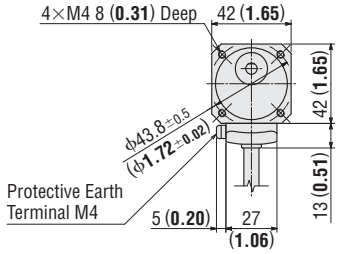
● Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name.

◇**TH** Geared Type

7 □42 mm (□1.65 in.)

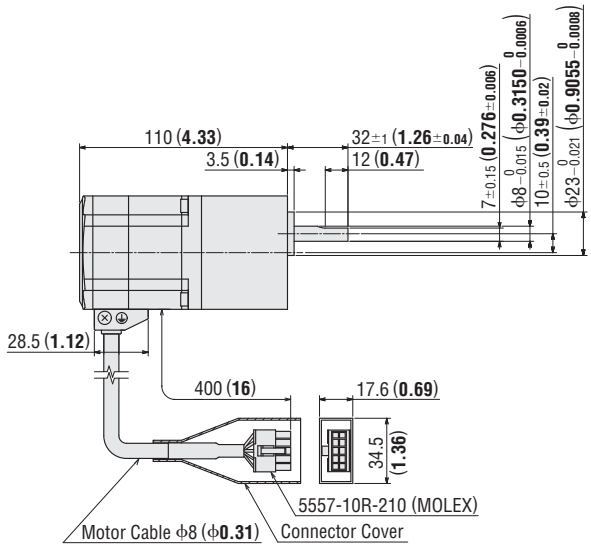
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46A□-T■-3	ARM46AC-T■	**3.6**, **7.2**, **10**, **20**, **30**	0.62 (1.36)	B458

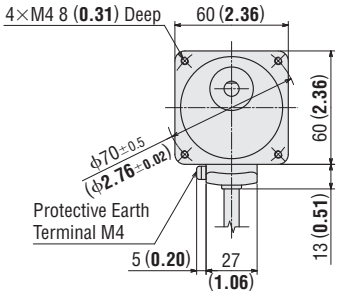




8 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66A□-T■-3	ARM66AC-T■	**3.6**, **7.2**, **10**, **20**, **30**	1.3 (2.9)	B459

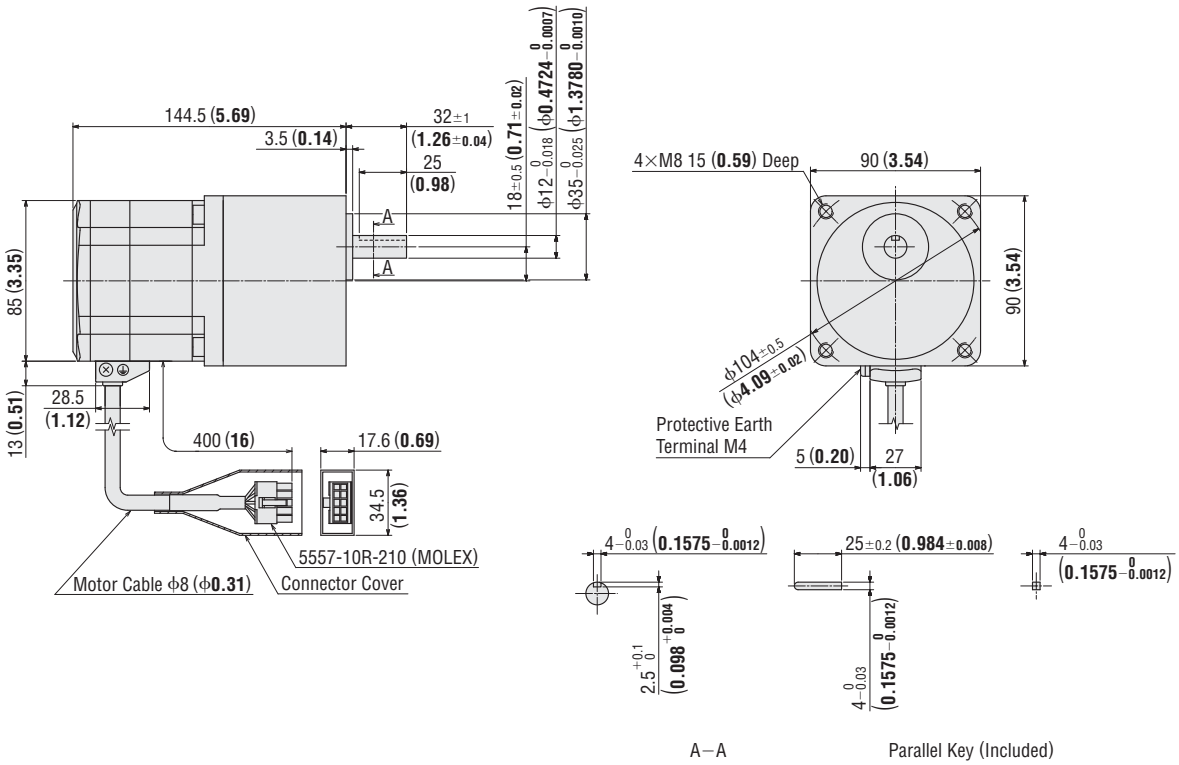




● Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name.
Enter the gear ratio in the box (■) within the model name.

9 □90 mm (□3.54 in.)

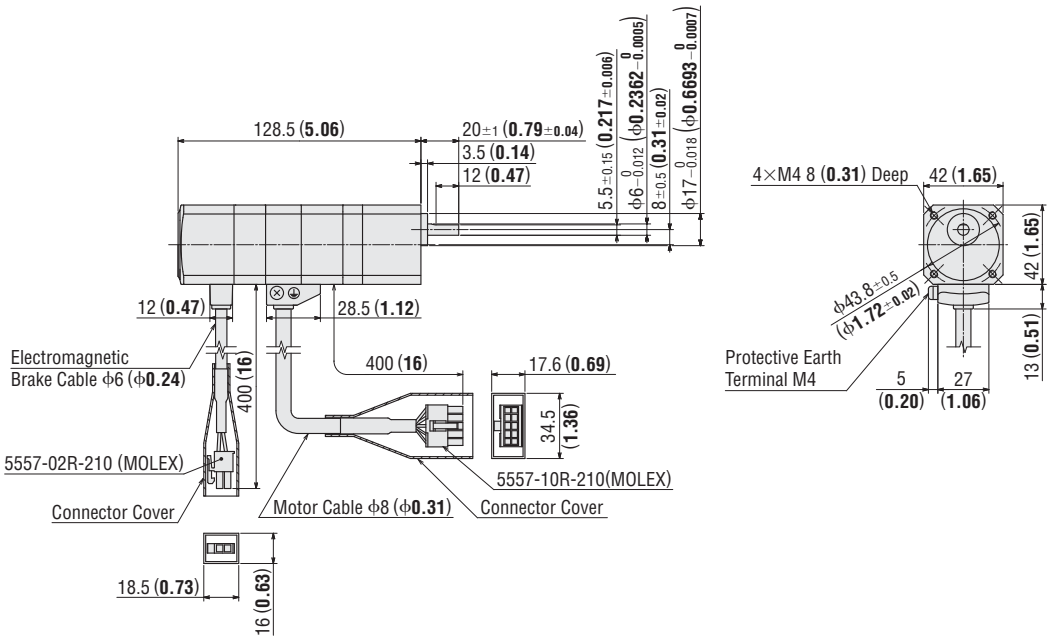
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98A□-T■-3	ARM98AC-T■	**3.6, 7.2, 10, 20, 30**	3.1 (6.8)	B460



◇**TH** Geared Type with Electromagnetic Brake

10 □42 mm (□1.65 in.)

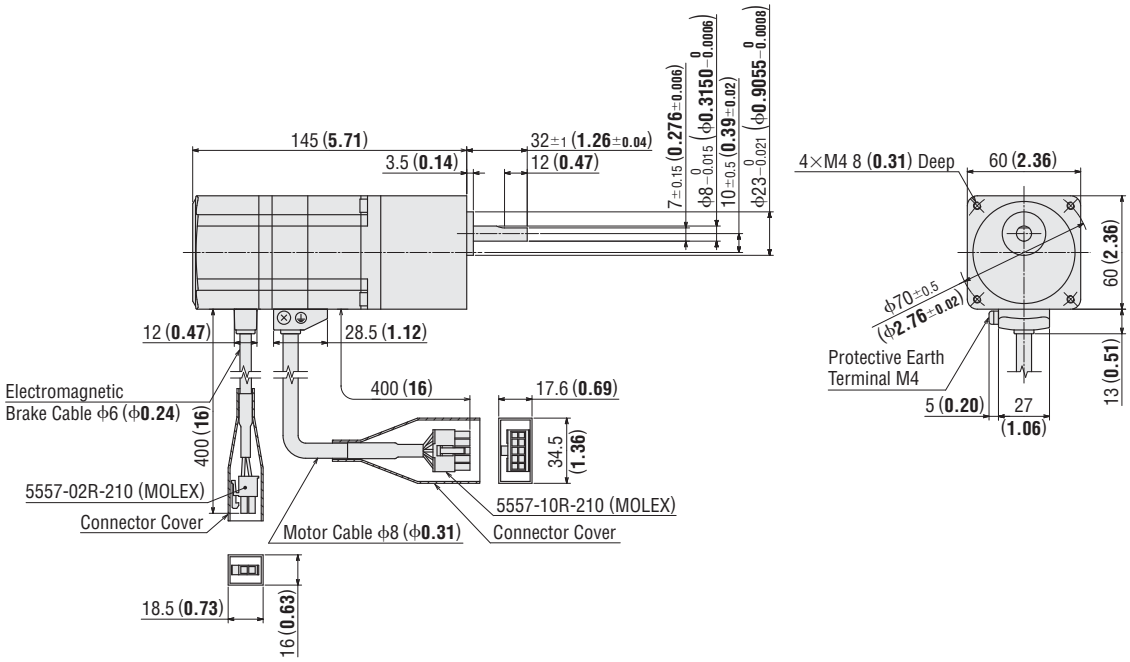
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46M□-T■-3	ARM46MC-T■	**3.6, 7.2, 10, 20, 30**	0.77 (1.69)	B461



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

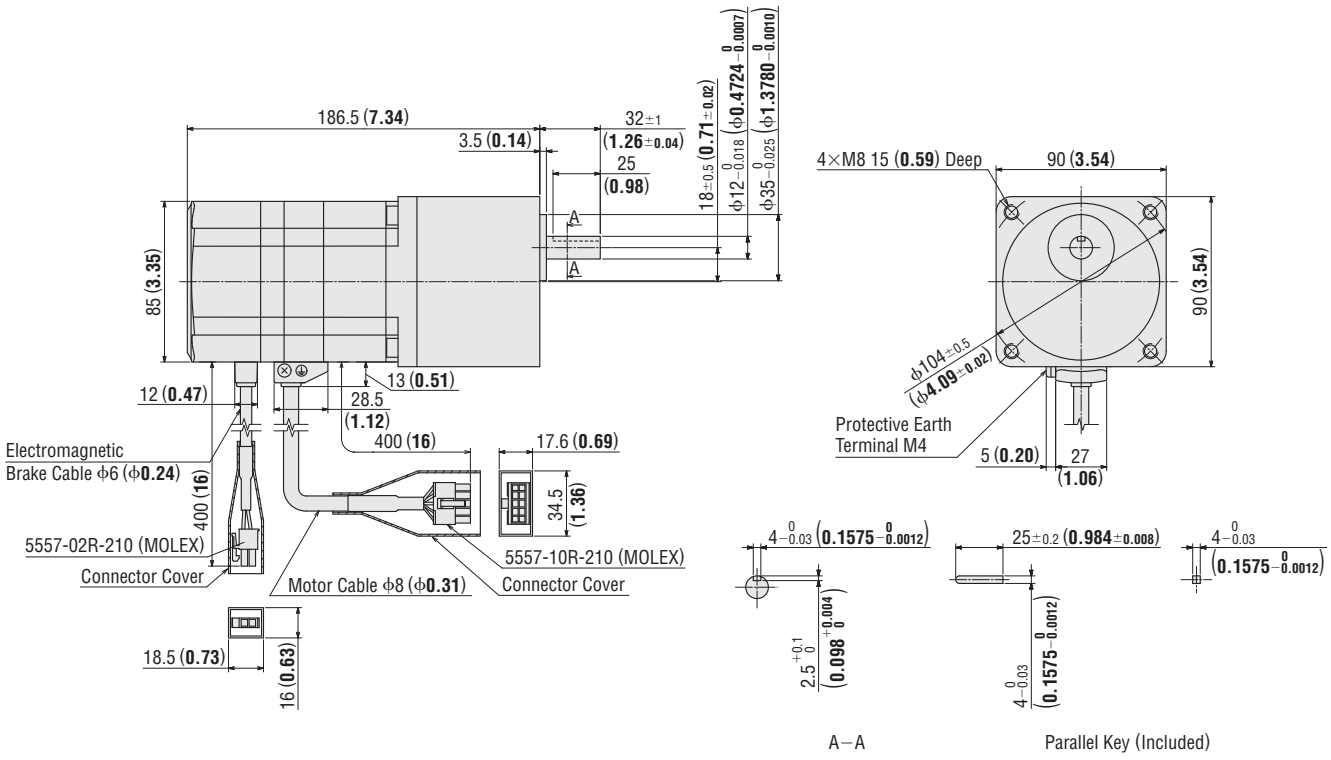
11 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66M□-T■-3	ARM66MC-T■	**3.6**, **7.2**, **10**, **20**, **30**	1.6 (3.5)	B462



12 □90 mm (□3.54 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98M□-T■-3	ARM98MC-T■	**3.6**, **7.2**, **10**, **20**, **30**	3.7 (8.1)	B463

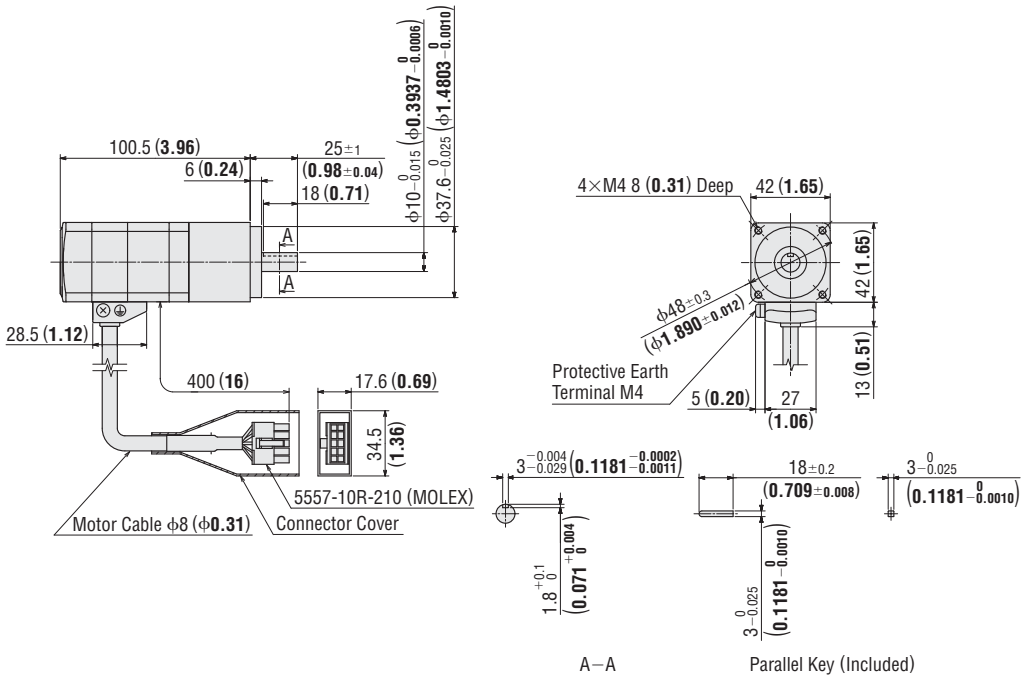


● Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name.
Enter the gear ratio in the box (■) within the model name.

◇**PN** Geared Type

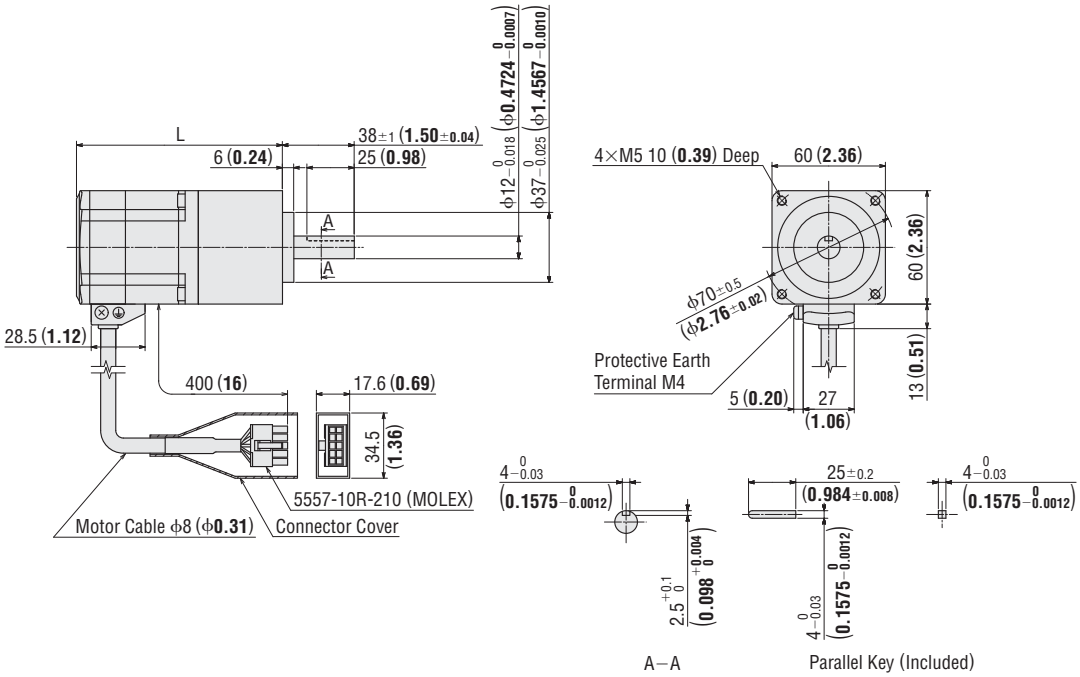
13 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46A□-N■-3	ARM46AC-N■	**5**, **7.2**, **10**	0.73 (1.61)	B476



14 □60 mm (□2.36 in.)

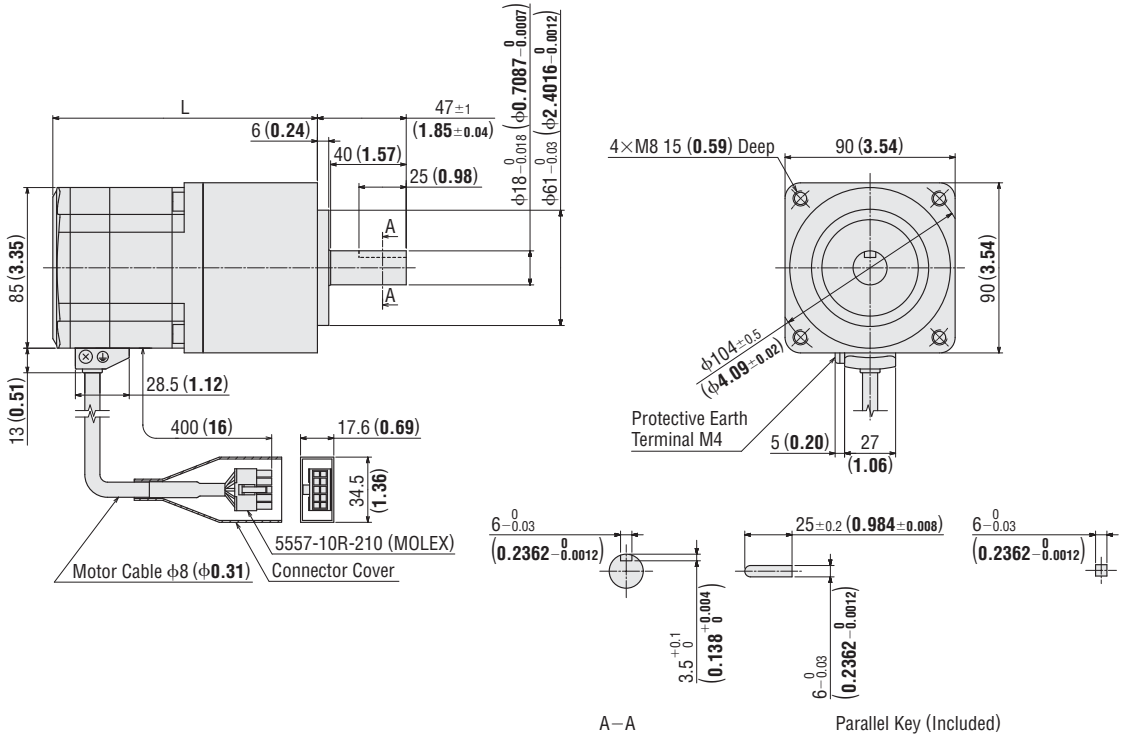
Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR66A□-N■-3	ARM66AC-N■	**5**, **7.2**, **10**	109 (4.29)	1.5 (3.3)	B477
		25, **36**, **50**	125 (4.92)	1.73 (3.8)	B478



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

15 □90 mm (□3.54 in.)

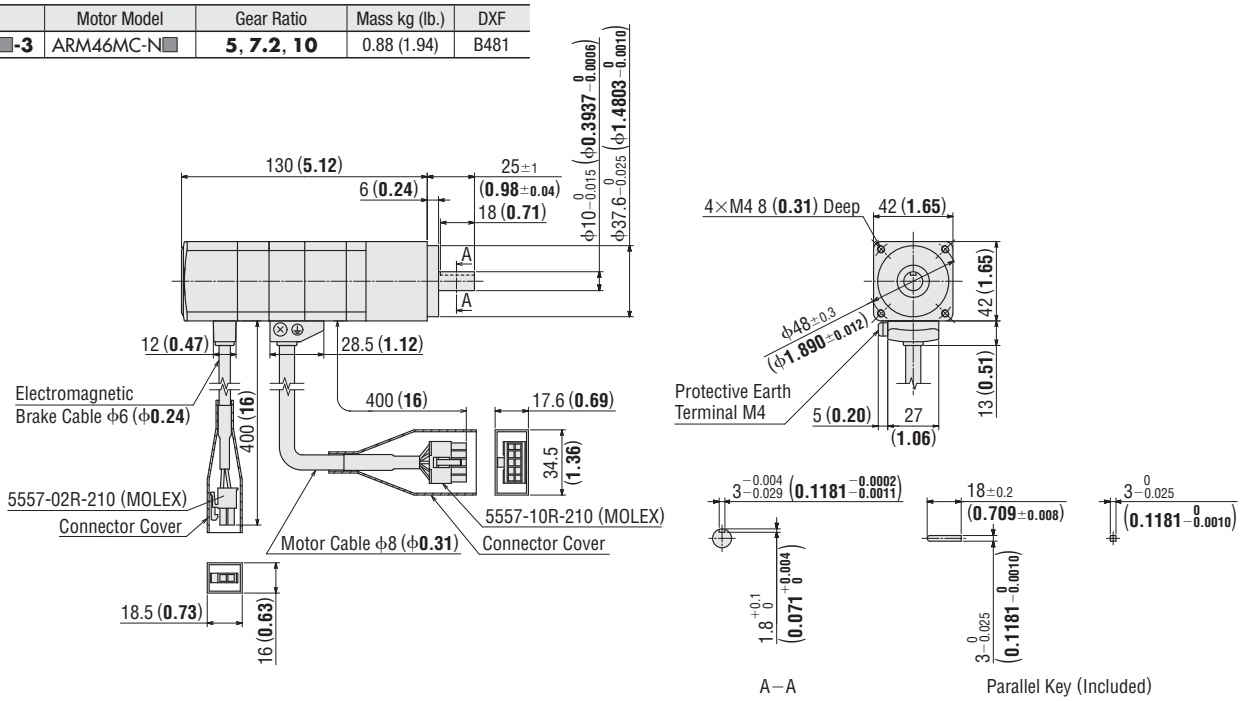
Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR98A□-N■-3	ARM98AC-N■	**5, 7.2, 10**	140 (5.51)	3.8 (8.4)	B479
		25, 36, 50	163 (6.42)	4.5 (9.9)	B480



◇**PN** Geared Type with Electromagnetic Brake

16 □42 mm (□1.65 in.)

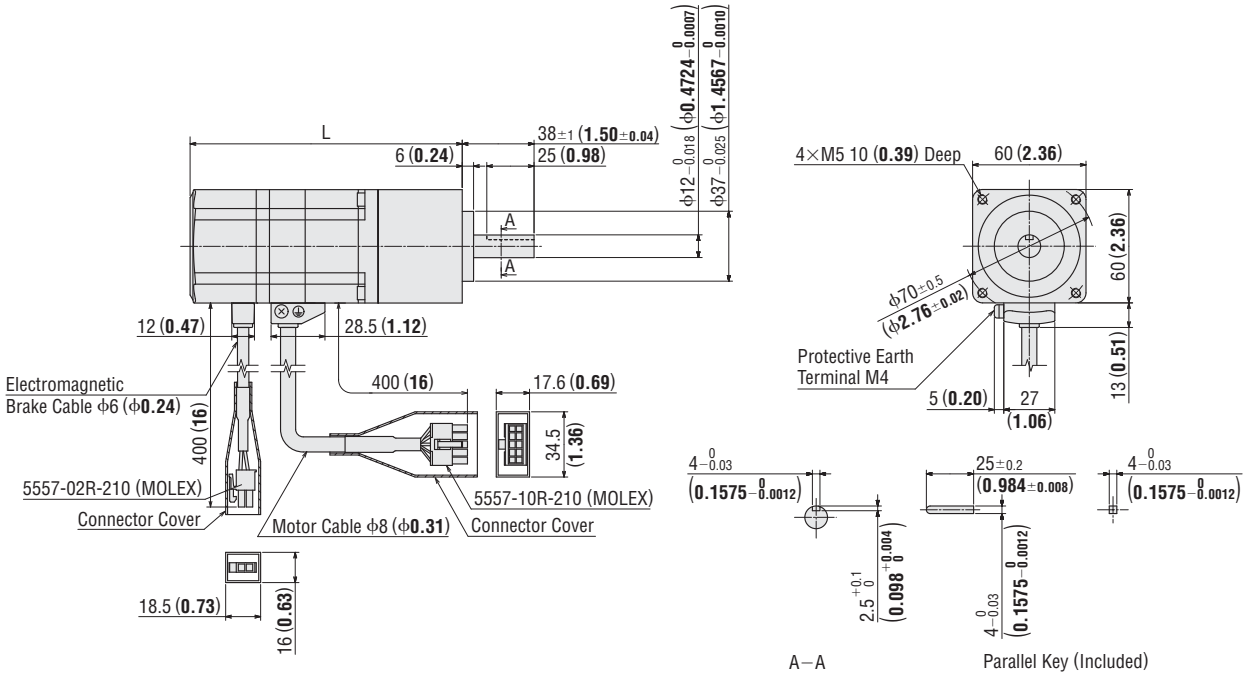
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46M□-N■-3	ARM46MC-N■	**5, 7.2, 10**	0.88 (1.94)	B481



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

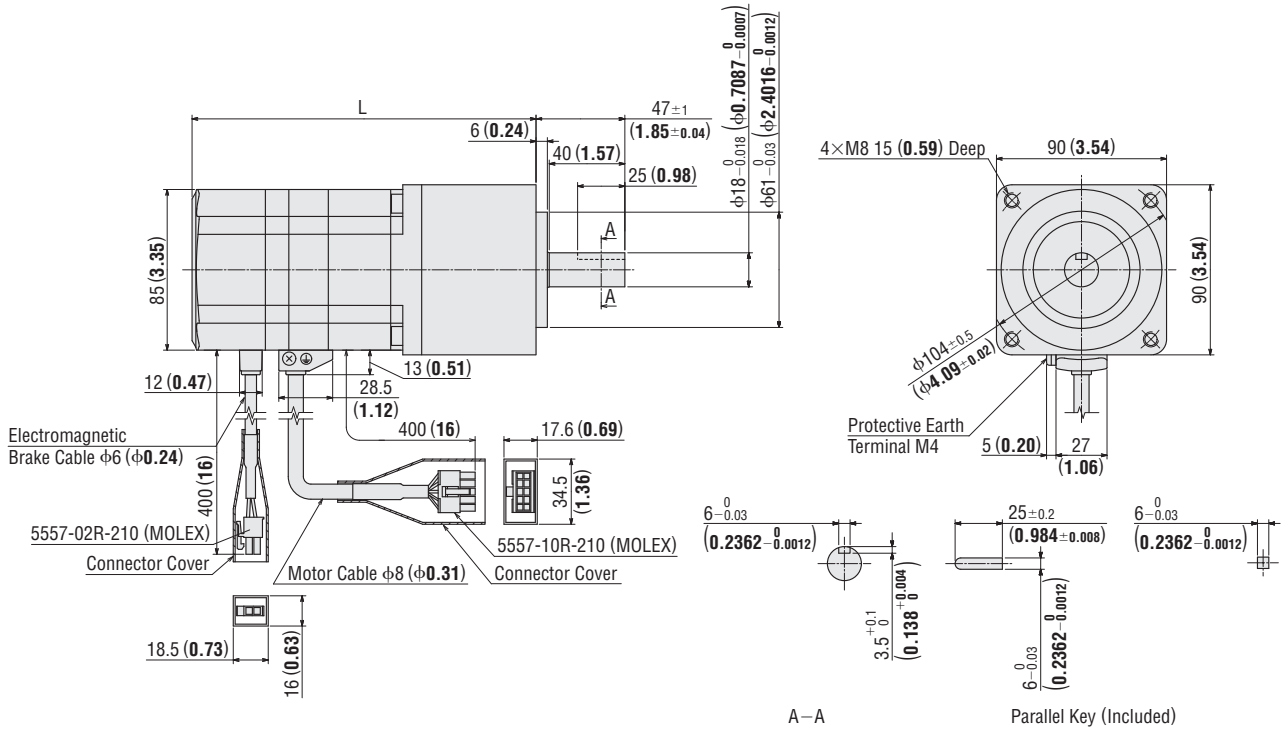
17 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR66M□-N■-3	ARM66MC-N■	**5, 7.2, 10**	144 (5.67)	1.8 (4.0)	B482
		25, 36, 50	160 (6.30)	2.0 (4.4)	B483



18 □90 mm (□3.54 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR98M□-N■-3	ARM98MC-N■	**5, 7.2, 10**	182 (7.17)	4.4 (9.7)	B484
		25, 36, 50	205 (8.07)	5.1 (11.2)	B485

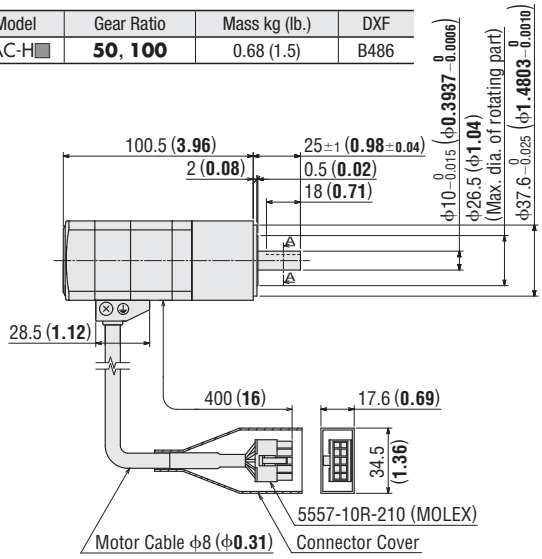


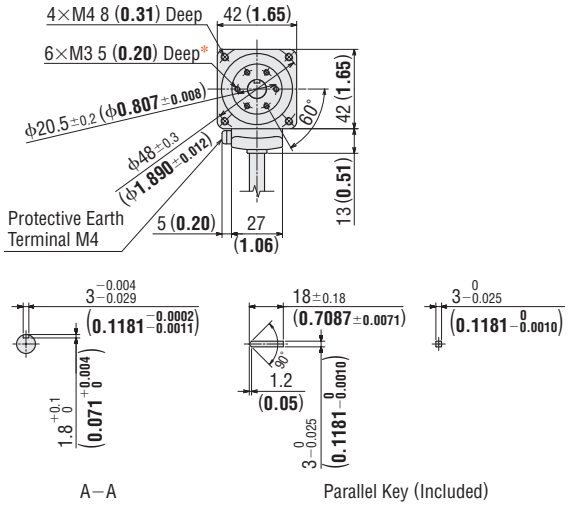
● Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name.
Enter the gear ratio in the box (■) within the model name.

◇Harmonic Geared Type

19 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46A□-H■-3	ARM46AC-H■	**50, 100**	0.68 (1.5)	B486



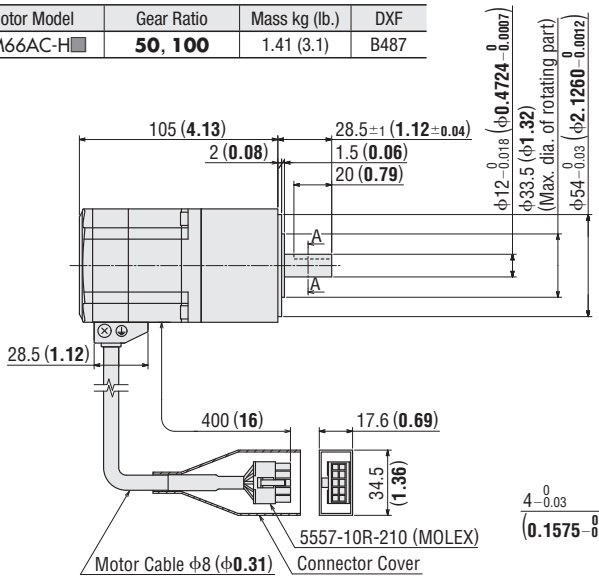


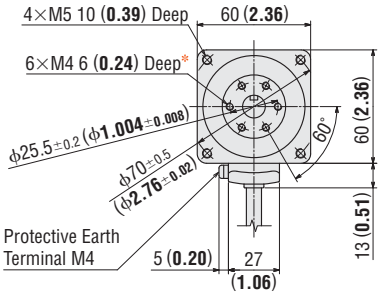
A–A　　Parallel Key (Included)

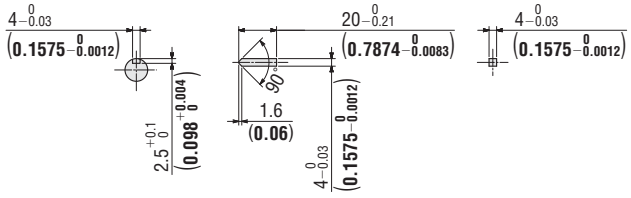
*The position of the output shaft relative to the screw holes on the rotating part is arbitrary.

20 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66A□-H■-3	ARM66AC-H■	**50, 100**	1.41 (3.1)	B487







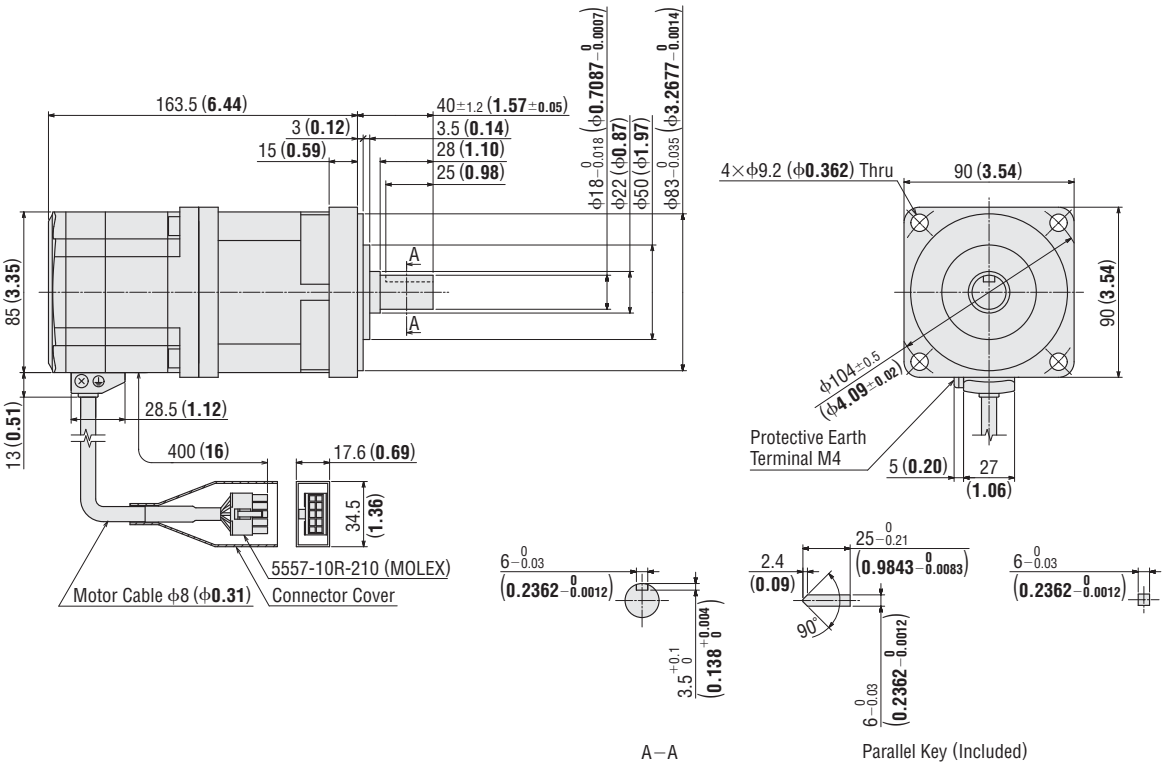
A–A　　Parallel Key (Included)

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

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

21 □90 mm (□3.54 in.)

