

Stepping Motors Stepping Motor and Driver Packages AC Input

AR Series	A-24
AS Series	A-68
RK Series	A-78
UMK Series	A-114

	Introduction
<i>α</i> STEP AR Series	AC Input Motor & Driver 0.36° / Geared <i>α</i> STEP AR
<i>α</i> STEP AS Series	0.72° / Geared <i>α</i> STEP AS
RK Series	0.9°/1.8° RK
UMK Series	UMK
	DC Input Motor & Driver
	0.36° / Geared <i>α</i> STEP AR
	0.36° / Geared <i>α</i> STEP ASX
	0.36°/0.72° / Geared CRK
	0.9°/1.8° / Geared CMK
	1.8° / Geared RBK
	Motor Only
	0.36° PK
	0.72° PK
	0.9° PK
	1.8° PK/PV
	Geared PK
	Controllers SCX10 /EMP400 /SG8030J
	Accessories

0.36° Closed Loop Stepping Motor and Driver Package α STEP High-Efficiency AR Series

● Additional Information ●
 Technical reference → Page G-1
 Safety standards → Page H-2

This series substantially reduces heat generation from the motor through the use of high-efficiency technology. It allows you to take advantage of the beneficial features of the stepping motor to perform quick positioning operations over a short distance repeatedly without worrying about the duty cycle.



● For detailed product safety standard information including standards, file number and certification body, please visit www.orientalmotor.com.



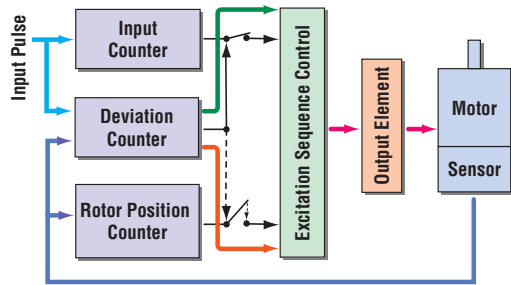
Features

● Uses Oriental Motor's Original Closed Loop Control Technology

◇ Maintains Operation Even During Abrupt Load Fluctuations and Accelerations.

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.



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

Motor runs in open loop mode like a stepping motor.

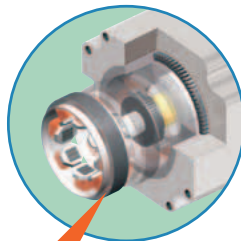
During Overload Condition (Positioning deviation is $\pm 1.8^\circ$ or more)

The closed loop mode is engaged to maintain the positioning operation.

◇ 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.

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



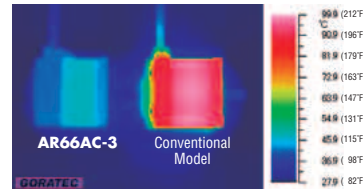
Sensor detects rotor position

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

◇ Lower Heat Generation

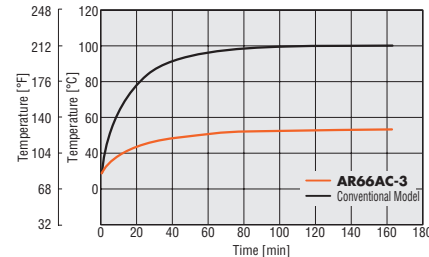
The **AR** Series utilizes high-efficiency technology to achieve a significant reduction in the amount of heat generated from the motor.

● Temperature Distribution by Thermography



Comparison under the same conditions

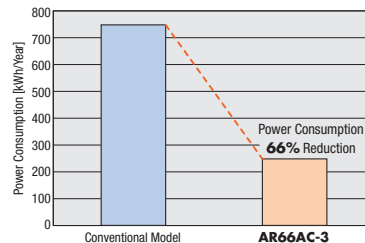
● Motor Case Temperature under Same Operating Conditions



◇ Energy-Saving

Power consumption: up to **66%** less than a conventional model

● Power Consumption



CO₂ emission: up to **66%** less* than a conventional model

* Operating Condition

Speed: 1000 r/min, Load Factor: 50%

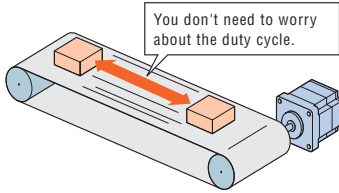
Operating Time: 24 hours of operation (70% operating, 25% standing by, 5% standstill), 365 days/year

◇ 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

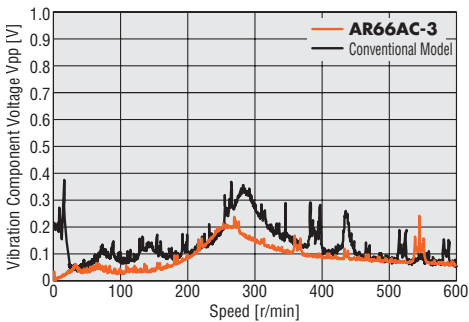
- If the motor is operated continuously, a heat sink of a capacity at least equivalent to an aluminum plate with a size of 250×250 mm (9.84×9.84 in.), 6 mm (0.236 in.) thick is required.



● A Stepping Motor with Advanced Characteristics That's 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.

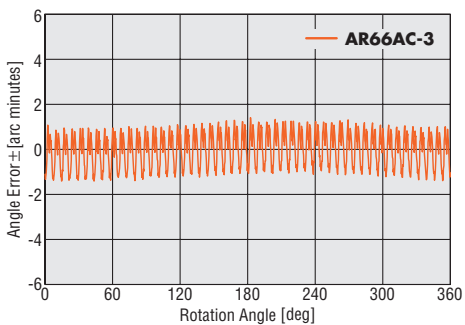


◇ Improved Angle Accuracy

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

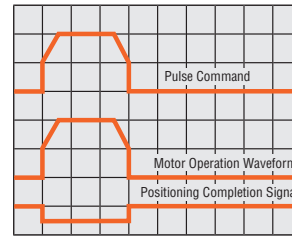
Conventional Model: ±5 arc minutes



● 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.

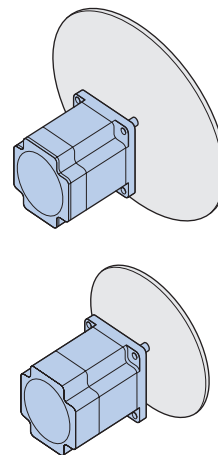


Measurement condition: Distance: 1/5 rotation
Load Inertia: $250 \times 10^{-7} \text{ kg-m}^2$ [1.37×10^{-7} (oz-in²)] (J)

◇ Capable of Driving Large Inertial Loads

Compared with a servo motor of the same frame size, a larger inertial load can be driven regardless of speed conditions.

● Comparison at 30 times of the rotor inertia



● AR Series

Load Inertia $22.4 \times 10^{-4} \text{ kg-m}^2$ (0.123×10^{-4} oz-in²)
(30 times the rotor inertia)

Load Inertia: Diameter: 169 mm (6.65 in.),
Thickness: 10 mm (0.39 in.),
Material: Aluminum
Motor: Frame Size 60 mm (2.36 in.)
Length 90 mm (3.54 in.)

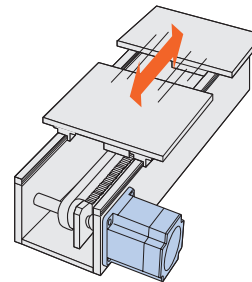
● Conventional Servo Motor

Load Inertia $4.0 \times 10^{-4} \text{ kg-m}^2$ (0.022×10^{-4} oz-in²)
(30 times the rotor inertia)

Load Inertia: Diameter: 110 mm (4.33 in.),
Thickness: 10 mm (0.39 in.),
Material: Aluminum
Motor: Frame Size 60 mm (2.36 in.)
Length 96.5 mm (3.8 in.)

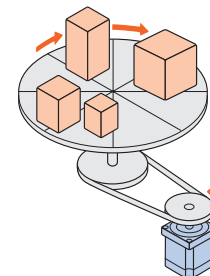
◇ No Tuning

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.



Introduction	AC Input Motor & Driver	Motor Only
AR /GATED	0.36° /Gated	PK
AS	0.72°	PK
RK	0.9°/1.8°	PK
UMK	0.9°/1.8°	PK
AR /GATED	0.36° /Gated	PK/PV
ASX	0.36° /Gated	PK
CRK	0.36°/0.72° /Gated	PK
CMK	0.9°/1.8° /Gated	PK
RBK	1.8° /Gated	PK
PK	0.36°	PK
PK	0.72°	PK
PK	0.9°	PK
PK/PV	1.8°	PK
PK	Gated	PK
Controllers	SCX10	PK
	EMP400	PK
	/SG8030J	PK
Accessories		

● 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.

* Double shaft models: IP20

◇ Major Safety Standards

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

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

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

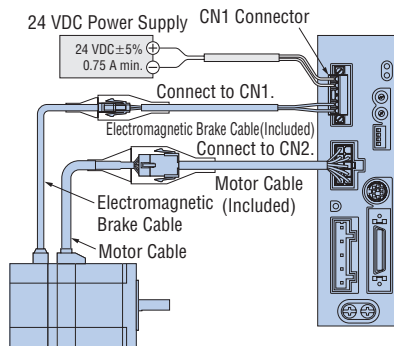
● Easy to Use with High Functionality

◇ 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

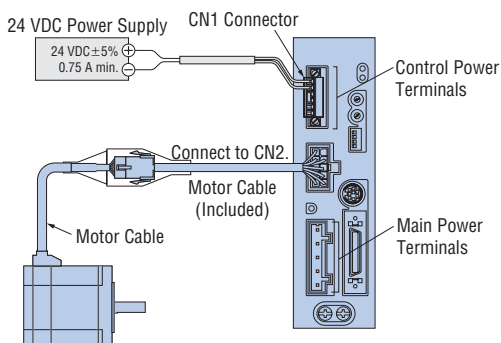
● A separate 24 VDC power supply is needed for electromagnetic brake control.



◇ 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.

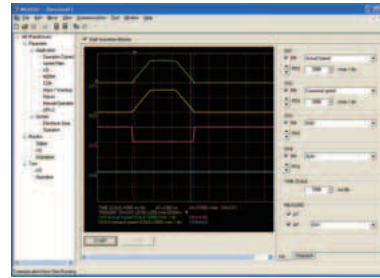
● The motor can be operated with the main power alone.



◇ Extended Functions are Available 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. → Refer to page A-67 for Details.

● Monitoring of Operating Condition by Waveform



◇ Return Operation

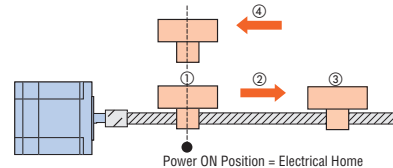
Two return operation functions are available: Return to electrical home operation and automatic return operation. With these options, you can easily set up your system to return home when the main power has been cut off due to an emergency stop, etc., or the motor excitation has been turned off.

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

● Return to Electrical Home Operation

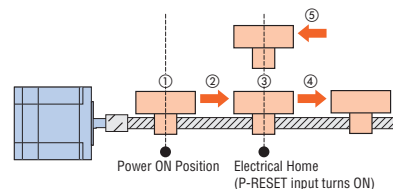
An operation in which the motor returns to the "position it had assumed when the power was turned on (= electrical home)" or "location set as the electrical home."

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



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)

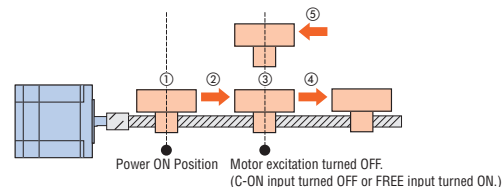
● Returning to the location set as the electrical home



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)."



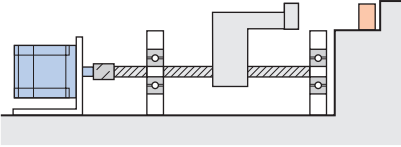
①The power is turned on. (power ON position = electrical home) → ②Positioning operation (the load moves) → ③After the motor stops, the C-ON input turns OFF or FREE input turns ON. (③ = automatic return location) → ④Move the table manually (the load moves) → ⑤After the table stops, the C-ON input turns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

◇ Push-Motion Operation

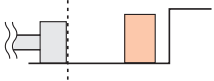
You can input pulses to perform a push-motion operation where the load continuously has force applied to it. The amount of force (motor output torque) is set by the push-motion operating current value. Using a control module (**OPX-2A**) or data setting software (**MEXE02**) (both sold separately), change 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.

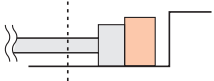


① Move to reference position



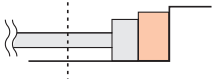
② Start of push-motion operation

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



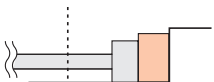
③ Push-motion operation in progress

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



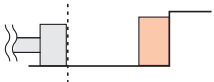
④ Completion of push-motion operation

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



⑤ Returning to reference position






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



Introduction	AC Input Motor & Driver		DC Input Motor & Driver		Motor Only	Controllers	Accessories
	0.36° / Geared / AR	0.72° / Geared / AS	0.36° / Geared / AR	0.36° / Geared / ASX	0.36° / Geared / CRK	SCX10 / EMP400 / 5G8030J	
					0.9° / 1.8° / Geared / CMK		
					1.8° / Geared / RBK		
					0.36° / PK		
					0.72° / PK		
					0.9° / PK		
					1.8° / PK / PV		
					Geared / PK		

AR Series Lineup

Characteristics Comparison for Motors and Geared Motors


Motor Type Geared Type	Features	Permissible Torque Maximum Torque [N·m (lb-in)]	Backlash [arc min (degrees)]	Basic Resolution [deg/step]	Output Shaft Speed [r/min]
Step Angle 0.36° Standard 	<ul style="list-style-type: none"> Basic model of the AR Series 	Maximum Holding Torque 4 (35)	—	0.36	4000
Low backlash TH Geared (Parallel shaft) 	<ul style="list-style-type: none"> High speed (low gear ratio) A wide variety of gear ratios for selecting the desired step angle (resolution) Gear ratios: 3.6, 7.2, 10, 20, 30 	12 (106)	45 (0.75)	0.012	500
PS Geared (Planetary) 	<ul style="list-style-type: none"> High permissible/maximum torque A wide variety of gear ratios for selecting the desired step angle (resolution) Centered output shaft Gear ratios: 5, 7.2, 10, 25, 36, 50 	Permissible Torque 37 (320)	25 (0.42)	0.0072	600
Non-backlash PN Geared (Planetary) 	<ul style="list-style-type: none"> 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, 7.2, 10, 25, 36, 50 	Permissible Torque 37 (320)	3 (0.05)	0.0072	600
Harmonic Geared (Harmonic drive) 	<ul style="list-style-type: none"> High accuracy positioning High permissible/maximum torque High resolution (high gear ratio) Centered output shaft Gear ratios: 50, 100 	Permissible Torque 37 (320)	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.