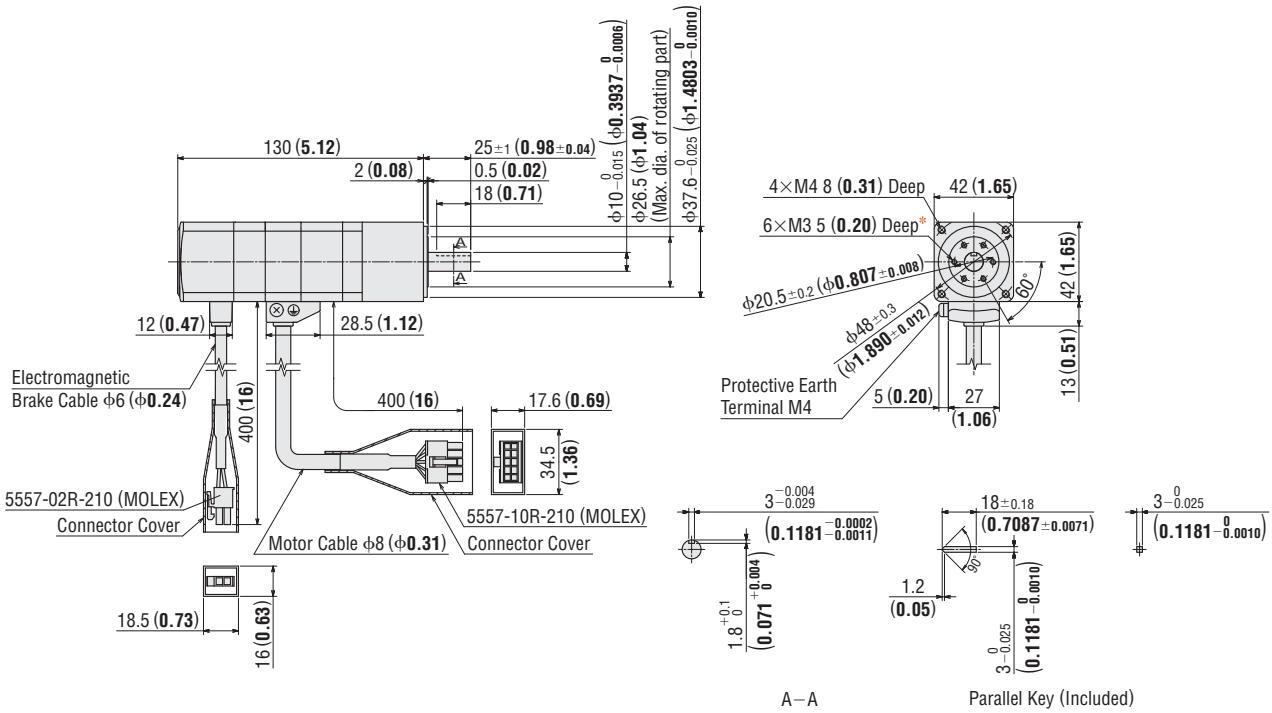
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98A□-H■-3	ARM98AC-H■	**50, 100**	4.0 (8.8)	B488



◇Harmonic Geared Type with Electromagnetic Brake

22 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46M□-H■-3	ARM46MC-H■	**50, 100**	0.83 (1.83)	B489

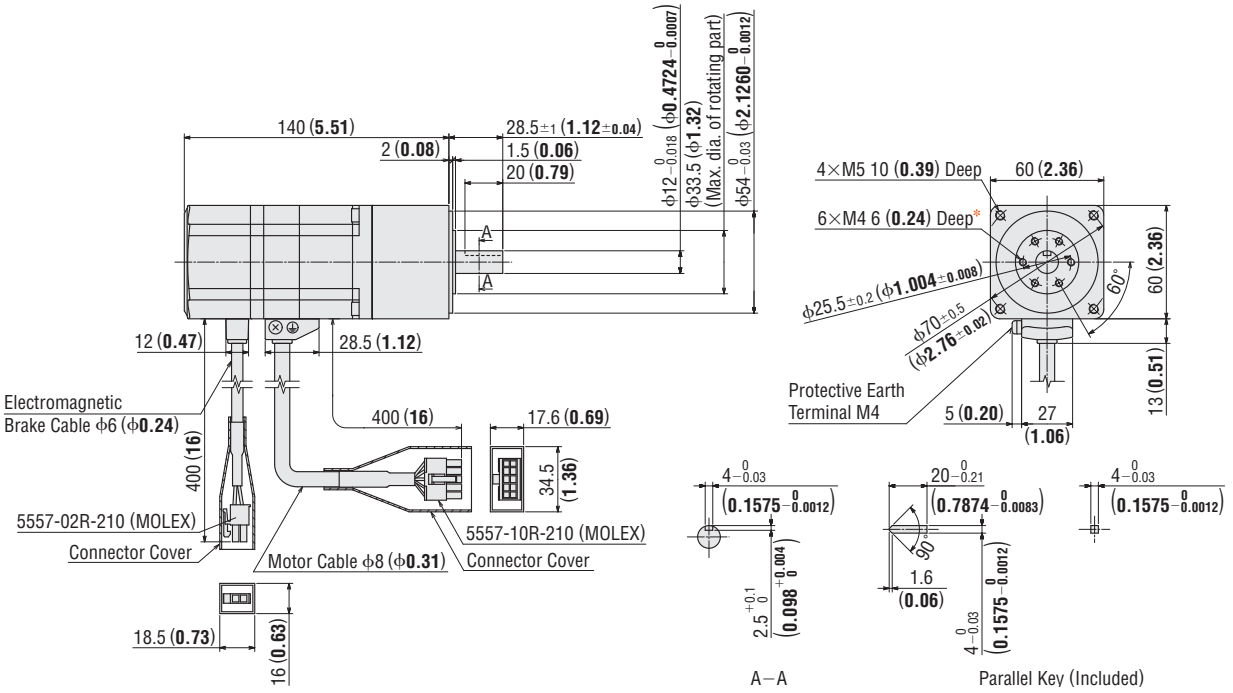


*The position of the output shaft relative to the screw holes on the rotating part is arbitrary

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

23 □60 mm (□2.36 in.)

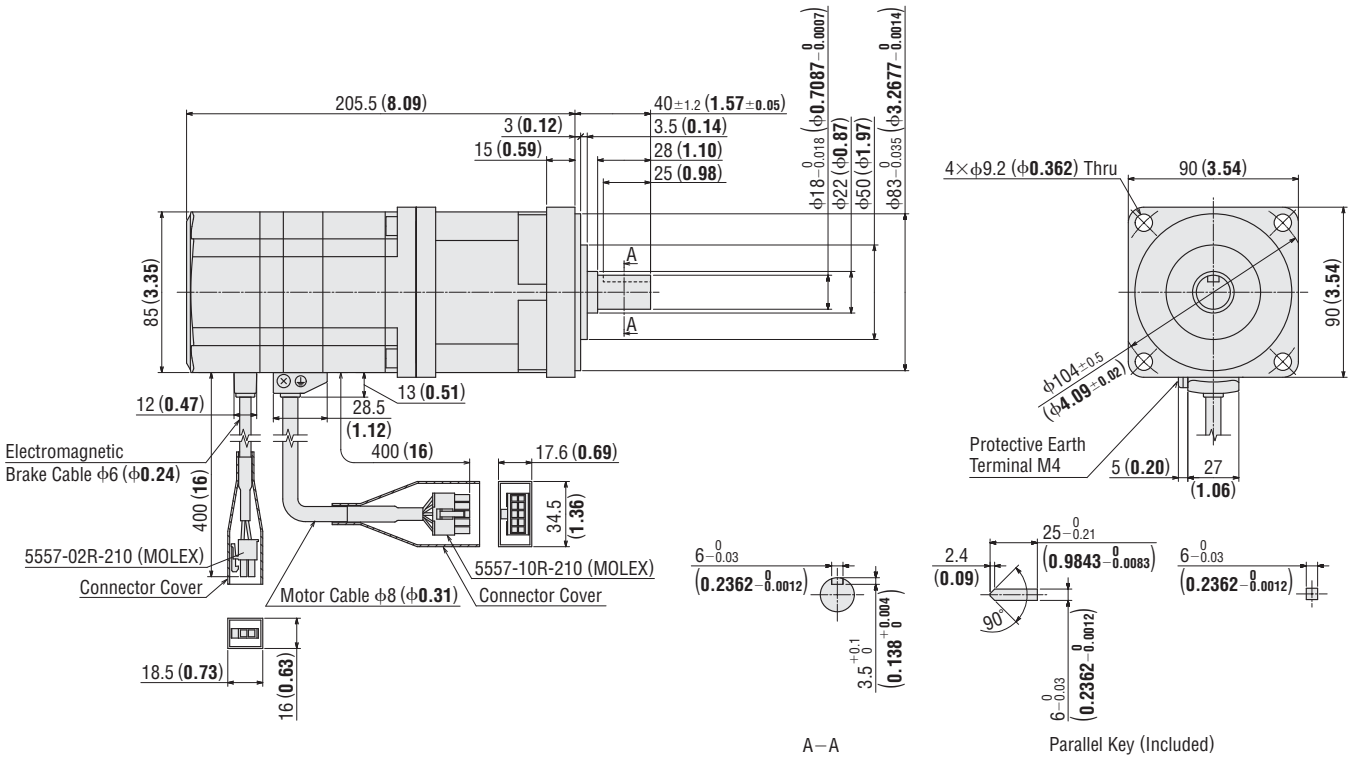
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66M□-H■-3	ARM66MC-H■	**50, 100**	1.71 (3.8)	B490



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

24 □90 mm (□3.54 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98M□-H■-3	ARM98MC-H■	**50, 100**	4.6 (10.1)	B491



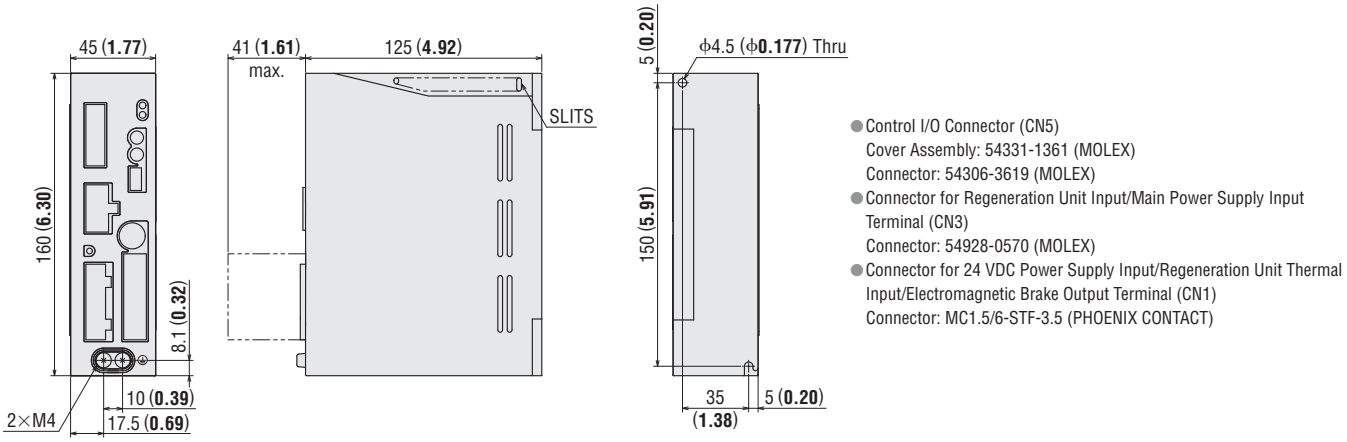
● Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name.
Enter the gear ratio in the box (■) within the model name.

●Driver

25 Common to All AC Types

Mass: 0.75 kg (1.65 lb.)

DXF B454

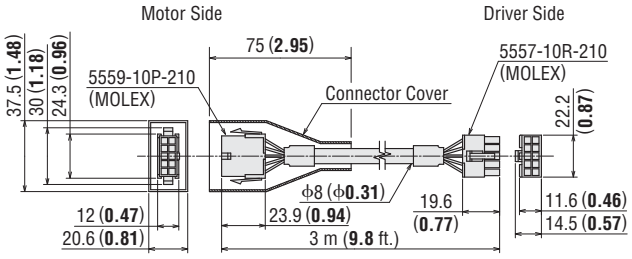


- Control I/O Connector (CN5)
  Cover Assembly: 54331-1361 (MOLEX)
  Connector: 54306-3619 (MOLEX)
- Connector for Regeneration Unit Input/Main Power Supply Input Terminal (CN3)
  Connector: 54928-0570 (MOLEX)
- Connector for 24 VDC Power Supply Input/Regeneration Unit Thermal Input/Electromagnetic Brake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

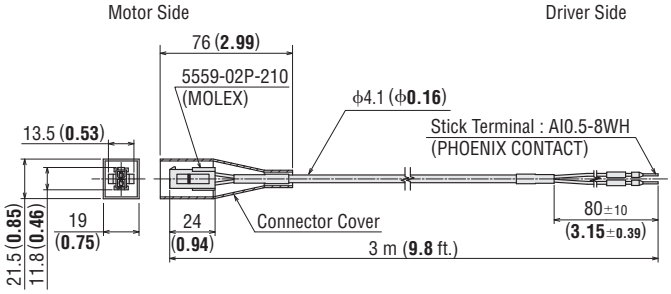
●Motor Cable (Included), Electromagnetic Brake Cable (Included)

26 Common to All AC Types

• Motor Cables



• Electromagnetic Brake Cables (Only for electromagnetic brake type)



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-3**[*1]	ARM46□C	ARD-A
	AR66□A-3[*1]	ARM66□C	
	AR69□A-3[*1]	ARM69□C	
	AR98□A-3[*1]	ARM98□C	
	AR911□A-3[*2]	ARM911□C	
TH Geared Type	**AR46□A-T3.6-3**	ARM46□C-T3.6	ARD-A
	AR46□A-T7.2-3	ARM46□C-T7.2	
	AR46□A-T10-3	ARM46□C-T10	
	AR46□A-T20-3	ARM46□C-T20	
	AR46□A-T30-3	ARM46□C-T30	
	AR66□A-T3.6-3	ARM66□C-T3.6	
	AR66□A-T7.2-3	ARM66□C-T7.2	
	AR66□A-T10-3	ARM66□C-T10	
	AR66□A-T20-3	ARM66□C-T20	
	AR66□A-T30-3	ARM66□C-T30	
	AR98□A-T3.6-3	ARM98□C-T3.6	
	AR98□A-T7.2-3	ARM98□C-T7.2	
	AR98□A-T10-3	ARM98□C-T10	
	AR98□A-T20-3	ARM98□C-T20	
	AR98□A-T30-3	ARM98□C-T30	
PN Geared Type	**AR46□A-N5-3**	ARM46□C-N5	ARD-A
	AR46□A-N7.2-3	ARM46□C-N7.2	
	AR46□A-N10-3	ARM46□C-N10	
	AR66□A-N5-3	ARM66□C-N5	
	AR66□A-N7.2-3	ARM66□C-N7.2	
	AR66□A-N10-3	ARM66□C-N10	
	AR66□A-N25-3	ARM66□C-N25	
	AR66□A-N36-3	ARM66□C-N36	
	AR66□A-N50-3	ARM66□C-N50	
	AR98□A-N5-3	ARM98□C-N5	
	AR98□A-N7.2-3	ARM98□C-N7.2	
	AR98□A-N10-3	ARM98□C-N10	
	AR98□A-N25-3	ARM98□C-N25	
	AR98□A-N36-3	ARM98□C-N36	
	AR98□A-N50-3	ARM98□C-N50	
Harmonic Geared Type	**AR46□A-H50-3**	ARM46□C-H50	ARD-A
	AR46□A-H100-3	ARM46□C-H100	
	AR66□A-H50-3	ARM66□C-H50	
	AR66□A-H100-3	ARM66□C-H100	
	AR98□A-H50-3	ARM98□C-H50	
	AR98□A-H100-3	ARM98□C-H100	

Single-Phase 200-230 VAC

Type	Model	Motor Model	Driver Model
Standard Type	**AR46□C-3**[*1]	ARM46□C	ARD-C
	AR66□C-3[*1]	ARM66□C	
	AR69□C-3[*1]	ARM69□C	
	AR98□C-3[*1]	ARM98□C	
	AR911□C-3[*2]	ARM911□C	
TH Geared Type	**AR46□C-T3.6-3**	ARM46□C-T3.6	ARD-C
	AR46□C-T7.2-3	ARM46□C-T7.2	
	AR46□C-T10-3	ARM46□C-T10	
	AR46□C-T20-3	ARM46□C-T20	
	AR46□C-T30-3	ARM46□C-T30	
	AR66□C-T3.6-3	ARM66□C-T3.6	
	AR66□C-T7.2-3	ARM66□C-T7.2	
	AR66□C-T10-3	ARM66□C-T10	
	AR66□C-T20-3	ARM66□C-T20	
	AR66□C-T30-3	ARM66□C-T30	
	AR98□C-T3.6-3	ARM98□C-T3.6	
	AR98□C-T7.2-3	ARM98□C-T7.2	
	AR98□C-T10-3	ARM98□C-T10	
	AR98□C-T20-3	ARM98□C-T20	
	AR98□C-T30-3	ARM98□C-T30	
PN Geared Type	**AR46□C-N5-3**	ARM46□C-N5	ARD-C
	AR46□C-N7.2-3	ARM46□C-N7.2	
	AR46□C-N10-3	ARM46□C-N10	
	AR66□C-N5-3	ARM66□C-N5	
	AR66□C-N7.2-3	ARM66□C-N7.2	
	AR66□C-N10-3	ARM66□C-N10	
	AR66□C-N25-3	ARM66□C-N25	
	AR66□C-N36-3	ARM66□C-N36	
	AR66□C-N50-3	ARM66□C-N50	
	AR98□C-N5-3	ARM98□C-N5	
	AR98□C-N7.2-3	ARM98□C-N7.2	
	AR98□C-N10-3	ARM98□C-N10	
	AR98□C-N25-3	ARM98□C-N25	
	AR98□C-N36-3	ARM98□C-N36	
	AR98□C-N50-3	ARM98□C-N50	
Harmonic Geared Type	**AR46□C-H50-3**	ARM46□C-H50	ARD-C
	AR46□C-H100-3	ARM46□C-H100	
	AR66□C-H50-3	ARM66□C-H50	
	AR66□C-H100-3	ARM66□C-H100	
	AR98□C-H50-3	ARM98□C-H50	
	AR98□C-H100-3	ARM98□C-H100	

Three-Phase 200-230 VAC

Type	Model	Motor Model	Driver Model
Standard Type	**AR46□S-3**[*1]	ARM46□C	ARD-S
	AR66□S-3[*1]	ARM66□C	
	AR69□S-3[*1]	ARM69□C	
	AR98□S-3[*1]	ARM98□C	
	AR911□S-3[*2]	ARM911□C	
TH Geared Type	**AR46□S-T3.6-3**	ARM46□C-T3.6	ARD-S
	AR46□S-T7.2-3	ARM46□C-T7.2	
	AR46□S-T10-3	ARM46□C-T10	
	AR46□S-T20-3	ARM46□C-T20	
	AR46□S-T30-3	ARM46□C-T30	
	AR66□S-T3.6-3	ARM66□C-T3.6	
	AR66□S-T7.2-3	ARM66□C-T7.2	
	AR66□S-T10-3	ARM66□C-T10	
	AR66□S-T20-3	ARM66□C-T20	
	AR66□S-T30-3	ARM66□C-T30	
	AR98□S-T3.6-3	ARM98□C-T3.6	
	AR98□S-T7.2-3	ARM98□C-T7.2	
	AR98□S-T10-3	ARM98□C-T10	
	AR98□S-T20-3	ARM98□C-T20	
	AR98□S-T30-3	ARM98□C-T30	
PN Geared Type	**AR46□S-N5-3**	ARM46□C-N5	ARD-S
	AR46□S-N7.2-3	ARM46□C-N7.2	
	AR46□S-N10-3	ARM46□C-N10	
	AR66□S-N5-3	ARM66□C-N5	
	AR66□S-N7.2-3	ARM66□C-N7.2	
	AR66□S-N10-3	ARM66□C-N10	
	AR66□S-N25-3	ARM66□C-N25	
	AR66□S-N36-3	ARM66□C-N36	
	AR66□S-N50-3	ARM66□C-N50	
	AR98□S-N5-3	ARM98□C-N5	
	AR98□S-N7.2-3	ARM98□C-N7.2	
	AR98□S-N10-3	ARM98□C-N10	
	AR98□S-N25-3	ARM98□C-N25	
	AR98□S-N36-3	ARM98□C-N36	
	AR98□S-N50-3	ARM98□C-N50	
Harmonic Geared Type	**AR46□S-H50-3**	ARM46□C-H50	ARD-S
	AR46□S-H100-3	ARM46□C-H100	
	AR66□S-H50-3	ARM66□C-H50	
	AR66□S-H100-3	ARM66□C-H100	
	AR98□S-H50-3	ARM98□C-H50	
	AR98□S-H100-3	ARM98□C-H100	

● Enter **A** (single shaft) or **M** (electromagnetic brake) 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□□-3**, **AR66□□-3**, **AR69□□-3** and **AR98□□-3**.

*2 Enter **A** (single shaft) or **B** (double shaft) in the box (□) within the model name of **AR911□□-3**.

AR Series DC Input Type Lineup

Standard Type

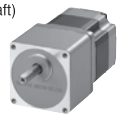
Standard Type with Electromagnetic Brake

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 (lb-in)]	Backlash [arc min]	Basic Resolution [deg/step]	Output Shaft Speed [r/min]
Standard	· Basic model of the **AR** Series	Maximum Holding Torque 4 (35)	——	0.36	4000
Low backlash **TH** Geared (Parallel shaft) 	· A wide variety of low gear ratios, high-speed operations · Gear ratios: 3.6:1, 7.2:1, 10:1, 20:1, 30:1	12 (106)	45	0.012	500
Non-backlash **PN** Geared (Planetary)	· High speed (low gear ratio), high accuracy positioning · High permissible/maximum torque · A wide variety of gear ratios for selecting the desired step angle (resolution) · Centered output shaft · Gear ratios: 5:1, 7.2:1, 10:1, 25:1, 36:1, 50:1	Permissible Torque 37 (320) Maximum Torque 60 (530)	3	0.0072	600
Non-backlash Harmonic Geared (Harmonic drive)	· High accuracy positioning · High permissible/maximum torque · High gear ratios, high resolution · Centered output shaft · Gear ratios: 50:1, 100:1	Permissible Torque 37 (320) Maximum Torque 55 (480)	0	0.0036	70

Note:

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

● Each type offers various motor frame sizes in accordance with the motor type, as shown below.

[□42 (□1.65): indicates a motor frame size of 42 mm (1.65 in.).]

	Power Supply Voltage	Motor Type			
		Standard Type	**TH** Geared Type	**PN** Geared Type	Harmonic Geared Type
	24/48 VDC	□42 (□1.65) □60 (□2.36) □85 (□3.35)	□42 (□1.65) □60 (□2.36) □90 (□3.54)		

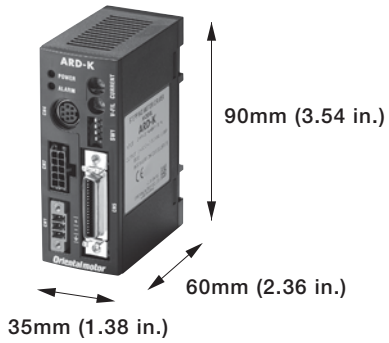
● An electromagnetic brake is available on all types of motors.

Features of the **AR** series DC Input Type

Easy to use, Compact Driver

■ Compact DC Input Driver with Plastic Case

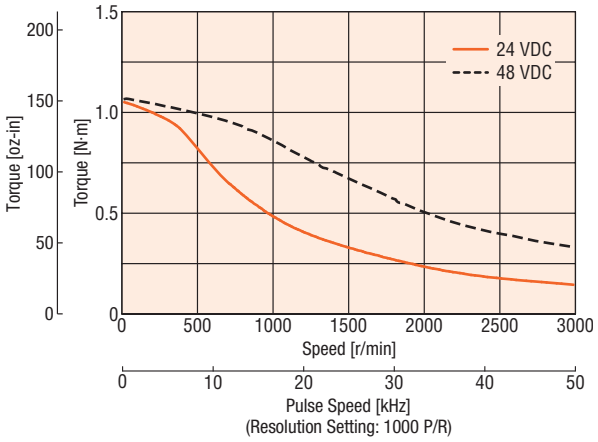
Compact DC power input driver is covered by a plastic case.
The compact size is great for space-saving



■ 24/48 VDC

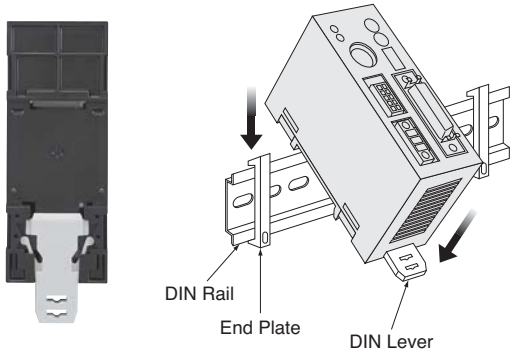
Choose the appropriate power supply 24 VDC or 48 VDC for your application. Motor torque at speed will be increased when 48 VDC is input rather than 24 VDC.

AR66AK-3



■ DIN Rail Mounting

You can attach this driver to a 35 mm (1.38 in.) width DIN rail through one-step operation, no screw is needed. (DIN rail mounting is the only way to install the driver.)



Complying with Various Standards to Support Diverse Equipment Designs

■ 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:

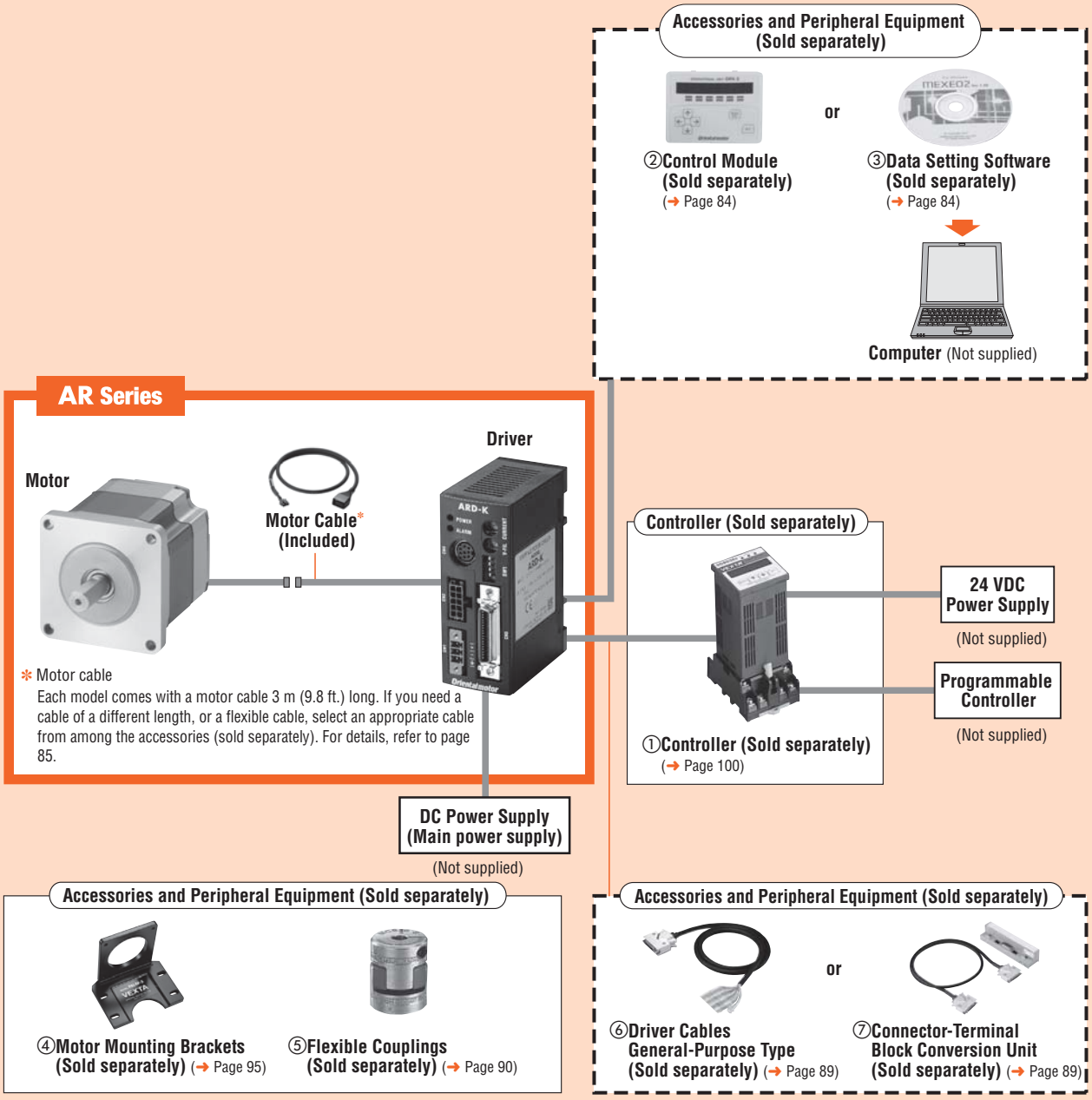
Directive on restriction of the use of certain hazardous substances in electrical and electronic equipment (2002/95/EC).
The RoHS Directive prohibits the use of six chemical substances in electrical and electronic products sold in the EU member states.
The six controlled substances are: lead, hexavalent chromium, cadmium, mercury and two specific brominated flame-retardants (PBB and PBDE) .

■ CE Marking (EMC Directive)

System Configuration

Standard Type

An example of a single-axis system configuration with the **SG8030J** controller.



No.	Product Name	Overview	Page
①	Controller	This controller outputs pulse commands that determine the rotating amount and rotating speed.	100
②	Control Module	This control module lets you set (edit, monitor, operate) various data and enables extended functions. Comes with a communication cable [5 m (16.4 ft.)].	84
③	Data Setting Software	This data setting software lets you set (edit, monitor, operate) various data and enables extended functions. Comes with a PC interface cable [5 m (16.4 ft.)] and a USB cable [0.5 m (20 in.)].	84
④	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	95
⑤	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	90
⑥	Driver Cables General-Purpose Type	General-purpose cable for connecting the driver and controller [1 m (3.3 ft.), 2 mm (6.6 ft.)].	89
⑦	Connector–Terminal Block Conversion Unit	Set of terminal block and cable for connecting the driver and controller [1 m (3.3 ft.)].	89

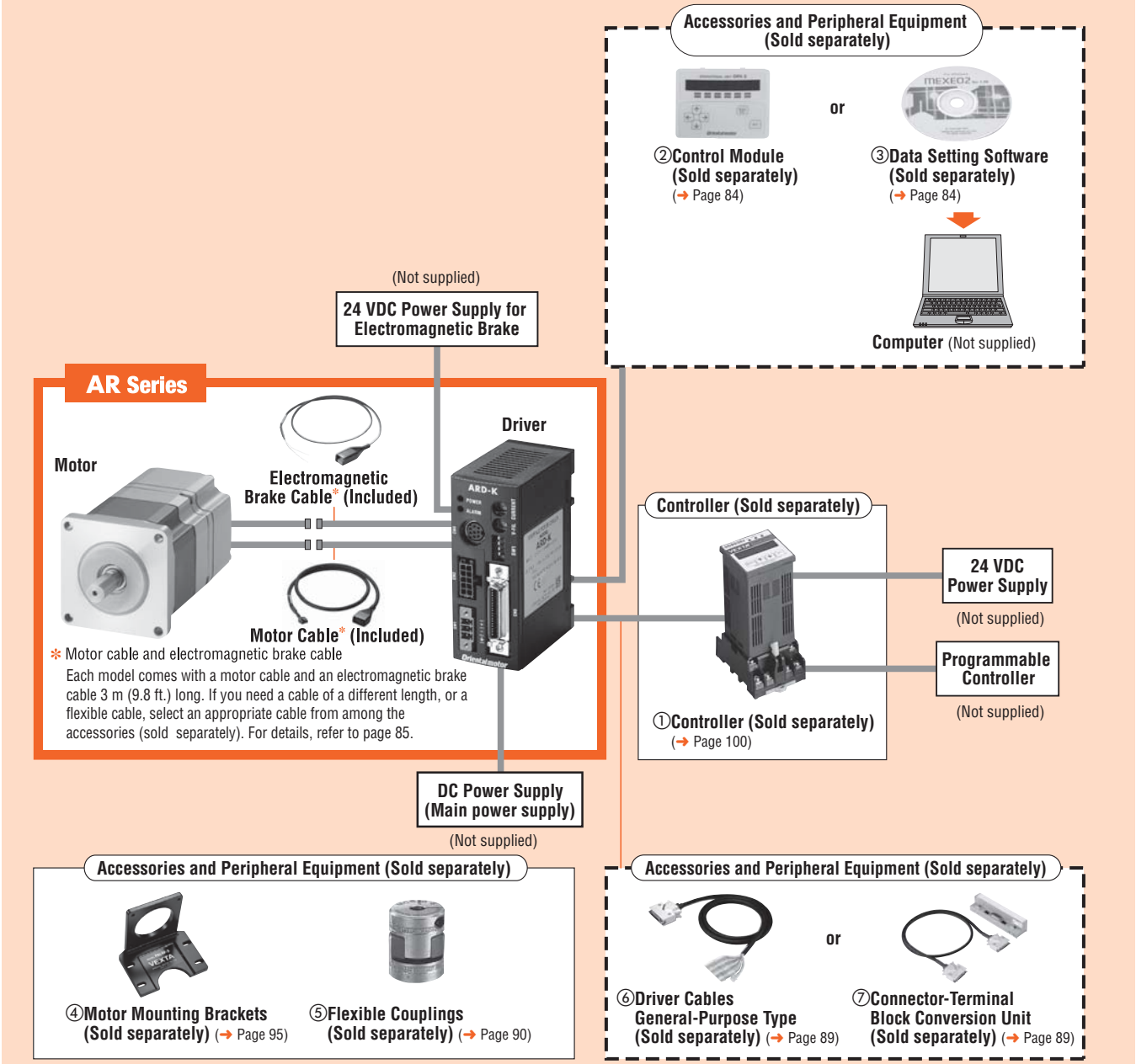
Example of System Configuration

AR Series		Controller (Sold separately)	Motor Mounting Bracket (Sold separately)	Flexible Coupling (Sold separately)	Connector–Terminal Block Conversion Unit [1 m (3.3 ft.)] (Sold separately)
AR66AK-3	+	SG8030J-D	PAL2P-5A	MCS300610	CC36T1

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 **SG8030J** controller.



No.	Product Name	Overview	Page
①	Controller	This controller outputs pulse commands that determine the rotating amount and rotating speed.	100
②	Control Module	This control module lets you set (edit, monitor, operate) various data and enables extended functions. Comes with a communication cable [5 m (16.4 ft.)].	84
③	Data Setting Software	This data setting software lets you set (edit, monitor, operate) various data and enables extended functions. Comes with a PC interface cable [5 m (16.4 ft.)] and a USB cable [0.5 m (20 in.)].	84
④	Motor Mounting Brackets	Dedicated mounting bracket for the motor.	95
⑤	Flexible Couplings	Coupling that connects the motor shaft to the driven shaft.	90
⑥	Driver Cables General-Purpose Type	General-purpose cable for connecting the driver and controller [1 m (3.3 ft.), 2 m (6.6 ft.)].	89
⑦	Connector–Terminal Block Conversion Unit	Set of terminal block and cable for connecting the driver and controller [1 m (3.3 ft.)].	89

●Example of System Configuration

(Sold separately)

AR Series		Controller	Motor Mounting Bracket	Flexible Coupling	Connector–Terminal Block Conversion Unit [1 m (3.3 ft.)]
AR66MK-3	+	SG8030J-D	PAL2P-5A	MCS300610	CC36T1

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

Safety Standards and CE Marking

Product	CE Markings
Motor	EMC Directives
Driver	

● 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 K - 3

① ② ③ ④ ⑤ ⑥

①	Series	**AR**: **AR** Series
②	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.) **9**: 85 mm (3.35 in.)
③	Motor Case Length	
④	Motor Type	**A**: Standard (Single shaft) **B**: Standard (Double shaft) **M**: Electromagnetic Brake Type
⑤	Power Supply Voltage	**K**: 24/48 VDC
⑥	Cable Length (Included)	**3**: 3 m (9.8 ft.)

●Geared Type

AR 6 6 A K - N 50 - 3

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Series	**AR**: **AR** Series
②	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.) **9**: 90 mm (3.54 in.)
③	Motor Case Length	
④	Motor Type	**A**: Standard (Single shaft) **M**: Electromagnetic Brake Type
⑤	Power Supply Voltage	**K**: 24/48 VDC
⑥	Gearhead Type	**T**: **TH** Geared Type **N**: **PN** Geared Type **H**: Harmonic Geared Type
⑦	Gear Ratio	
⑧	Cable Length (Included)	**3**: 3 m (9.8 ft.)

Product Line

●Standard Type

Power Supply Voltage	Model (Single shaft)	Model (Double shaft)
24/48 VDC	**AR46AK-3**	**AR46BK-3**
	AR66AK-3	**AR66BK-3**
	AR69AK-3	**AR69BK-3**
	AR98AK-3	**AR98BK-3**

The following items are included in each product.

Motor, Driver, Motor Cable*, I/O Signal Connector, Connector for Power Supply Input/Frame Ground Terminal, Operating Manual

*Each product comes with a motor cable 3 m (9.8 ft.) long.

If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

●Standard Type with Electromagnetic Brake

Power Supply Voltage	Model
24/48 VDC	**AR46MK-3**
	AR66MK-3
	AR69MK-3
	AR98MK-3

The following items are included in each product.

Motor, Driver, Motor Cable and Electromagnetic Brake Cable*, I/O Signal Connector, Connector for Power Supply Input/Frame Ground Terminal, Surge Suppressor, Operating Manual

* Each product comes with a motor cable and an electromagnetic brake cable 3 m (9.8 ft.) long.

If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

●TH Geared Type

Power Supply Voltage	Model
24/48 VDC	**AR46AK-T3.6-3**
	AR46AK-T7.2-3
	AR46AK-T10-3
	AR46AK-T20-3
	AR46AK-T30-3
	AR66AK-T3.6-3
	AR66AK-T7.2-3
	AR66AK-T10-3
	AR66AK-T20-3
	AR66AK-T30-3
	AR98AK-T3.6-3
	AR98AK-T7.2-3
	AR98AK-T10-3
	AR98AK-T20-3
	AR98AK-T30-3

●PN Geared Type

Power Supply Voltage	Model
24/48 VDC	**AR46AK-N5-3**
	AR46AK-N7.2-3
	AR46AK-N10-3
	AR66AK-N5-3
	AR66AK-N7.2-3
	AR66AK-N10-3
	AR66AK-N25-3
	AR66AK-N36-3
	AR66AK-N50-3
	AR98AK-N5-3
	AR98AK-N7.2-3
	AR98AK-N10-3
	AR98AK-N25-3
	AR98AK-N36-3
	AR98AK-N50-3

●Harmonic Geared Type

Power Supply Voltage	Model
24/48 VDC	**AR46AK-H50-3**
	AR46AK-H100-3
	AR66AK-H50-3
	AR66AK-H100-3
	AR98AK-H50-3
	AR98AK-H100-3

The following items are included in each product.

Motor, Shaft Parallel Key※1, Driver, Motor Cable※2, I/O Signal Connector, Connector for Power Supply Input/Frame Ground Terminal, Operating Manual

※1 Only for products with a key slot on the output shaft.

※2 Each product comes with a motor cable 3 m (9.8 ft.) long.

If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

●TH Geared Type with Electromagnetic Brake

Power Supply Voltage	Model
24/48 VDC	**AR46MK-T3.6-3**
	AR46MK-T7.2-3
	AR46MK-T10-3
	AR46MK-T20-3
	AR46MK-T30-3
	AR66MK-T3.6-3
	AR66MK-T7.2-3
	AR66MK-T10-3
	AR66MK-T20-3
	AR66MK-T30-3
	AR98MK-T3.6-3
	AR98MK-T7.2-3
	AR98MK-T10-3
	AR98MK-T20-3
	AR98MK-T30-3

●PN Geared Type with Electromagnetic Brake

Power Supply Voltage	Model
24/48 VDC	**AR46MK-N5-3**
	AR46MK-N7.2-3
	AR46MK-N10-3
	AR66MK-N5-3
	AR66MK-N7.2-3
	AR66MK-N10-3
	AR66MK-N25-3
	AR66MK-N36-3
	AR66MK-N50-3
	AR98MK-N5-3
	AR98MK-N7.2-3
	AR98MK-N10-3
	AR98MK-N25-3
	AR98MK-N36-3
	AR98MK-N50-3

●Harmonic Geared Type with Electromagnetic Brake

Power Supply Voltage	Model
24/48 VDC	**AR46MK-H50-3**
	AR46MK-H100-3
	AR66MK-H50-3
	AR66MK-H100-3
	AR98MK-H50-3
	AR98MK-H100-3

The following items are included in each product.

Motor, Shaft Parallel Key※1, Driver, Motor Cable and Electromagnetic Brake Cable※2, I/O Signal Connector, Connector for Power Supply Input/Frame Ground Terminal, Surge Suppressor, Operating Manual

※1 Only for products with a key slot on the output shaft.

※2 Each product comes with a motor cable and an electromagnetic brake cable 3 m (9.8 ft.) long.

If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately). For details, refer to page 85.

How to Read the Specifications Table

	Model		Standard (Single shaft)	**AR46AK-3**	**AR46AK-N5-3**
			Standard (Double shaft)*4	**AR46BK-3**	–
			Electromagnetic Brake	**AR46MK-3**	**AR46MK-N5-3**
①	Maximum Holding Torque		N·m (oz-in)	0.3 (42)	1.35 (11.9 lb-in)
②	Rotor Inertia J		kg·m^2 (oz-in^2)	58×10^{-7} (0.32)[73×10^{-7} (0.4)]*1	58×10^{-7}(0.32) [73×10^{-7}(0.4)]*1
③	Backlash		arc min (deg)	–	2 (0.034°)
④	Angular Transmission Error		arc min (deg)	–	6 (0.1°)
⑤	Permissible Speed Range		r/min	–	0～600
⑥	Gear Ratio			–	5:1
⑦	Resolution	Resolution Setting: 1000 P/R		0.36°/Pulse	0.072°/Pulse
⑧	Permissible Torque		N·m (lb-in)	–	1.35 (11.9)
⑨	Maximum Torque*5		N·m (lb-in)	–	1.5 (13.2)
⑩	Power Source			24 VDC±10% 1.4 A/48 VDC±5% 1.4 A	
	Electromagnetic Brake*3		Type	Active when the power is off	
			Power Supply Input	24 VDC±5%*2 0.1 A	
			Power Consumption W	2	
			Excitation Current A	0.08	
⑪	Static Friction Torque		N·m (oz-in)	0.15 (21)	0.68 (6 lb-in)
	Mass		Motor kg (lb.)	0.47 (1.03) [0.62 (1.36)]*1	0.73 (1.61) [0.88 (1.94)]*1
			Driver kg (lb.)	0.17 (0.37)	
	Dimension No.	Motor		1 [4]*1	13 [16]*1
		Driver		25	25
		Cable		26	26

*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 (65.6 ft.) 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.

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

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

③Backlash
The play of gear output shaft when the motor shaft is fixed. With bidirectional positioning, the positioning accuracy is affected.

④Angular 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.

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

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

⑦Resolution
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.

⑧Permissible Torque
The permissible torque represents the torque value limited by the mechanical strength of the gearhead 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.

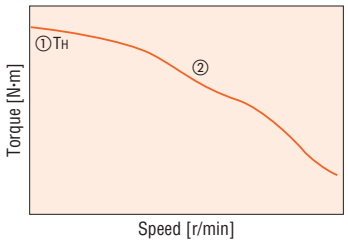
⑨Maximum Torque (PN geared, harmonic geared type only)
This is the maximum torque that can be used instantaneously (for a short time). During acceleration/deceleration, the motor can be operated up to this value.

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

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

How to Read Speed – Torque Characteristics

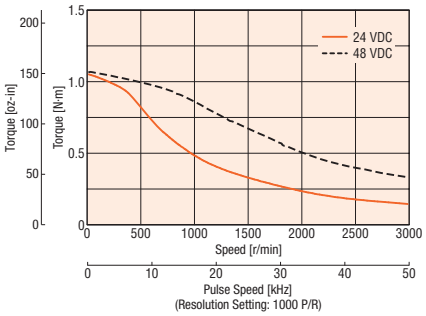
The graph below is the characteristics that indicate the relationship between the speed and torque when a stepping motor is driven. The required speed and torque is always used when selecting a stepping motor. On the graph, the horizontal axis expresses the speed at the motor output shaft while the vertical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



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

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

The following figure shows the speed – torque characteristics of the **AR** Series **AR66AK-3**.



● 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 (212°F) .

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

Specifications RoHS

CE

Model			Standard (Single shaft)	AR46AK-3	AR66AK-3	AR69AK-3	AR98AK-3
			Standard (Double shaft)*4	AR46BK-3	AR66BK-3	AR69BK-3	AR98BK-3
			Electromagnetic Brake	AR46MK-3	AR66MK-3	AR69MK-3	AR98MK-3
Maximum Holding Torque			N-m (oz-in)	0.3 (42)	1 (142)	2 (280)	
Rotor Inertia J			kg·m^2 (oz-in^2)	58×10^{-7} (0.32) [73×10^{-7} (0.4)]*1	380×10^{-7} (2.1) [500×10^{-7} (2.7)]*1	750×10^{-7} (4.1) [870×10^{-7} (4.8)]*1	1100×10^{-7} (6) [1220×10^{-7} (6.7)]*1
Resolution		Resolution Setting: 1000 P/R		0.36°/Pulse			
Power Source				24 VDC±10% 1.4 A/ 48 VDC±5% 1.4 A	24 VDC±10% 3.1 A/ 48 VDC±5% 3.1 A*5	24 VDC±10% 3.0 A/ 48 VDC±5% 3.0 A*5	24 VDC±10% 2.5 A/ 48 VDC±5% 2.5 A*5
Electromagnetic Brake*3		Type		Active when the power is off			
		Power Supply Input		24 VDC±5%*2 0.1A	24 VDC±5%*2 0.3A		
		Power Consumption W		2	6		
		Excitation Current A		0.08	0.25		
	Static Friction Torque		N-m (oz-in)	0.15 (21)	0.6 (85)	1 (142)	
Mass		Motor	kg (lb.)	0.47 (1.03) [0.62 (1.36)]*1	0.9 (1.98) [1.2 (2.6)]*1	1.4 (3.1) [1.7 (3.7)]*1	1.9 (4.2) [2.5 (5.5)]*1
		Driver	kg (lb.)	0.17 (0.37)			
Dimension No.	Motor			1 [4]*1	2 [5]*1		3 [6]*1
	Driver			25			
	Cable			26			

How to read specifications table ➜ Page 48

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

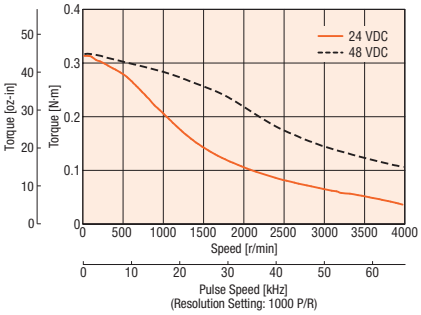
*4 With a double shaft model, the output shaft located on the opposite side of the motor output shaft is used to install a slit disk or similar device. Do not apply any load torque, overhung load or thrust load on this output shaft.

*5 When running the motor at 48 VDC, the load inertia should be under 10 times of the rotor inertia and allow for a safety factor of 2 or more times the required torque.

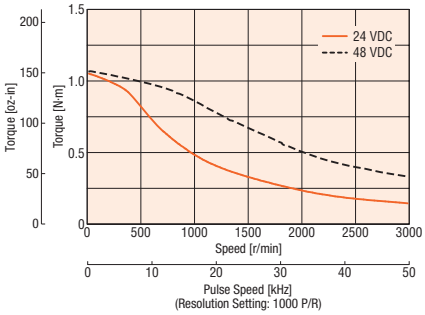
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 48

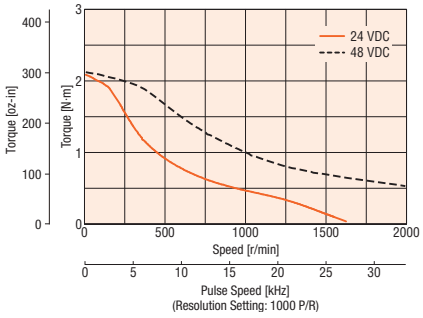
AR46□K-3



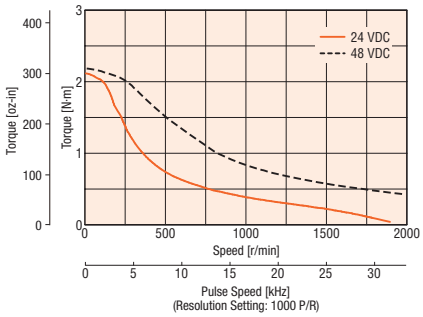
AR66□K-3



AR69□K-3



AR98□K-3



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 (212°F).
- 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.

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

Specifications RoHS

CE

Model		Standard (Single shaft)	AR46AK-T3.6-3	AR46AK-T7.2-3	AR46AK-T10-3	AR46AK-T20-3	AR46AK-T30-3
		Electromagnetic Brake	AR46MK-T3.6-3	AR46MK-T7.2-3	AR46MK-T10-3	AR46MK-T20-3	AR46MK-T30-3
Maximum Holding Torque		N·m (lb-in)	0.35 (3.0)	0.7 (6.1)	1 (8.8)	1.5 (13.2)	
Rotor Inertia J		kg·m^2 (oz-in^2)	58×10^{-7} (0.32) [73×10^{-7} (0.4)]*1				
Backlash		arc min (deg)	45 (0.75°)	25 (0.417°)		15 (0.25°)	
Permissible Speed Range		r/min	0~500	0~250	0~180	0~90	0~60
Gear Ratio			3.6:1	7.2:1	10:1	20:1	30:1
Resolution		Resolution Setting: 1000 P/R	0.1°/Pulse	0.05°/Pulse	0.036°/Pulse	0.018°/Pulse	0.012°/Pulse
Permissible Torque		N·m (lb-in)	0.35 (3.0)	0.7 (6.1)	1 (8.8)	1.5 (13.2)	
Power Source			24 VDC±10% 1.4 A/48 VDC±5% 1.4A				
Electromagnetic Brake*3		Type	Active when the power is off				
		Power Supply Input	24 VDC±5%*2 0.1 A				
		Power Consumption W	2				
		Excitation Current A	0.08				
	Static Friction Torque	N·m (lb-in)	0.18 (1.59)	0.35 (3.0)	0.5 (4.4)	0.75 (6.6)	
Mass		Motor kg (lb.)	0.62 (1.36) [0.77 (1.69)]*1				
		Driver kg (lb.)	0.17 (0.37)				
Dimension No.	Motor		7 [10]*1				
	Driver		25				
	Cable		26				

How to read specifications table ➜ Page 48

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

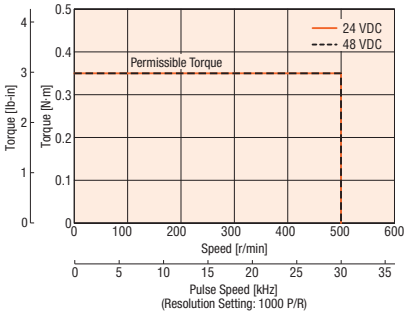
Note:

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

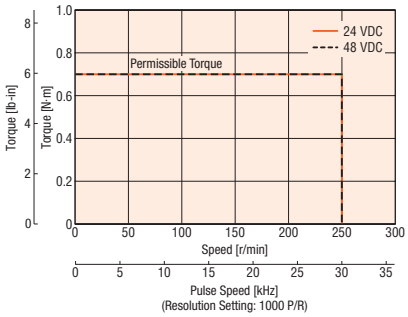
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 48

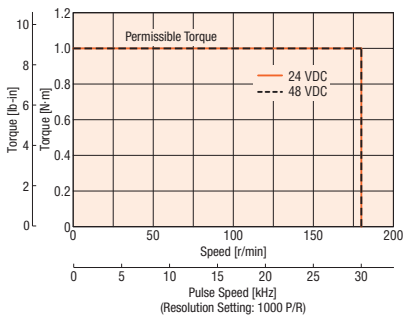
AR46□K-T3.6-3



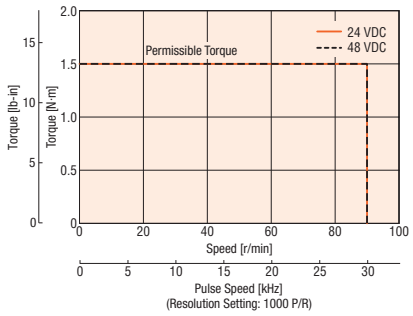
AR46□K-T7.2-3



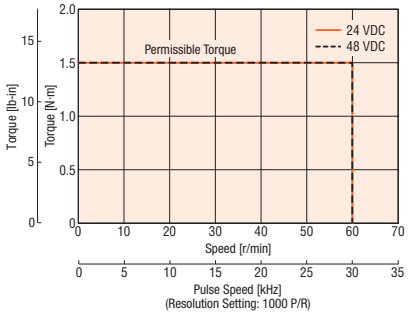
AR46□K-T10-3



AR46□K-T20-3



AR46□K-T30-3



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 (212°F).
- 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.

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

Specifications RoHS

Model	Standard (Single shaft)	AR66AK-T3.6-3	AR66AK-T7.2-3	AR66AK-T10-3	AR66AK-T20-3	AR66AK-T30-3
	Electromagnetic Brake	AR66MK-T3.6-3	AR66MK-T7.2-3	AR66MK-T10-3	AR66MK-T20-3	AR66MK-T30-3
Maximum Holding Torque	N·m (lb-in)	1.25 (11.0)	2.5 (22)	3 (26)	3.5 (30)	4 (35)
Rotor Inertia J	kg·m^2 (oz-in^2)	380×10^{-7} (2.1) [500×10^{-7} (2.7)]*1				
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		3.6:1	7.2:1	10:1	20:1	30:1
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 (lb-in)	1.25 (11.0)	2.5 (22)	3 (26)	3.5 (30)	4 (35)
Power Source		24 VDC±10% 3.1 A/48 VDC±5% 3.1 A*4				
Electromagnetic Brake*3	Type	Active when the power is off				
	Power Supply Input	24 VDC±5%*2 0.3 A				
	Power Consumption W	6				
	Excitation Current A	0.25				
	Static Friction Torque N·m (lb-in)	0.63 (5.5)	1.25 (11.0)	1.5 (13.2)	1.75 (15.4)	2 (17.7)
Mass	Motor kg (lb.)	1.3 (2.9) [1.6 (3.5)]*1				
	Driver kg (lb.)	0.17 (0.37)				
Dimension No.	Motor	8 [11]*1				
	Driver	25				
	Cable	26				

How to read specifications table ➜ Page 48

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

*4 When running the motor at 48 VDC, the load inertia should be under 10 times of the rotor inertia and allow for a safety factor of 2 or more times the required torque.

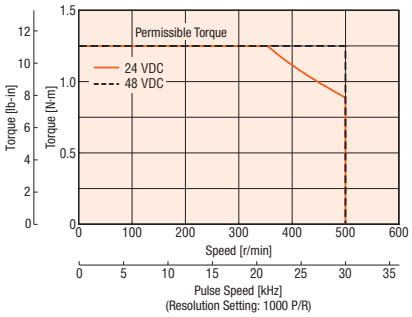
Note:

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

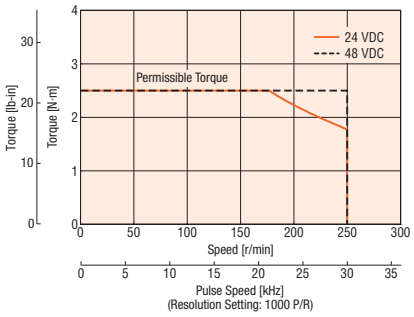
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 48

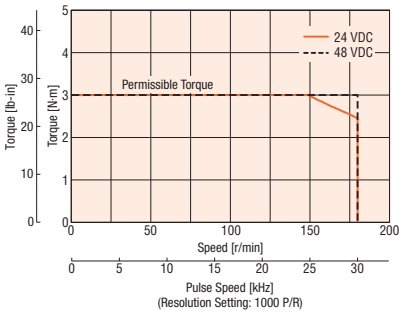
AR66□K-T3.6-3



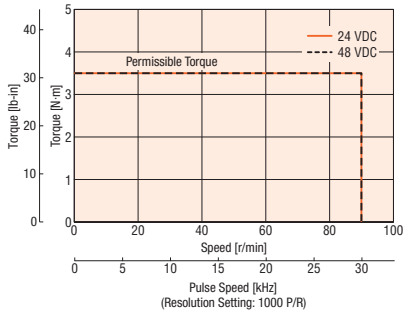
AR66□K-T7.2-3



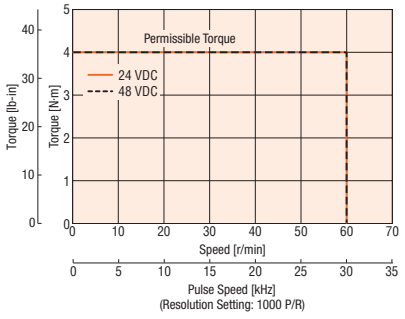
AR66□K-T10-3



AR66□K-T20-3



AR66□K-T30-3



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 (212°F).
- 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.

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

Specifications RoHS

CE

Model		Standard (Single shaft)	AR98AK-T3.6-3	AR98AK-T7.2-3	AR98AK-T10-3	AR98AK-T20-3	AR98AK-T30-3
		Electromagnetic Brake	AR98MK-T3.6-3	AR98MK-T7.2-3	AR98MK-T10-3	AR98MK-T20-3	AR98MK-T30-3
Maximum Holding Torque		N·m (lb-in)	4.5 (39)	9 (79)		12 (106)	
Rotor Inertia J		kg·m^2 (oz-in^2)	1100×10^{-7} (6.0) [1220×10^{-7} (6.7)]*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			3.6:1	7.2:1	10:1	20:1	30:1
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 (lb-in)	4.5 (39)	9 (79)		12 (106)	
Power Source			24 VDC±10% 2.5 A/48 VDC±5% 2.5 A*4				
Electromagnetic Brake*3		Type	Active when the power is off				
		Power Supply Input	24 VDC±5%*2 0.3 A				
		Power Consumption W	6				
		Excitation Current A	0.25				
	Static Friction Torque	N·m (lb-in)	2.25 (19.9)	4.5 (39)		6 (53)	
Mass		Motor kg (lb.)	3.1 (6.8) [3.7 (8.1)]*1				
		Driver kg (lb.)	0.17 (0.37)				
Dimension No.	Motor		9 [12]*1				
	Driver		25				
	Cable		26				

How to read specifications table ➜ Page 48

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

*4 When running the motor at 48 VDC, the load inertia should be under 10 times of the rotor inertia and allow for a safety factor of 2 or more times the required torque.

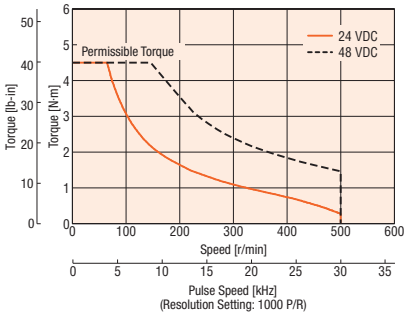
Note:

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

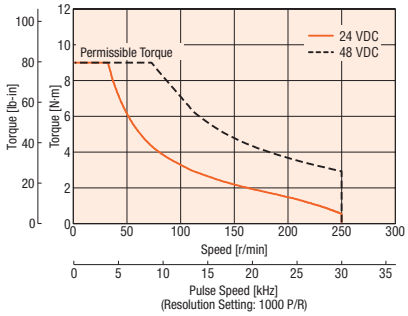
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 48

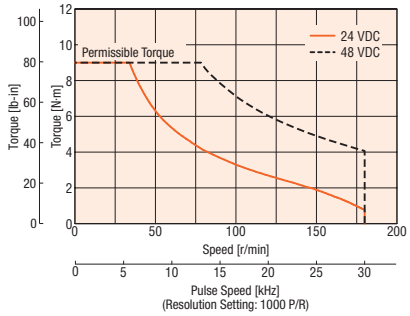
AR98□K-T3.6-3



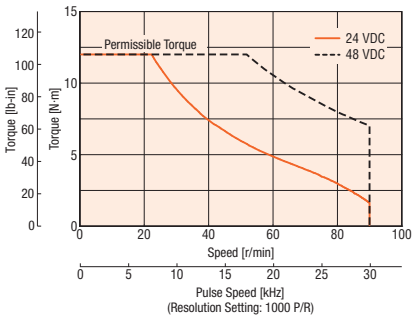
AR98□K-T7.2-3



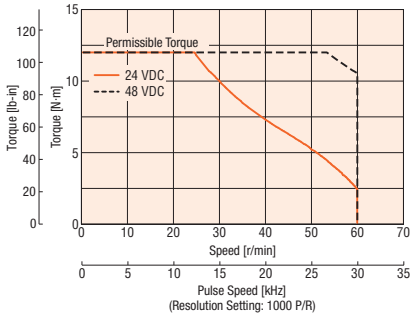
AR98□K-T10-3



AR98□K-T20-3



AR98□K-T30-3



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 (212°F).
- 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.

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

Specifications RoHS

Model		Standard (Single shaft)	AR46AK-N5-3	AR46AK-N7.2-3	AR46AK-N10-3
		Electromagnetic Brake	AR46MK-N5-3	AR46MK-N7.2-3	AR46MK-N10-3
Maximum Holding Torque		N·m (lb-in)	1.35 (11.9)	1.5 (13.2)	
Rotor Inertia J		kg·m^2 (oz-in^2)	58×10^{-7} (0.32) [73×10^{-7} (0.4)]*1		
Backlash		arc min (deg)	2 (0.034°)		
Angular Transmission Error		arc min (deg)	6 (0.1°)		
Permissible Speed Range		r/min	0～600	0～416	0～300
Gear Ratio			5:1	7.2:1	10:1
Resolution		Resolution Setting: 1000 P/R	0.072°/Pulse	0.05°/Pulse	0.036°/Pulse
Permissible Torque		N·m (lb-in)	1.35 (11.9)	1.5 (13.2)	
Maximum Torque*3		N·m (lb-in)	1.5 (13.2)	2 (17.7)	
Power Source			24 VDC±10% 1.4 A/48 VDC±5% 1.4 A		
Electromagnetic Brake*4		Type	Active when the power is off		
		Power Supply Input	24 VDC±5%*2 0.1 A		
		Power Consumption W	2		
		Excitation Current A	0.08		
	Static Friction Torque	N·m (lb-in)	0.68 (6.0)	0.75 (6.6)	
Mass		Motor kg (lb.)	0.73 (1.61) [0.88 (1.94)]*1		
		Driver kg (lb.)	0.17 (0.37)		
Dimension No.	Motor		13 [16]*1		
	Driver		25		
	Cable		26		

How to read specifications table ➜ Page 48

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.

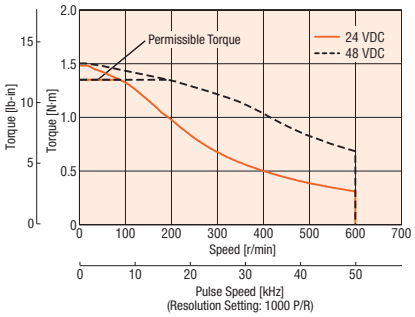
Note:

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

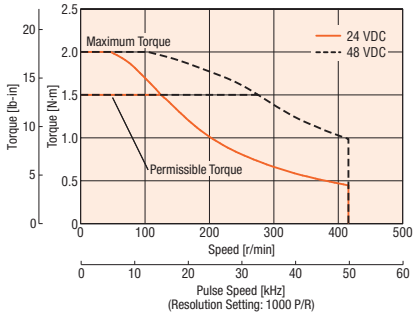
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 48

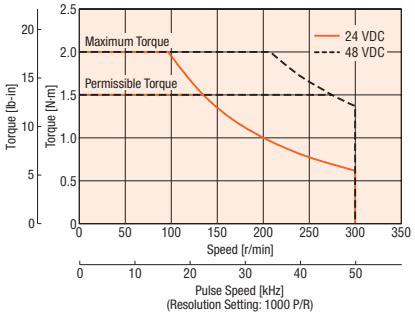
AR46□K-N5-3



AR46□K-N7.2-3



AR46□K-N10-3



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 (212°F).
- 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.

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

Specifications RoHS

CE

Model		Standard (Single shaft)	AR66AK-N5-3	AR66AK-N7.2-3	AR66AK-N10-3	AR66AK-N25-3	AR66AK-N36-3	AR66AK-N50-3
		Electromagnetic Brake	AR66MK-N5-3	AR66MK-N7.2-3	AR66MK-N10-3	AR66MK-N25-3	AR66MK-N36-3	AR66MK-N50-3
Maximum Holding Torque		N·m (lb-in)	3.5 (30)	4 (35)	5 (44)	8 (70)		
Rotor Inertia J		kg·m^2 (oz-in^2)	380×10^{-7} (2.1) [500×10^{-7} (2.7)]※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			5:1	7.2:1	10:1	25:1	36:1	50:1
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 (lb-in)	3.5 (30)	4 (35)	5 (44)	8 (70)		
Maximum Torque※3		N·m (lb-in)	7 (61)	9 (79)	11 (97)	16 (141)	20 (177)	
Power Source			24 VDC±10% 3.1 A/48 VDC±5% 3.1 A※5					
Electromagnetic Brake※4	Type		Active when the power is off					
	Power Supply Input		24 VDC±5%※2 0.3 A					
	Power Consumption W		6					
	Excitation Current A		0.25					
	Static Friction Torque	N·m (lb-in)	1.75 (15.4)	2 (17.7)	2.5 (22)	4 (35)		
Mass	Motor	kg (lb.)	1.5 (3.3) [1.8 (4)]※1			1.73 (3.8) [2 (4.4)]※1		
	Driver	kg (lb.)	0.17 (0.37)					
Dimension No.	Motor		14 [17]※1					
	Driver		25					
	Cable		26					

How to read specifications table ➜ Page 48

※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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.
※5 When running the motor at 48 VDC, the load inertia should be under 10 times of the rotor inertia and allow for a safety factor of 2 or more times the required torque.

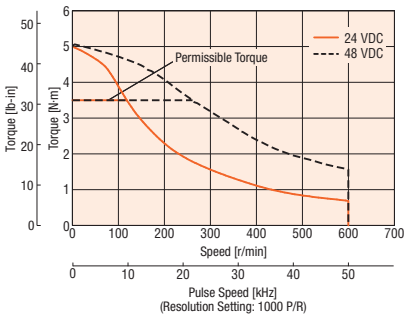
Note:

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

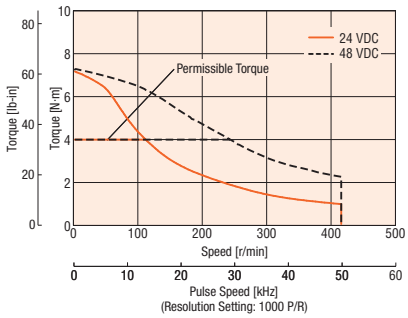
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 48

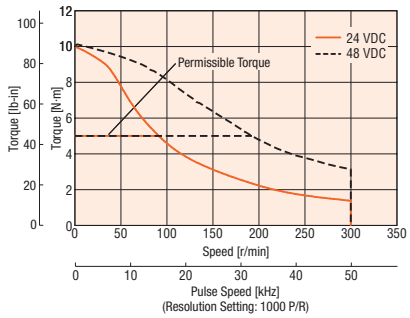
AR66□K-N5-3



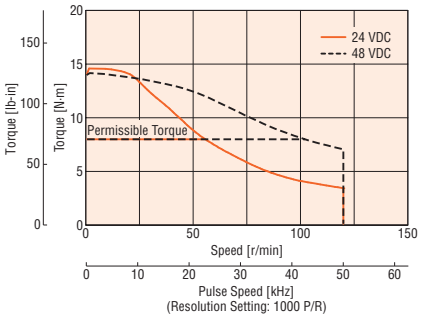
AR66□K-N7.2-3



AR66□K-N10-3



AR66□K-N25-3



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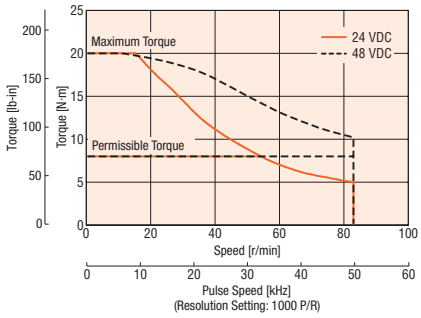

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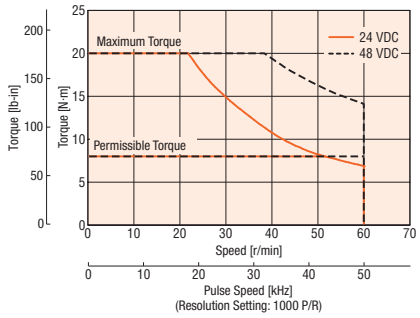


Notes:

- 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 (212°F).
- 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.

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

Specifications RoHS

Model		Standard (Single shaft)	AR98AK-N5-3	AR98AK-N7.2-3	AR98AK-N10-3	AR98AK-N25-3	AR98AK-N36-3	AR98AK-N50-3
		Electromagnetic Brake	AR98MK-N5-3	AR98MK-N7.2-3	AR98MK-N10-3	AR98MK-N25-3	AR98MK-N36-3	AR98MK-N50-3
Maximum Holding Torque		N·m (lb-in)	10 (88)	14 (123)	20 (177)	37 (320)		
Rotor Inertia J		kg·m^2 (oz-in^2)	1100×10^{-7} (6) [1220×10^{-7} (6.7)]*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	0～400	0～277	0～200	0～80	0～55	0～40
Gear Ratio			5:1	7.2:1	10:1	25:1	36:1	50:1
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 (lb-in)	10 (88)	14 (123)	20 (177)	37 (320)		
Maximum Torque*3		N·m (lb-in)	28 (240)	35 (300)		56 (490)	60 (530)	
Power Source			24 VDC±10% 2.5 A/48 VDC±5% 2.5 A*5					
Electromagnetic Brake*4	Type		Active when the power is off					
	Power Supply Input		24 VDC±5%*2 0.3 A					
	Power Consumption W		6					
	Excitation Current A		0.25					
	Static Friction Torque	N·m (lb-in)	4.5 (39)	6.5 (57)	9 (79)	18.5 (163)		
Mass	Motor	kg (lb.)	3.8 (8.4) [4.4 (9.7)]*1			4.5 (9.9) [5.1 (11.2)]*1		
	Driver	kg (lb.)	0.17 (0.37)					
Dimension No.	Motor		15 [18]*1					
	Driver		25					
	Cable		26					

How to read specifications table ➜ Page 48

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.
*5 When running the motor at 48 VDC, the load inertia should be under 10 times of the rotor inertia and allow for a safety factor of 2 or more times the required torque.