AR Series Offers Various Motor Frame Sizes in Accordance with the Motor Type and Power Supply Voltage, as Shown Below

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

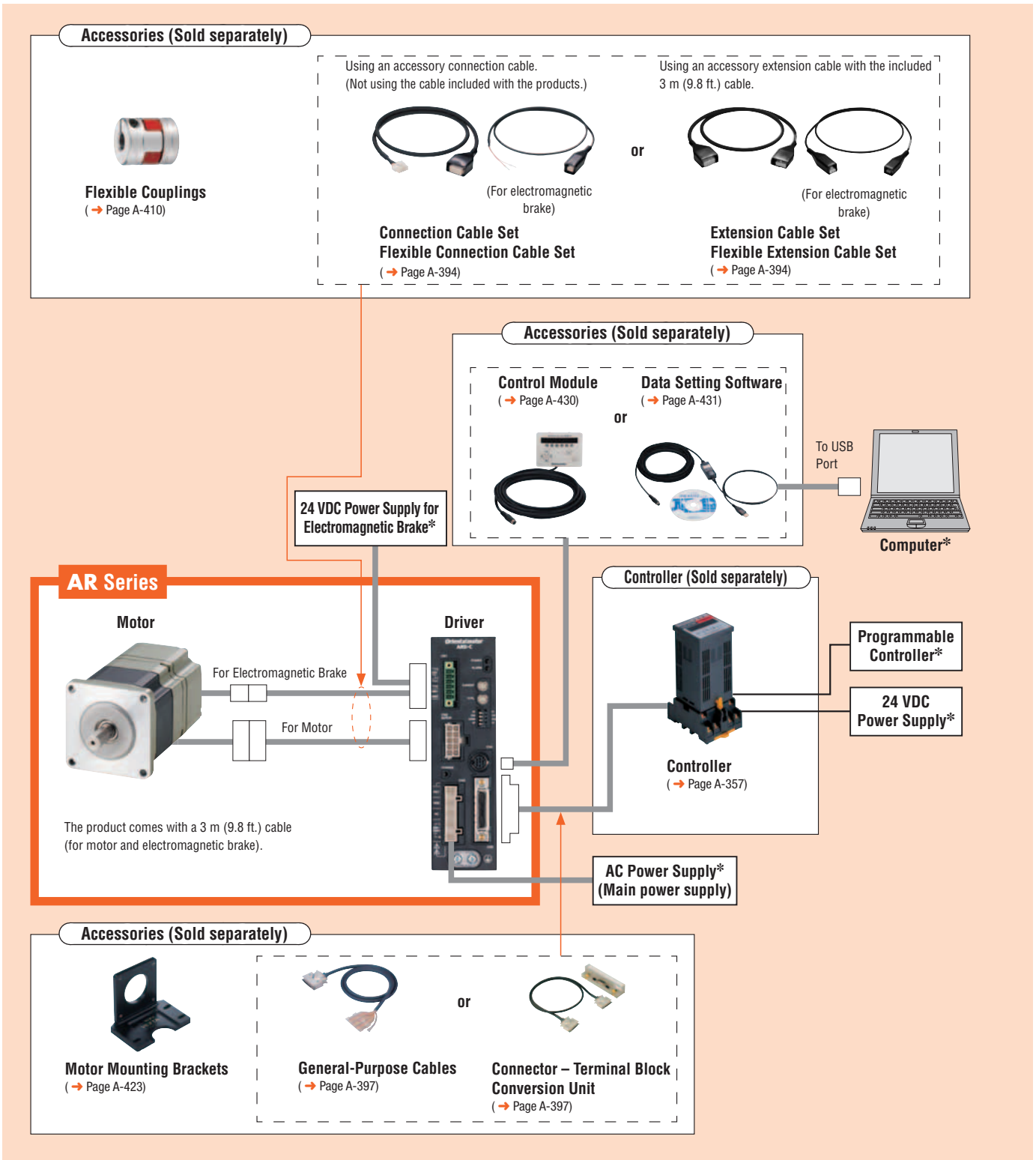
Motor Type	Power Supply Voltage	□42 (□1.65)	□60 (□2.36)	□85 (□3.35) [□90 (□3.54)*]
			Without Electromagnetic Brake With Electromagnetic Brake	Single-Phase 100-115 VAC
Step Angle 0.36° Standard Type	Without Electromagnetic Brake	●	●	●
	With Electromagnetic Brake	●	●	●
	Without Electromagnetic Brake	●	●	●
	With Electromagnetic Brake	●	●	●
	Without Electromagnetic Brake	●	●	●
	With Electromagnetic Brake	●	●	●
TH, PS, PN, Harmonic Geared Type	Without Electromagnetic Brake	●	●	●
	With Electromagnetic Brake	●	●	●
	Without Electromagnetic Brake	●	●	●
	With Electromagnetic Brake	●	●	●
	Without Electromagnetic Brake	●	●	●
	With Electromagnetic Brake	●	●	●

*Geared type

System Configuration

Standard Type with Electromagnetic Brake

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



Example of System Configuration

AR Series	Sold Separately			
	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.

Introduction
AR / Geared / 0.36°
AS / Geared / 0.36°
RK / Geared / 0.72°
UMK / Geared / 0.9°/1.8°
AR / Geared / 0.36°
ASX / Geared / 0.36°
CRK / Geared / 0.36°/0.72°
CMK / Geared / 0.9°/1.8°
RBK / Geared / 1.8°
PK / Geared / 0.36°
PK / Geared / 0.72°
PK / Geared / 0.9°
PK/PV / Geared / 1.8°
PK / Geared / Geared
Controllers / SCA10 / EMP400 / SG8030J
Accessories

Product Number Code

● Step Angle 0.36° 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 PS: PS 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

● Step Angle 0.36°
Standard Type

Model (Single shaft)	Model (Double shaft)
AR46A□-3	AR46B□-3
AR66A□-3	AR66B□-3
AR69A□-3	AR69B□-3
AR98A□-3	AR98B□-3
AR911A□-3	AR911B□-3

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

The following items are included in each product.

Motor, Shaft Parallel Key*1, Driver, Cable for Motor*2, Cable for Electromagnetic Brake*2*3, I/O Signal Connector, Regeneration Unit/Main Power Supply Connector, 24 VDC Power Supply/Regeneration Unit Thermal Input Connector, Connector Wiring Lever, Operating Manual, USER MANUAL (CD-ROM)

*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 different length cables, or flexible cables, select an appropriate cable from among the accessories (sold separately). For details, refer to page A-395.

*3 Only with Electromagnetic Brake Type.

● Step Angle 0.36°
Standard Type with Electromagnetic Brake

Model
AR46M□-3
AR66M□-3
AR69M□-3
AR98M□-3

● **TH Geared Type**

Model	Model
AR46A□-T3.6-3	AR46M□-T3.6-3
AR46A□-T7.2-3	AR46M□-T7.2-3
AR46A□-T10-3	AR46M□-T10-3
AR46A□-T20-3	AR46M□-T20-3
AR46A□-T30-3	AR46M□-T30-3
AR66A□-T3.6-3	AR66M□-T3.6-3
AR66A□-T7.2-3	AR66M□-T7.2-3
AR66A□-T10-3	AR66M□-T10-3
AR66A□-T20-3	AR66M□-T20-3
AR66A□-T30-3	AR66M□-T30-3
AR98A□-T3.6-3	AR98M□-T3.6-3
AR98A□-T7.2-3	AR98M□-T7.2-3
AR98A□-T10-3	AR98M□-T10-3
AR98A□-T20-3	AR98M□-T20-3
AR98A□-T30-3	AR98M□-T30-3

● **PS Geared Type**

Model	Model
AR46A□-PS5-3	AR46M□-PS5-3
AR46A□-PS7-3	AR46M□-PS7-3
AR46A□-PS10-3	AR46M□-PS10-3
AR46A□-PS25-3	AR46M□-PS25-3
AR46A□-PS36-3	AR46M□-PS36-3
AR46A□-PS50-3	AR46M□-PS50-3
AR66A□-PS5-3	AR66M□-PS5-3
AR66A□-PS7-3	AR66M□-PS7-3
AR66A□-PS10-3	AR66M□-PS10-3
AR66A□-PS25-3	AR66M□-PS25-3
AR66A□-PS36-3	AR66M□-PS36-3
AR66A□-PS50-3	AR66M□-PS50-3
AR98A□-PS5-3	AR98M□-PS5-3
AR98A□-PS7-3	AR98M□-PS7-3
AR98A□-PS10-3	AR98M□-PS10-3
AR98A□-PS25-3	AR98M□-PS25-3
AR98A□-PS36-3	AR98M□-PS36-3
AR98A□-PS50-3	AR98M□-PS50-3

● **TH Geared Type with Electromagnetic Brake**

● **PN Geared Type**

Model	Model
AR46A□-N5-3	AR46M□-N5-3
AR46A□-N7.2-3	AR46M□-N7.2-3
AR46A□-N10-3	AR46M□-N10-3
AR66A□-N5-3	AR66M□-N5-3
AR66A□-N7.2-3	AR66M□-N7.2-3
AR66A□-N10-3	AR66M□-N10-3
AR66A□-N25-3	AR66M□-N25-3
AR66A□-N36-3	AR66M□-N36-3
AR66A□-N50-3	AR66M□-N50-3
AR98A□-N5-3	AR98M□-N5-3
AR98A□-N7.2-3	AR98M□-N7.2-3
AR98A□-N10-3	AR98M□-N10-3
AR98A□-N25-3	AR98M□-N25-3
AR98A□-N36-3	AR98M□-N36-3
AR98A□-N50-3	AR98M□-N50-3

● **Harmonic Geared Type**

Model	Model
AR46A□-H50-3	AR46M□-H50-3
AR46A□-H100-3	AR46M□-H100-3
AR66A□-H50-3	AR66M□-H50-3
AR66A□-H100-3	AR66M□-H100-3
AR98A□-H50-3	AR98M□-H50-3
AR98A□-H100-3	AR98M□-H100-3

● **PN Geared Type with Electromagnetic Brake**

● **Harmonic Geared Type with Electromagnetic Brake**

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

Introduction

AC Input Motor & Driver

AR ^{0.36° / Geared} _{OSTEP} / AS ^{0.72° / Geared} RK ^{0.9°/1.8°} UMK

DC Input Motor & Driver

AR ^{0.36° / Geared} _{OSTEP} / ASX ^{0.36° / Geared} CRK ^{0.36°/0.72° / Geared} CMK ^{0.9°/1.8° / Geared} RBK ^{1.8° / Geared} PK ^{0.36°} PK ^{0.72°} PK ^{0.9°} PK/PV ^{1.8°} PK ^{Geared} / SCX10 / EMP400 / SG8030J

Controllers

Accessories

Step Angle 0.36° Motor Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.), 85 mm (3.35 in.)

Standard Type

Specifications RoHS

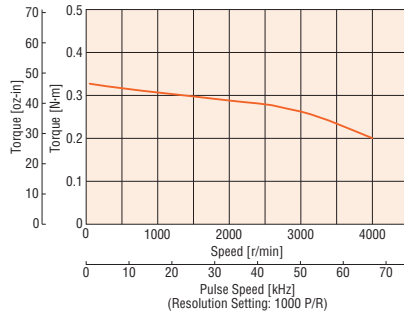


Model	Standard (Single shaft)		AR46A-3	AR66A-3	AR69A-3	AR98A-3	AR911A-3	
	Standard (Double shaft)*1		AR46B-3	AR66B-3	AR69B-3	AR98B-3	AR911B-3	
	Electromagnetic Brake		AR46M-3	AR66M-3	AR69M-3	AR98M-3	-	
Maximum Holding Torque	N·m (oz·in)		0.3 (42)	1.2 (170)	2 (280)		4 (560)	
Holding Torque at Motor Standstill	Power ON	N·m (oz·in)	0.15 (21)	0.6 (85)	1 (142)		2 (280)	
	Electromagnetic Brake	N·m (oz·in)	0.15 (21)	0.6 (85)	1 (142)		-	
Rotor Inertia	J: kg·m ² (oz·in ²)		58×10 ⁻⁷ (0.32) [73×10 ⁻⁷ (0.4)]*2	380×10 ⁻⁷ (2.1) [500×10 ⁻⁷ (2.7)]*2	750×10 ⁻⁷ (4.1) [870×10 ⁻⁷ (4.8)]*2	1100×10 ⁻⁷ (6) [1220×10 ⁻⁷ (6.7)]*2	2200×10 ⁻⁷ (12)	
Resolution			0.36°/Pulse					
Power Supply Input	Voltage/Frequency		Single-Phase 100-115 VAC, Single-Phase 200-230 VAC, 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
			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	Power Supply Input		24 VDC±5%*4	0.08 A	24 VDC±5%*4			0.25 A

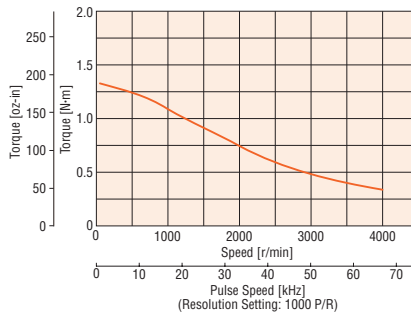
- Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box () within the model name.
- *1 With a double shaft model, the output shaft located on the opposite side of the motor output shaft is used to install a slit disk or similar device. Do not apply any load torque, overhung load or thrust load on this output shaft.
- *2 The values inside the brackets [] represent the specification for the electromagnetic brake type.
- *3 A separate power supply is required for the electromagnetic brakes.
- *4 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%.

Speed – Torque Characteristics

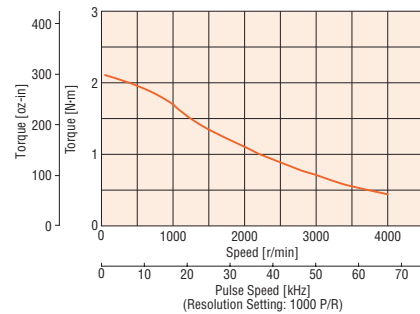
AR46



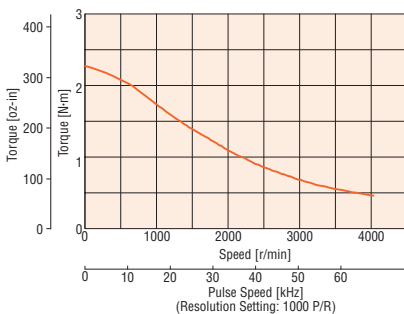
AR66



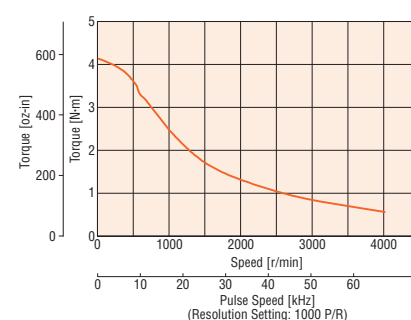
AR69



AR98



AR911



Note

- Pay attention to heat dissipation from the 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).

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					
Gear Ratio			3.6	7.2	10	20	30	
Resolution			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)		
Holding Torque at Motor Standstill	Power ON	N·m (lb·in)	0.34 (3.0)	0.69 (6.1)	0.96 (8.4)	1.4 (12.3)	1.5 (13.2)	
	Electromagnetic Brake	N·m (lb·in)	0.34 (3.0)	0.69 (6.1)	0.96 (8.4)	1.4 (12.3)	1.5 (13.2)	
Permissible Speed Range	r/min		0~500	0~250	0~180	0~90	0~60	
Backlash	arc min (degrees)		45 (0.75)	25 (0.42)		15 (0.25)		
Power Supply Input	Voltage/Frequency		Single-Phase 100-115 VAC, Single-Phase 200-230 VAC, Three-Phase 200-230 VAC				-15~+10%	50/60 Hz
	Maximum Input Current	A	Single-Phase 100-115 VAC		2.9			
		A	Single-Phase 200-230 VAC		1.9			
		A	Three-Phase 200-230 VAC		1			
Control Power Supply			24 VDC±5%		0.5 A			
Electromagnetic Brake*2	Power Supply Input		24 VDC±5%*3		0.08 A			

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

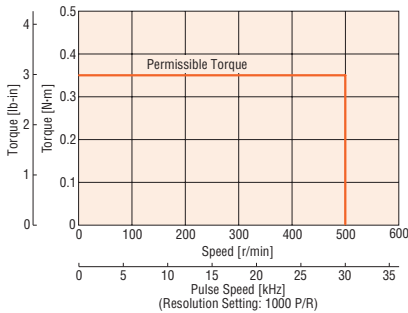
*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

*2 A separate power supply is required for the electromagnetic brakes.

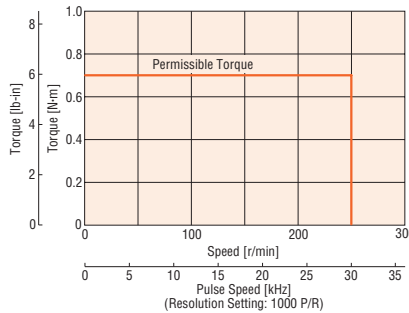
*3 If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC±4%.

Speed – Torque Characteristics

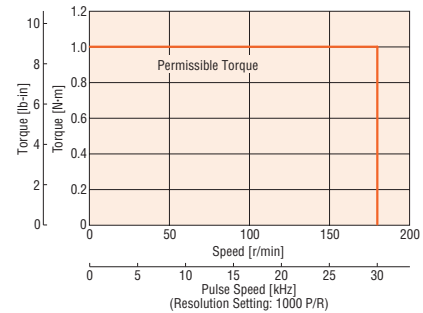
AR46 Gear Ratio 3.6



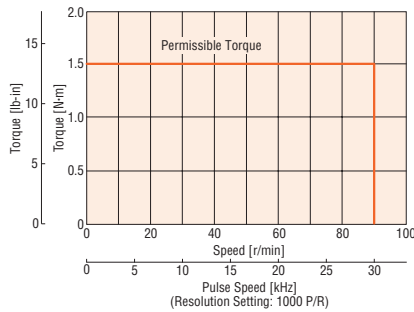
AR46 Gear Ratio 7.2



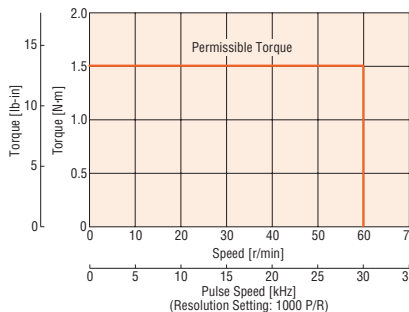
AR46 Gear Ratio 10



AR46 Gear Ratio 20



AR46 Gear Ratio 30



Note

● Pay attention to heat dissipation from the 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).

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				
Gear Ratio		3.6	7.2	10	20	30
Resolution		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)
Holding Torque at Motor Standstill	Power ON	N·m (lb·in)	1.25 (11.0)	2.5 (22)	3 (26)	4 (35)
	Electromagnetic Brake	N·m (lb·in)	1.25 (11.0)	2.5 (22)	3 (26)	4 (35)
Permissible Speed Range	r/min	0~500	0~250	0~180	0~90	0~60
Backlash	arc min (degrees)	35 (0.59)	15 (0.25)		10 (0.17)	
Power Supply Input	Voltage/Frequency		Single-Phase 100-115 VAC, Single-Phase 200-230 VAC, Three-Phase 200-230 VAC			-15~+10% 50/60 Hz
	Maximum Input Current	A	Single-Phase 100-115 VAC			4.4
		A	Single-Phase 200-230 VAC			2.7
		A	Three-Phase 200-230 VAC			1.4
Control Power Supply				24VDC±5%	0.5 A	
Electromagnetic Brake*2	Power Supply Input			24VDC±5%*3	0.25 A	

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

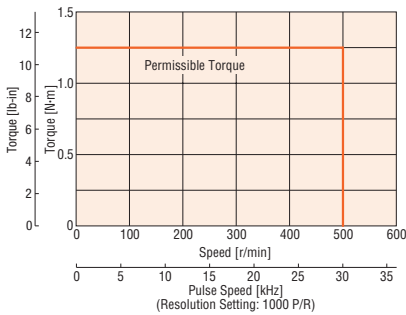
*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

*2 A separate power supply is required for the electromagnetic brakes.

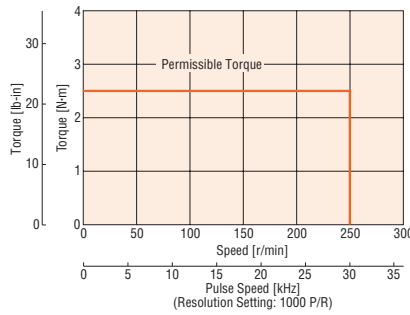
*3 If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC±4%.

Speed – Torque Characteristics

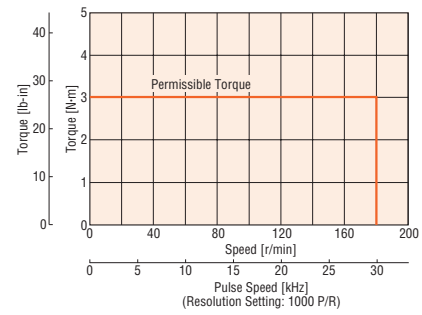
AR66 Gear Ratio 3.6



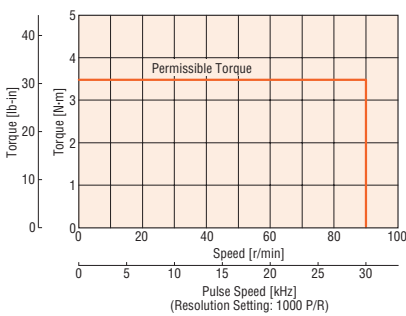
AR66 Gear Ratio 7.2



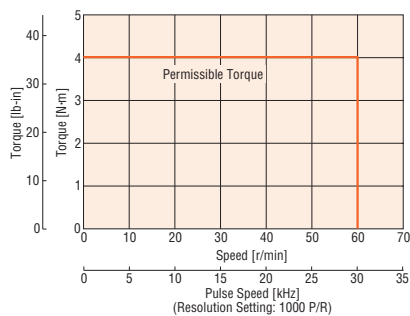
AR66 Gear Ratio 10



AR66 Gear Ratio 20



AR66 Gear Ratio 30



Note

● Pay attention to heat dissipation from the 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).

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)	12 (106)	12 (106)
Rotor Inertia	J: kg·m ² (oz·in ²)	1100×10 ⁻⁷ (6.0) [1220×10 ⁻⁷ (6.7)]*1				
Gear Ratio		3.6	7.2	10	20	30
Resolution		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)	12 (106)	12 (106)
Holding Torque at Motor Standstill	Power ON Electromagnetic Brake	N·m (lb·in) N·m (lb·in)	3.6 (31) 7.2 (63)	9 (79) 9 (79)	10 (88) 10 (88)	12 (106) 12 (106)
Permissible Speed Range	r/min	0~500	0~250	0~180	0~90	0~60
Backlash	arc min (degrees)	25 (0.42)	15 (0.25)	10 (0.17)	10 (0.17)	10 (0.17)
Power Supply Input	Voltage/Frequency	Single-Phase 100-115 VAC, Single-Phase 200-230 VAC, Three-Phase 200-230 VAC -15~+10% 50/60 Hz				
	Maximum Input Current	Single-Phase 100-115 VAC	5.5			3.4
	A	Single-Phase 200-230 VAC	3.4			1.8
Control Power Supply		24 VDC±5% 0.5 A				
Electromagnetic Brake*2	Power Supply Input	24 VDC±5%*3 0.25 A				

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

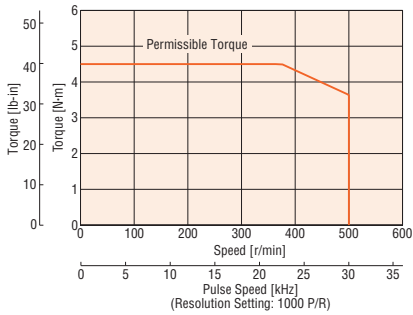
*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

*2 A separate power supply is required for the electromagnetic brakes.

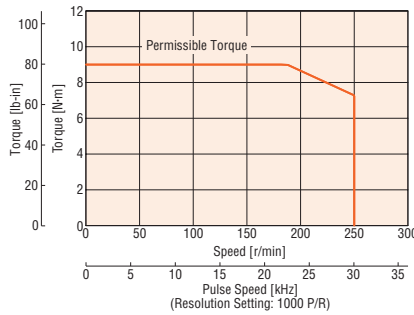
*3 If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC±4%.

Speed – Torque Characteristics

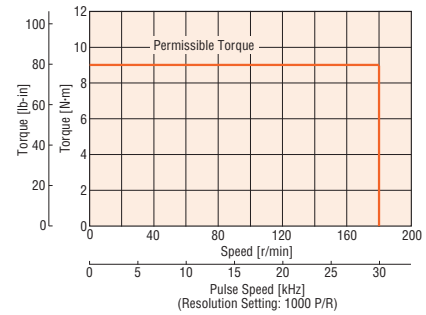
AR98 Gear Ratio 3.6



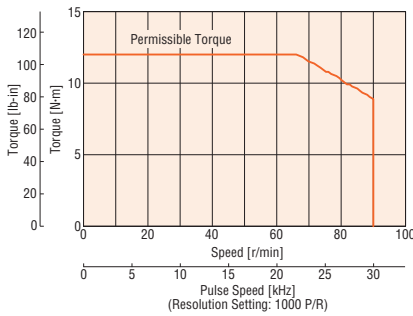
AR98 Gear Ratio 7.2



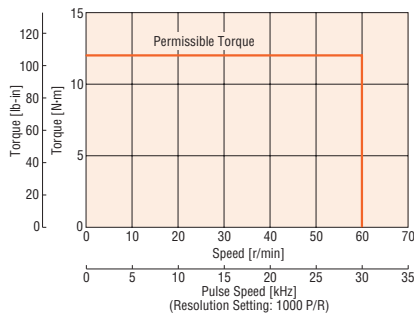
AR98 Gear Ratio 10



AR98 Gear Ratio 20



AR98 Gear Ratio 30



Note

● Pay attention to heat dissipation from the 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).

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

Specifications RoHS



Model	Standard (Single shaft)	AR46A PS5-3	AR46A PS7-3	AR46A PS10-3	AR46A PS25-3	AR46A PS36-3	AR46A PS50-3
	Electromagnetic Brake	AR46M PS5-3	AR46M PS7-3	AR46M PS10-3	AR46M PS25-3	AR46M PS36-3	AR46M PS50-3
Maximum Holding Torque	N·m (lb·in)	1 (8.8)	1.5 (13.2)	2.5 (22)	3 (26)		
Rotor Inertia	J: kg·m ² (oz·in ²)	58×10 ⁻⁷ (0.32) [73×10 ⁻⁷ (0.4)]*1					
Gear Ratio		5	7.2	10	25	36	50
Resolution		0.072°/Pulse	0.05°/Pulse	0.036°/Pulse	0.0144°/Pulse	0.01°/Pulse	0.0072°/Pulse
Permissible Torque	N·m (lb·in)	1 (8.8)	1.5 (13.2)	2.5 (22)	3 (26)		
Maximum Torque	N·m (lb·in)	1.5 (13.2)	2 (17.7)	6 (53)			
Holding Torque at Power ON	N·m (lb·in)	0.75 (6.6)	1 (8.8)	1.5 (13.2)	2.5 (22)	3 (26)	
Motor Standstill Electromagnetic Brake	N·m (lb·in)	0.75 (6.6)	1 (8.8)	1.5 (13.2)	2.5 (22)	3 (26)	
Permissible Speed Range	r/min	0~600	0~416	0~300	0~120	0~83	0~60
Backlash	arc min (degrees)	25 (0.42)					
Power Supply Input	Voltage/Frequency	Single-Phase 100-115 VAC, Single-Phase 200-230 VAC, 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*2 Power Supply Input		24 VDC±5%*3 0.08 A					

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

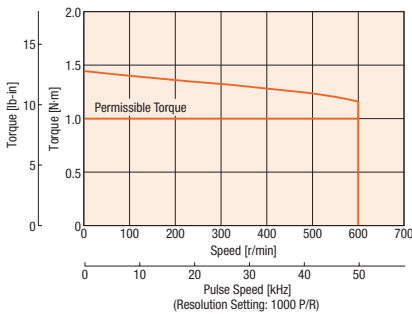
*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

*2 A separate power supply is required for the electromagnetic brakes.

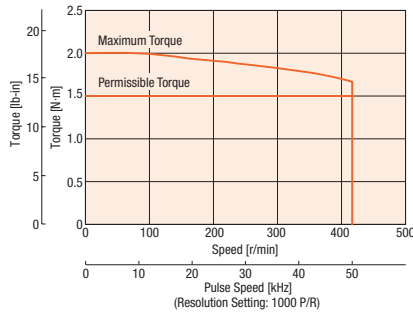
*3 If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC±4%.

Speed – Torque Characteristics

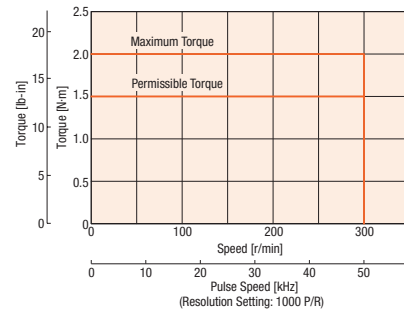
AR46 Gear Ratio 5



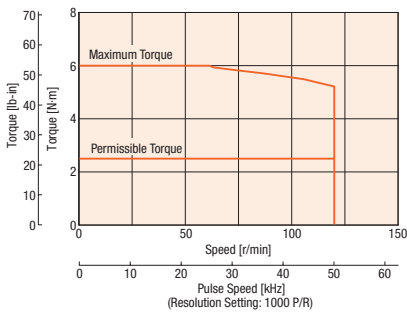
AR46 Gear Ratio 7.2



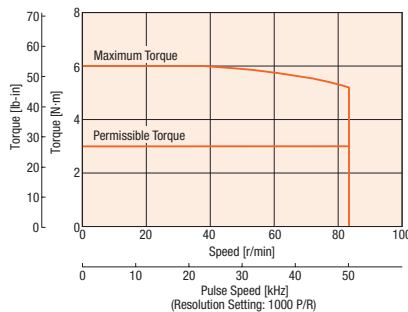
AR46 Gear Ratio 10



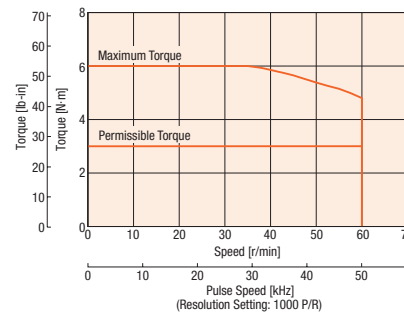
AR46 Gear Ratio 25



AR46 Gear Ratio 36



AR46 Gear Ratio 50



Note

● Pay attention to heat dissipation from the 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).