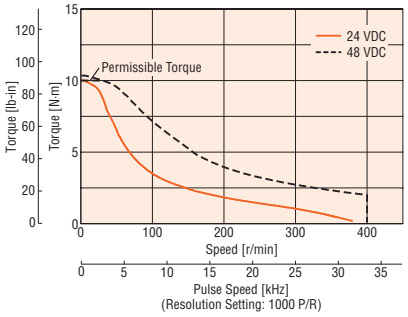
Note:

- 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 48

AR98□K-N5-3



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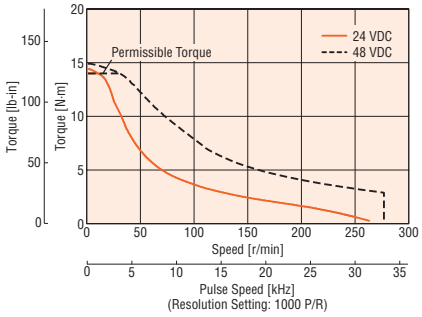

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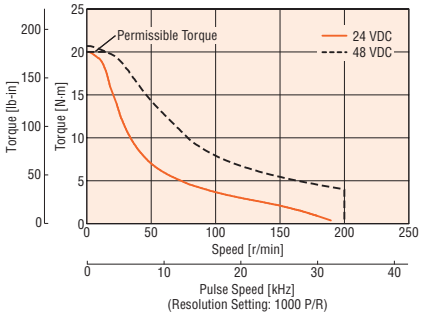

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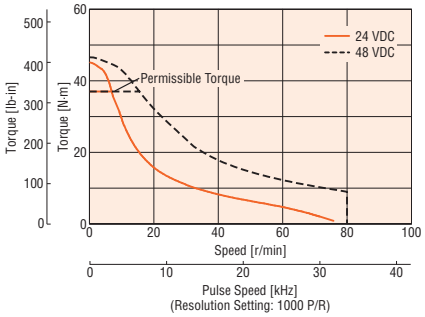
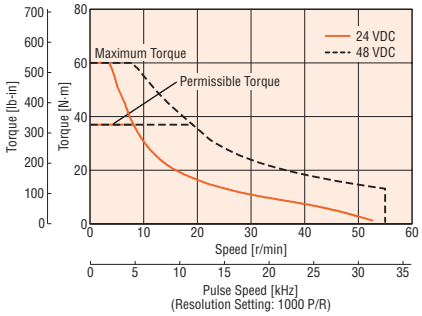
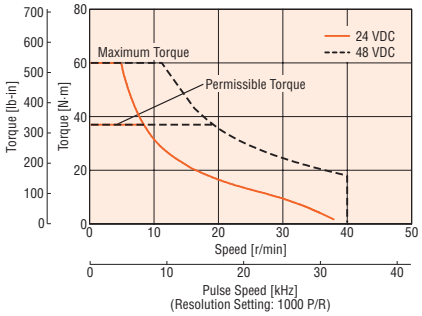


AR98□K-N36-3



AR98□K-N50-3



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 (212°F).
- 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.

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

Specifications RoHS

CE

Model		Standard (Single shaft)	AR46AK-H50-3	AR46AK-H100-3	AR66AK-H50-3	AR66AK-H100-3	AR98AK-H50-3	AR98AK-H100-3
		Electromagnetic Brake	AR46MK-H50-3	AR46MK-H100-3	AR66MK-H50-3	AR66MK-H100-3	AR98MK-H50-3	AR98MK-H100-3
Maximum Holding Torque		N·m (lb-in)	3.5 (30)	5 (44)	5.5 (48)	8 (70)	25 (220)	37 (320)
Rotor Inertia J		kg·m^2 (oz-in^2)	75×10^{-7} (0.41) [90×10^{-7} (0.49)]*1		415×10^{-7} (2.3) [535×10^{-7} (2.9)]*1		1300×10^{-7} (7.1) [1420×10^{-7} (7.8)]*1	
Permissible Speed Range		r/min	0～70	0～35	0～60	0～30	0～40	0～20
Gear Ratio			50:1	100:1	50:1	100:1	50:1	100:1
Resolution		Resolution Setting: 1000 P/R	0.0072°/Pulse	0.0036°/Pulse	0.0072°/Pulse	0.0036°/Pulse	0.0072°/Pulse	0.0036°/Pulse
Permissible Torque		N·m (lb-in)	3.5 (30)	5 (44)	5.5 (48)	8 (70)	25 (220)	37 (320)
Maximum Torque		N·m (lb-in)	8.3 (73)	11 (97)	18 (159)	28 (240)	35 (300)	55 (480)
Lost Motion (Load torque)		arc min	1.5 max. (±0.16 N·m)	1.5 max. (±0.2 N·m)	0.7 max. (±0.28 N·m)	0.7 max. (±0.39 N·m)	1.5 max. (±1.2 N·m)	
Power Source			24 VDC±10% 1.4 A/48 VDC±5% 1.4 A		24 VDC±10% 3.1 A/48 VDC±5% 3.1 A*4		24 VDC±10% 2.5 A/48 VDC±5% 2.5 A*4	
Electromagnetic Brake*3		Type	Active when the power is off					
		Power Supply Input	24 VDC±5%*2 0.1 A		24 VDC±5%*2 0.3 A			
		Power Consumption W	2		6			
		Excitation Current A	0.08		0.25			
	Static Friction Torque	N·m (lb-in)	1.75 (15.4)	2.5 (22)	2.75 (24)	4 (35)	12.5 (110)	18.5 (163)
Mass		Motor kg (lb.)	0.68 (1.5) [0.83 (1.83)]*1		1.41 (3.1) [1.71 (3.8)]*1		4 (8.8) [4.6 (10.1)]*1	
		Driver kg (lb.)	0.17 (0.37)					
Dimension No.	Motor		19 [22]*1		20 [23]*1		21 [24]*1	
	Driver		25					
	Cable		26					

How to read specifications table ➜ Page 48

*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 (65.6 ft.) 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 to stop the motor. Also, a separate power supply is required for the electromagnetic brakes.
*4 When running the motor at 48 VDC, the load inertia should be under 10 times of the rotor inertia and allow for a safety factor of 2 or more times the required torque.

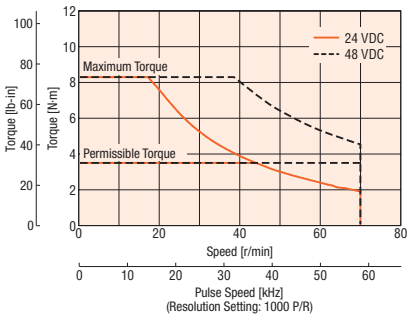
Note:

- 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.

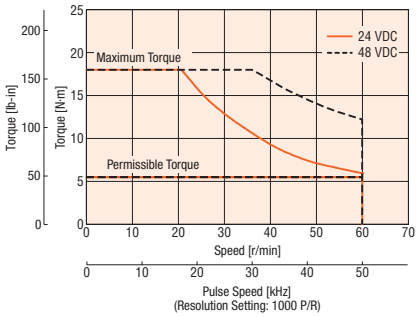
Speed – Torque Characteristics

How to read speed – torque characteristics ➜ Page 48

AR46□K-H50-3



AR66□K-H50-3



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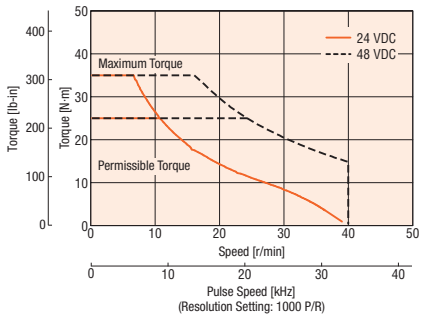

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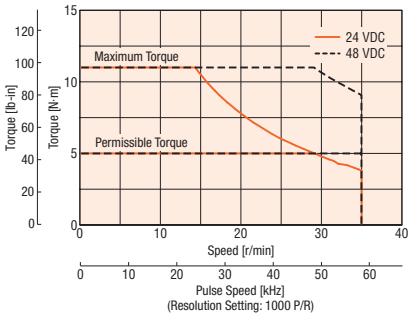

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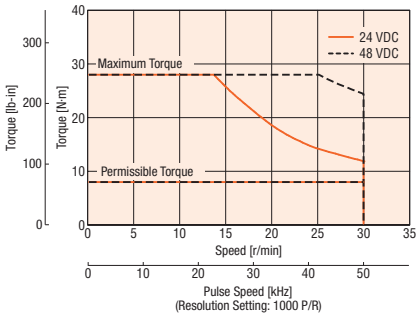

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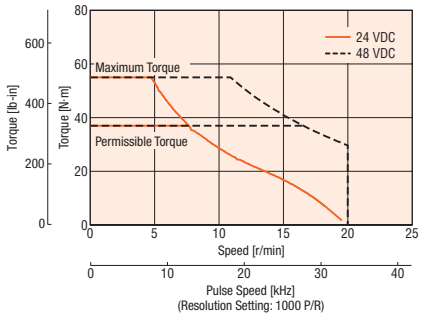


Notes:

- 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 (212°F).
- In order to prevent fatigue of the gear grease in the harmonic gear, keep the temperature of the gear case under 70°C (158°F).
- The driver's automatic current cutback function at motor standstill reduces maximum holding torque by approximately 50%.

- Enter **A** (single shaft) or **M** (electromagnetic brake) 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 a line driver output: 500 kHz (When the pulse duty is 50%) When the host controller is an 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 will coast to a stop. Overheat, Overload, Overspeed, Command pulse error, Overvoltage, Undervoltage, Overflow rotation during current on, Overflow rotation during current off, Abnormal operation data, 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	· Motor resolution setting function (4 levels) · Current setting function (16 levels) · Velocity filter function (16 levels) · Pulse input setting function (2-pulse input, 1-pulse input) · Current control mode function
Extended Functions [When the control module (**OPX-2A**) or data setting software (**MEXE02**) (both sold separately) is used]	· Push-motion operation function (8 current levels; desired levels can be set within a range of 0 to 100%) · Motor resolution setting function (electronic gear) · Alarm code output function (3 bits) · Current setting function (16 levels; desired levels can be set within a range of 0 to 100%) · Velocity filter function (16 levels; desired levels can be set within a range of 0 to 200 ms) · Current ON (C-ON) input logic setting function · Positioning completion (END) signal width setting function · Positioning completion (END) signal offset setting function · Standstill current setting function · Return operation setting function (starting speed, acceleration/deceleration rate, operating speed) · JOG operation setting function (starting speed, acceleration/deceleration rate, operating speed) · **OPX-2A** display setting function (gear output shaft speed, speed code display, setting change prohibition) · Pulse input setting function (2-pulse, 1-pulse, logic, phase difference, multiplication) · Smooth drive cancellation · Motor excitation position setting function at power ON · Excitation position reset operation function at current ON · Motor rotation direction setting function · Warning output setting function (overflow rotation during current on, overflow rotation during current off, overheat, overvoltage, undervoltage, overload, overspeed, abnormal operation data, electronic gear setting error)

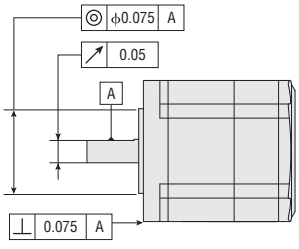
*Value applies when an accessory driver cable general-purpose type (**CC36D1-1**) is used. **Driver cable general-purpose type** ➜ Page 89

General Specifications

Item		Motor	Driver
Insulation Class		Class B [130°C (266°F)]	–
Insulation Resistance		100 MΩ or more when 500 VDC megger is applied between the following places: · Case – Motor and sensor windings · Case – Electromagnetic brake windings	–
Dielectric Strength		Sufficient to withstand the following for 1 minute: · Case – Motor and sensor windings 1.0 kVAC 50 Hz or 60 Hz · Case – Electromagnetic brake windings 1.0 kVAC 50 Hz or 60 Hz	–
Operating Environment	Ambient Temperature	−10～+50°C (+14～+122°F) (non-freezing)*1: Standard type, **TH**, **PN** geared type 0～+40°C (+32～+104°F) (non-freezing)*1: Harmonic geared type	0～+50°C (+32～+122°F) (non-freezing)
	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		**AR46**: ±4 arc minutes (±0.067°) **AR66**, **AR69**, **AR98**: ±3 arc minutes (±0.05°)	
Shaft Runout		0.05 mm (0.002 in) T.I.R.*2	–
Concentricity		0.075 mm (0.003 in) T.I.R.*2	–
Perpendicularity		0.075 mm (0.003 in) T.I.R.*2	–

*1 When a heat sink of a capacity at least equivalent to an aluminum plate with a size of 100×100 mm (3.94×3.94 in), 6 mm (0.24 in.) thick is installed.
*2 T.I.R. (Total Indicator Reading): The total dial gauge reading when the measurement section is rotated one revolution centered on the reference axis center.

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



Load Torque – Driver Input Current Characteristics

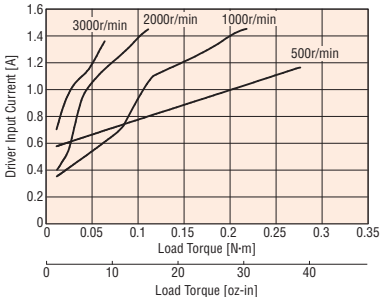
This is the relationship between the load torque and driver input current at each speed when the motor is operated. From these characteristics, the current capacity required when used for multiple axes can be estimated. For geared motors, convert to torque and speed at the motor shaft.

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

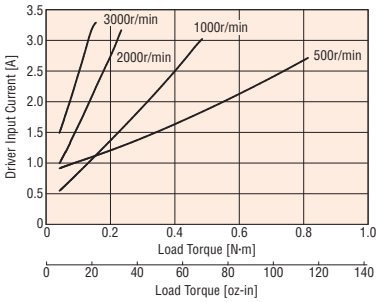
$$\text{Motor shaft torque [N·m (oz-in)]} = \frac{\text{Gear output shaft torque}}{\text{Gear ratio}}$$

●24 VDC

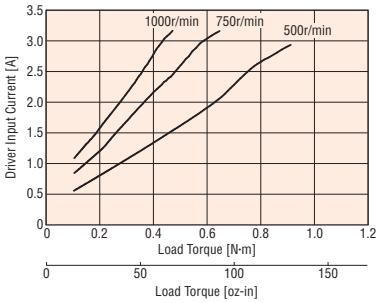
AR46□K



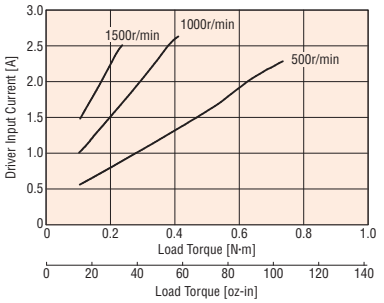
AR66□K



AR69□K

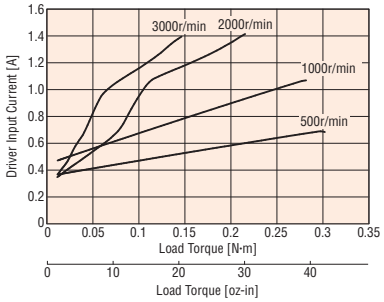


AR98□K



●48 VDC

AR46□K



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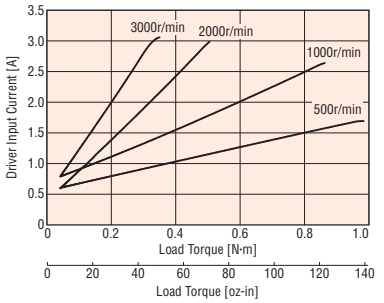

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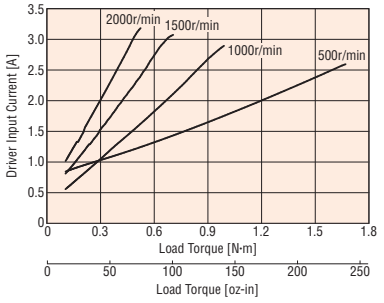
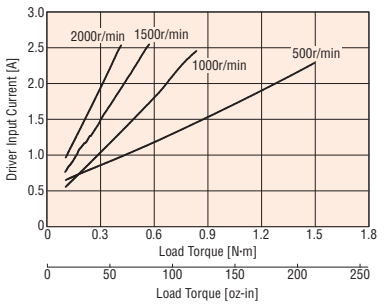


AR98□K



Permissible Overhung Load and Permissible Thrust Load

Unit = N (lb.)

Type	Model	Gear Ratio	Permissible Overhung Load					Permissible Thrust Load
			Distance from Shaft End					
			0 mm (0 in.)	5 mm (0.2 in.)	10 mm (0.39 in.)	15 mm (0.59 in.)	20 mm (0.79 in.)	
Standard Type	**AR46AK-3** **AR46BK-3***	–	35 (7.8)	44 (9.9)	58 (13.0)	85 (19.1)	–	4.6 (1.03)
	AR46MK-3							6.1 (1.37)
	AR66AK-3 **AR66BK-3***		90 (20)	100 (22)	130 (29)	180 (40)	270 (60)	8.8 (1.98)
	AR66MK-3							11.8 (2.6)
	AR69AK-3 **AR69BK-3***							13.7 (3.0)
	AR69MK-3							16.7 (3.7)
	AR98AK-3 **AR98BK-3***		260 (58)	290 (65)	340 (76)	390 (87)	480 (108)	18 (4.0)
	AR98MK-3							24 (5.4)
TH Geared Type	**AR46□K-T■-3**	**3.6**, **7.2**, **10**, **20**, **30**	10 (2.2)	14 (3.1)	20 (4.5)	30 (6.7)	–	15 (3.3)
	AR66□K-T■-3		70 (15.7)	80 (18.0)	100 (22)	120 (27)	150 (33)	40 (9.0)
	AR98□K-T■-3		220 (49)	250 (56)	300 (67)	350 (78)	400 (90)	100 (22)
PN Geared Type	**AR46□K-N■-3**	**5**, **7.2**, **10**	100 (22)	120 (27)	150 (33)	190 (42)	–	100 (22)
	AR66□K-N5-3	**5**	200 (45)	220 (49)	250 (56)	280 (63)	320 (72)	
	AR66□K-N■-3	**7.2**, **10**	250 (56)	270 (60)	300 (67)	340 (76)	390 (87)	
	AR66□K-N■-3	**25**, **36**, **50**	330 (74)	360 (81)	400 (90)	450 (101)	520 (117)	
	AR98□K-N5-3	**5**	480 (108)	520 (117)	550 (123)	580 (130)	620 (139)	300 (67)
	AR98□K-N■-3	**7.2**, **10**	480 (108)	540 (121)	600 (135)	680 (153)	790 (177)	
	AR98□K-N25-3	**25**	850 (191)	940 (210)	1050 (230)	1110 (240)	1190 (260)	
	AR98□K-N36-3	**36**	930 (200)	1030 (230)	1150 (250)	1220 (270)	1300 (290)	
	AR98□K-N50-3	**50**	1050 (230)	1160 (260)	1300 (290)	1380 (310)	1490 (330)	
Harmonic Geared Type	**AR46□K-H■-3**	**50**, **100**	180 (40)	220 (49)	270 (60)	360 (81)	510 (114)	220 (49)
	AR66□K-H■-3		320 (72)	370 (83)	440 (99)	550 (123)	720 (162)	450 (101)
	AR98□K-H■-3		1090 (240)	1150 (250)	1230 (270)	1310 (290)	1410 (310)	1300 (290)

*With a double shaft model, the output shaft located on the opposite side of the motor output shaft is used to install a slit disk or similar device. 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 gear ratio in the box (■) within the model name.

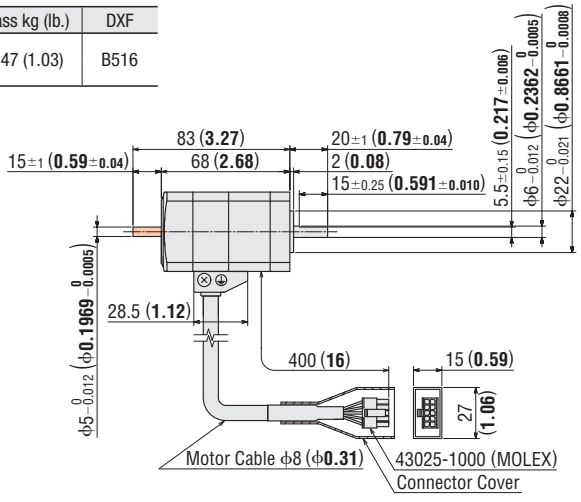
Dimensions Unit = mm (inch)

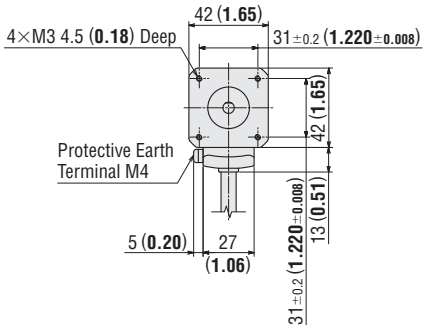
●Motor

◇Standard Type

1 □42 mm (□1.65 in.)

Model	Motor Model	Mass kg (lb.)	DXF
AR46AK-3	ARM46AK	0.47 (1.03)	B516
AR46BK-3	ARM46BK		

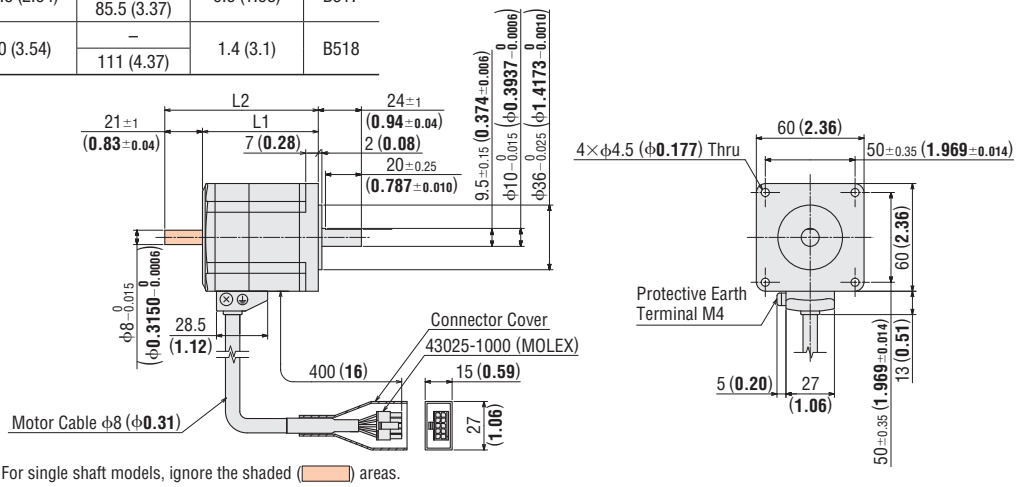




● These dimensions are for double shaft models. For single shaft models, ignore the shaded ( ) areas.

2 □60 mm (□2.36 in.)

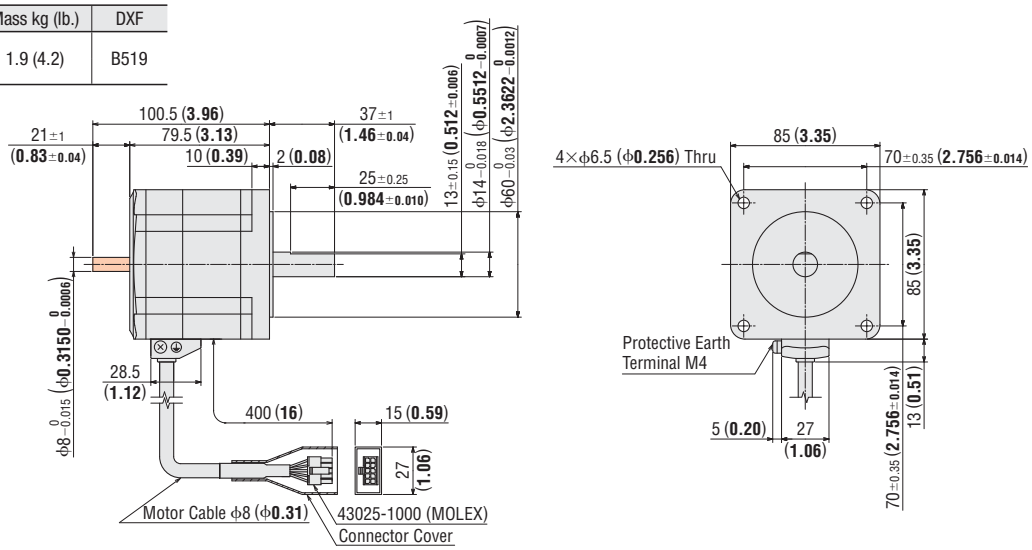
Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
AR66AK-3	ARM66AK	64.5 (2.54)	–	0.9 (1.98)	B517
AR66BK-3	ARM66BK		85.5 (3.37)		
AR69AK-3	ARM69AK	90 (3.54)	–	1.4 (3.1)	B518
AR69BK-3	ARM69BK		111 (4.37)		



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

3 □85 mm (□3.35 in.)

Model	Motor Model	Mass kg (lb.)	DXF
AR98AK-3	ARM98AK	1.9 (4.2)	B519
AR98BK-3	ARM98BK		

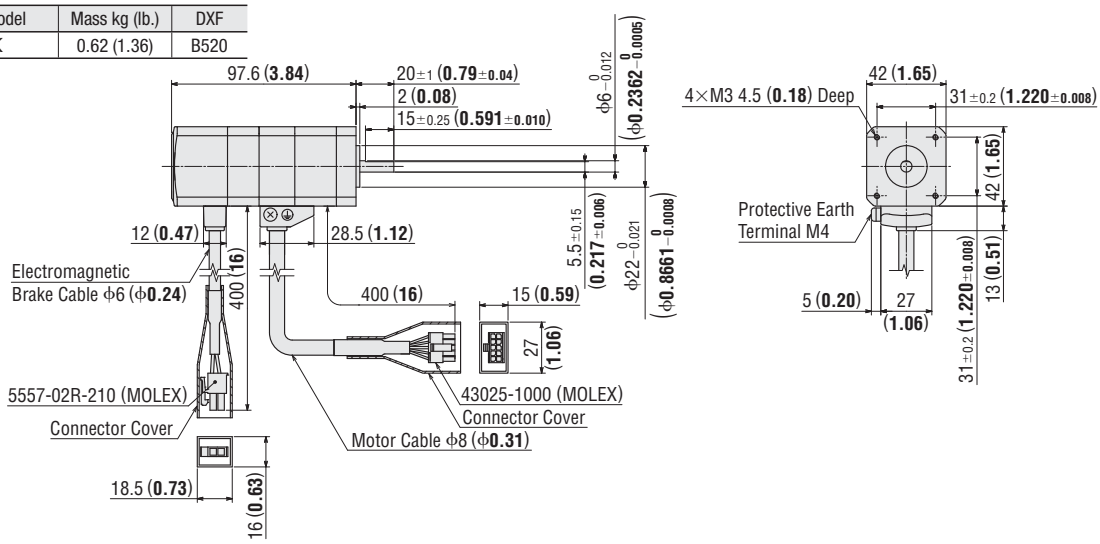


● These dimensions are for double shaft models. For single shaft models, ignore the shaded ( ) areas.

◇Standard Type with Electromagnetic Brake

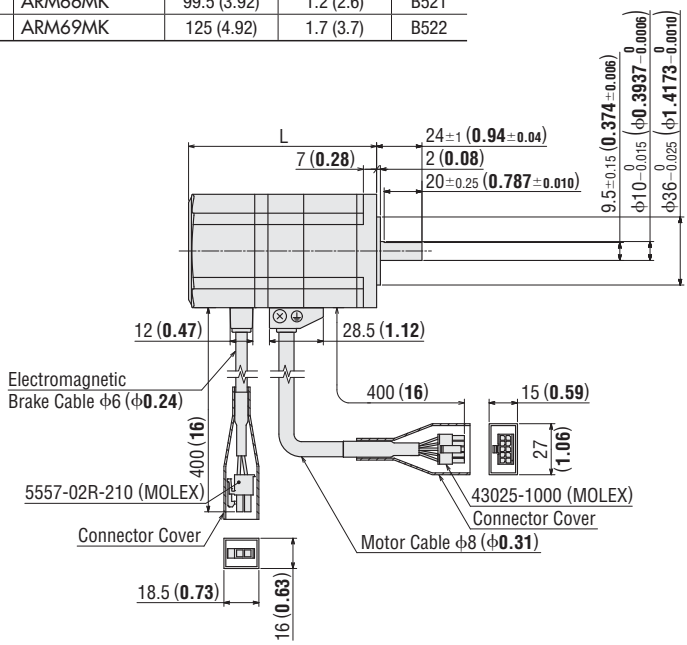
4 □42 mm (□1.65 in.)

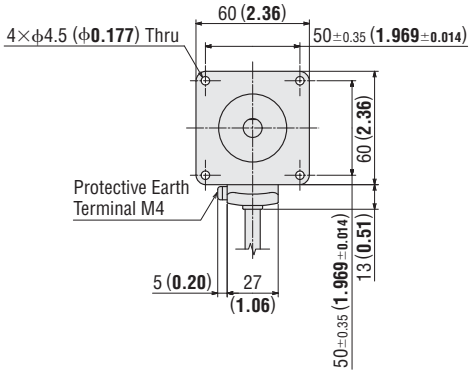
Model	Motor Model	Mass kg (lb.)	DXF
AR46MK-3	ARM46MK	0.62 (1.36)	B520



5 □60 mm (□2.36 in.)

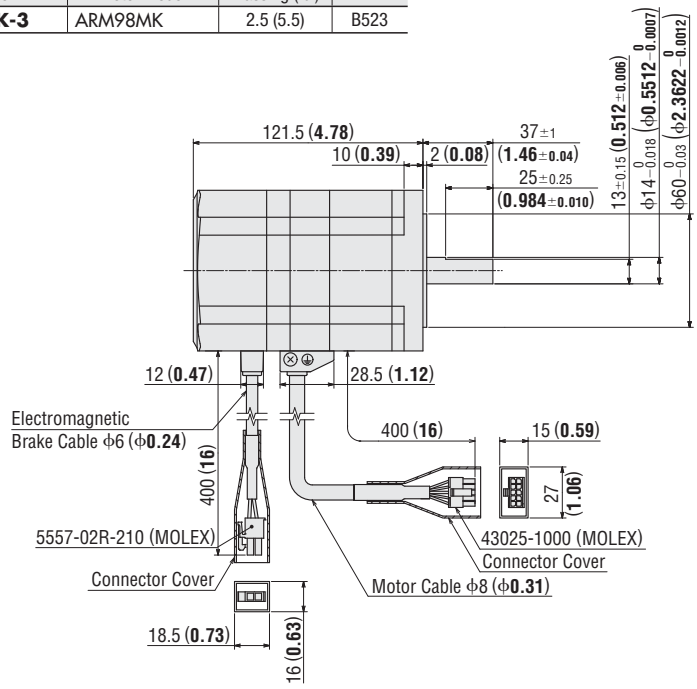
Model	Motor Model	L	Mass kg (lb.)	DXF
AR66MK-3	ARM66MK	99.5 (3.92)	1.2 (2.6)	B521
AR69MK-3	ARM69MK	125 (4.92)	1.7 (3.7)	B522

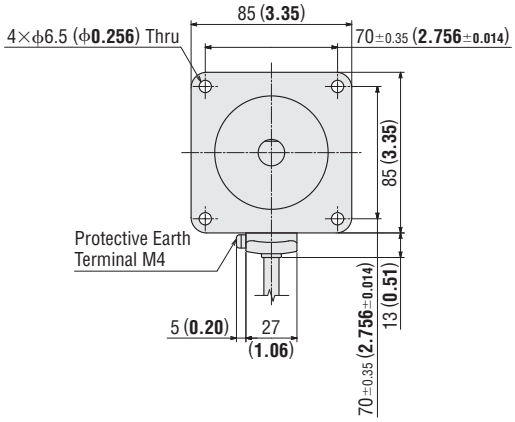




6 □85 mm (□3.35 in.)

Model	Motor Model	Mass kg (lb.)	DXF
AR98MK-3	ARM98MK	2.5 (5.5)	B523

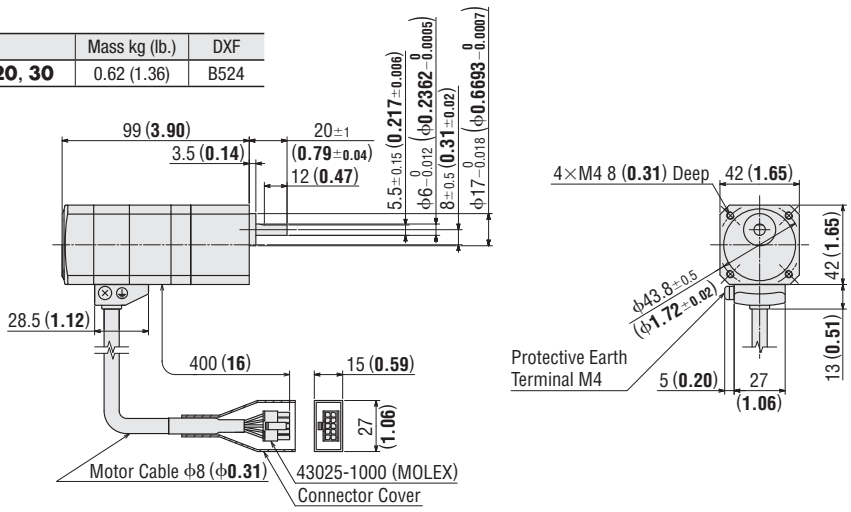




◇**TH** Geared Type

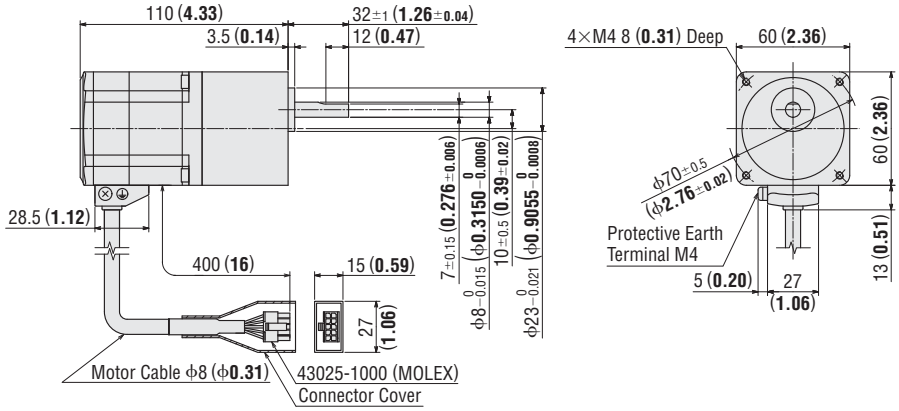
7 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46AK-T■-3	ARM46AK-T■	**3.6**, **7.2**, **10**, **20**, **30**	0.62 (1.36)	B524



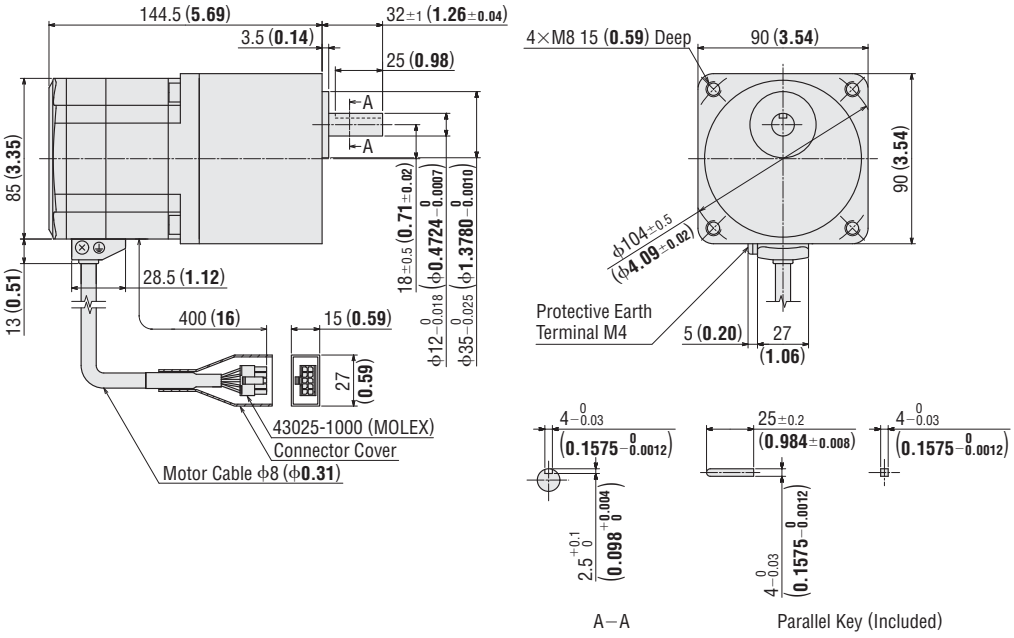
8 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66AK-T■-3	ARM66AK-T■	**3.6**, **7.2**, **10**, **20**, **30**	1.3 (2.9)	B525



9 □90 mm (□3.54 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98AK-T■-3	ARM98AK-T■	**3.6**, **7.2**, **10**, **20**, **30**	3.1 (6.8)	B526

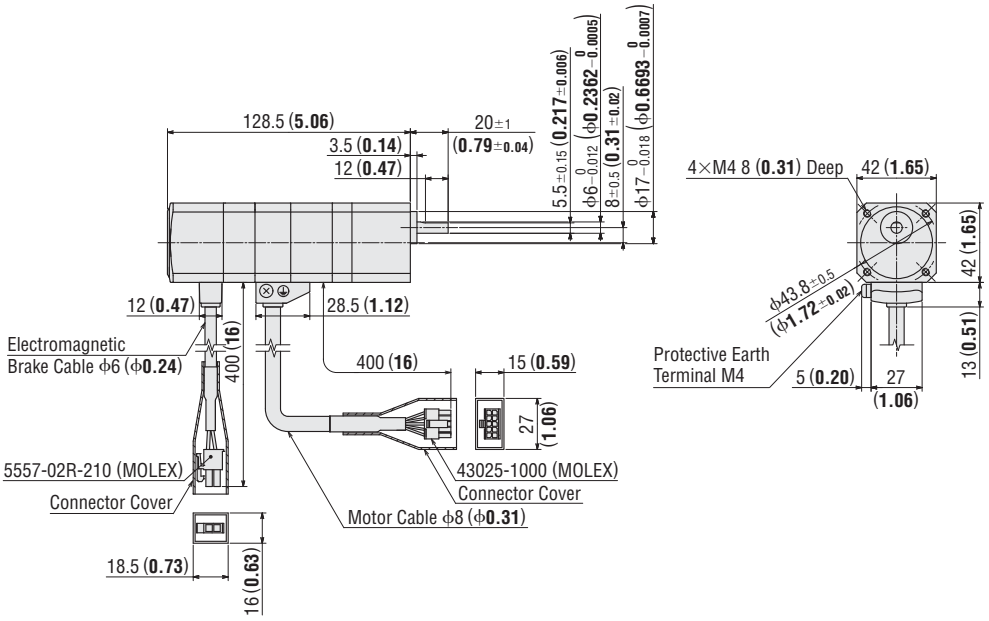


● Enter the gear ratio in the box (■) within the model name.

◇**TH** Geared Type with Electromagnetic Brake

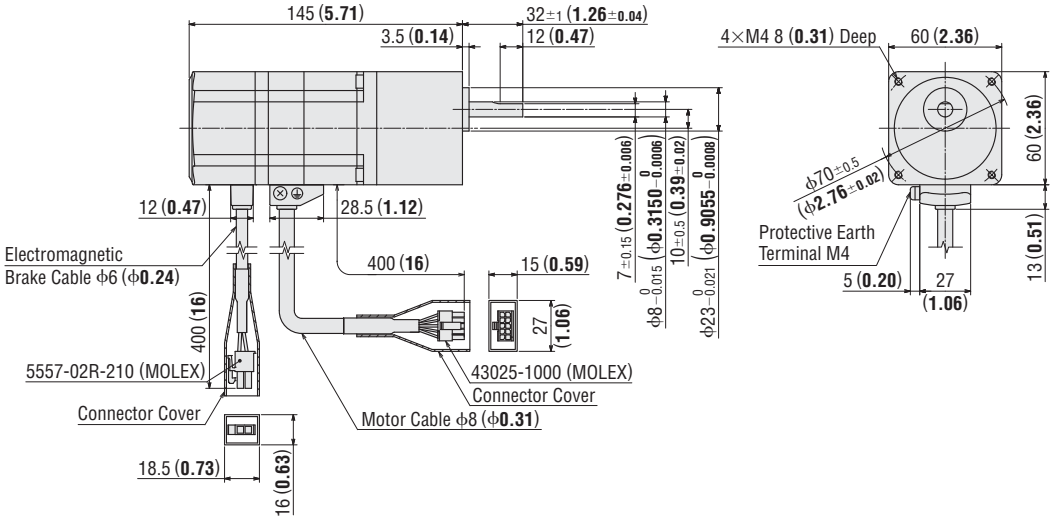
10 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46MK-T■-3	ARM46MK-T■	**3.6**, **7.2**, **10**, **20**, **30**	0.77 (1.69)	B527



11 □60 mm (□2.36 in.)

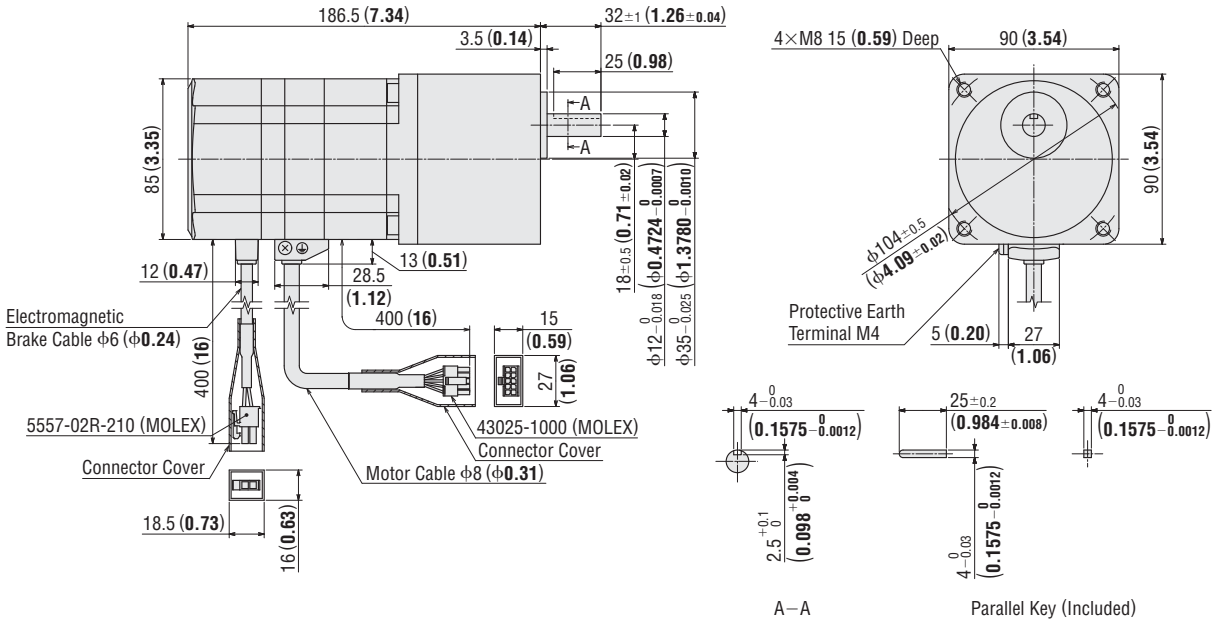
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66MK-T■-3	ARM66MK-T■	**3.6**, **7.2**, **10**, **20**, **30**	1.6 (3.5)	B528



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

12 □90 mm (□3.54 in.)

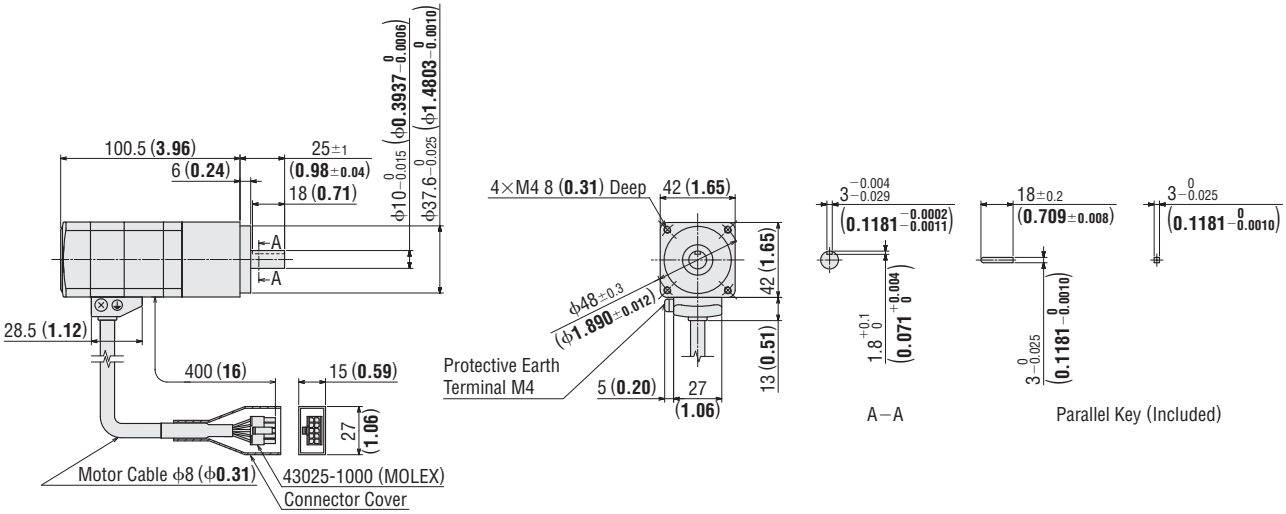
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98MK-T■-3	ARM98MK-T■	**3.6, 7.2, 10, 20, 30**	3.7 (8.1)	B529



◇**PN** Geared Type

13 □42 mm (□1.65 in.)

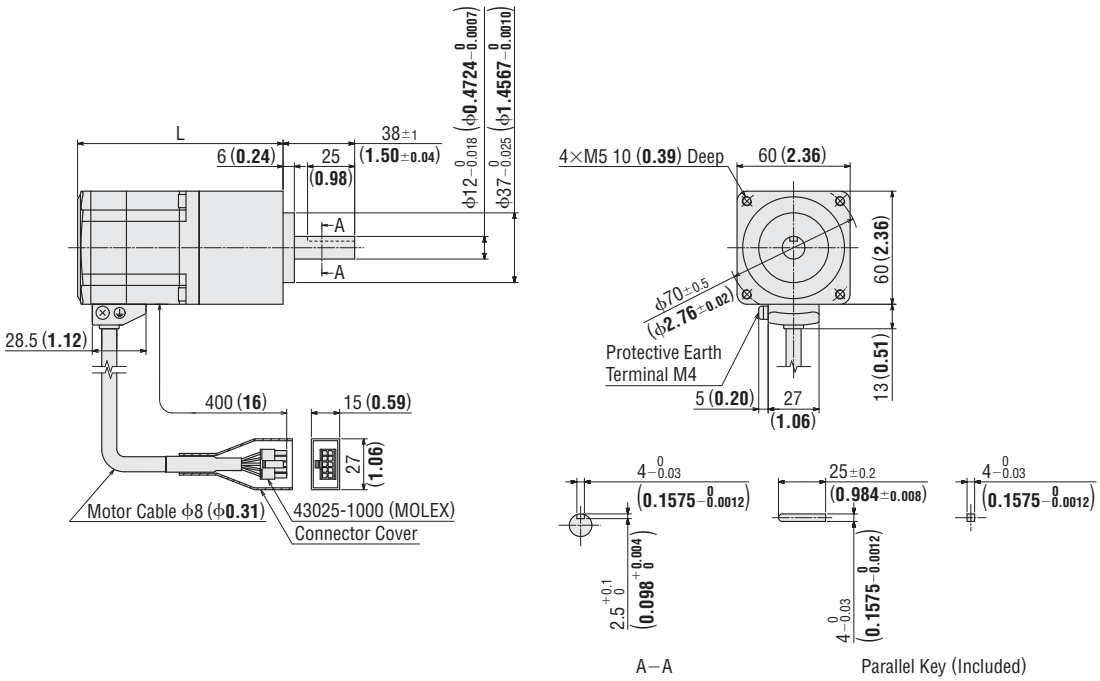
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46AK-N■-3	ARM46AK-N■	**5, 7.2, 10**	0.73 (1.61)	B530



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

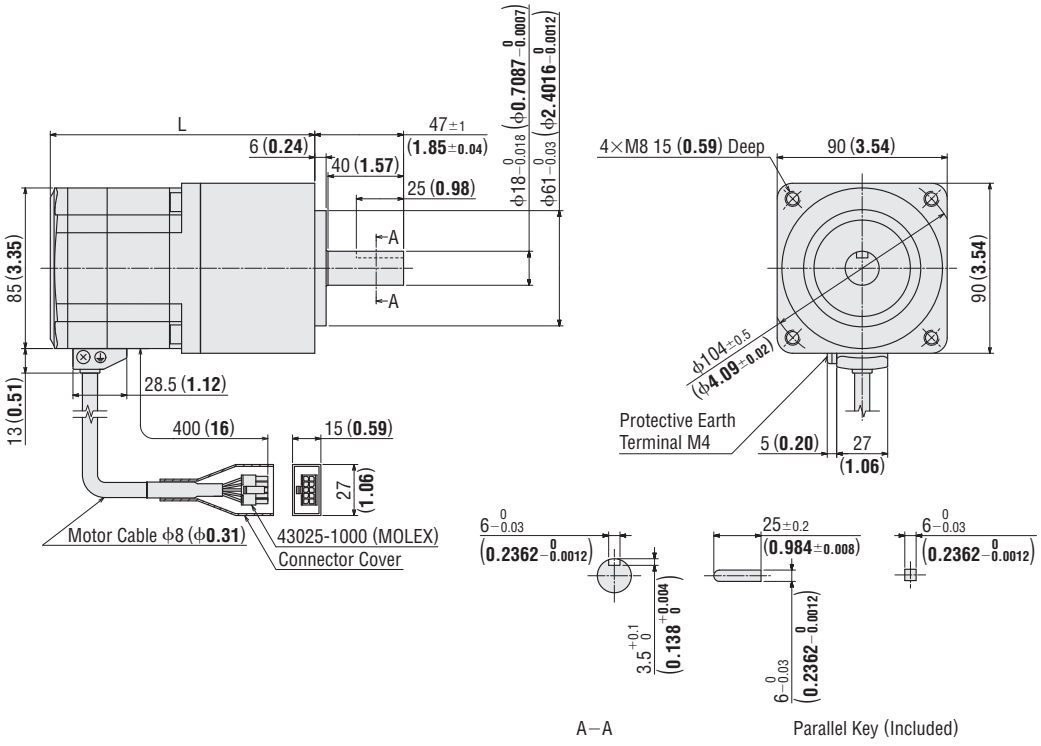
14 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR66AK-N■-3	ARM66AK-N■	**5, 7.2, 10**	109 (4.29)	1.5 (3.3)	B531
		25, 36, 50	125 (4.92)	1.73 (3.8)	B532



15 □90 mm (□3.54 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR98AK-N■-3	ARM98AK-N■	**5, 7.2, 10**	140 (5.51)	3.8 (8.4)	B533
		25, 36, 50	163 (6.42)	4.5 (9.9)	B534

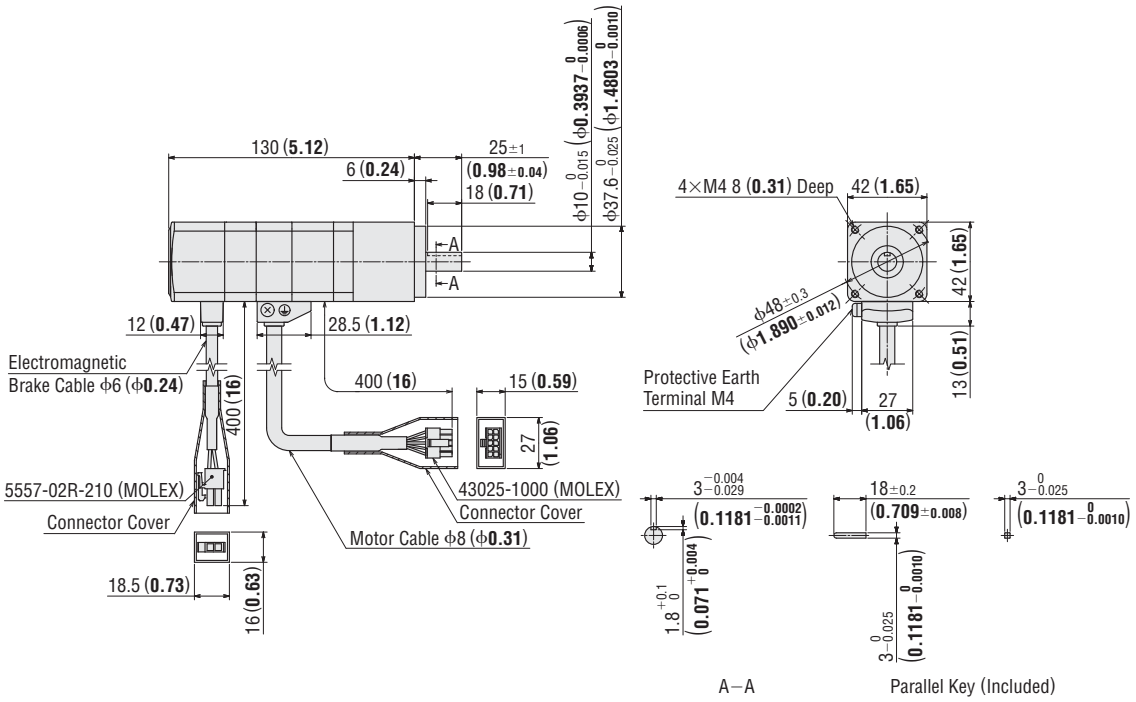


● Enter the gear ratio in the box (■) within the model name.

◇**PN** Geared Type with Electromagnetic Brake

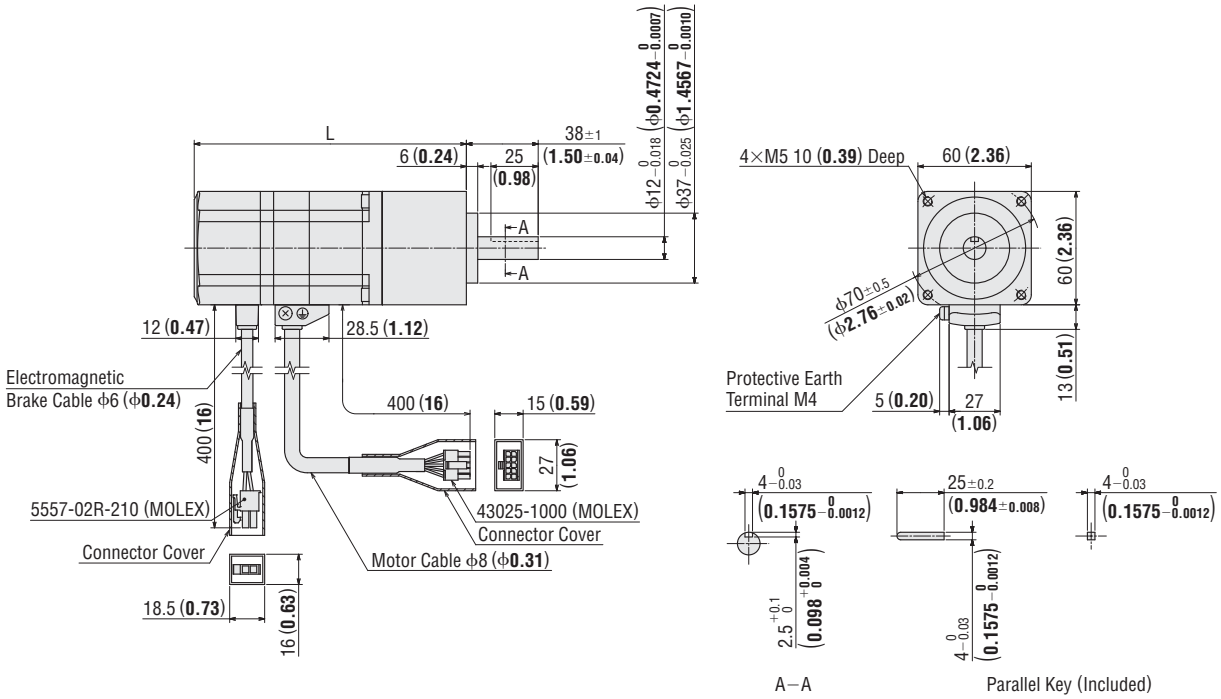
16 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46MK-N■-3	ARM46MK-N■	**5, 7.2, 10**	0.88 (1.94)	B535



17 □60 mm (□2.36 in.)

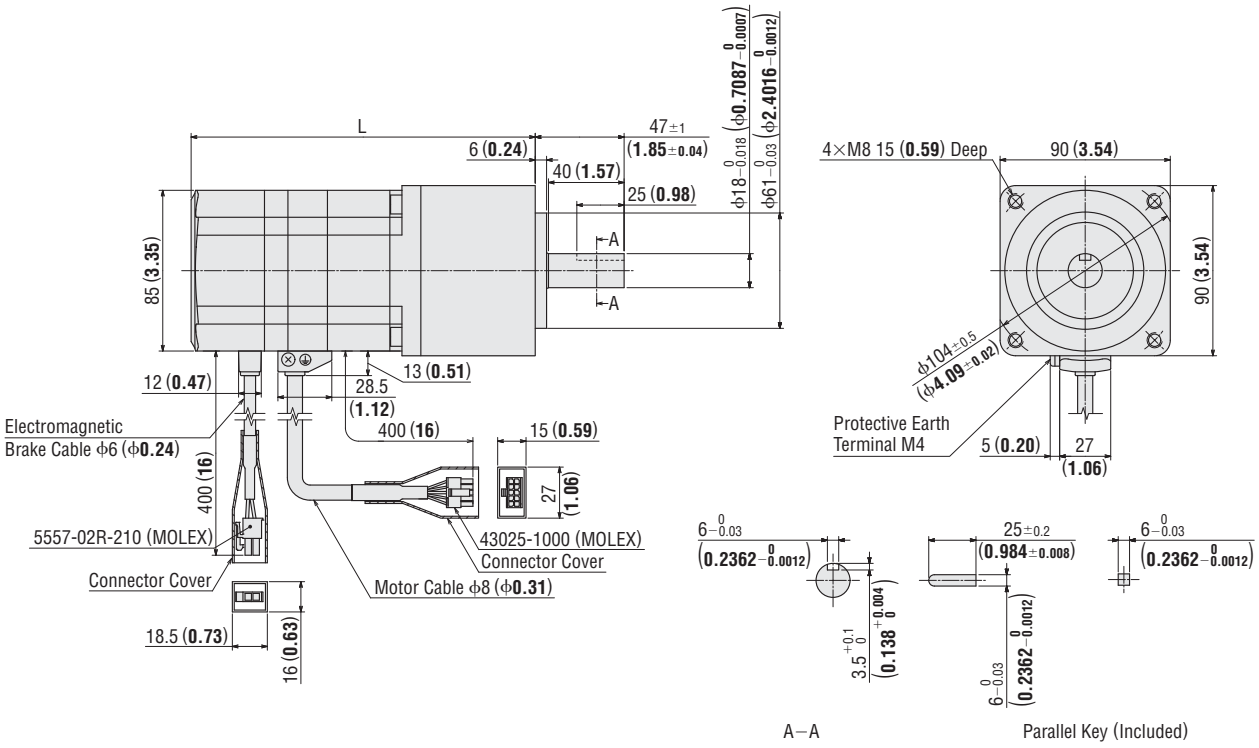
Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR66MK-N■-3	ARM66MK-N■	**5, 7.2, 10**	144 (5.67)	1.8 (4.0)	B536
		25, 36, 50	160 (6.30)	2.0 (4.4)	B537



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

18 □90 mm (□3.54 in.)

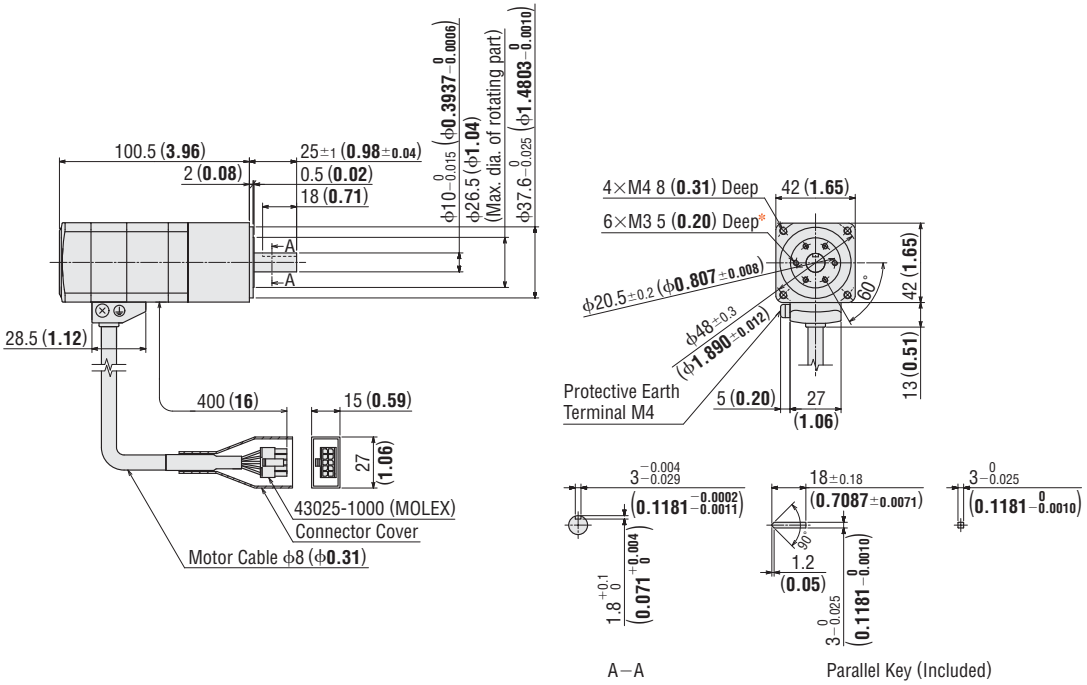
Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR98MK-N■-3	ARM98MK-N■	**5**, **7.2**, **10**	182 (7.17)	4.4 (9.7)	B538
		25, **36**, **50**	205 (8.07)	5.1 (11.2)	B539



◇Harmonic Geared Type

19 □42 mm (□1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46AK-H■-3	ARM46AK-H■	**50**, **100**	0.68 (1.5)	B540

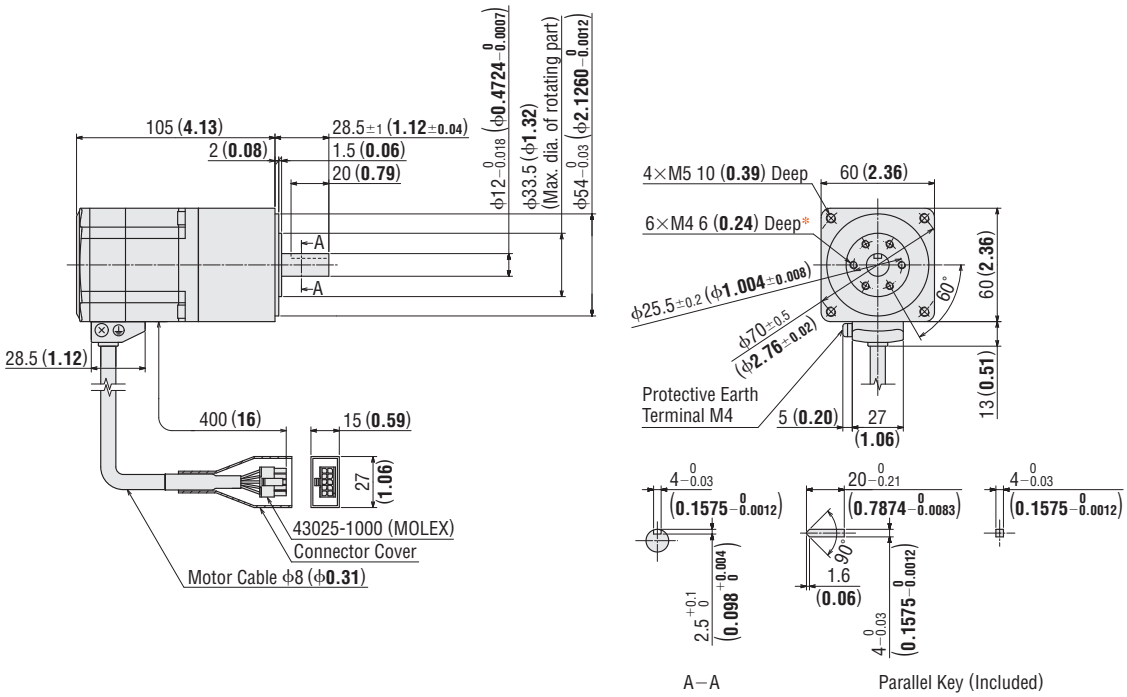


*The position of the output shaft relative to the screw holes on the rotating part is arbitrary.

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

20 □60 mm (□2.36 in.)

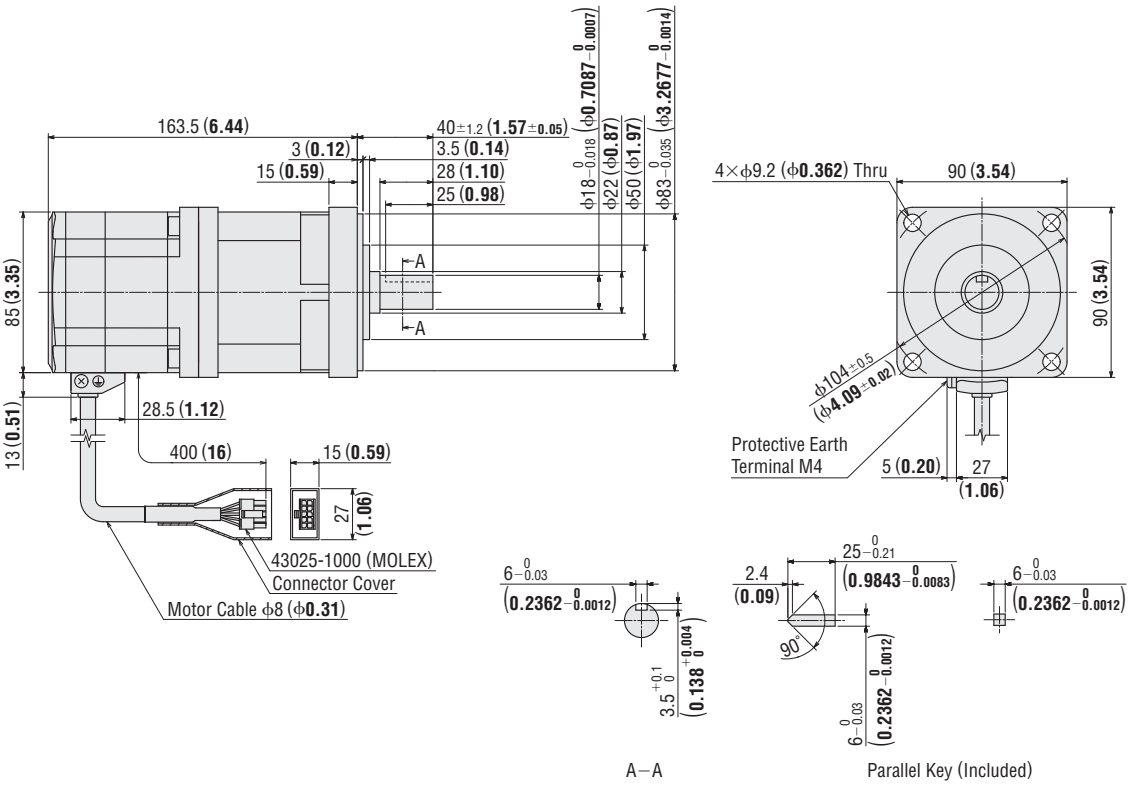
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66AK-H■-3	ARM66AK-H■	**50, 100**	1.41 (3.1)	B541



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

21 □90 mm (□3.54 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98AK-H■-3	ARM98AK-H■	**50, 100**	4.0 (8.8)	B542

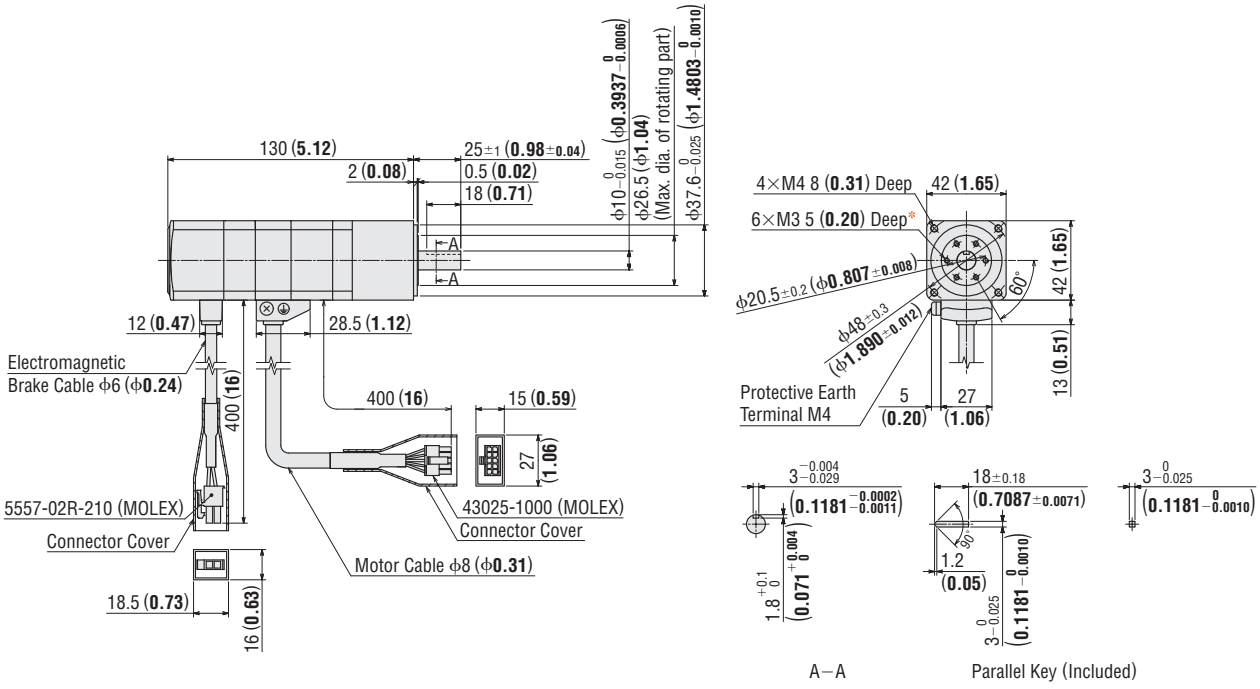


● Enter the gear ratio in the box (■) within the model name.

◇Harmonic Geared Type with Electromagnetic Brake

22 □42 mm (□1.65 in.)