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

Specifications RoHS



Model	Standard (Single shaft)	AR66A P PS5-3	AR66A P PS7-3	AR66A P PS10-3	AR66A P PS25-3	AR66A P PS36-3	AR66A P PS50-3	
	Electromagnetic Brake	AR66M P PS5-3	AR66M P PS7-3	AR66M P PS10-3	AR66M P PS25-3	AR66M P PS36-3	AR66M P PS50-3	
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)]*						
Gear Ratio		5	7.2	10	25	36	50	
Resolution		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	N·m (lb·in)	7 (61)	9 (79)	11 (97)	16 (141)	20 (177)		
Holding Torque at	Power ON	N·m (lb·in)	3 (26)	4 (35)	5 (44)	8 (70)		
	Electromagnetic Brake	N·m (lb·in)	3 (26)	4 (35)	5 (44)	8 (70)		
Permissible Speed Range	r/min	0~600	0~416	0~300	0~120	0~83	0~60	
Backlash	arc min (degrees)	15 (0.25)						
Power Supply Input	Voltage/Frequency		Single-Phase 100-115 VAC, Single-Phase 200-230 VAC, 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 ^{#2}	Power Supply Input	24 VDC±5% ^{#3}					0.25 A	

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

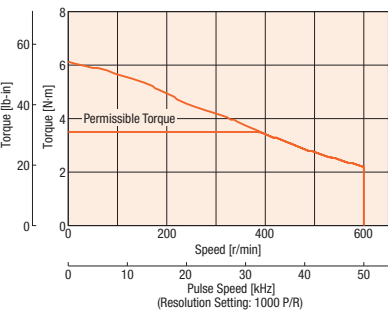
*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

*2 A separate power supply is required for the electromagnetic brakes.

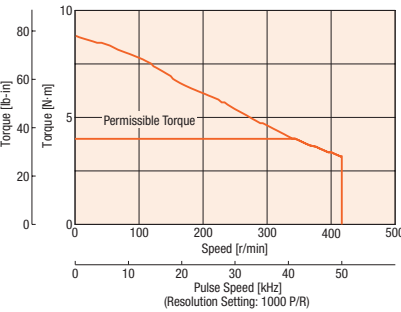
*3 If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC±4%.

Speed – Torque Characteristics

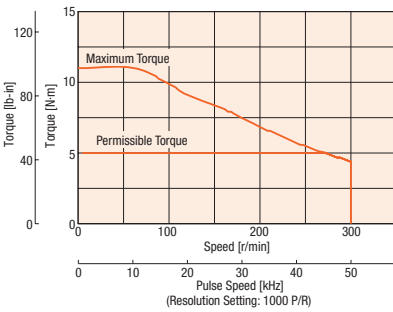
AR66 Gear Ratio 5



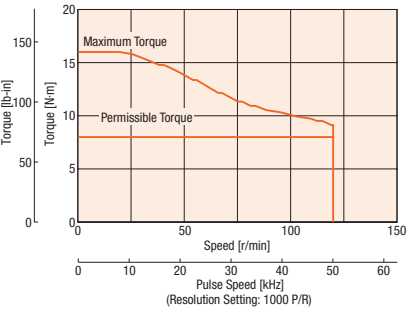
AR66 Gear Ratio 7.2



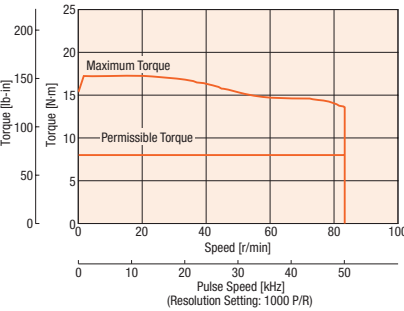
AR66 Gear Ratio 10



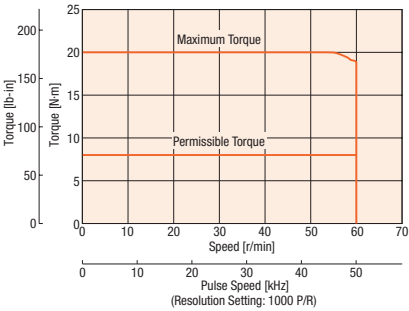
AR66 Gear Ratio 25



AR66 Gear Ratio 36



AR66 Gear Ratio 50



Note

● Pay attention to heat dissipation from the 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).

Introduction

0.36° / Geared / ASTEP AR

AC Input Motor & Driver

0.72° / Geared / RK

0.9°/1.8° / UMK

0.36° / Geared / ASTEP AR

0.36° / Geared / ASTEP ASX

DC Input Motor & Driver

0.36°/0.72° / Geared / CRK

0.9°/1.8° / Geared / CMK

1.8° / Geared / RBK

0.36° / PK

0.72° / PK

0.9° / PK

Motor Only

1.8° / PK/PV

Geared / PK

Controllers / SCX10 / EMP400 / 5G80301

Accessories

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

Specifications RoHS



Model	Standard (Single shaft)	AR98A PS5-3	AR98A PS7-3	AR98A PS10-3	AR98A PS25-3	AR98A PS36-3	AR98A PS50-3
	Electromagnetic Brake	AR98M PS5-3	AR98M PS7-3	AR98M PS10-3	AR98M PS25-3	AR98M PS36-3	AR98M PS50-3
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 (6.0) [1220×10 ⁻⁷ (6.7)]*1					
Gear Ratio		5	7.2	10	25	36	50
Resolution		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	N·m (lb·in)	28 (240)	35 (300)		56 (490)	60 (530)	
Holding Torque at Power ON	N·m (lb·in)	5 (44)	7.2 (63)	10 (88)	25 (220)	36 (310)	37 (320)
Motor Standstill Electromagnetic Brake	N·m (lb·in)	5 (44)	7.2 (63)	10 (88)	25 (220)	36 (310)	37 (320)
Permissible Speed Range	r/min	0~600	0~416	0~300	0~120	0~83	0~60
Backlash	arc min (degrees)	15 (0.25)					
Power Supply Input	Voltage/Frequency	Single-Phase 100-115 VAC, Single-Phase 200-230 VAC, 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		
Control Power Supply		Three-Phase 200-230 VAC			1.8		
Electromagnetic Brake*2 Power Supply Input		24 VDC±5% 0.5 A			0.5 A		
		24 VDC±5%*3			0.25 A		

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

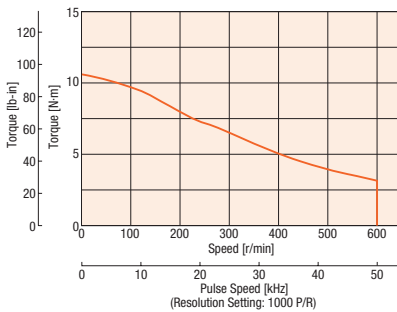
*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

*2 A separate power supply is required for the electromagnetic brakes.

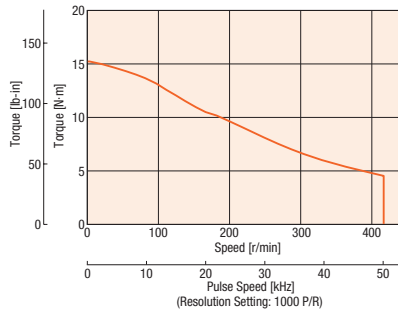
*3 If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC±4%.

Speed – Torque Characteristics

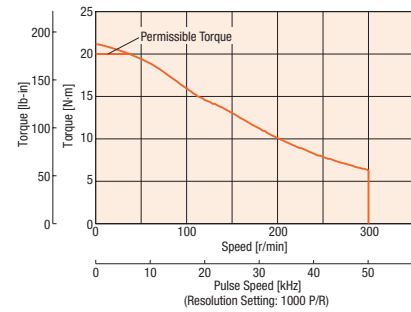
AR98 Gear Ratio 5



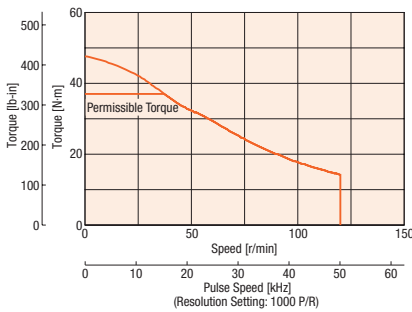
AR98 Gear Ratio 7.2



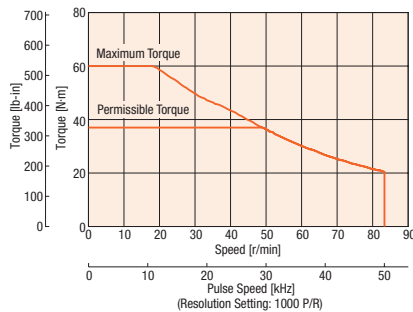
AR98 Gear Ratio 10



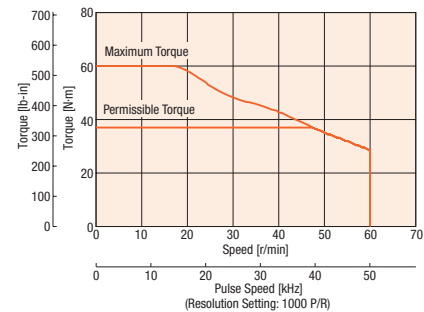
AR98 Gear Ratio 25



AR98 Gear Ratio 36



AR98 Gear Ratio 50



Note

● Pay attention to heat dissipation from the 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).

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·m ² (oz·in ²)		58×10 ⁻⁷ (0.32) [73×10 ⁻⁷ (0.4)]*1		
Gear Ratio			5	7.2	10
Resolution			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	N·m (lb·in)		1.5 (13.2)		2 (17.7)
Holding Torque at Motor Standstill	Power ON	N·m (lb·in)	0.75 (6.6)	1 (8.8)	1.5 (13.2)
	Electromagnetic Brake	N·m (lb·in)	0.75 (6.6)	1 (8.8)	1.5 (13.2)
Permissible Speed Range	r/min		0~600	0~416	0~300
Backlash	arc min (degrees)		2 (0.034)		
Power Supply Input	Voltage/Frequency		Single-Phase 100-115 VAC, Single-Phase 200-230 VAC, 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		
Control Power Supply			24 VDC±5%	0.5 A	
Electromagnetic Brake*2	Power Supply Input		24 VDC±5%*3 0.08 A		

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

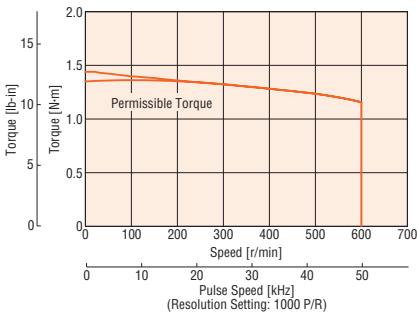
*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

*2 A separate power supply is required for the electromagnetic brakes.

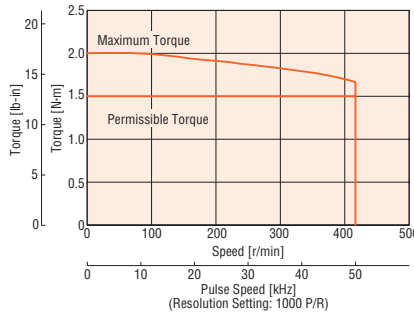
*3 If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC±4%.

Speed – Torque Characteristics

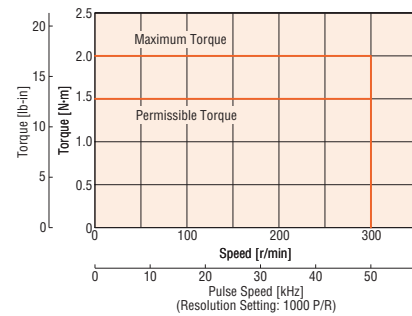
AR46 Gear Ratio 5



AR46 Gear Ratio 7.2



AR46 Gear Ratio 10



Note

● Pay attention to heat dissipation from the 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).

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					
Gear Ratio		5	7.2	10	25	36	50
Resolution		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	N·m (lb·in)	7 (61)	9 (79)	11 (97)	16 (141)	20 (177)	
Holding Torque at	Power ON	N·m (lb·in)	3 (26)	4 (35)	5 (44)	8 (70)	
Motor Standstill	Electromagnetic Brake	N·m (lb·in)	3 (26)	4 (35)	5 (44)	8 (70)	
Permissible Speed Range	r/min	0~600	0~416	0~300	0~120	0~83	0~60
Backlash	arc min (degrees)	2 (0.034)			3 (0.05)		
Voltage/Frequency		Single-Phase 100-115 VAC, Single-Phase 200-230 VAC, Three-Phase 200-230 VAC				-15~+10%	50/60 Hz
Power Supply Input	Maximum Input	Single-Phase 100-115 VAC				4.4	
	Current A	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*2	Power Supply Input	24 VDC±5%*3				0.25 A	

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

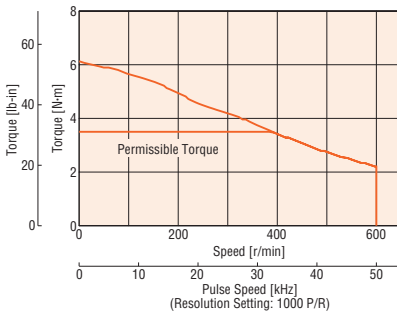
*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

*2 A separate power supply is required for the electromagnetic brakes.

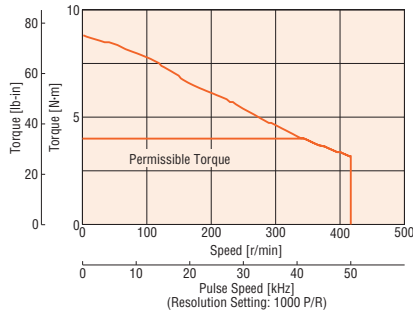
*3 If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC±4%.

Speed – Torque Characteristics

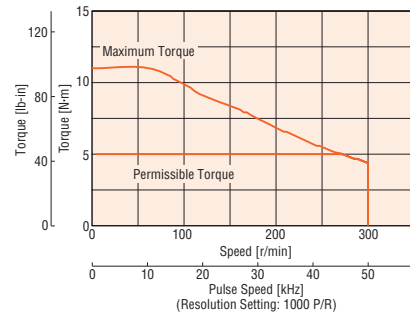
AR66 Gear Ratio 5



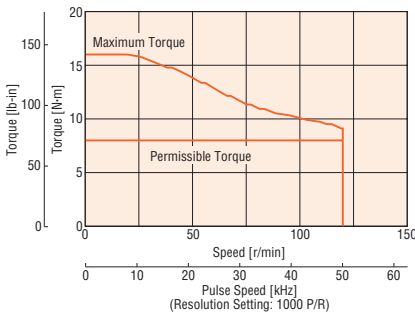
AR66 Gear Ratio 7.2



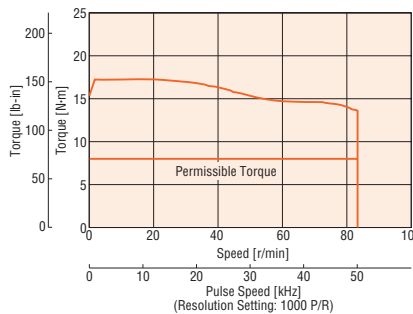
AR66 Gear Ratio 10



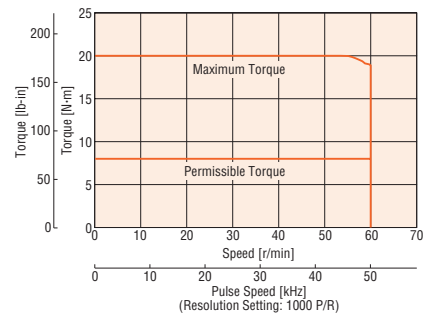
AR66 Gear Ratio 25



AR66 Gear Ratio 36



AR66 Gear Ratio 50



Note

● Pay attention to heat dissipation from the 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).

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 (6.0) [1220×10 ⁻⁷ (6.7)]*1					
Gear Ratio		5	7.2	10	25	36	50
Resolution		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	N·m (lb·in)	28 (240)	35 (300)		56 (490)	60 (530)	
Holding Torque at Motor Standstill	Power ON	5 (44)	7.2 (63)	10 (88)	25 (220)	36 (310)	37 (320)
	Electromagnetic Brake	5 (44)	7.2 (63)	10 (88)	25 (220)	36 (310)	37 (320)
Permissible Speed Range	r/min	0~600	0~416	0~300	0~120	0~83	0~60
Backlash	arc min (degrees)	2 (0.034)			3 (0.05)		
Power Supply Input	Voltage/Frequency		Single-Phase 100-115 VAC, Single-Phase 200-230 VAC, Three-Phase 200-230 VAC				-15~+10% 50/60 Hz
	Maximum Input Current	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*2	Power Supply Input			24 VDC±5%*3		0.25 A	

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

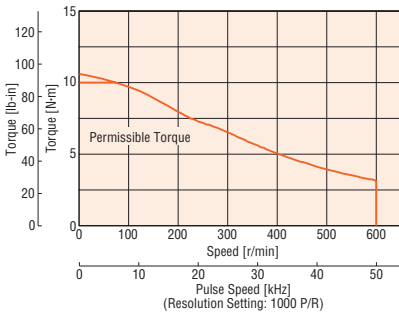
*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

*2 A separate power supply is required for the electromagnetic brakes.

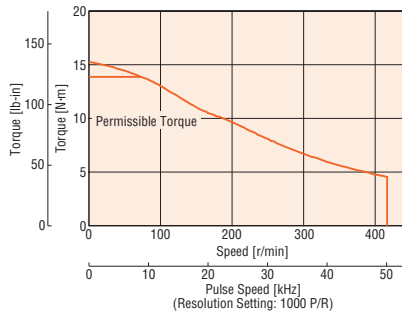
*3 If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC±4%.

Speed – Torque Characteristics

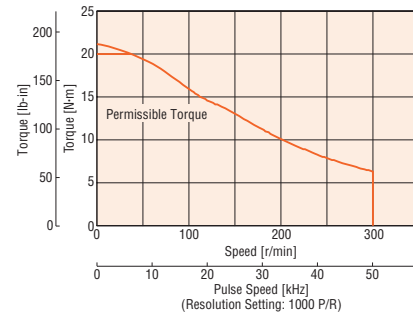
AR98 Gear Ratio 5



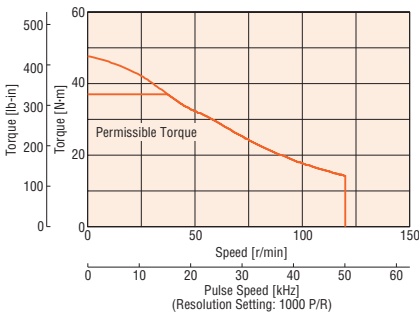
AR98 Gear Ratio 7.2



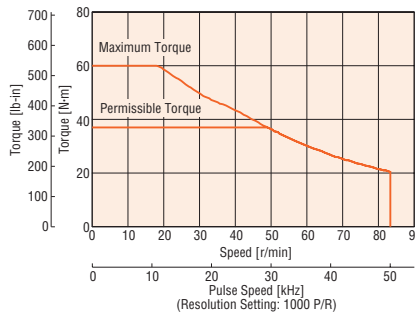
AR98 Gear Ratio 10



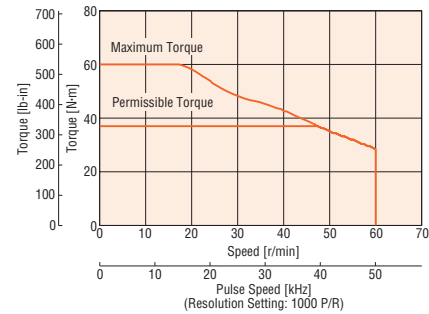
AR98 Gear Ratio 25



AR98 Gear Ratio 36



AR98 Gear Ratio 50



Note

● Pay attention to heat dissipation from the 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).

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·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	
Gear Ratio		50	100	50	100	50	100	
Resolution		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)	
Holding Torque at Motor Standstill	Power ON Electromagnetic Brake	N·m (lb·in) N·m (lb·in)	3.5 (30) 5 (44)	5.5 (48) 5.5 (48)	8 (70) 8 (70)	25 (220) 25 (220)	37 (320) 37 (320)	
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)		
Permissible Speed Range	r/min	0~70	0~35	0~70	0~35	0~70	0~35	
Power Supply Input	Voltage/Frequency	Single-Phase 100-115VAC, Single-Phase 200-230 VAC, Three-Phase 200-230 VAC						50/60 Hz
	Maximum Input Current A	Single-Phase 100-115 VAC	2.9		4.4		5.5	
	Current A	Single-Phase 200-230 VAC	1.9		2.7		3.4	
		Three-Phase 200-230 VAC	1		1.4		1.8	
Control Power Supply		24VDC±5% 0.5A						
Electromagnetic Brake*2	Power Supply Input	24 VDC±5%*3 0.08 A			24 VDC±5%*3 0.25 A			

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

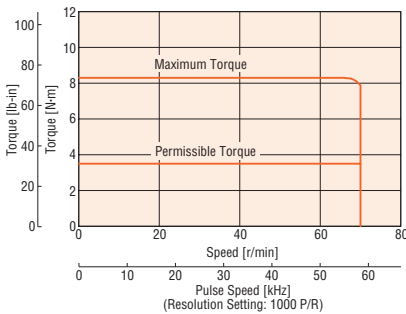
*1 The values inside the brackets [] represent the specification for the electromagnetic brake type.

*2 A separate power supply is required for the electromagnetic brakes.

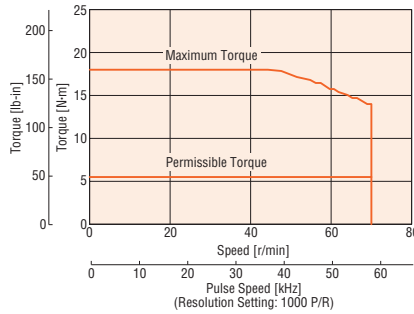
*3 If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC±4%.

Speed – Torque Characteristics

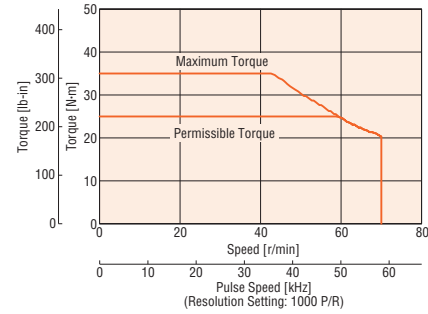
AR46 Gear Ratio 50



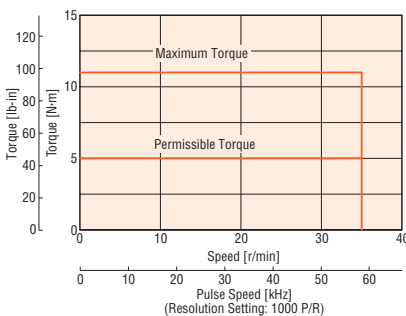
AR66 Gear Ratio 50



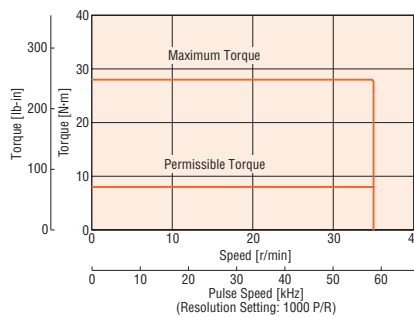
AR98 Gear Ratio 50



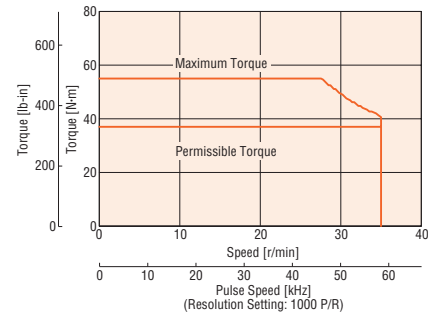
AR46 Gear Ratio 100



AR66 Gear Ratio 100



AR98 Gear Ratio 100



Note

● Pay attention to heat dissipation from the 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).

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, MO, M1, M2) Photocoupler input, Input resistance: 200 Ω, Input signal voltage: 3 to 5.25 V (CW/PLS, CCW/DIR) Photocoupler input, Input resistance: 2.7 kΩ, Input signal voltage: 21.6 to 26.4 V (CW24V/PLS24V, CCW24V/DIR24V)
Output Signals	Photocoupler, Open-collector output External use condition: 30 VDC maximum, 10 mA maximum (READY, TLC, END, TIM2, WNG, ALM) Line driver output External use condition: Connect a terminal resistor of 100 Ω or more between the driver and the input of the line receiver. (TIM1, ASG, BSG)
Other Functions	<ul style="list-style-type: none"> 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]	<ul style="list-style-type: none"> 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 general-purpose cable (**CC36D1-1**) is used.
General-purpose cable → Page A-37

General Specifications

Item	Motor	Driver
Thermal Class	130 (B)	—
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 1.5 kVAC 50 Hz or 60 Hz · Signal I/O terminal – Power supply terminal 1.8 kVAC 50 Hz or 60 Hz
Operating Environment	Ambient Temperature	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	—

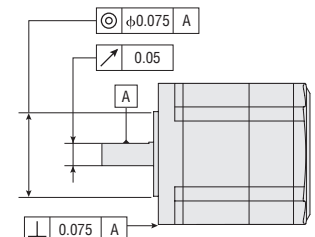
*1 When a heat sink of a capacity at least equivalent to an aluminum plate with a size of 250×250 mm (9.84×9.84 in.), 6 mm (0.24 in.) thick is installed.
*2 When a heat sink of a capacity at least equivalent to an aluminum plate with a size of 200×200 mm (7.87×7.87 in.), 2 mm (0.08 in.) thick is installed.
*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.

Permissible Overhung Load and Permissible Thrust Load

→ Page A-14



Load Torque – Driver Input Current Characteristics

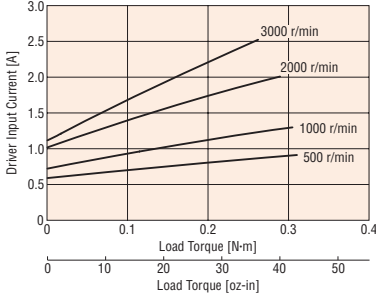
This is the relationship between the load torque and driver input current at each speed when the motor is operated. From these characteristics, the current capacity required when used for multiple axes can be estimated. For geared motors, convert to torque and speed at the motor shaft.

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

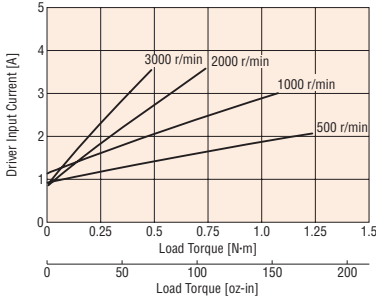
$$\text{Motor shaft torque [N·m (oz·in)]} = \frac{\text{Gear output shaft torque}}{\text{Gear ratio}}$$