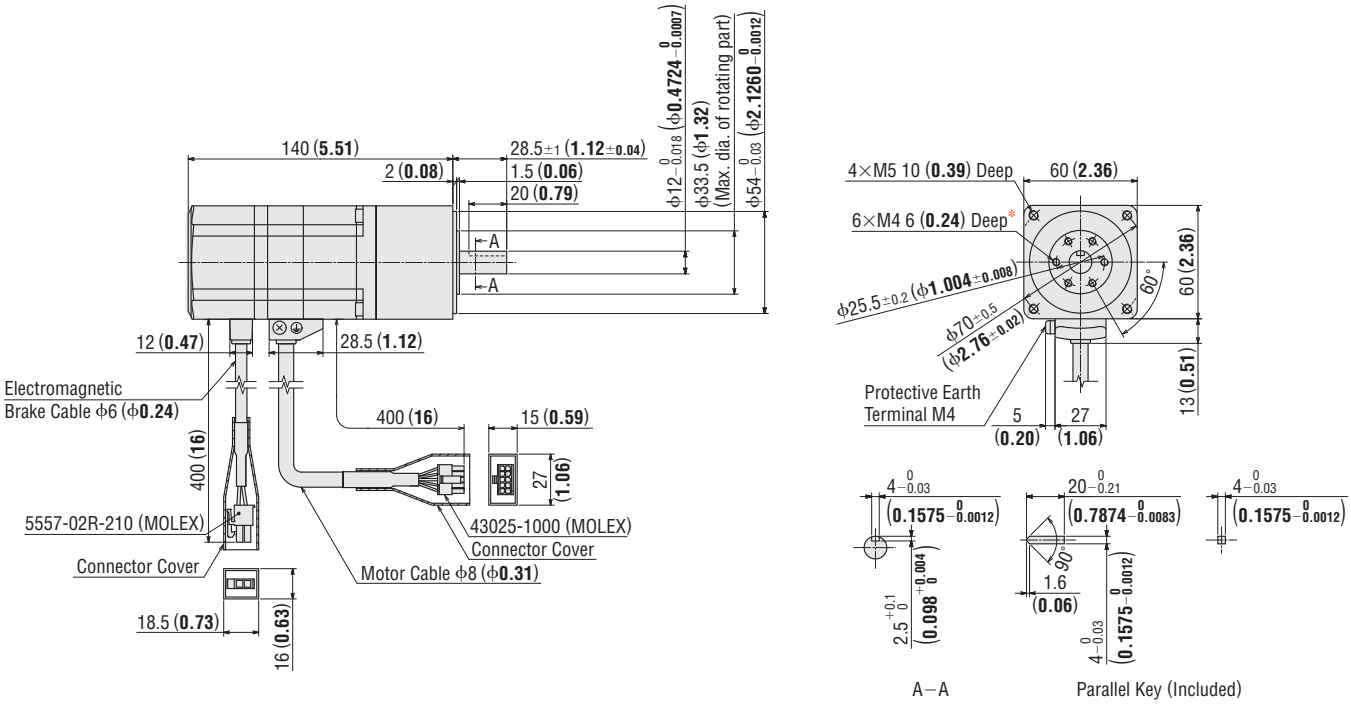
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46MK-H■-3	ARM46MK-H■	**50, 100**	0.83 (1.83)	B543



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

23 □60 mm (□2.36 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66MK-H■-3	ARM66MK-H■	**50, 100**	1.71 (3.8)	B544

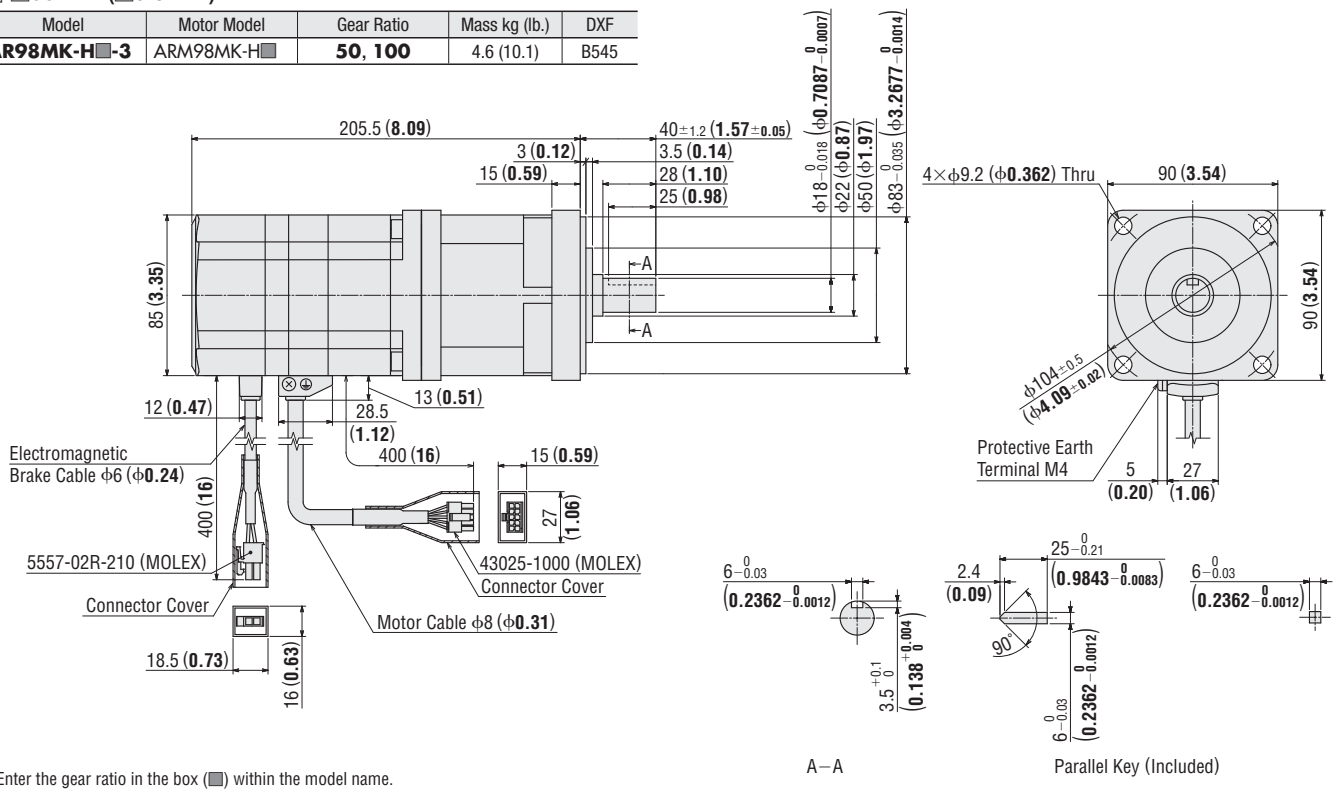


*The position of the output shaft relative to the screw holes on the rotating part is arbitrary.

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

24 □90 mm (□3.54 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98MK-H■-3	ARM98MK-H■	**50, 100**	4.6 (10.1)	B545

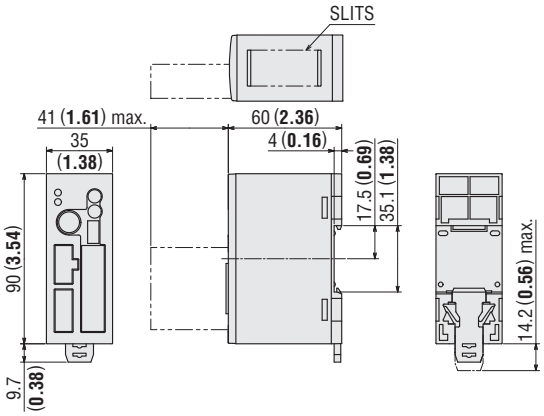


● Enter the gear ratio in the box (■) within the model name.

● Driver

25 Common to All DC Types

Mass: 0.17 kg (0.37 lb.)
DXF B546

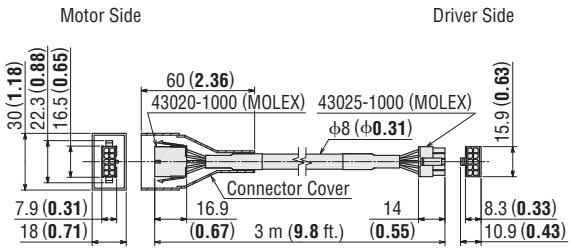


● Control I/O Connector (CN5)
Cover Assembly: 54331-1361 (MOLEX)
Connector: 54306-3619 (MOLEX)
● Connector for Power Supply Input/Frame Ground Terminal (CN1)
Connector: MC1.5/3-STF-3.5 (PHOENIX CONTACT)

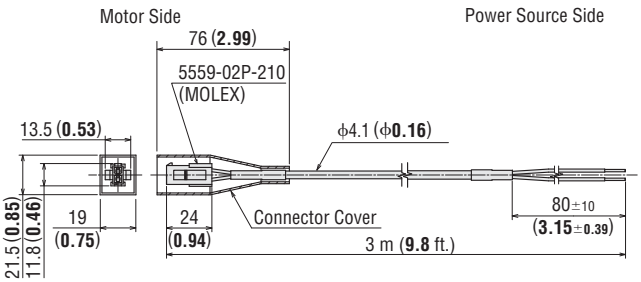
● Motor Cable (Included), Electromagnetic Brake Cable (Included)

26 Common to All DC Types

• Motor Cables



• Electromagnetic Brake Cables (Only for electromagnetic brake type)



List of Motor and Driver Combinations

Model names for motor and driver combinations are shown below.

Type	Model	Motor Model	Driver Model
Standard Type	**AR46□K-3***	ARM46□K	ARD-K
	AR66□K-3*	ARM66□K	
	AR69□K-3*	ARM69□K	
	AR98□K-3*	ARM98□K	
TH Geared Type	**AR46□K-T3.6-3**	ARM46□K-T3.6	ARD-K
	AR46□K-T7.2-3	ARM46□K-T7.2	
	AR46□K-T10-3	ARM46□K-T10	
	AR46□K-T20-3	ARM46□K-T20	
	AR46□K-T30-3	ARM46□K-T30	
	AR66□K-T3.6-3	ARM66□K-T3.6	
	AR66□K-T7.2-3	ARM66□K-T7.2	
	AR66□K-T10-3	ARM66□K-T10	
	AR66□K-T20-3	ARM66□K-T20	
	AR66□K-T30-3	ARM66□K-T30	
	AR98□K-T3.6-3	ARM98□K-T3.6	
	AR98□K-T7.2-3	ARM98□K-T7.2	
	AR98□K-T10-3	ARM98□K-T10	
	AR98□K-T20-3	ARM98□K-T20	
	AR98□K-T30-3	ARM98□K-T30	
PN Geared Type	**AR46□K-N5-3**	ARM46□K-N5	ARD-K
	AR46□K-N7.2-3	ARM46□K-N7.2	
	AR46□K-N10-3	ARM46□K-N10	
	AR66□K-N5-3	ARM66□K-N5	
	AR66□K-N7.2-3	ARM66□K-N7.2	
	AR66□K-N10-3	ARM66□K-N10	
	AR66□K-N25-3	ARM66□K-N25	
	AR66□K-N36-3	ARM66□K-N36	
	AR66□K-N50-3	ARM66□K-N50	
	AR98□K-N5-3	ARM98□K-N5	
	AR98□K-N7.2-3	ARM98□K-N7.2	
	AR98□K-N10-3	ARM98□K-N10	
	AR98□K-N25-3	ARM98□K-N25	
	AR98□K-N36-3	ARM98□K-N36	
	AR98□K-N50-3	ARM98□K-N50	
Harmonic Geared Type	**AR46□K-H50-3**	ARM46□K-H50	ARD-K
	AR46□K-H100-3	ARM46□K-H100	
	AR66□K-H50-3	ARM66□K-H50	
	AR66□K-H100-3	ARM66□K-H100	
	AR98□K-H50-3	ARM98□K-H50	
	AR98□K-H100-3	ARM98□K-H100	

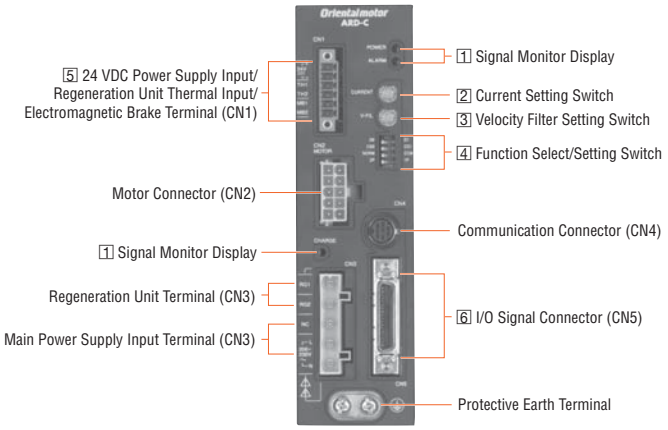
● Enter **A** (single shaft) or **M** (electromagnetic brake) in the box (□) within the model name.

* Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the model names of **AR46□K-3**, **AR66□K-3**, **AR69□K-3** and **AR98□K-3**.

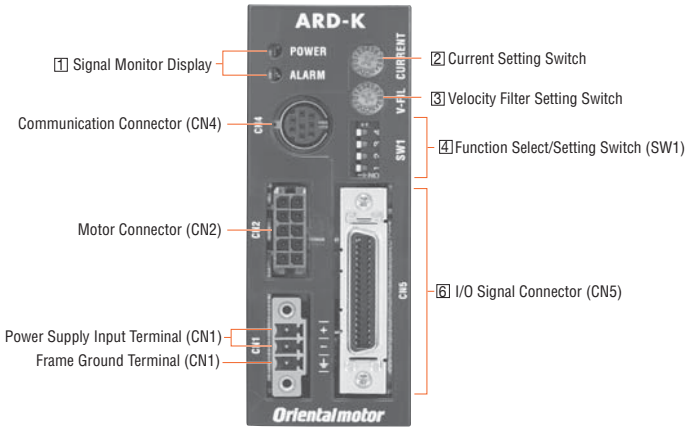
Connection and Operation

Names and Functions of Driver Parts

AC Input Type



DC Input Type



1 Signal Monitor Displays

◇LED Displays

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

*Only for AC input type

◇Alarms

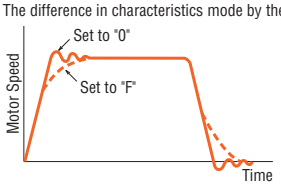
Blink Count	Function	When Activated
2	Overheat	The temperature inside the driver rises above 85°C (185°F).
	Overload	When the amount of time during which the load torque exceeded the maximum torque exceeds the overload detection time. (Default value: 5 seconds)
	Overspeed	The motor output shaft speed 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	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	Overflow rotation during current on	The position deviation exceeds the overflow revolutions. (Default value: 3 revolutions)
	Overflow rotation during 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*	An excessive current flows through the inverter power element inside the driver.
	Drive circuit error*	The power cable of the motor is disconnected.
7	Abnormal operation data	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.

*Only for AC input type

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	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." The difference in characteristics mode by the velocity filter 

4 Function Select/Setting Switches

Indication	Switch Name	Function
D0/D1 (4)	Resolution select switches	These switches are used to set the resolution per rotation of the motor output shaft. "D0 (4:OFF)" "CS0 (3:OFF)"→1000 pulse <0.36°/step> [Factory setting] "D0 (4:OFF)" "CS1 (3:ON)"→10000 pulse <0.036°/step> "D1 (4:ON)" "CS0 (3:OFF)"→500 pulse <0.72°/step> "D1 (4:ON)" "CS1 (3:ON)"→5000 pulse <0.072°/step>
CS0/CS1 (3)		
NORM/CCM (2)	Control mode select switches	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 may reduce. "NORM (2:OFF)": Normal mode [Factory setting] "CCM (2:ON)": Current control mode
2P/1P (1)	Pulse input mode switch	The settings of this switch are compatible with the following two types of pulse input modes: "2P (1:OFF)" for the 2-pulse input mode, "1P (1:ON)" for the 1-pulse input mode.

Indication and Function in parentheses are for DC input type.

5 24 VDC Power Supply Input/Regeneration Unit Thermal Input/Electromagnetic Brake Terminal (CN1) (Only for AC Input Type)

Indication	Input/Output	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 for the electromagnetic brake power.
24V−		24 VDC power supply input terminal−	
TH1		Regeneration unit thermal input terminal	Connect the accessory regeneration unit **RGB100** (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)

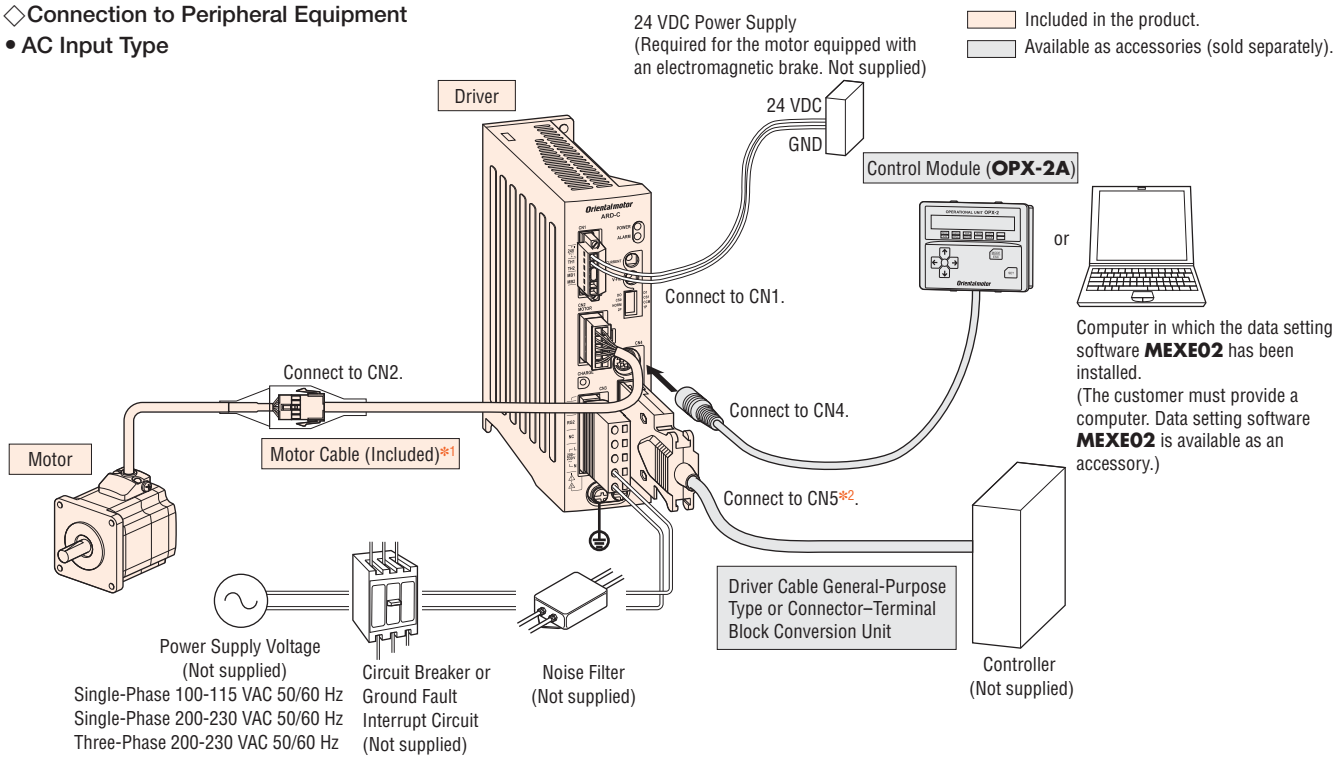
Indication	Input/Output	Pin No.	Signal		Signal Name	
			Positioning Operation	Push-Motion Operation*1	Positioning Operation	Push-Motion Operation*1
CN5	–	1	–		–	
	Output	2	GND		Ground connection	
		3	ASG+		A-phase pulse output (line driver)	
		4	ASG−			
		5	BSG+		B-phase pulse output (line driver)	
		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 complete output	
		14	END−			
		15	READY+/ALO0+*1		Operation ready complete output/Alarm code output 0*1	
		16	READY−/ALO0−*1			
		17	TLC+/AL1+*1		Torque limit output /Alarm code output 1*1	
		18	TLC−/AL1−*1			
		19	TIM2+/AL2+*1		Timing output (open-collector)/Alarm code output 2*1	
		20	TIM2−/AL2−*1			
		21	GND		Ground connection	
	Input	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	
		26	CS	T–MODE*1	Resolution select input	Push-motion operation ON*1
		27	–	M0*1	–	Push-current setting select input*1
		28	RETURN	M1*1	Return to electrical home operation	
		29	P–RESET	M2*1	Position reset input	
		30	FREE		Electromagnetic brake release*2, excitation OFF	
		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/Direction input (+24 V)	
		35	CCW+/DIR+		CCW pulse input/Direction input (+5 V/line driver)	
		36	CCW−/DIR−			

*1 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).
*2 Only for AC input type

●Connection Diagram

◇Connection to Peripheral Equipment

• AC Input Type

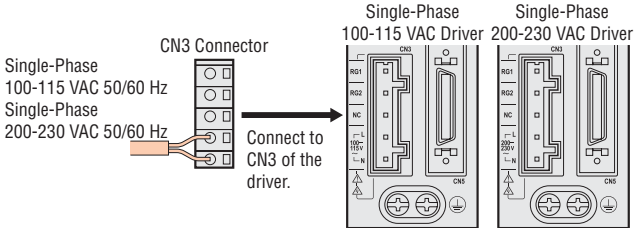


*1 Each model comes with a motor cable 3 m (9.8 ft.) long. If you need a cable of a different length, or a flexible cable, select an appropriate cable from among the accessories (sold separately).
*2 Each model comes with a control I/O connector (CN5), but you must select the driver cable general-purpose type or connector–terminal block conversion unit, both of which are provided as accessories (sold separately).

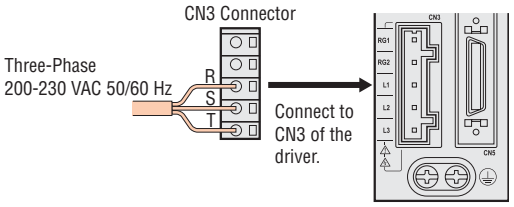
◇Connecting a Main Power Supply

Use the following cable for the power supply line;
Single-phase 100-115 VAC, Single-phase 200-230 VAC: 3-core cable of AWG16 to 14
Three-phase 200-230 VAC: 4-core cable of AWG16 to 14

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

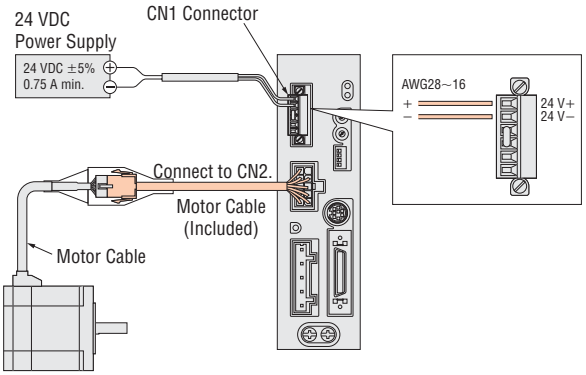


・Three-Phase 200-230 VAC



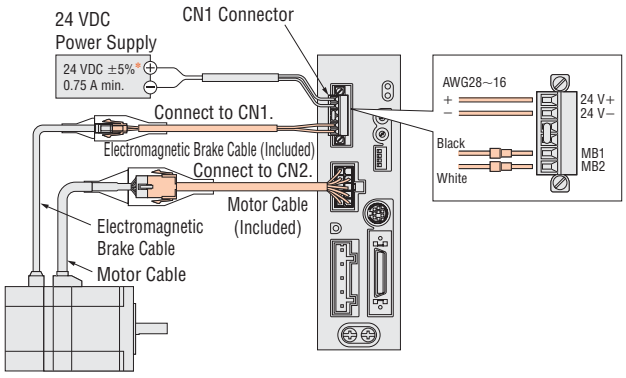
◇Connecting the Control Power Supply

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.



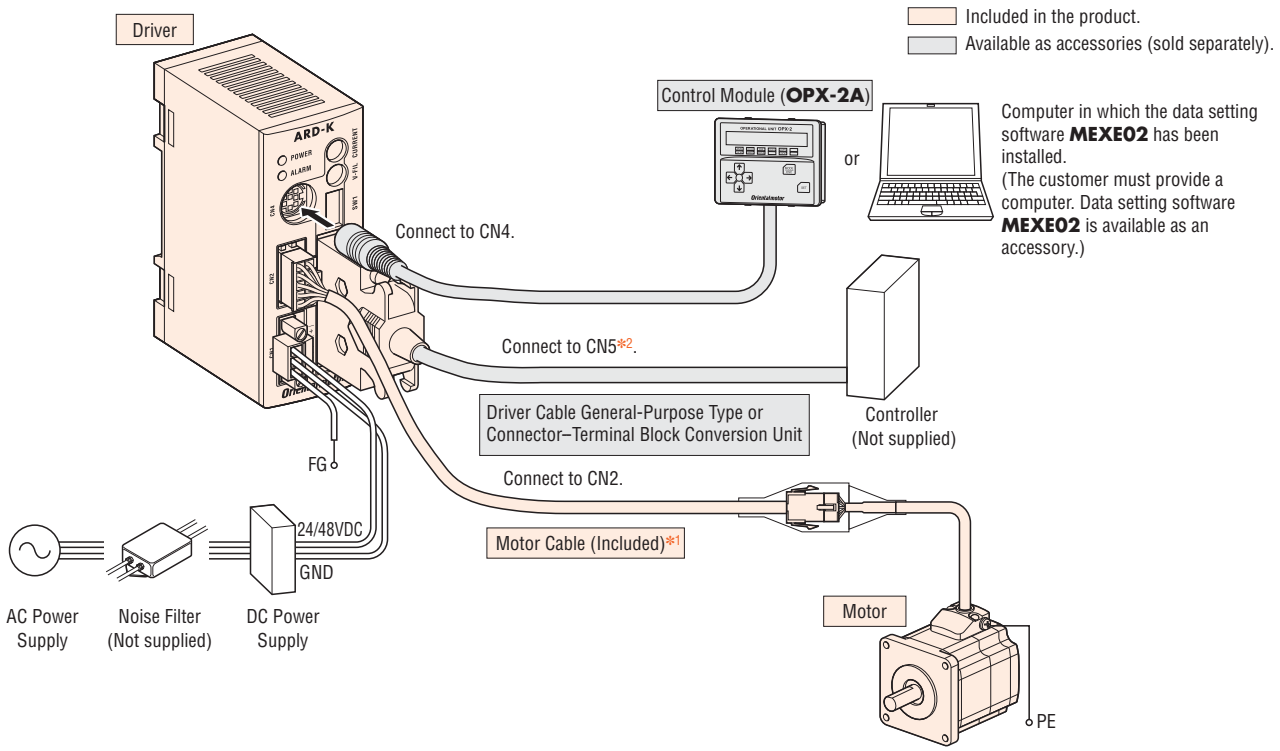
◇Connecting the Electromagnetic Brake

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 (65.6 ft.) or longer, use a power supply of 24 VDC ±4%.

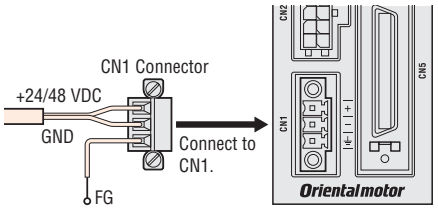
• DC Input Type



*1 Each model comes with a motor cable 3 m (9.8 ft.) long. If you need a cable of a different length, or a flexible 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).

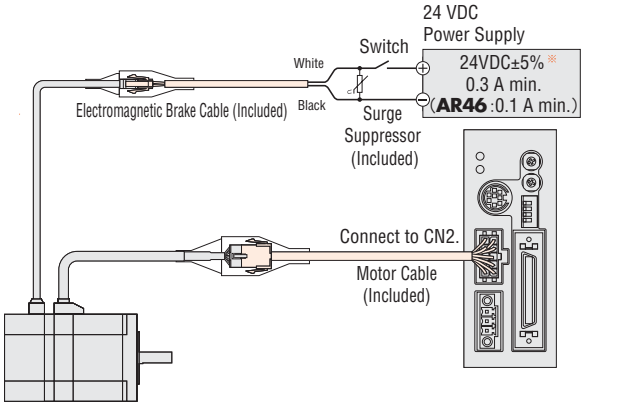
◇Connecting a Main Power Supply

Use the following cable for the power supply line;
AWG24 to 16



◇Connecting the Electromagnetic Brake

Provide a 24 VDC power supply.



*If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC ±4%.

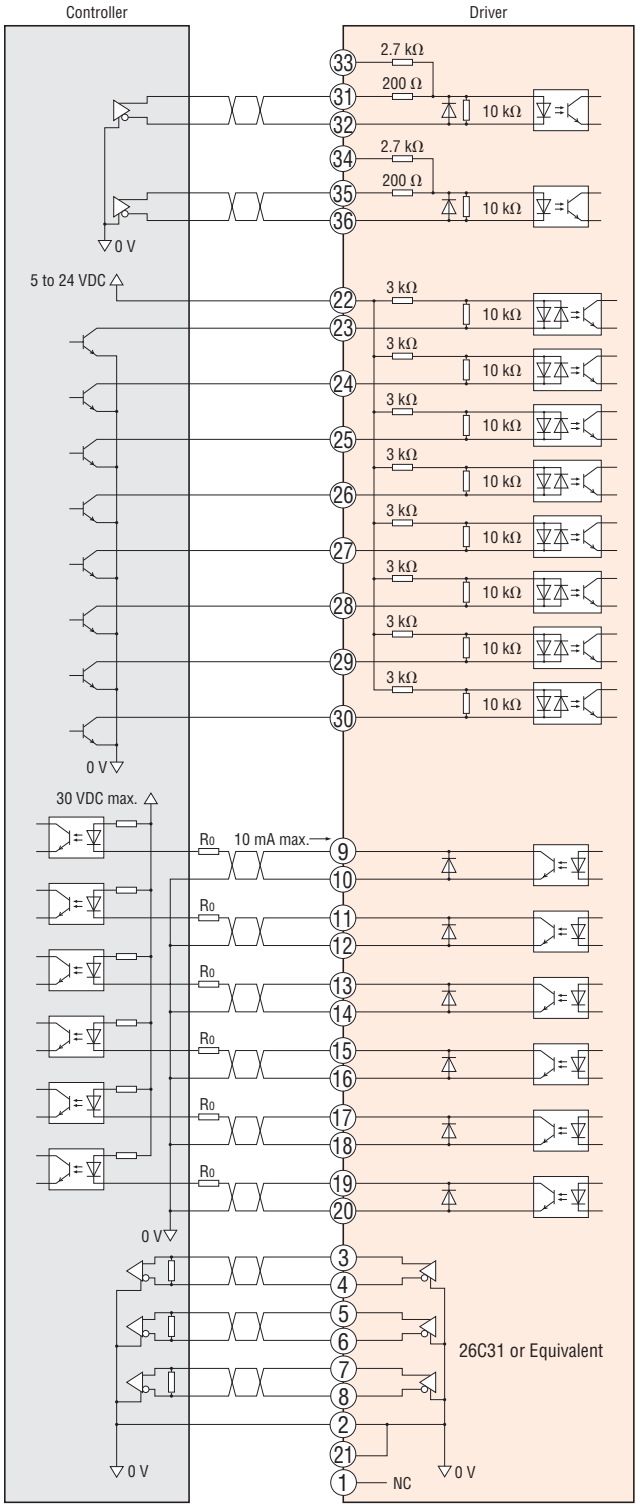
Note:

- To protect the switch contacts and prevent noise, always connect the surge suppressor. (The surge suppressor is included with electromagnetic brake motors.)

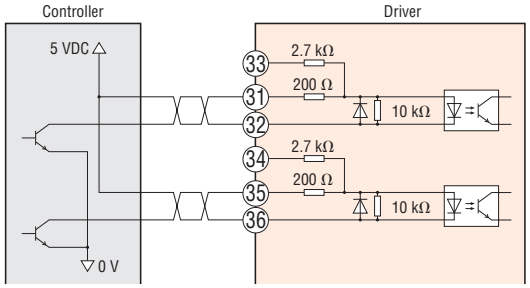
◇Connecting to a Host Controller

• Connecting to a Current Sink Output Circuit

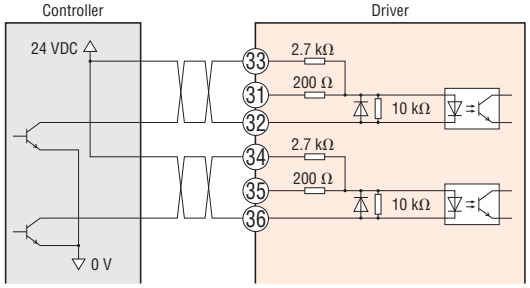
When pulse input is of line driver type



When pulse input is of 5 VDC type



When pulse input is of 24 VDC type



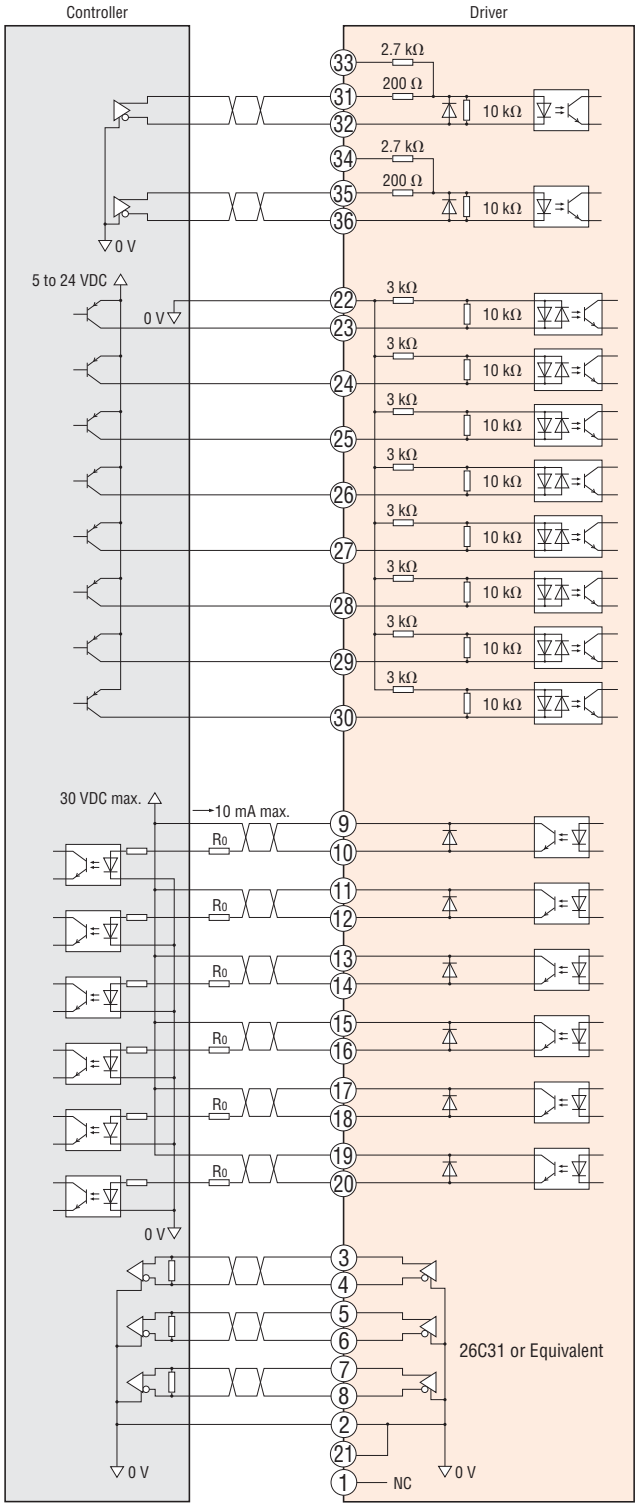
Notes:

- Use output signals at 30 VDC or less. If the current exceeds 10 mA, connect an external resistor R_0.
- Connect a terminal resistor of 100 Ω or more between the input of the line receiver terminals.
- Use a multi-core, twisted-pair shielded wire of AWG28 to 26 for the control input/output signal line (CN5), and keep wiring as short as possible [within 2 m (6.6 ft.)].
- Note that as the length of the pulse signal line increases, the maximum transmission frequency decreases.
- Provide a minimum distance of 300 mm (1 ft.) between the control I/O signal lines and power lines (AC lines, motor lines and other large-current circuits). Do not run the control I/O signal lines in the same duct as power lines or bundle them with power lines.

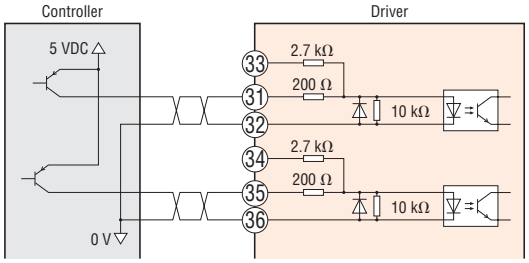
◇Connecting to a Host Controller

• Connecting to a Current Source Output Circuit

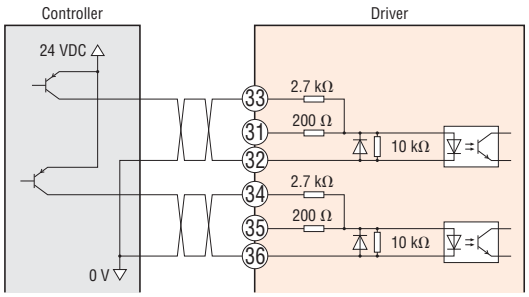
When pulse input is of line driver type



When pulse input is of 5 VDC type



When pulse input is of 24 VDC type



Notes:

- Use output signals at 30 VDC or less. If the current exceeds 10 mA, connect an external resistor R_0.
- Connect a terminal resistor of 100 Ω or more between the input of the line receiver terminals.
- Use a multi-core, twisted-pair shielded wire of AWG28 to 26 for the control input/output signal line (CN5), and keep wiring as short as possible [within 2 m (6.6 ft.)].
- Note that as the length of the pulse signal line increases, the maximum transmission frequency decreases.
- Provide a minimum distance of 300 mm (1 ft.) between the control I/O signal lines and power lines (AC lines, motor lines and other large-current circuits). Do not run the control I/O signal lines in the same duct as power lines or bundle them with power lines.

●Description of Input/Output Signals

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

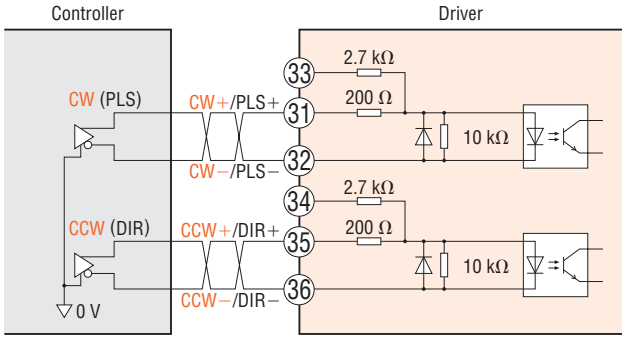
Input (output) "ON" indicates that the current is sent into the photocoupler (transistor) inside the driver. Input (output) "OFF" indicates that the current is not sent into the photocoupler (transistor) inside the driver. The input/output remains "OFF" if nothing is connected.