● Single – Phase 100-115 VAC

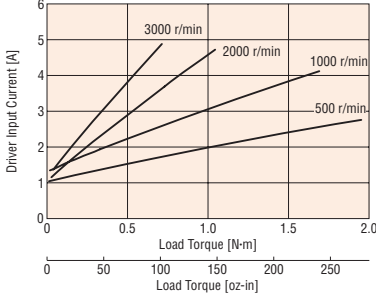
AR46



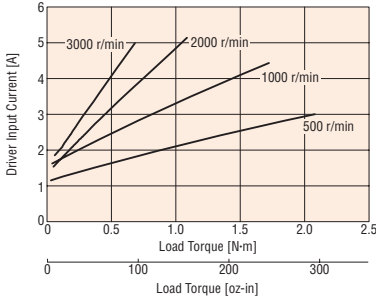
AR66



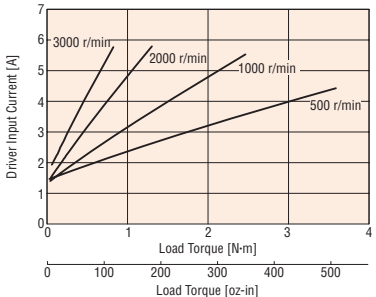
AR69



AR98

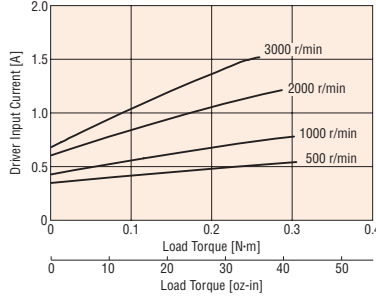


AR911

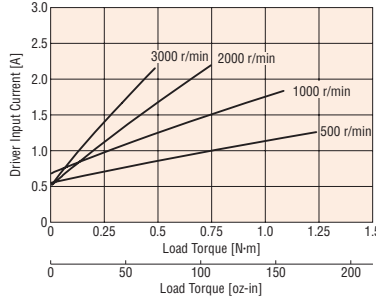


● Single – Phase 200-230 VAC

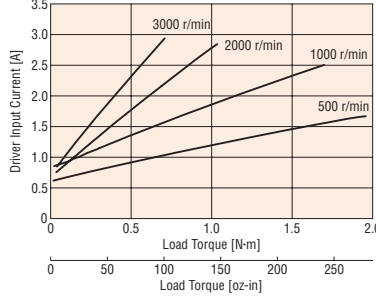
AR46



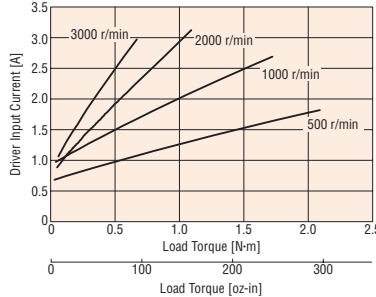
AR66



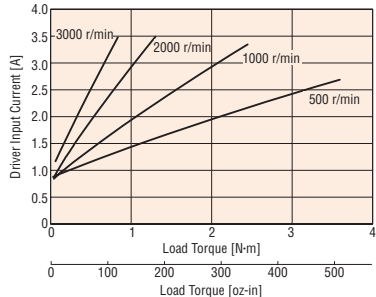
AR69



AR98

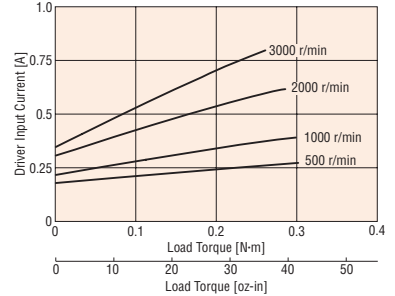


AR911

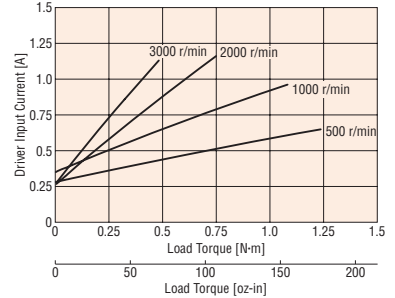


● Three – Phase 200-230 VAC

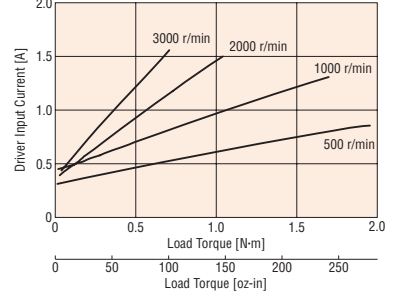
AR46



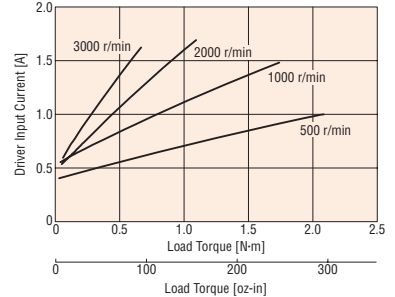
AR66



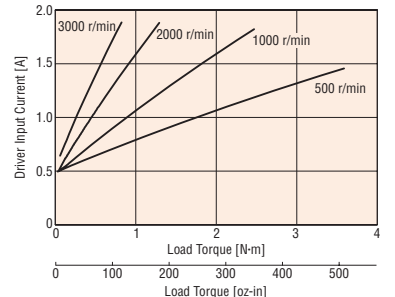
AR69



AR98



AR911



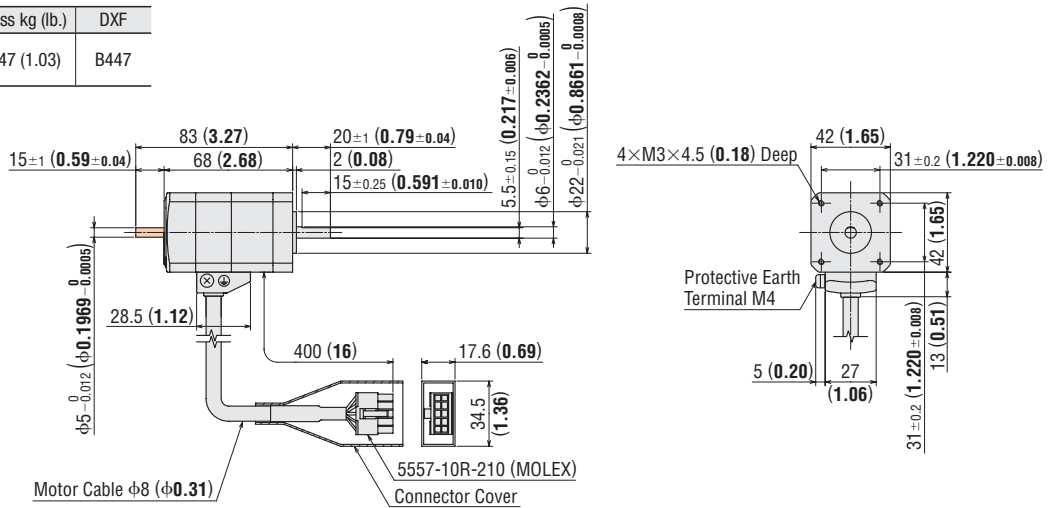
Dimensions Unit = mm (in.)

● Motor

◇ Step Angle 0.36° Standard Type

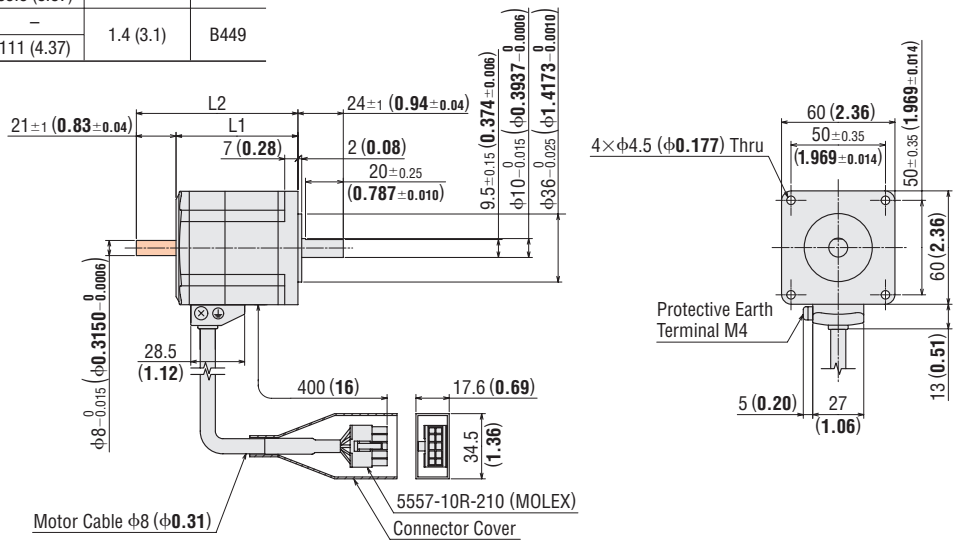
Motor Frame Size 42 mm (1.65 in.)

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



Motor Frame Size 60 mm (2.36 in.)

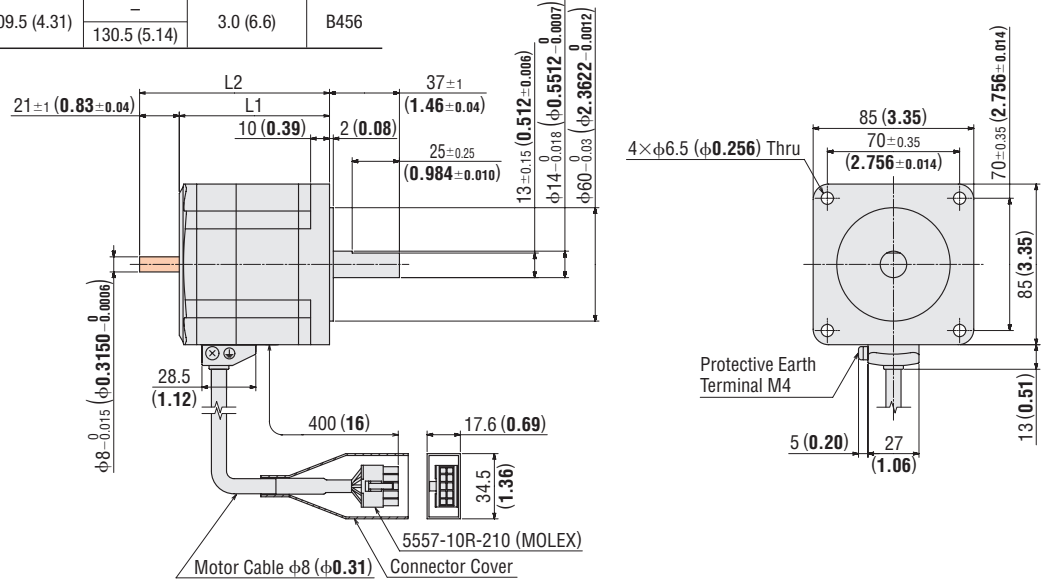
Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
AR66A □-3	ARM66AC	64.5 (2.54)	-	0.9 (1.98)	B448
AR66B □-3	ARM66BC		85.5 (3.37)		
AR69A □-3	ARM69AC	90 (3.54)	-	1.4 (3.1)	B449
AR69B □-3	ARM69BC		111 (4.37)		



● 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.

Motor Frame Size 85 mm (3.35 in.)

Model	Motor Model	L1	L2	Mass kg (lb.)	DXF
AR98A <input type="checkbox"/> -3	ARM98AC	79.5 (3.13)	-	1.9 (4.2)	B455
AR98B <input type="checkbox"/> -3	ARM98BC		100.5 (3.96)		
AR911A <input type="checkbox"/> -3	ARM911AC	109.5 (4.31)	-	3.0 (6.6)	B456
AR911B <input type="checkbox"/> -3	ARM911BC		130.5 (5.14)		

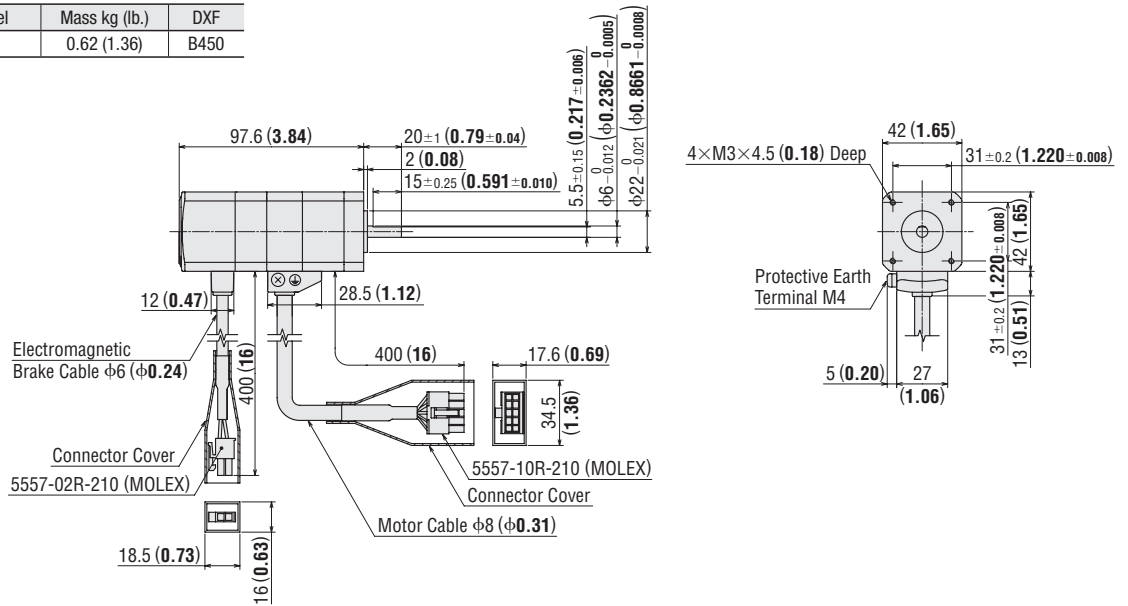


● These dimensions are for double shaft models. For single shaft models, ignore the shaded () areas.

◇ Step Angle 0.36° Standard Type with Electromagnetic Brake

Motor Frame Size 42 mm (1.65 in.)

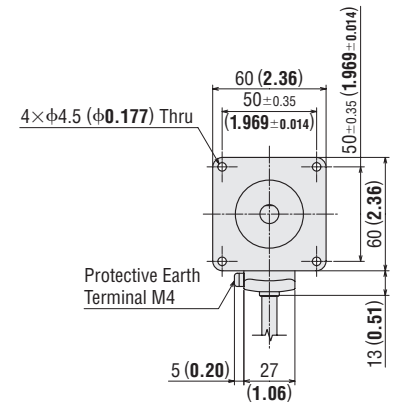
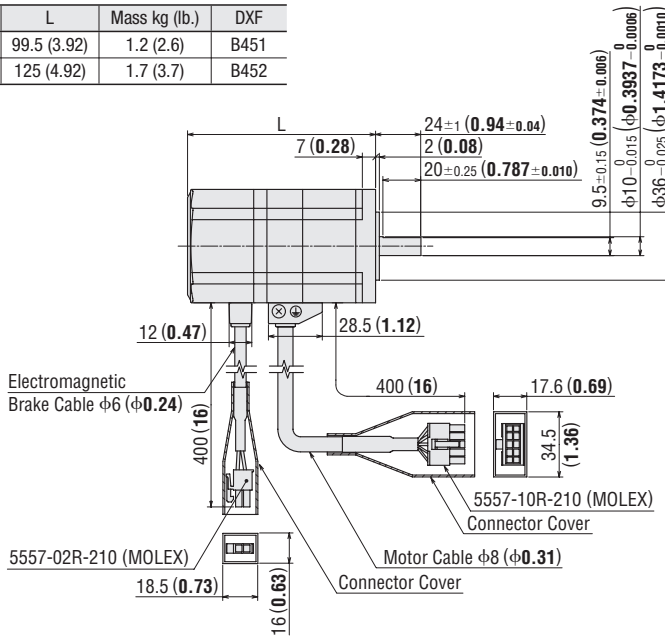
Model	Motor Model	Mass kg (lb.)	DXF
AR46M <input type="checkbox"/> -3	ARM46MC	0.62 (1.36)	B450



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

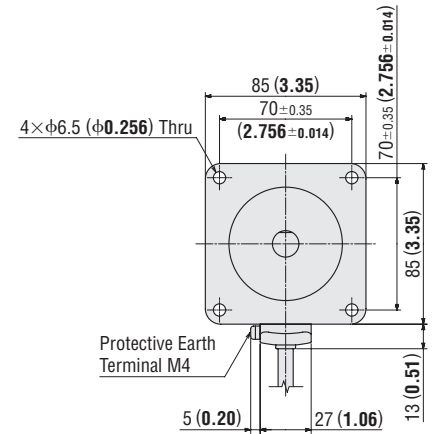
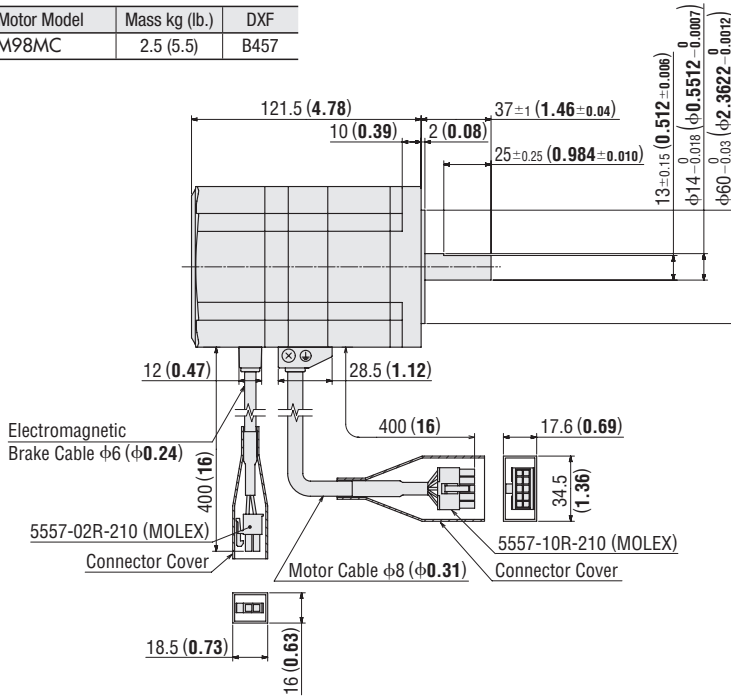
Motor Frame Size 60 mm (2.36 in.)