Photocoupler OFF ON

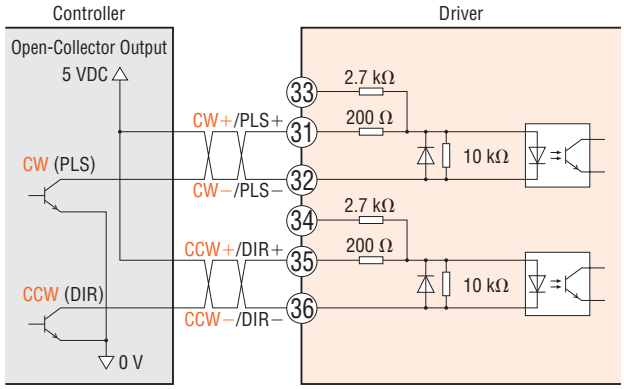
CW (PLS) and CCW (DIR) Pulse Input Signal

◇Input Circuit and Sample Connection

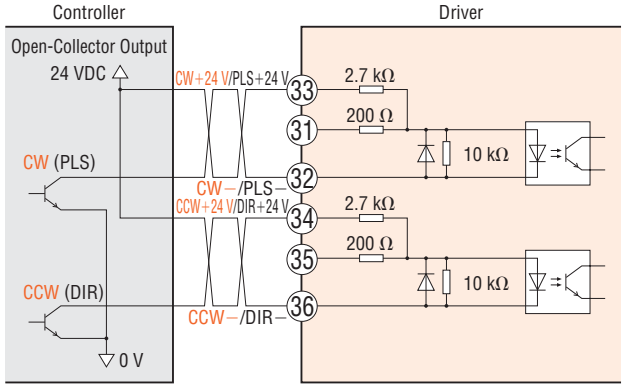
• Line Driver Output



• When Using 5 VDC

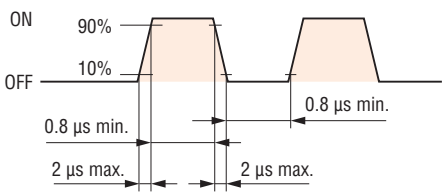


• When Using 24 VDC



● 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

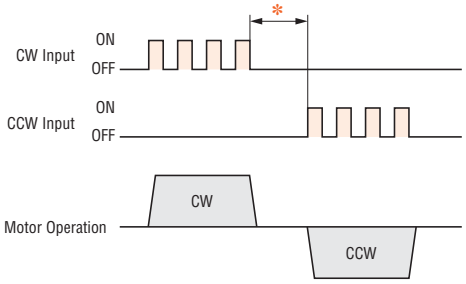


● For pulse signals, use input pulse waveforms like those shown in the figure above.

◇Pulse Input Mode

• 2-Pulse Input Mode

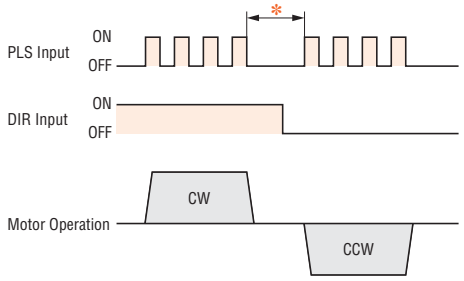
When the CW input is turned ON, the motor will rotate by one step in CW direction. When the CCW input is turned ON, the motor will rotate by one step in CCW direction.



* 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.

• 1-Pulse Input Mode

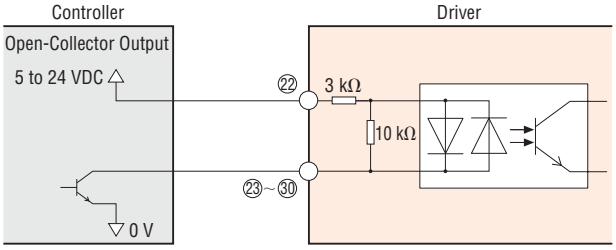
When the PLS input is turned ON while the DIR input is ON, the motor will rotate by one step in CW direction. When the PLS input is turned ON while the DIR input is OFF, the motor will rotate by one step in CCW direction.



* 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.

Control Input Signals

◇Input Circuit and Sample Connection



◇Current ON (C-ON) Input

Pin No.㉓

This signal is used to excite the motor.

• AC Input Type

If an electromagnetic brake motor is used, the electromagnetic brake will be released after the motor is excited.

• DC Input Type

If an electromagnetic brake motor is used, please release the electromagnetic brake 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.

◇Electromagnetic Brake Release*, Excitation OFF (FREE) Input
Pin No.㉚

*Only for AC input type

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.

• AC Input Type

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.

• DC Input Type

When the FREE input is turned ON, current supplied to the motor will be cut off. In this condition, the detent torque is bigger than the torque when cutting power off, because the coil inside the motor is shorted. When the FREE input is turned OFF, current will be supplied to the motor.

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 in combination with the resolution select switches.
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 (SW1-No.4: OFF)	The CS0 (SW1-No.3: OFF) setting is selected. Factory setting: 1000 P/R	The CS1 (SW1-No.3: ON) setting is selected. Factory setting: 10000 P/R
D1 (SW1-No.4: ON)	The CS0 (SW1-No.3: OFF) setting is selected. Factory setting: 500 P/R	The CS1 (SW1-No.3: ON) setting is selected. Factory setting: 5000 P/R

- Descriptions in parentheses are for DC input type.

Notes:

AC Input Type:

- 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.

DC Input Type:

- While the resolution select switch (SW1-No.3) is set to "OFF", the CS input becomes effective.
- While the resolution select switch (SW1-No.3) is set to "ON", the CS input is ignored and the (SW1-No.3: ON) 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.

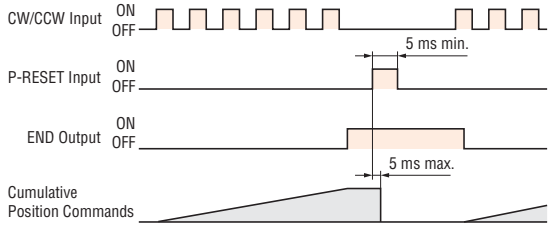
M1 Input Setting

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

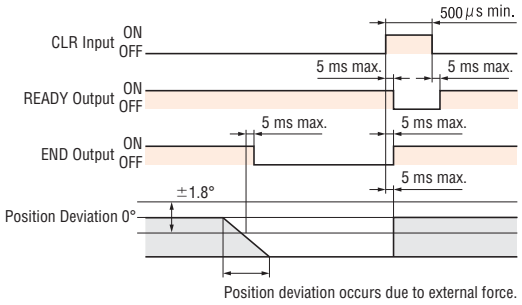
When "push-motion operation" is selected with the control module **OPX-2A** or data setting software **MEXE02** (both sold separately), the push-current setting select (M2) input will become effective. The setting data can be selected via the combination of M0, M1 and M2 inputs.

◇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.

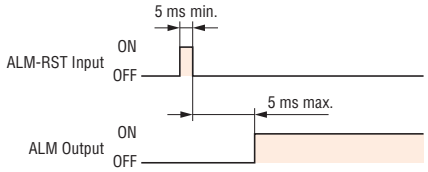


Notes:

- 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* · Overvoltage · Overcurrent* · Driver circuit error* · Electronic gear setting error · Sensor error during operation · Initial sensor error · Initial rotor rotation error · Motor combination error · EEPROM error

* Only for AC input type

◇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 may reduce.

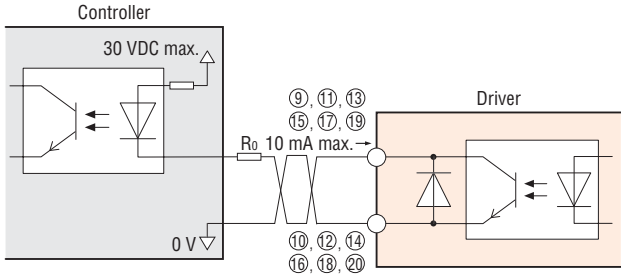
Notes:

- Switch the mode while the motor is at standstill.
- The CCM input becomes effective, when the control mode switch is set to "NORM" for AC input type or switch (SW1-No.2) is set to "OFF" for DC input type.

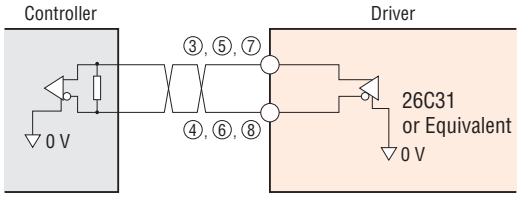
Control Output Signals

◇Output Circuit and Sample Connection

· Operation Ready Complete (READY)/Alarm Code 0 (AL0) Output
· Torque Limit (TLC)/Alarm Code 1 (AL1) Output
· Positioning Complete (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 Limit (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.

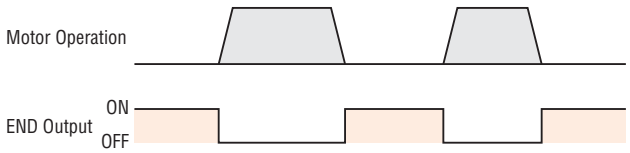
AL1 Output Setting

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 Complete (END)

Pin No.⑬, ⑭

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 ±1.8° 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).

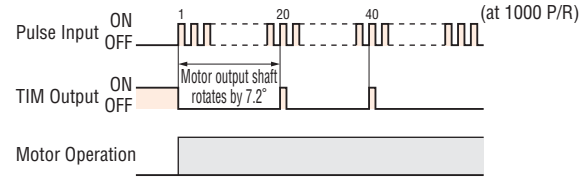


◇Timing (TIM1) Output
Pin No.⑦, ⑧

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°.
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.



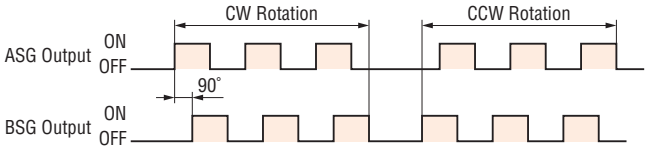
Notes:
- The TIM1 output will not turn ON properly unless the pulse speed is 10 kHz or less. The TIM2 output will not turn ON properly unless the pulse speed is 500 Hz or less.
- When changing the resolution using the CS input, do so while the TIM output is ON and the motor is at standstill. If the CS 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°.

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° 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 Ω or more between the input of the line receiver terminals.

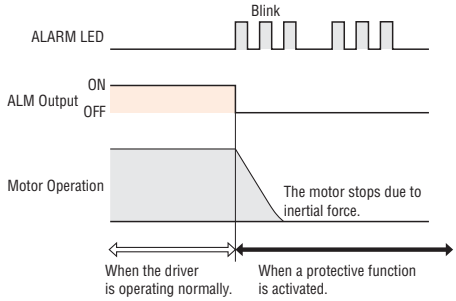
◇Warning (WNG) Output
Pin No.⑪, ⑫

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. For AC input type, 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.

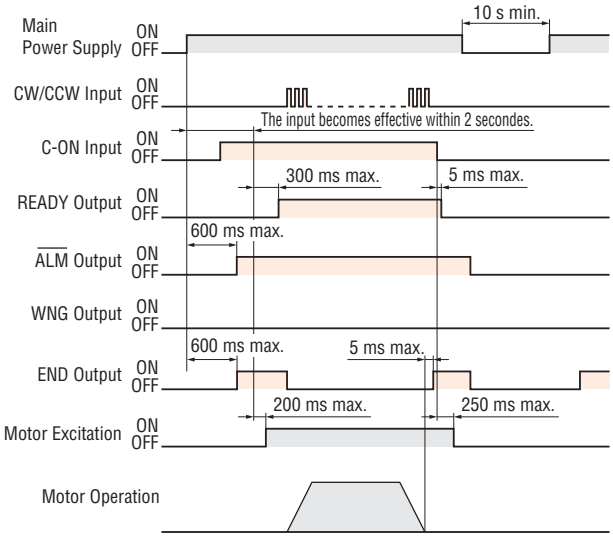
Note:
- In the case of operation data errors, the current will not be cut off and if an AC input type motor is used, the electromagnetic brake will not be held even after these errors occur.



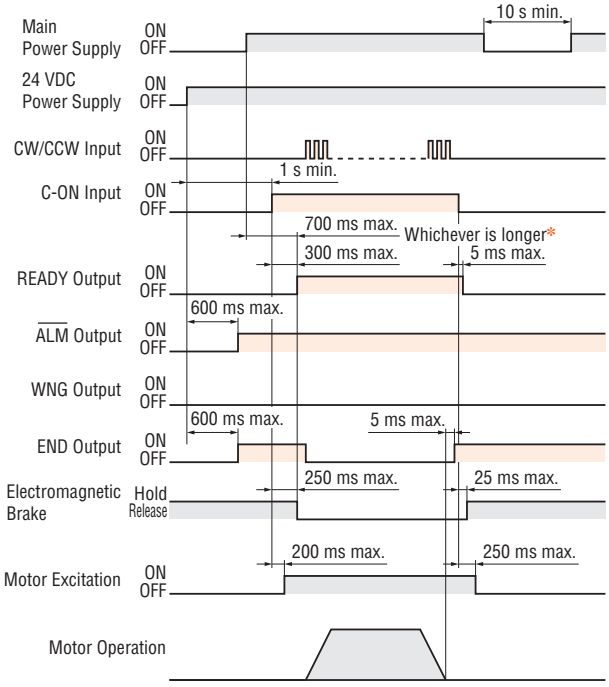
●Timing Charts

◇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.

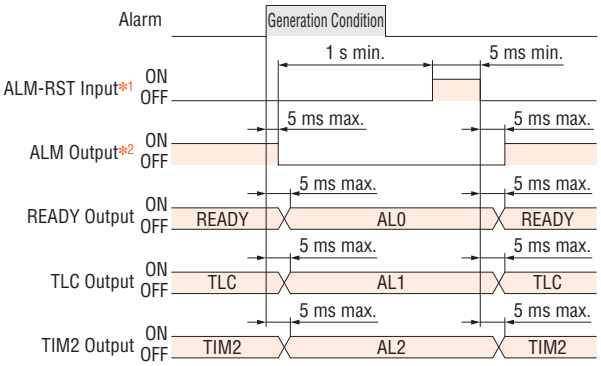


• Using 24 VDC Power Supply (Only for AC Input Type)



* 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.

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 operations and monitor the operation.

Control Module (**OPX-2A**)
➜ Page 84

Data Setting Software (**MEXE02**)
➜ Page 84

Parameter Setting

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

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 input logic
		Output condition for END signal (output width)
		Current value applicable to push-motion operation
	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 overflow rotation alarm during current on
		Generation condition of overflow rotation alarm during current off
		Generation condition of overload alarm
		Generation condition of overflow rotation 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
	Manual 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

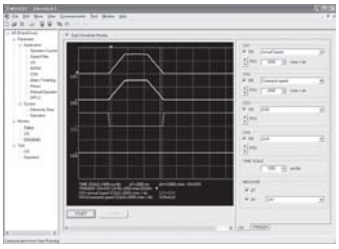
You can monitor various signals, alarms and motor speeds/positions, and also perform test operations.

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

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

Waveform Monitoring*

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



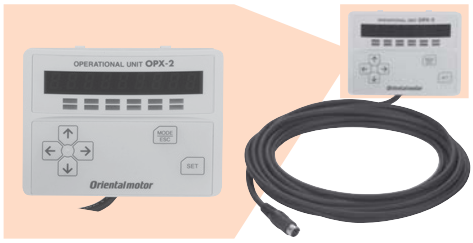
Other

Electrical home reset
Parameter initialization

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.



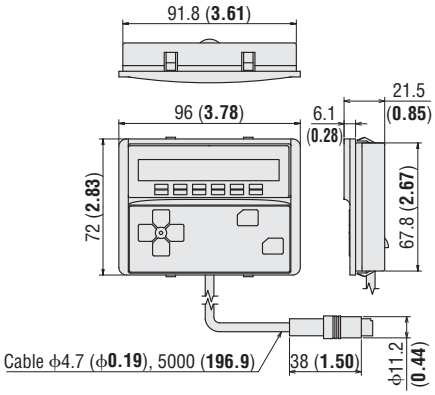
Product Line

Model
OPX-2A

Dimensions Unit = mm (in.)

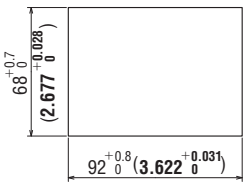
Control Module

Mass: 0.25 kg (0.55 lb.) DXF B453



Panel Cut-Out for Control Module

[Thickness of the mounting plate: 1 ~ 3 mm (0.04 ~ 0.12 in.)]



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
MEXE02

PC interface cable of 5 m (16.4 ft.) and USB cable of 0.5 m (20 in.) are included

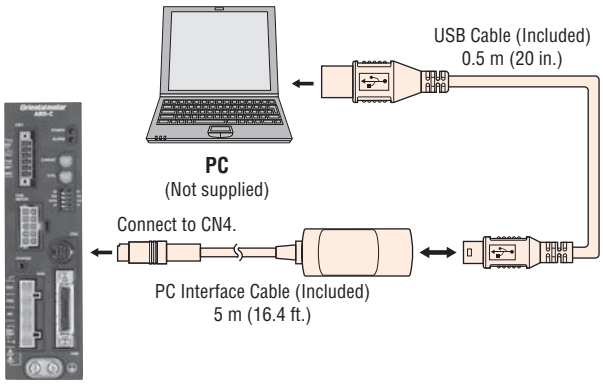
Operating Software

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*
Windows® Vista Home Basic Service Pack 1 or later*
Windows® Vista Home Premium Service Pack 1 or later*
Windows® Vista Business Service Pack 1 or later*
Windows® Vista Ultimate Service Pack 1 or later*
*MEXE02 is not available for 64-bit (x64, IA64) Windows XP and Windows Vista.

Computer

CPU	Pentium Ⅲ 800 MHz or more (The OS must be supported.)
Display Resolution	XGA (1024×768) or higher resolution video adapter and monitor
Memory	Windows® 2000 Professional: 448 MB or more Windows® XP Home Edition, Professional: 512 MB or more Windows® Vista Home Basic: 896 MB or more Windows® Vista Home Premium, Business, Ultimate: 1.4 GB or more
Free Hard Disk Space	Available disk space of 30 MB or more
USB Port	USB 1 port
Disk Device	CD-ROM drive

Connection between Computer and Driver

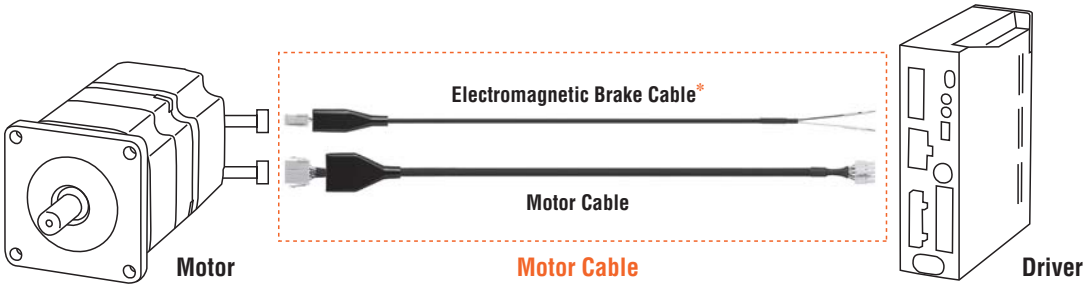


Motor Cables RoHS
Extension Cables RoHS

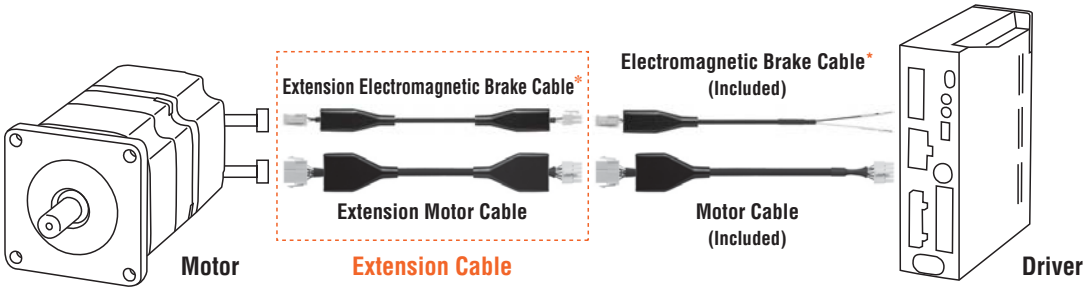
The **AR** Series comes with a 3 m (9.8 ft.) cable for connection between the motor and driver.
When it is necessary to have a connection of a different length between motor and driver, a motor cable or extension cable must be used. Use a flexible motor cable if the cable will be flexed repeatedly.

System Configuration

Using an Accessory Motor Cable (Not using the 3 m cable included in the **AR** Series)



Using an Accessory Extension Cable with the included 3 m Motor Cable



*Electromagnetic brake cable and extension electromagnetic cable are for electromagnetic brake motors. For DC input type, connect the lead wires of the electromagnetic brake cable to the 24 VDC power supply, not to the driver.

Note:

- Keep the total cable length below 30 m (98.4 ft.) 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 repeatedly.
- 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

For AC Input Type

◇Motor Cables

Motor Cable

Motor Cable

Electromagnetic Brake Cable

Motor Cables

Model	Length L m (ft.)
CC010VAF	1 (3.3)
CC020VAF	2 (6.6)
CC030VAF	3 (9.8)
CC050VAF	5 (16.4)
CC070VAF	7 (23.0)
CC100VAF	10 (32.8)
CC150VAF	15 (49.2)
CC200VAF	20 (65.6)
CC300VAF	30 (98.4)

Flexible Motor Cables

Model	Length L m (ft.)
CC010VAR	1 (3.3)
CC020VAR	2 (6.6)
CC030VAR	3 (9.8)
CC050VAR	5 (16.4)
CC070VAR	7 (23.0)
CC100VAR	10 (32.8)
CC150VAR	15 (49.2)
CC200VAR	20 (65.6)
CC300VAR	30 (98.4)

Cable Set for Electromagnetic Brake Motor

Model	Length L m (ft.)
CC010VAFB	1 (3.3)
CC020VAFB	2 (6.6)
CC030VAFB	3 (9.8)
CC050VAFB	5 (16.4)
CC070VAFB	7 (23.0)
CC100VAFB	10 (32.8)
CC150VAFB	15 (49.2)
CC200VAFB	20 (65.6)
CC300VAFB	30 (98.4)

Flexible Cable Set for Electromagnetic Brake Motor

Model	Length L m (ft.)
CC010VARB	1 (3.3)
CC020VARB	2 (6.6)
CC030VARB	3 (9.8)
CC050VARB	5 (16.4)
CC070VARB	7 (23.0)
CC100VARB	10 (32.8)
CC150VARB	15 (49.2)
CC200VARB	20 (65.6)
CC300VARB	30 (98.4)

◇Extension Cables

Extension Motor Cable

Extension Motor Cable

Extension Electromagnetic Brake Cable

Extension Motor Cables

Model	Length L m (ft.)
CC010VAFT	1 (3.3)
CC020VAFT	2 (6.6)
CC030VAFT	3 (9.8)
CC050VAFT	5 (16.4)
CC070VAFT	7 (23.0)
CC100VAFT	10 (32.8)
CC150VAFT	15 (49.2)
CC200VAFT	20 (65.6)

Flexible Extension Motor Cables

Model	Length L m (ft.)
CC010VART	1 (3.3)
CC020VART	2 (6.6)
CC030VART	3 (9.8)
CC050VART	5 (16.4)
CC070VART	7 (23.0)
CC100VART	10 (32.8)
CC150VART	15 (49.2)
CC200VART	20 (65.6)

Extension Cable Set for Electromagnetic Brake Motor

Model	Length L m (ft.)
CC010VAFBT	1 (3.3)
CC020VAFBT	2 (6.6)
CC030VAFBT	3 (9.8)
CC050VAFBT	5 (16.4)
CC070VAFBT	7 (23.0)
CC100VAFBT	10 (32.8)
CC150VAFBT	15 (49.2)
CC200VAFBT	20 (65.6)

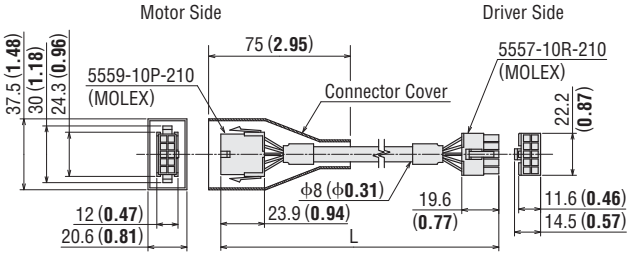
Flexible Extension Cable Set for Electromagnetic Brake Motor

Model	Length L m (ft.)
CC010VARBT	1 (3.3)
CC020VARBT	2 (6.6)
CC030VARBT	3 (9.8)
CC050VARBT	5 (16.4)
CC070VARBT	7 (23.0)
CC100VARBT	10 (32.8)
CC150VARBT	15 (49.2)
CC200VARBT	20 (65.6)

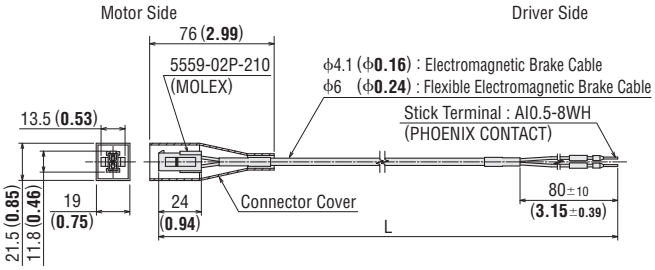
Dimensions Unit = mm (in.)

◇Motor Cables

Motor Cable, Flexible Motor Cable

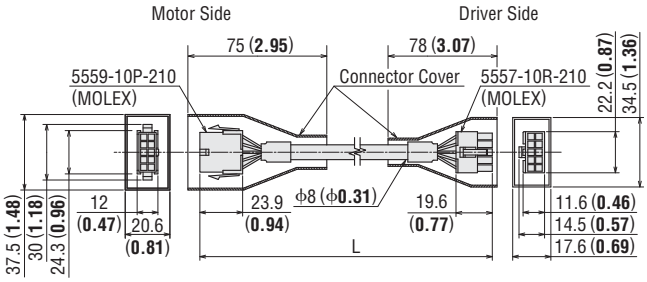


Electromagnetic Brake Cable, Flexible Electromagnetic Brake Cable

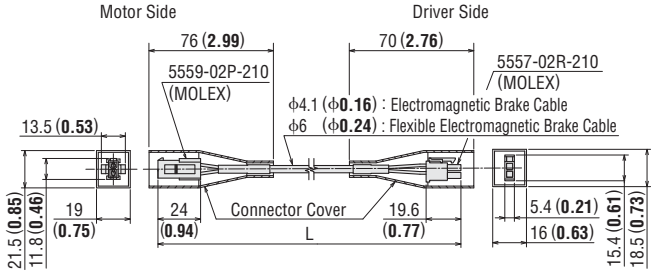


◇Extension Cables

Extension Motor Cable, Flexible Extension Motor Cable



Extension Electromagnetic Brake Cable, Flexible Extension Electromagnetic Brake Cable



●For DC Input Type

◇Motor Cables

Motor Cable

Motor Cable

Electromagnetic Brake Cable

Motor Cables

Model	Length L m (ft.)
CC010VAF2	1 (3.3)
CC020VAF2	2 (6.6)
CC030VAF2	3 (9.8)
CC050VAF2	5 (16.4)
CC070VAF2	7 (23.0)
CC100VAF2	10 (32.8)
CC150VAF2	15 (49.2)
CC200VAF2	20 (65.6)
CC300VAF2	30 (98.4)

Flexible Motor Cables

Model	Length L m (ft.)
CC010VAR2	1 (3.3)
CC020VAR2	2 (6.6)
CC030VAR2	3 (9.8)
CC050VAR2	5 (16.4)
CC070VAR2	7 (23.0)
CC100VAR2	10 (32.8)
CC150VAR2	15 (49.2)
CC200VAR2	20 (65.6)
CC300VAR2	30 (98.4)

Cable Set for Electromagnetic Brake Motor

Model	Length L m (ft.)
CC010VAFB2	1 (3.3)
CC020VAFB2	2 (6.6)
CC030VAFB2	3 (9.8)
CC050VAFB2	5 (16.4)
CC070VAFB2	7 (23.0)
CC100VAFB2	10 (32.8)
CC150VAFB2	15 (49.2)
CC200VAFB2	20 (65.6)
CC300VAFB2	30 (98.4)

Flexible Cable Set for Electromagnetic Brake Motor

Model	Length L m (ft.)
CC010VARB2	1 (3.3)
CC020VARB2	2 (6.6)
CC030VARB2	3 (9.8)
CC050VARB2	5 (16.4)
CC070VARB2	7 (23.0)
CC100VARB2	10 (32.8)
CC150VARB2	15 (49.2)
CC200VARB2	20 (65.6)
CC300VARB2	30 (98.4)

◇Extension Cables

Extension Motor Cable

Extension Motor Cable

Extension Electromagnetic Brake Cable

Extension Motor Cables

Model	Length L m (ft.)
CC010VAFT2	1 (3.3)
CC020VAFT2	2 (6.6)
CC030VAFT2	3 (9.8)
CC050VAFT2	5 (16.4)
CC070VAFT2	7 (23.0)
CC100VAFT2	10 (32.8)
CC150VAFT2	15 (49.2)
CC200VAFT2	20 (65.6)

Flexible Extension Motor Cables

Model	Length L m (ft.)
CC010VART2	1 (3.3)
CC020VART2	2 (6.6)
CC030VART2	3 (9.8)
CC050VART2	5 (16.4)
CC070VART2	7 (23.0)
CC100VART2	10 (32.8)
CC150VART2	15 (49.2)
CC200VART2	20 (65.6)

Extension Cable Set for Electromagnetic Brake Motor

Model	Length L m (ft.)
CC010VAFBT2	1 (3.3)
CC020VAFBT2	2 (6.6)
CC030VAFBT2	3 (9.8)
CC050VAFBT2	5 (16.4)
CC070VAFBT2	7 (23.0)
CC100VAFBT2	10 (32.8)
CC150VAFBT2	15 (49.2)
CC200VAFBT2	20 (65.6)

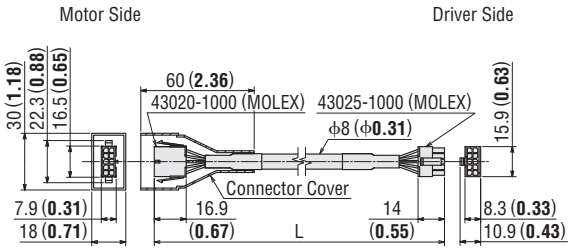
Flexible Extension Cable Set for Electromagnetic Brake Motor

Model	Length L m (ft.)
CC010VARBT2	1 (3.3)
CC020VARBT2	2 (6.6)
CC030VARBT2	3 (9.8)
CC050VARBT2	5 (16.4)
CC070VARBT2	7 (23.0)
CC100VARBT2	10 (32.8)
CC150VARBT2	15 (49.2)
CC200VARBT2	20 (65.6)

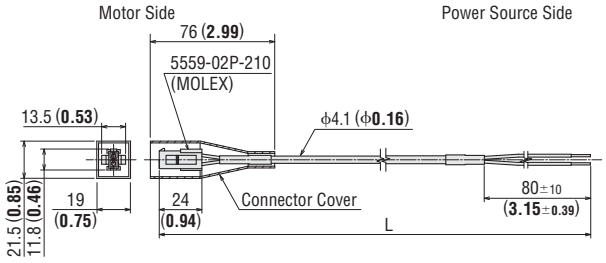
■Dimensions Unit = mm (in.)

◇Motor Cables

Motor Cable, Flexible Motor Cable

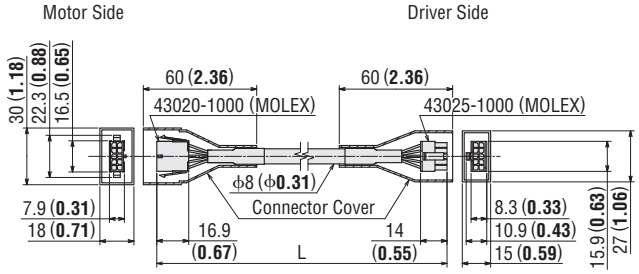


Electromagnetic Brake Cable, Flexible Electromagnetic Brake Cable

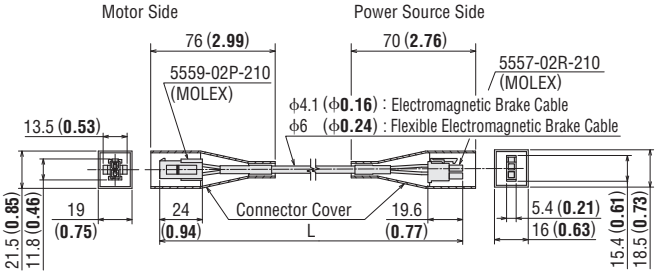


◇Extension Cables

Extension Motor Cable, Flexible Extension Motor Cable

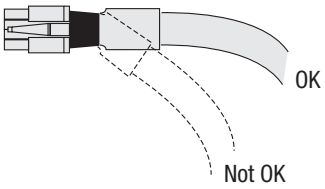


Extension Electromagnetic Brake Cable, Flexible Extension Electromagnetic Brake Cable

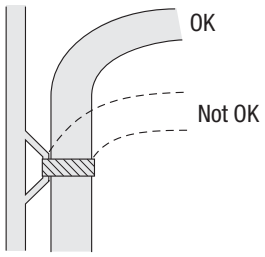


Notes on Use of a Flexible Cable

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

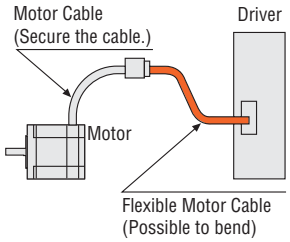


②Keep the bending radius to 60 mm (2.36 in.) or more.

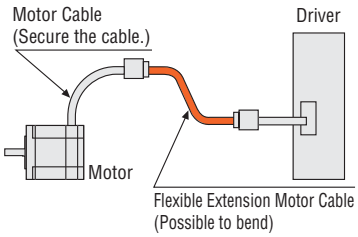


③The motor cable and extension motor cable are not flexible cables. If the cable is to be bent, bend it at the flexible motor cable or flexible extension motor cable.

· Flexible Motor Cable



· Flexible Extension Motor Cable



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 onto 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.

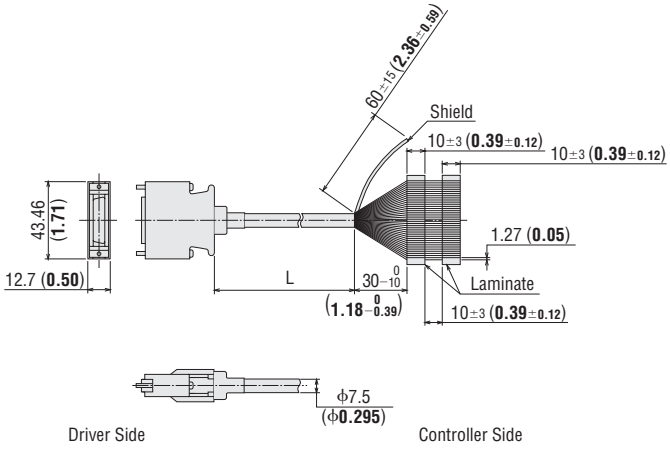
Product Line

Model	Applicable Connector	Length L m (ft.)
CC36D1-1	CN5 (36 pins)	1 (3.3)
CC36D2-1		2 (6.6)

Dimensions Unit = mm (in.)

CC36D1-1, CC36D2-1

Conductor: AWG28



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 (3.3 ft.)

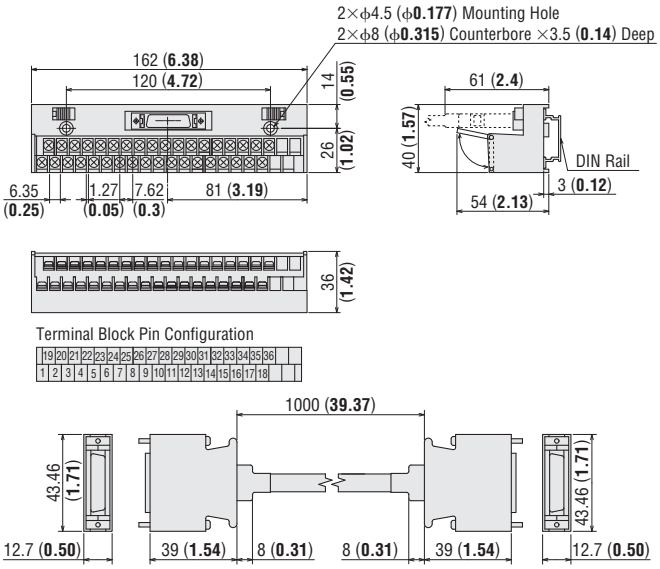
Product Line

Model	Applicable Connector	Length m (ft.)
CC36T1	CN5 (36 pins)	1 (3.3)

Dimensions Unit = mm (in.)

CC36T1

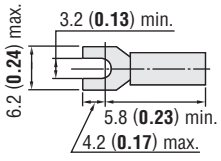
DXF B438



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

Note:

- Round terminals cannot be used.



Flexible Couplings
MCS Couplings RoHS

Flexible couplings for your application are available. Once you have decided on a drive motor, you can select the recommended coupling easily. All motor shaft diameters of stepping motor packages are available (including geared motors).

Features of MCS Couplings

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

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

Product Number Code

MCS 30 08 12

① ② ③ ④

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

Product Line

Model
MCS14□
MCS20□
MCS30□
MCS40□
MCS55□
MCS65□

- Enter the inner diameters of coupling in the box (□) within the model name.

Coupling Selection Table

Model	Gear Ratio	Motor Shaft Diameter mm (in.)	Type	Driven Shaft Diameter mm (in.)												
				ϕ4 (ϕ0.1575)	ϕ5 (ϕ0.1969)	ϕ6 (ϕ0.2362)	ϕ6.35 (ϕ0.2500)	ϕ8 (ϕ0.3150)	ϕ10 (ϕ0.3937)	ϕ12 (ϕ0.4724)	ϕ14 (ϕ0.5512)	ϕ15 (ϕ0.5906)	ϕ16 (ϕ0.6299)	ϕ18 (ϕ0.7087)	ϕ20 (ϕ0.7874)	ϕ25 (ϕ0.9843)
AR46□□-3*1	–	ϕ6 (ϕ0.2362)	**MCS14**	●	●	●										
AR46□□-T■-3	**3.6, 7.2, 10**		**MCS20**		●	●	●	●	●							
AR46□□-T■-3	**20, 30**	ϕ8 (ϕ0.3150)	**MCS30**			●	●	●	●							
AR66□□-T■-3	**3.6, 7.2**					●	●	●	●	●						
AR66□□-3*1 **AR69**□□-3*1	–	ϕ10 (ϕ0.3937)				●	●	●	●	●	●					
AR46□□-N■-3	**5, 7.2, 10**															
AR98□□-3*1 **AR911**□□-3*2	–	ϕ14 (ϕ0.5512)							●	●	●		●			
AR66□□-T■-3	**10, 20, 30**	ϕ8 (ϕ0.3150)	**MCS40**					●	●	●		●				
AR46□□-H■-3	**50, 100**	ϕ10 (ϕ0.3937)						●	●	●		●				
AR66□□-N■-3	**5, 7.2**	ϕ12 (ϕ0.4724)						●	●	●		●				
AR98□□-T■-3	**3.6, 7.2, 10, 20, 30**	ϕ12 (ϕ0.4724)	**MCS55**							●	●	●	●			
AR66□□-N■-3	**10, 25, 36, 50**															
AR66□□-H■-3	**50, 100**															
AR98□□-N■-3	**5, 7.2, 10, 25, 36, 50**	ϕ18 (ϕ0.7087)	**MCS65**										●	●	●	●
AR98□□-H■-3	**50, 100**															

- Enter **A** (single shaft) or **M** (electromagnetic brake) in the box (□) within the model name.
  Enter the power supply voltage (**A**, **C**, **S** or **K**) in the box (□) within the model name.
  Enter the gear ration 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**□□**-3**, **AR66**□□**-3**, **AR69**□□**-3** and **AR98**□□**-3**.

*2 Enter **A** (single shaft) or **B** (double shaft) in the box (□) within the model name of **AR911**□□**-3**.
Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name of **AR911**□□**-3**.

Specifications

Model	Dimensions					Normal Torque	Mass	Inertia	Static Torsion Spring Constant	Permissible Eccentricity	Permissible Declination	Permissible End Play
	Outer Diameter	Length	Shaft Hole Diameter d1	Shaft Hole Diameter d2	Key Slot Tolerance b/t							
	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	N·m (lb-in)	g (oz.)	kg·m^2 (oz-in^2)	N·m/rad (lb-in/rad)	mm (in.)	deg	mm (in.)
MCS140406	14 (0.55)	22 (0.87)	$4^{+0.012}_{0}$ ($0.1575^{+0.0005}_{0}$)	$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	—	2.0 (17.7)	6.7 (0.23)	0.184×10^{-6} (0.01)	22.9 (200)	0.06 (0.0024)	0.9	$^{+0.6}_{0}$ ($^{+0.024}_{0}$)
MCS140506			$5^{+0.012}_{0}$ ($0.1969^{+0.0005}_{0}$)	$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)								
MCS140606			$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)								
MCS200506	20 (0.79)	30 (1.18)	$5^{+0.012}_{0}$ ($0.1969^{+0.0005}_{0}$)	$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	—	5.0 (44)	19.8 (0.69)	1.059×10^{-6} (0.06)	51.6 (450)	0.08 (0.0031)	0.9	$^{+0.8}_{0}$ ($^{+0.031}_{0}$)
MCS200606			$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)								
MCS2006F04			$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	$6.35^{+0.015}_{0}$ ($0.2500^{+0.0006}_{0}$)								
MCS200608			$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)								
MCS200610			$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)								
MCS300606	30 (1.18)	35 (1.38)	$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	—	12.5 (110)	44.6 (1.57)	6.057×10^{-6} (0.33)	171.9 (1520)	0.09 (0.0035)	0.9	$^{+1.0}_{0}$ ($^{+0.039}_{0}$)
MCS3006F04			$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	$6.35^{+0.015}_{0}$ ($0.2500^{+0.0006}_{0}$)								
MCS300608			$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)								
MCS300610			$6^{+0.012}_{0}$ ($0.2362^{+0.0005}_{0}$)	$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)								
MCS30F04F04			$6.35^{+0.015}_{0}$ ($0.2500^{+0.0006}_{0}$)	$6.35^{+0.015}_{0}$ ($0.2500^{+0.0006}_{0}$)								
MCS30F0408			$6.35^{+0.015}_{0}$ ($0.2500^{+0.0006}_{0}$)	$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)								
MCS30F0410			$6.35^{+0.015}_{0}$ ($0.2500^{+0.0006}_{0}$)	$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)								
MCS300808			$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)	$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)								
MCS300810			$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)	$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)								
MCS300812			$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)	$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)								
MCS301010			$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)	$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)								
MCS301012			$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)	$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)								
MCS301014			$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)	$14^{+0.018}_{0}$ ($0.5512^{+0.0007}_{0}$)								
MCS301212	30 (1.18)	35 (1.38)	$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)	$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)	—	12.5 (110)	44.6 (1.57)	6.057×10^{-6} (0.33)	171.9 (1520)	0.09 (0.0035)	0.9	$^{+1.0}_{0}$ ($^{+0.039}_{0}$)
MCS301214			$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)	$14^{+0.018}_{0}$ ($0.5512^{+0.0007}_{0}$)								
MCS301414			$14^{+0.018}_{0}$ ($0.5512^{+0.0007}_{0}$)	$14^{+0.018}_{0}$ ($0.5512^{+0.0007}_{0}$)								
MCS301416			$14^{+0.018}_{0}$ ($0.5512^{+0.0007}_{0}$)	$16^{+0.018}_{0}$ ($0.6299^{+0.0007}_{0}$)								

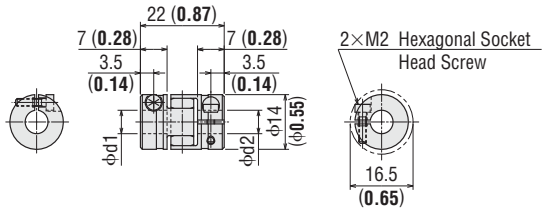
Specifications

Model	Dimensions					Normal Torque	Mass	Inertia	Static Torsion Spring Constant	Permissible Eccentricity	Permissible Declination	Permissible End Play
	Outer Diameter	Length	Shaft Hole Diameter d1	Shaft Hole Diameter d2	Key Slot Tolerance b/t							
	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	N·m (lb-in)	g (oz.)	kg·m^2 (oz-in^2)	N·m/rad (lb-in/rad)	mm (in.)	deg	mm (in.)
MCS400808	40 (1.57)	66 (2.60)	$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)	$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)	ϕ8 (ϕ0.3150) b: 2±0.0125 (0.0787±0.0005) t: $1^{+0.1}_{0}$ ($0.039^{+0.0039}_{0}$)	17.0 (150)	139 (4.9)	42.29×10^{-6} (2.3)	859.5 (7600)	0.06 (0.0024)	0.9	$+1.2\ 0\ \left(^{+0.047}_{0}\right)$
MCS400810			$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)	$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)								
MCS400812			$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)	$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)	ϕ10 (ϕ0.3937) b: 3±0.0125 (0.1181±0.0005) t: $1.4^{+0.1}_{0}$ ($0.055^{+0.0039}_{0}$)							
MCS400815			$8^{+0.015}_{0}$ ($0.3150^{+0.0006}_{0}$)	$15^{+0.018}_{0}$ ($0.5906^{+0.0007}_{0}$)								
MCS401010			$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)	$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)	ϕ12 (ϕ0.4724) b: 4±0.015 (0.0787±0.0006) t: $1.8^{+0.1}_{0}$ ($0.071^{+0.0039}_{0}$)							
MCS401012			$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)	$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)								
MCS401015			$10^{+0.015}_{0}$ ($0.3937^{+0.0006}_{0}$)	$15^{+0.018}_{0}$ ($0.5906^{+0.0007}_{0}$)	ϕ14 (ϕ0.5512) b: 5±0.015 (0.1969±0.0006) t: $2.3^{+0.1}_{0}$ ($0.091^{+0.0039}_{0}$)							
MCS401212			$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)	$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)								
MCS401215			$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)	$15^{+0.018}_{0}$ ($0.5906^{+0.0007}_{0}$)	ϕ15 (ϕ0.5906) b: 5±0.015 (0.1969±0.0006) t: $2.3^{+0.1}_{0}$ ($0.091^{+0.0039}_{0}$)							
MCS551212	55 (2.17)	78 (3.07)	$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)	$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)	ϕ16 (ϕ0.6299) b: 5±0.015 (0.1969±0.0006) t: $2.3^{+0.1}_{0}$ ($0.091^{+0.0039}_{0}$)	60.0 (530)	282 (10)	109.1×10^{-6} (6)	2063 (18200)	0.1 (0.0039)	0.9	$+1.4\ 0\ \left(^{+0.055}_{0}\right)$
MCS551214			$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)	$14^{+0.018}_{0}$ ($0.5512^{+0.0007}_{0}$)								
MCS551215			$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)	$15^{+0.018}_{0}$ ($0.5906^{+0.0007}_{0}$)	ϕ18 (ϕ0.7078) b: 6±0.015 (0.2362±0.0006) t: $2.8^{+0.1}_{0}$ ($0.110^{+0.0039}_{0}$)							
MCS551216			$12^{+0.018}_{0}$ ($0.4724^{+0.0007}_{0}$)	$16^{+0.018}_{0}$ ($0.6299^{+0.0007}_{0}$)								
MCS651618	65 (2.56)	90 (3.54)	$16^{+0.018}_{0}$ ($0.6299^{+0.0007}_{0}$)	$18^{+0.018}_{0}$ ($0.7087^{+0.0007}_{0}$)	ϕ20 (ϕ0.7874) b: 6±0.015 (0.2362±0.0006) t: $2.8^{+0.1}_{0}$ ($0.110^{+0.0039}_{0}$)	160 (1410)	535 (18.9)	417.1×10^{-6} (22.8)	3438 (30000)	0.11 (0.0043)	0.9	$+1.5\ 0\ \left(^{+0.059}_{0}\right)$
MCS651818			$18^{+0.018}_{0}$ ($0.7087^{+0.0007}_{0}$)	$18^{+0.018}_{0}$ ($0.7087^{+0.0007}_{0}$)								
MCS651820			$18^{+0.018}_{0}$ ($0.7087^{+0.0007}_{0}$)	$20^{+0.021}_{0}$ ($0.7874^{+0.0008}_{0}$)								
MCS651825			$18^{+0.018}_{0}$ ($0.7087^{+0.0007}_{0}$)	$25^{+0.021}_{0}$ ($0.9843^{+0.0008}_{0}$)	ϕ25 (ϕ0.9843) b: 8±0.018 (0.3150±0.0007) t: $3.3^{+0.2}_{0}$ ($0.130^{+0.0079}_{0}$)							

Dimensions Unit = mm (in.)

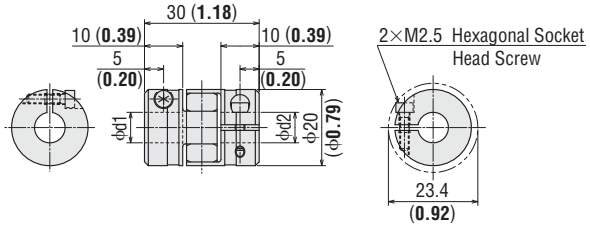
MCS14

Mass: 6.7 g (0.23 oz.)



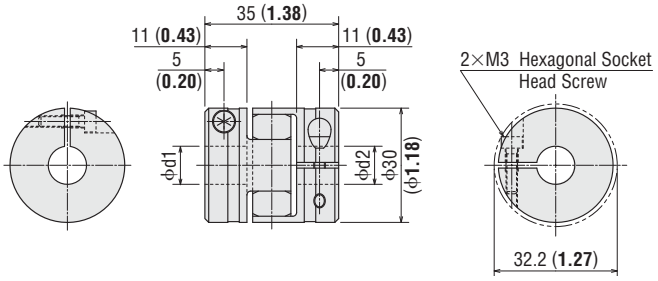
MCS20

Mass: 19.8 g (0.69 oz.)



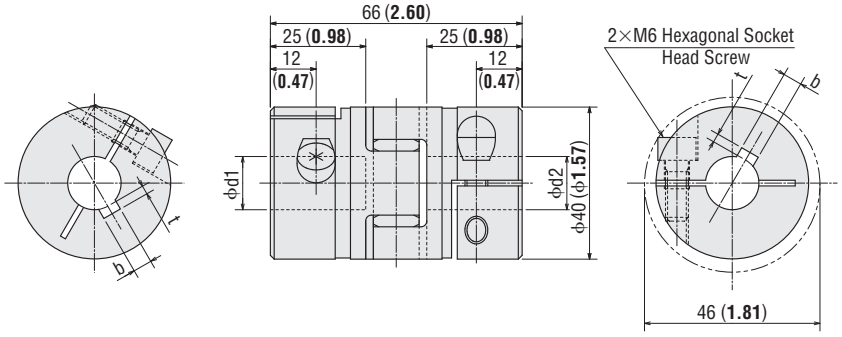
MCS30

Mass: 44.6 g (1.57 oz.)



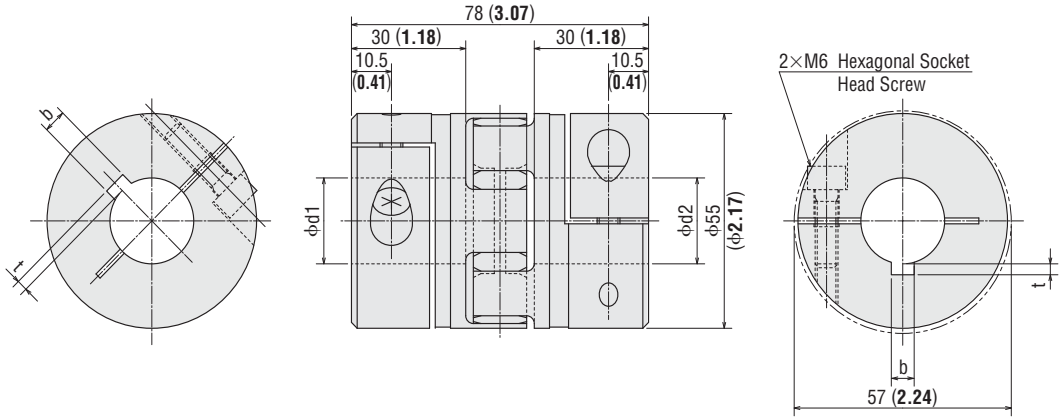
MCS40

Mass: 139 g (4.9 oz.)



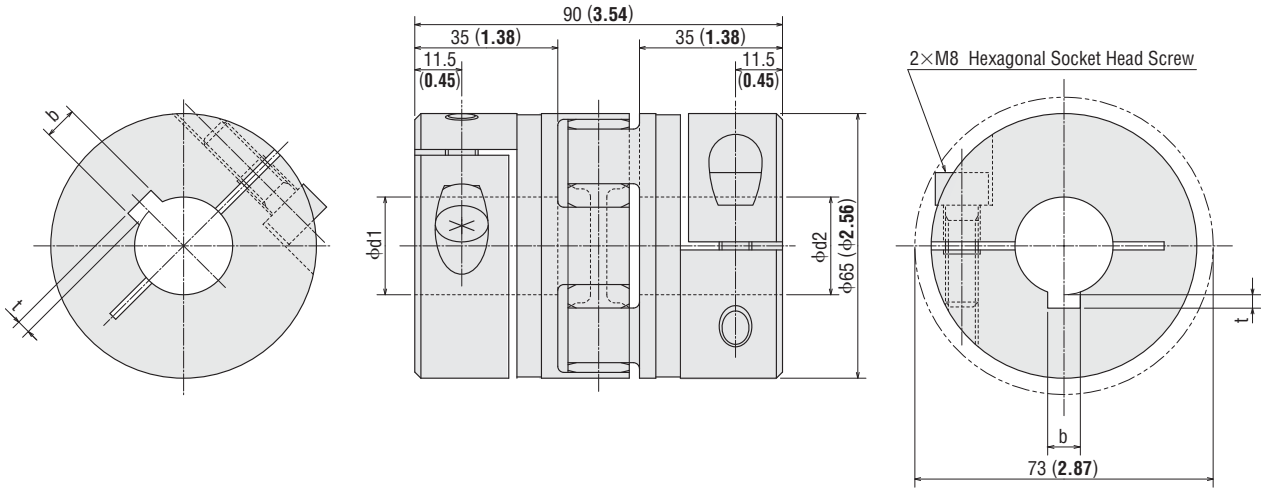
MCS55

Mass: 282 g (10 oz.)



MCS65

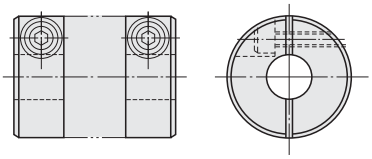
Mass:535 g (18.9 oz.)



Mounting to a Shaft

Clamp Type

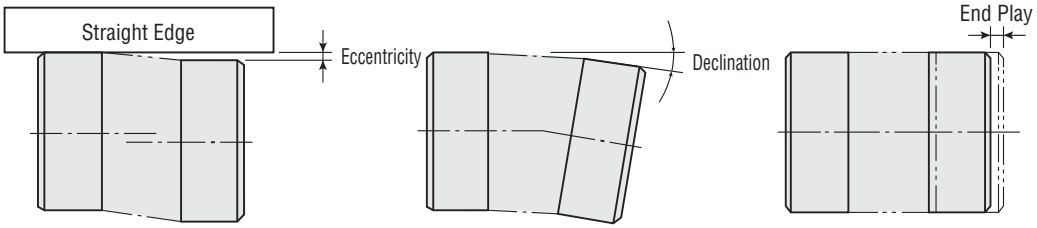
Clamp couplings use the tightening force of the screw to compress the shaft hole diameter and thereby fasten the coupling to the shaft. This does not damage the shaft and is easy to mount and remove. The following table shows the screw tightening torque. We recommend the use of a torque wrench to fasten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



Type		MCS14	MCS20	MCS30	MCS40	MCS55	MCS65
Tightening Torque	N·m (oz-in)	0.37 (52)	0.76 (107)	1.34 (190)	10.5 (1490)	10.5 (1490)	25.0 (3550)

Alignment Adjustment

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

Product Line

Standard Type

Material: Aluminum alloy

Model	Applicable Product
PAF0P	**AR46□□-3**
PAL0PA	**AR46□□-3**
PAL2P-5A	**AR66□□-3** **AR69□□-3**
PAL4P-5A	**AR98□□-3** **AR911□□-3***

- Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the model name.
  Enter the power supply voltage (**A**, **C**, **S** or **K**) 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 **AR911□□-3**.
Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name of **AR911□□-3**.

Note:

- They cannot be used with geared stepping motors.

Geared Type

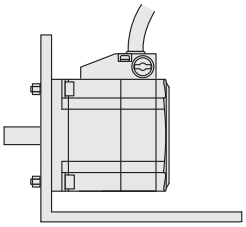
Material: Aluminum alloy

Model	Applicable Product
SOL0B-A	**AR46□□-T□-3**
SOL2A-A	**AR66□□-T□-3**
SOL5B-A	**AR98□□-T□-3**

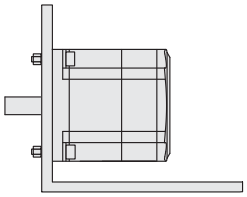
- Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the model name.
  Enter the power supply voltage (**A**, **C**, **S** or **K**) in the box (□) within the model name.
- The mounting bracket base is built with holes large enough to allow for alignment adjustments in the horizontal direction.
- No screws are supplied for installing. Appropriate screws must be purchased separately.

Motor Installation Direction

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



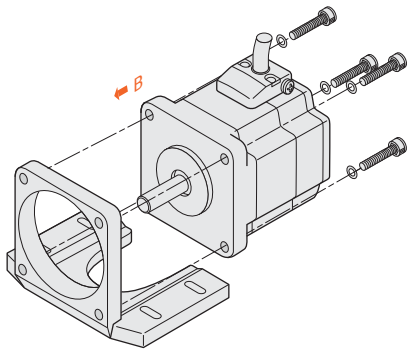
Cable Facing Upward



Cable Facing Sideways

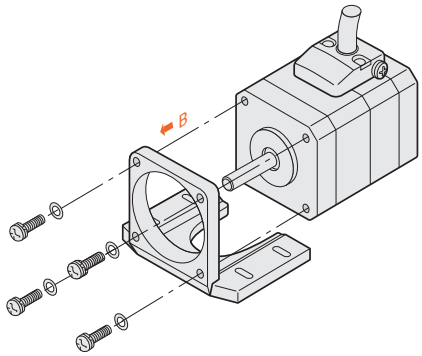
Mounting the Motor

1 PAL2P-5A, PAL4P-5A



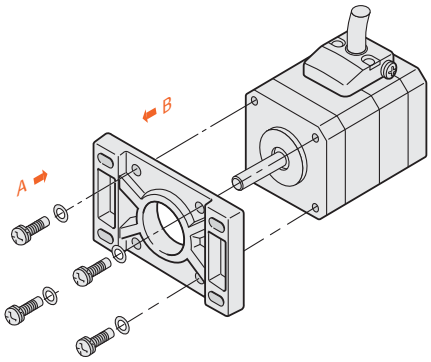
①Use the screws to secure the motor to the mounting bracket.
②Attach the motor from the direction shown by the arrow (B).

2 PAL0PA, SOL0B-A, SOL2A-A, SOL5B-A



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

3 PAF0P



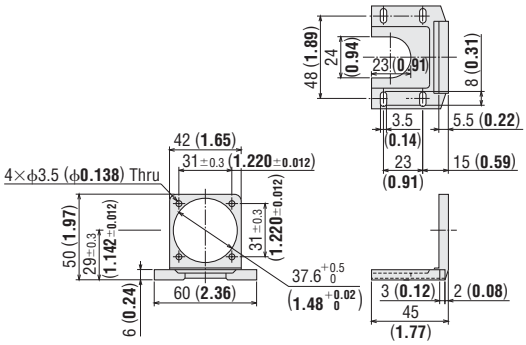
①Use the screws to secure the motor to the mounting bracket.
②Attach motor from the direction shown by either arrow (A) or arrow (B).

Dimensions Unit = mm (in.)

PAL0PA

Mass: 35 g (1.24 oz.)
DXF B139

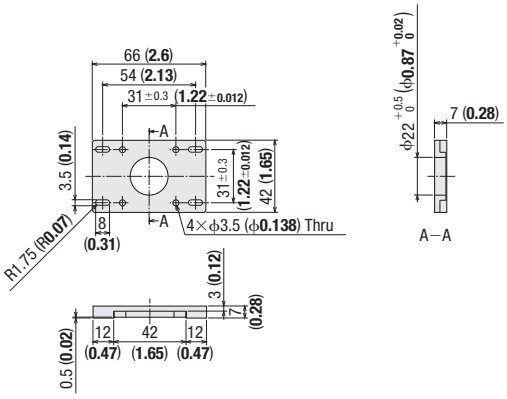
●Screws (Included)
No.4-40 UNC Length 10 mm (0.39 in.) ··· 4 pieces



PAF0P

Mass: 30 g (1.06 oz.)
DXF B140

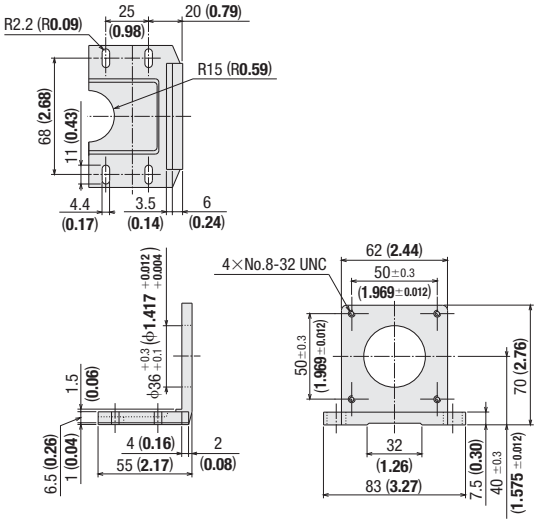
●Screws (Included)
M3 P0.5 Length 7 mm (0.28 in.) ··· 4 pieces



PAL2P-5A

Mass: 110 g (3.9 oz.)
DXF B143

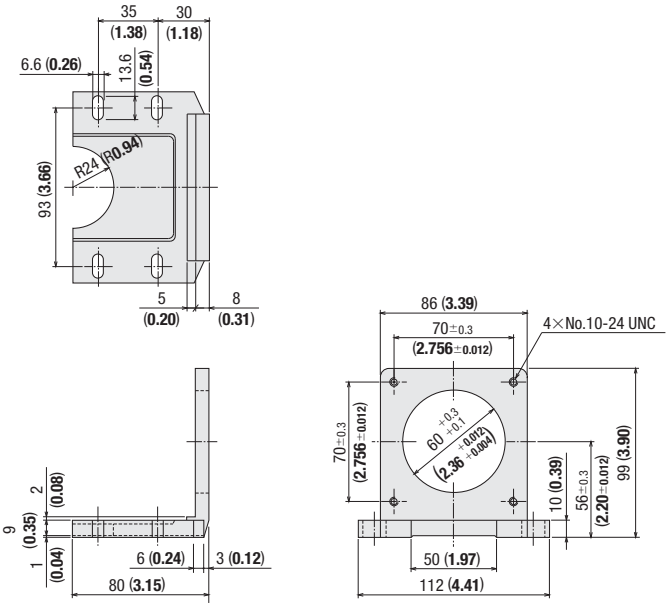
●Screws (Included)
No.8-32 UNC Length 12.7 mm (0.5 in.) ··· 4 pieces



PAL4P-5A

Mass: 250 g (8.8 oz.)
DXF B145

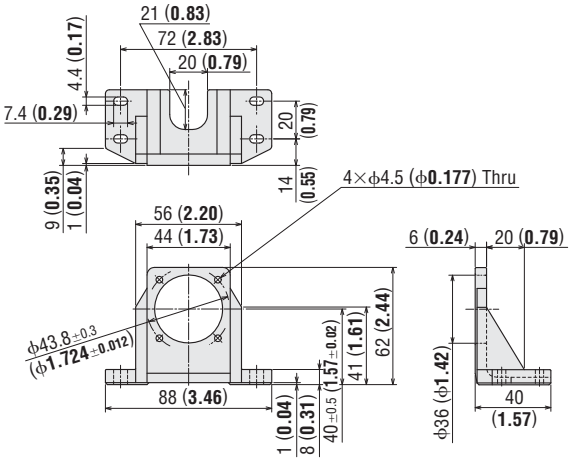
●Screws (Included)
No.10-24 UNC Length 15.875 mm (0.625 in.) ··· 4 pieces



SOL0B-A

Mass: 85 g (3 oz.)

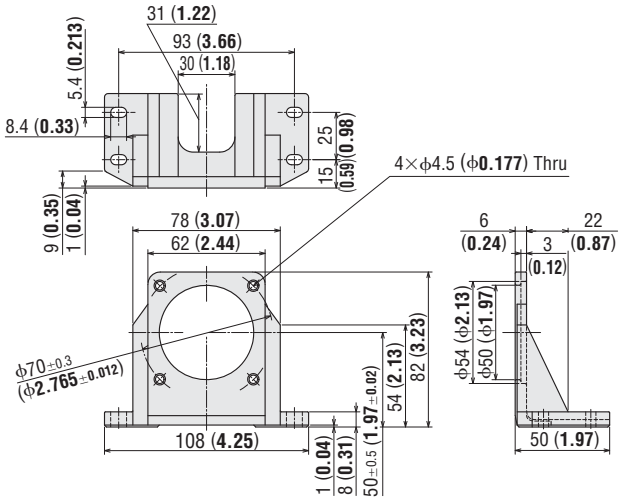
DXF B267



SOL2A-A

Mass: 120 g (4.2 oz.)

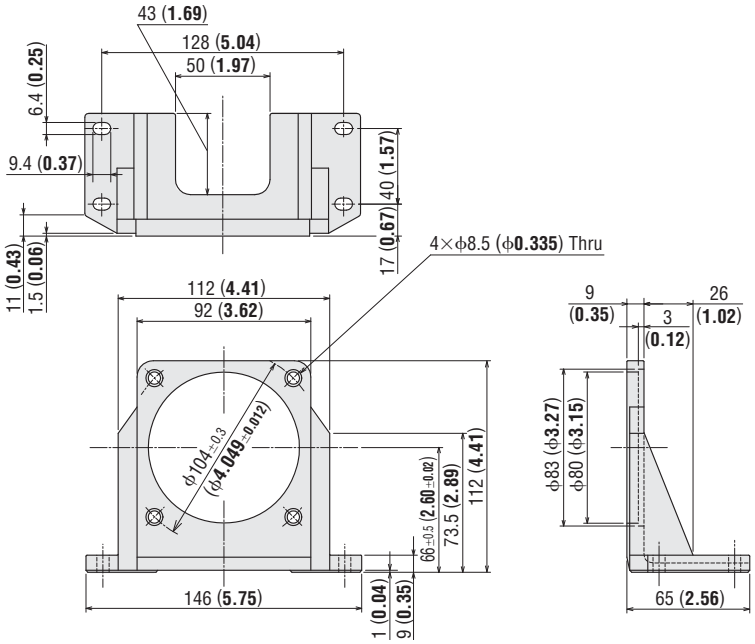
DXF B268



SOL5B-A

Mass: 270 g (9.5 oz.)

DXF 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
RGB100

• Applicable Products

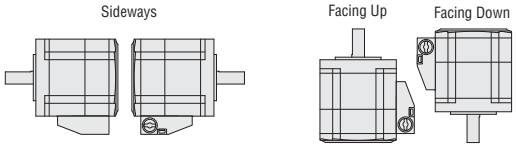
AC Input Type

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.



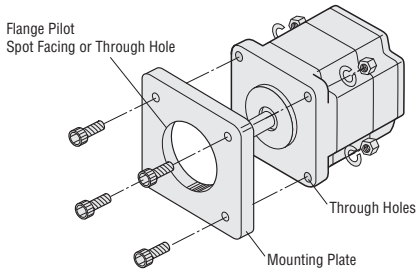
Notes:

- 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



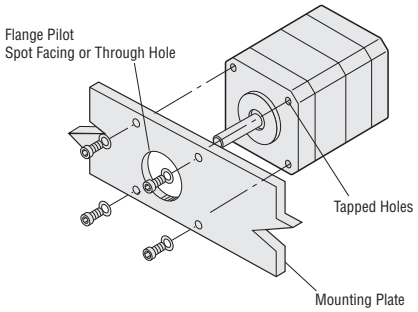
Model	Thickness of the Mounting Plate
AR66□□-3 **AR69□□-3**	5 mm (0.20 in.) min.
AR98□□-3 **AR911□□-3***1	8 mm (0.31 in.) min.
AR98□□-H■-3*2	12 mm (0.47 in.) min.

- Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the model name.
  Enter the power supply voltage (**A**, **C**, **S** or **K**) in the box (□) within the model name.
  Enter the gear ration 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□□-3**.
Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name of **AR911□□-3**.

*2 Enter **A** (single shaft) or **M** (electromagnetic brake) in the box (□) within the model name of **AR98□□-H■-3**.

◇Installation Method for Tapped Hole Type



Model	Thickness of the Mounting Plate
AR46□□-3*	3 mm (0.12 in.) min.
AR46□□-T■-3	5 mm (0.20 in.) min.
AR46□□-N■-3	
AR46□□-H■-3	
AR66□□-T■-3	
AR66□□-N■-3	8 mm (0.31 in.) min.
AR66□□-H■-3	
AR98□□-T■-3	
AR98□□-N■-3	12 mm (0.47 in.) min.

- Enter **A** (single shaft) or **M** (electromagnetic brake) in the box (□) within the model name.
  Enter the power supply voltage (**A**, **C**, **S** or **K**) in the box (□) within the model name.
  Enter the gear ration 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□□-3**.

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～+50°C (+14～+122°F)* (non-freezing): Standard type
  TH/**PN** geared type
  0～+40°C (+32～+104°F)* (non-freezing): Harmonic geared type

* When connecting a following heat radiation plate (material: aluminum) or equivalent.
AC Input Type: 250×250 mm (9.84×9.84 in.), Thickness: 6 mm (0.24 in.)
DC Input Type: 100×100 mm (3.94×3.94 in.), Thickness: 6 mm (0.24 in.)

- 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

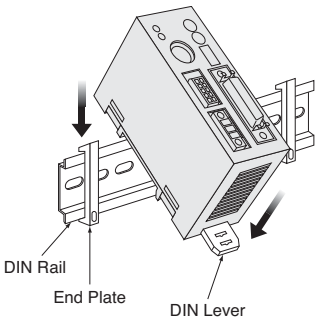
Drivers are designed to dissipate heat through natural convection. Install the driver vertically as shown in the photograph.

◇AC Input Type

- Firmly install on a metal plane that has good heat conductivity, such as iron or aluminum 2 mm (0.08 in.) or more in thickness.
- To directly install the driver without using the 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 (0.16 in.) or more through the surface of the driver may cause damage to the driver.

◇DC Input Type

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

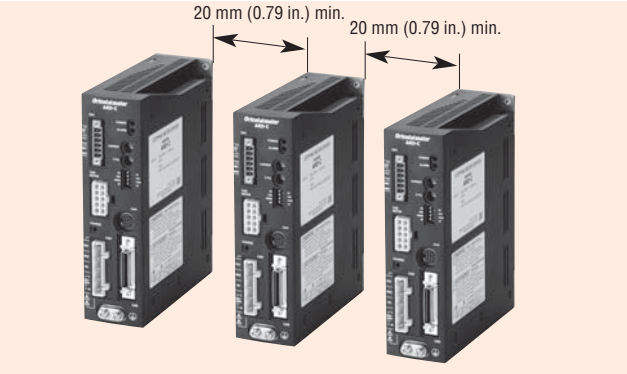


Using Multiple Axes

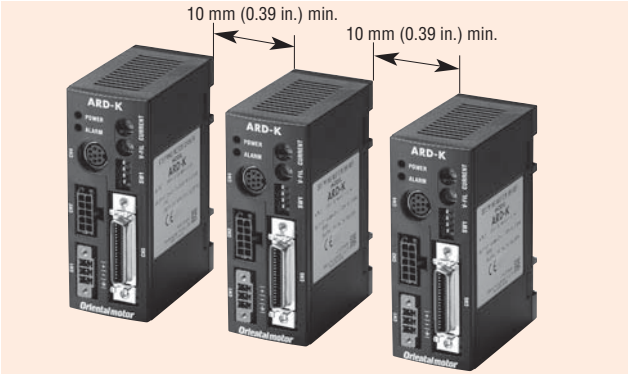
When using multiple stepping motor axes, driver temperature rise will cause ambient temperatures to rise. At least 20 mm (0.79 in.)*1 must be allowed between driver units and at least 25 mm (0.98 in.)*2 between drivers and other equipment or structures.
Install a forced-air cooling fan if ambient temperatures exceed 50°C (122°F).

*1 For AC input type. 10 mm (0.39 in.) for DC input type.
*2 For AC input type. 10 mm (0.39 in.) for DC input type.

● AC Input Type



● DC Input Type



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~+50°C (+32~+122°F)* (non-freezing)
  *Only for AC input type, when a heat sink of a capacity at least equivalent to an aluminum plate with a size of 200×200 mm (7.87×7.87 in.), 2 mm (0.08 in.) 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

SG8030J RoHS

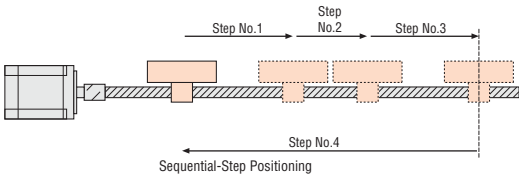
DIN Rail Mounting Model

Recessed Mounting Model

Features

All operations including data setting can easily be performed using the four touchpads 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 Positioning Operation/External Signal Operation Possible
- Maximum Oscillation Frequency 200 kHz
- 1-Pulse Output/2-Pulse Output Mode Select Possible



Product Line

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

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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Oriental motor

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