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



Motor Frame Size 85 mm (3.35 in.)

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

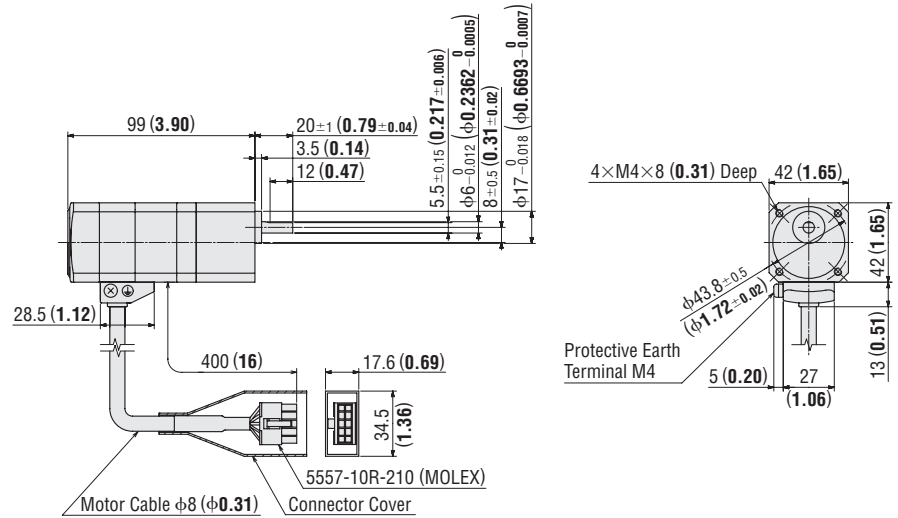


● Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name.

◇ TH Geared Type

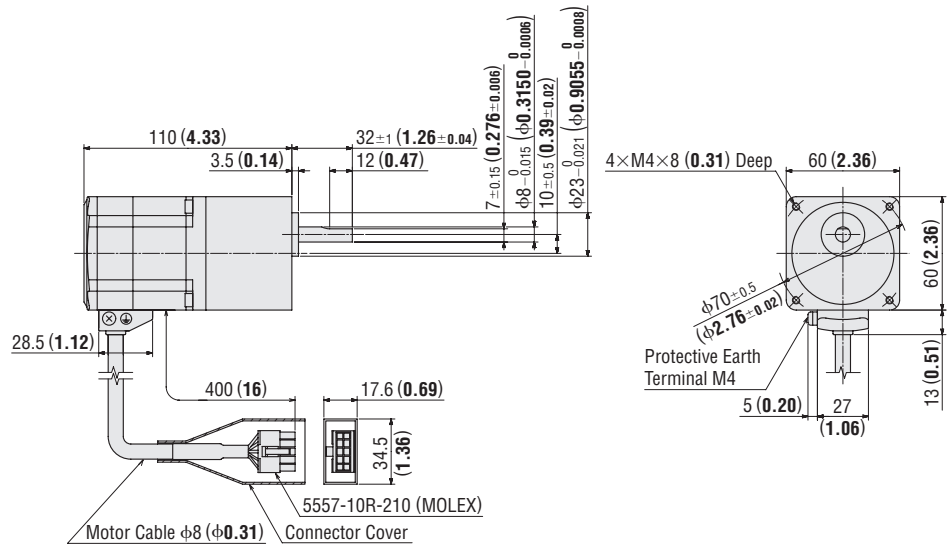
Motor Frame Size 42 mm (1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46A <input type="checkbox"/> -T <input type="checkbox"/> -3	ARM46AC-T <input type="checkbox"/>	3.6, 7.2, 10, 20, 30	0.62 (1.36)	B458



Motor Frame Size 60 mm (2.36 in.)

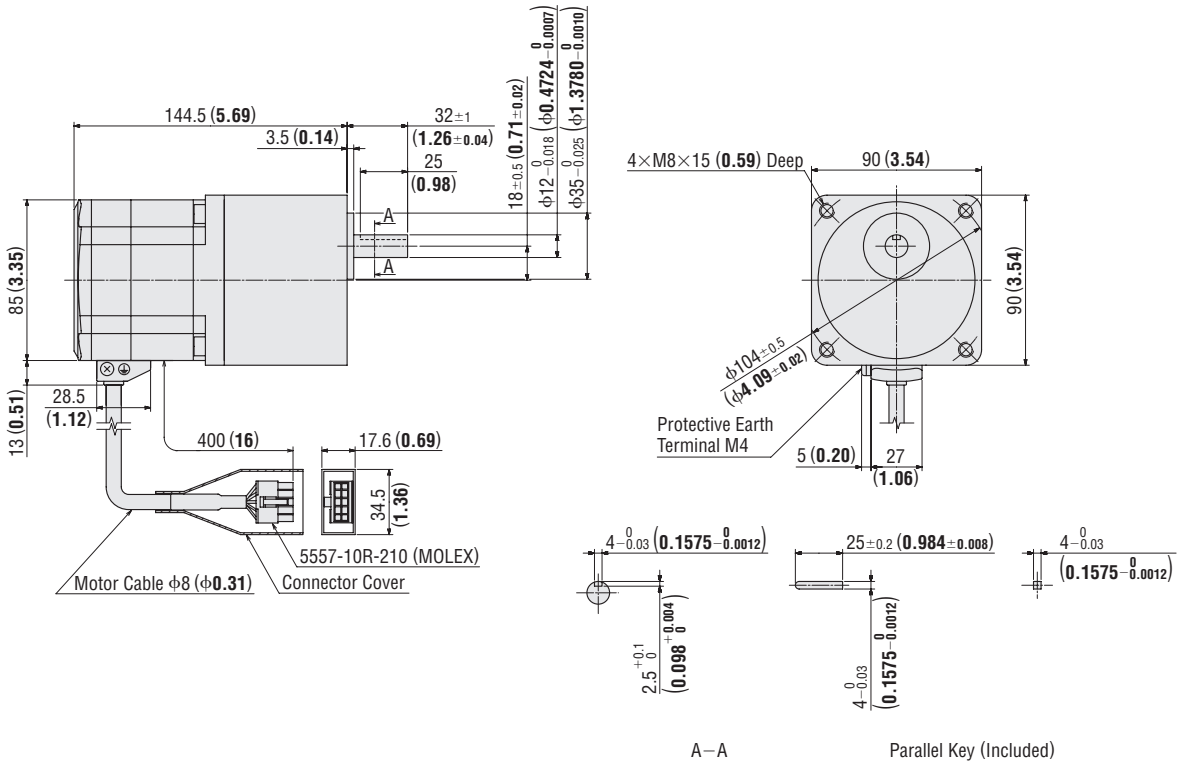
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66A <input type="checkbox"/> -T <input type="checkbox"/> -3	ARM66AC-T <input type="checkbox"/>	3.6, 7.2, 10, 20, 30	1.3 (2.9)	B459



● 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.

Motor Frame Size 90 mm (3.54 in.)

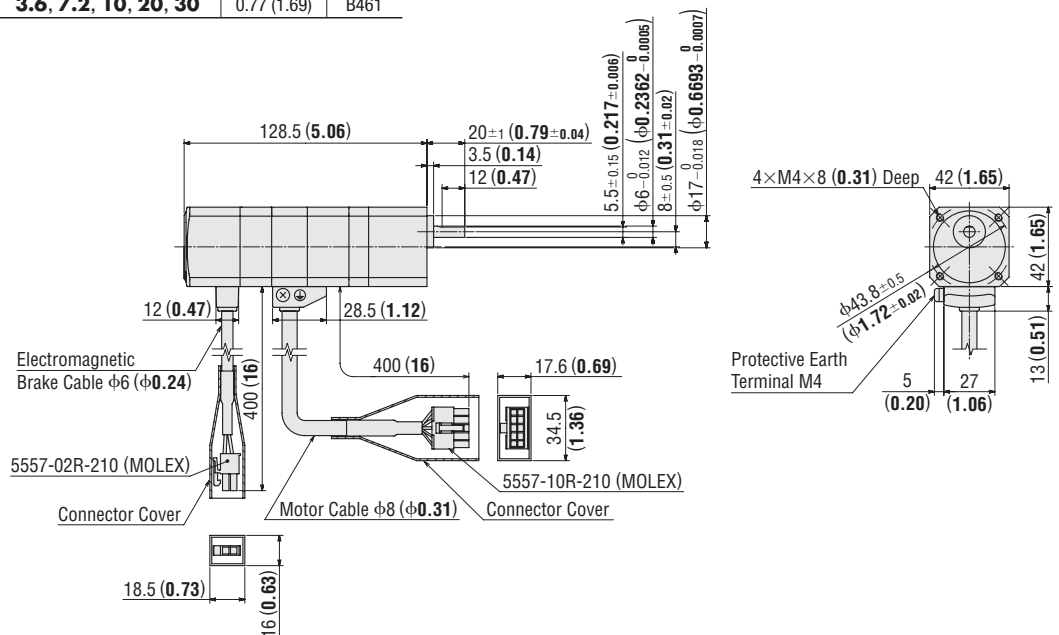
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98A <input type="checkbox"/> - T <input type="checkbox"/> - 3	ARM98AC-T	3.6, 7.2, 10, 20, 30	3.1 (6.8)	B460



◇TH Geared Type with Electromagnetic Brake

Motor Frame Size 42 mm (1.65 in.)

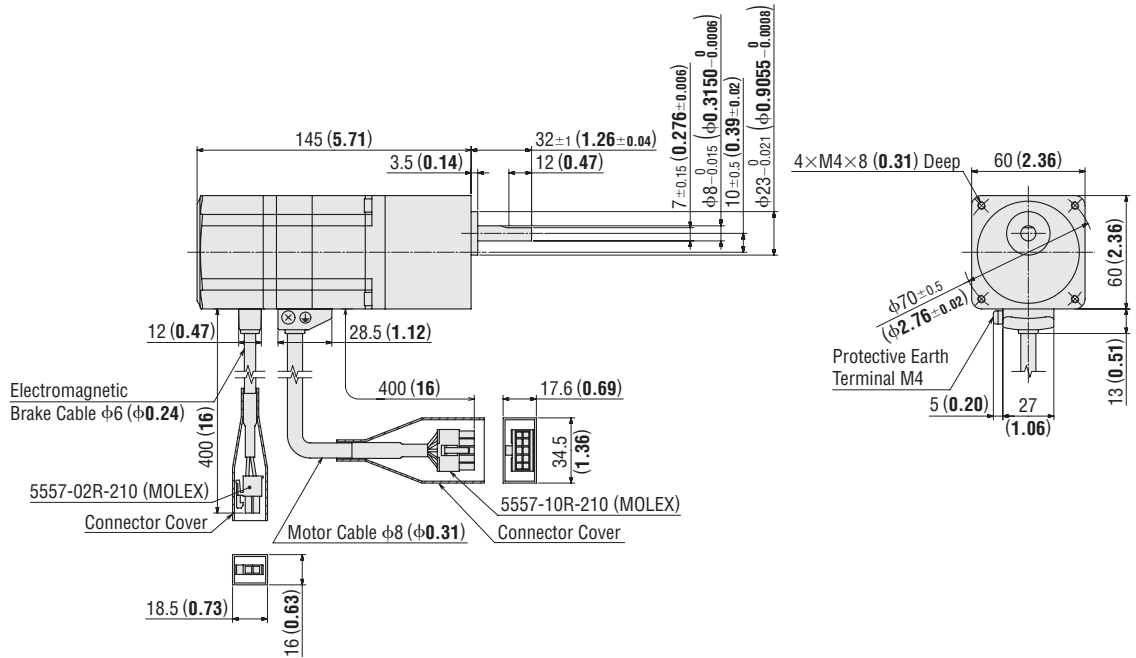
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46M <input type="checkbox"/> - T <input type="checkbox"/> - 3	ARM46MC-T	3.6, 7.2, 10, 20, 30	0.77 (1.69)	B461



● 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.

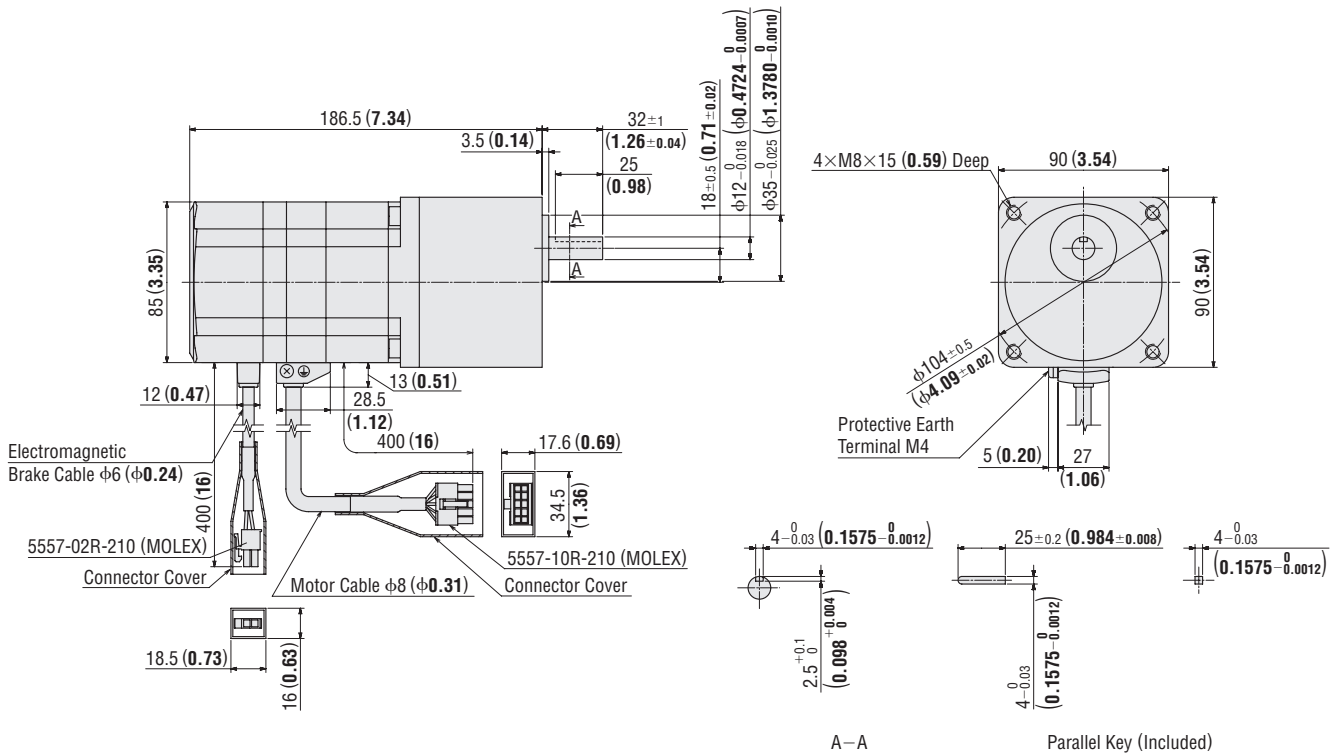
Motor Frame Size 60 mm (2.36 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66M <input type="checkbox"/> -T <input type="checkbox"/> -3	ARM66MC-T <input type="checkbox"/>	3.6, 7.2, 10, 20, 30	1.6 (3.5)	B462



Motor Frame Size 90 mm (3.54 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98M <input type="checkbox"/> -T <input type="checkbox"/> -3	ARM98MC-T <input type="checkbox"/>	3.6, 7.2, 10, 20, 30	3.7 (8.1)	B463

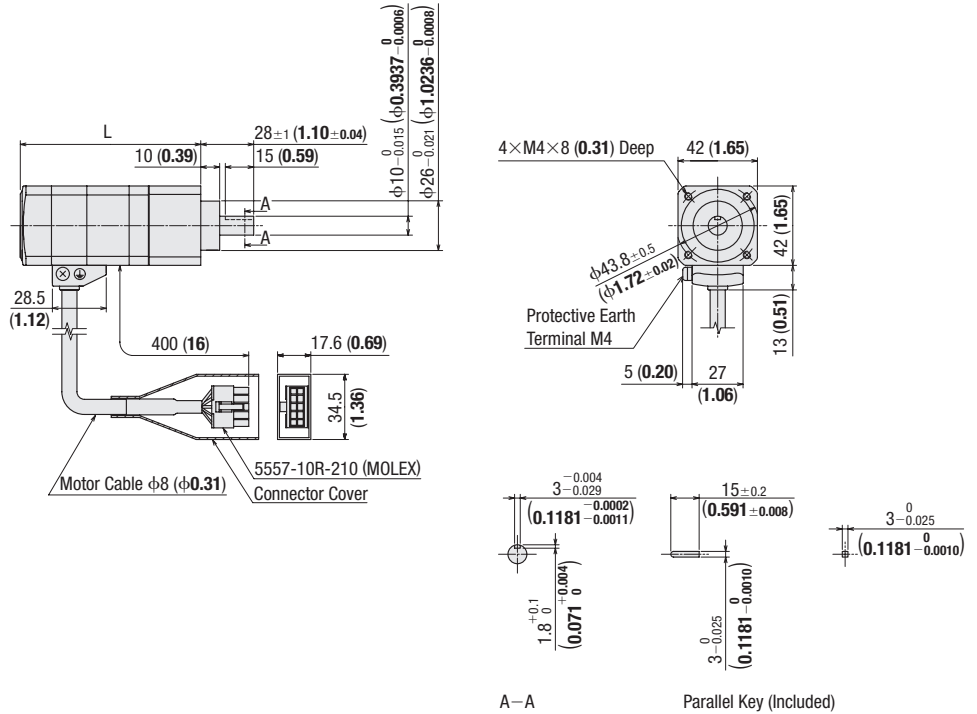


● Enter the power supply voltage (**A**, **C** or **S**) in the box () within the model name.
Enter the gear ratio in the box () within the model name.

◇ PS Geared Type

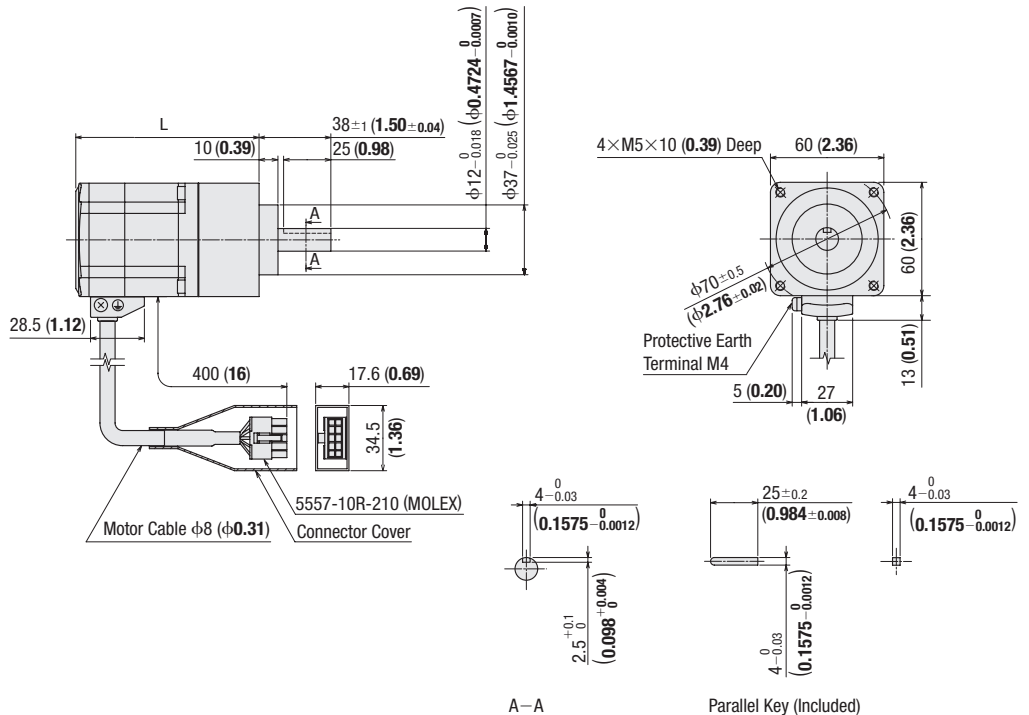
Motor Frame Size 42 mm (1.65 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR46A <input type="checkbox"/> -PS <input type="checkbox"/> -3	ARM46AC-PS <input type="checkbox"/>	5, 7.2, 10	96 (3.78)	0.67 (1.47)	B666
		25, 36, 50	119.5 (4.70)	0.82 (1.80)	B667



Motor Frame Size 60 mm (2.36 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR66A <input type="checkbox"/> -PS <input type="checkbox"/> -3	ARM66AC-PS <input type="checkbox"/>	5, 7.2, 10	97 (3.82)	1.3 (2.9)	B670
		25, 36, 50	117 (4.61)	1.6 (3.5)	B671



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

Introduction

AC Input Motor & Driver

0.36° / Geared / AR / Stepped / AS / RK / UMK / AR / Stepped / ASX / DC Input Motor & Driver

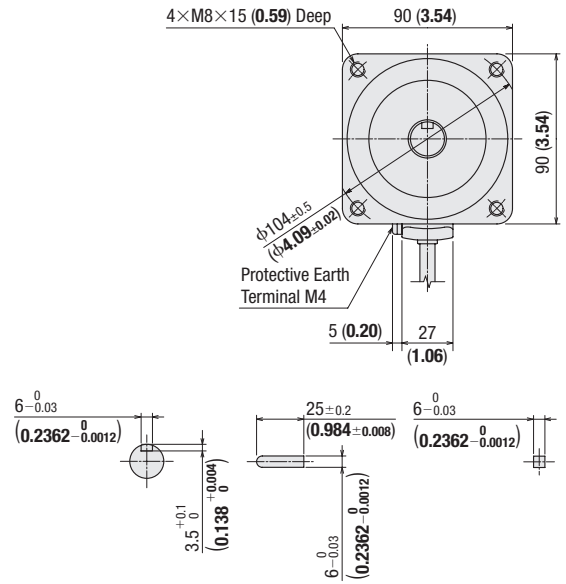
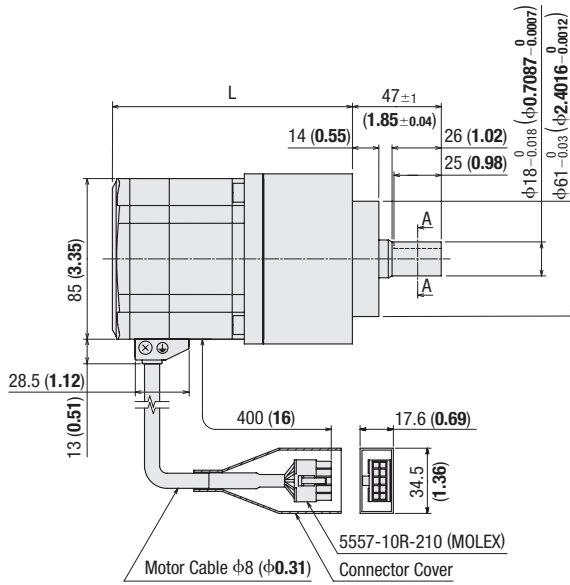
0.72° / Geared / CRK / CMK / RBK / PK / Motor Only

0.9° / 1.8° / Geared / PK / PK/PV / Geared / PK / Controllers / SCX10 / EMP400 / 5G8030J

Accessories

Motor Frame Size 90 mm (3.54 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR98A <input type="checkbox"/> -PS <input type="checkbox"/> -3	ARM98AC-PS <input type="checkbox"/>	5, 7, 2, 10	127 (5.00)	3.3 (7.3)	B674
		25, 36, 50	154.5 (6.08)	4.1 (9.0)	B675

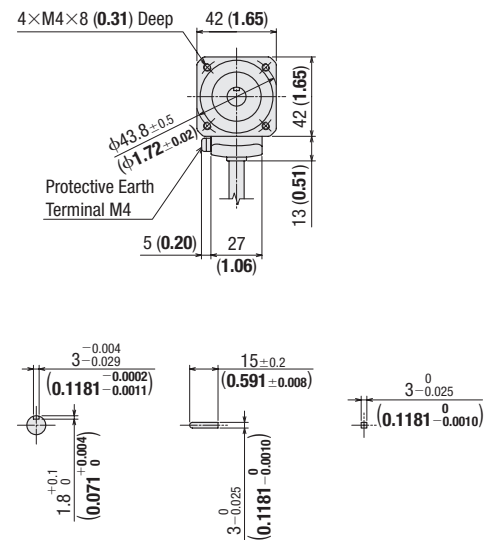
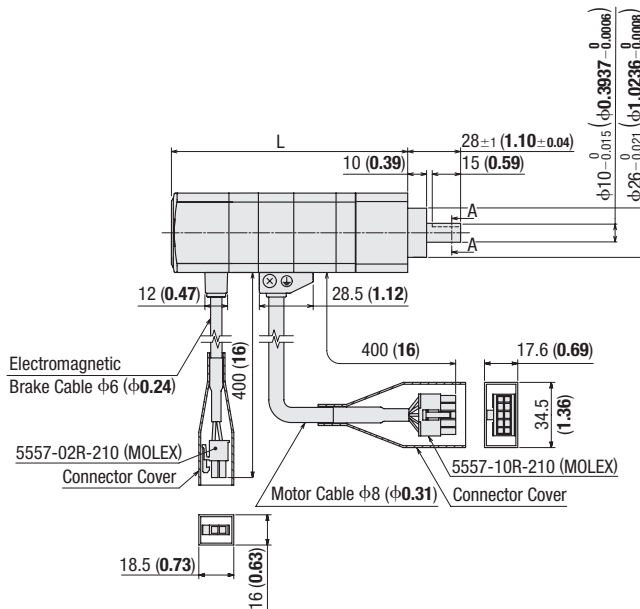


A-A Parallel Key (Included)

◇ PS Geared Type with Electromagnetic Brake

Motor Frame Size 42 mm (1.65 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR46M <input type="checkbox"/> -PS <input type="checkbox"/> -3	ARM46MC-PS <input type="checkbox"/>	5, 7, 2, 10	125.5 (4.94)	0.82 (1.80)	B668
		25, 36, 50	149 (5.87)	0.97 (2.1)	B669

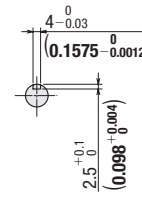
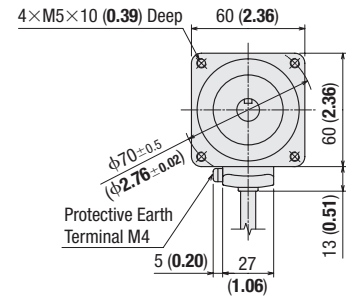
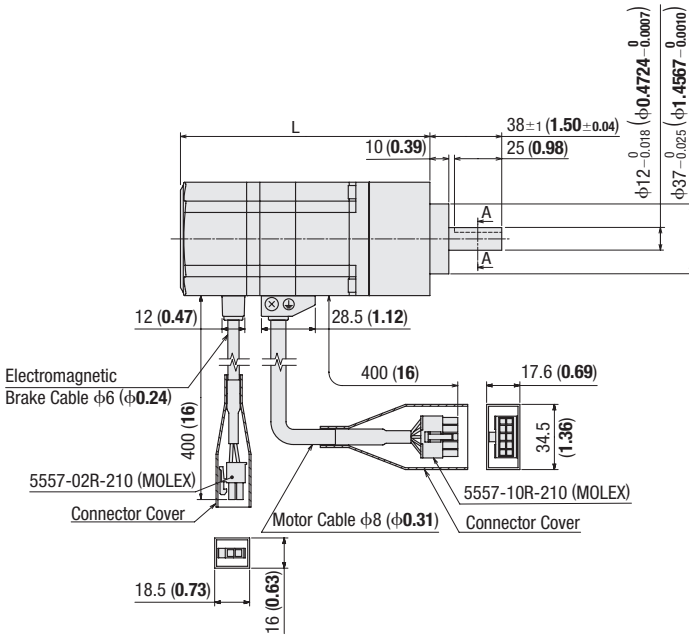


A-A Parallel Key (Included)

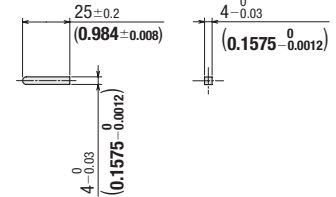
● Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name.
A number indicating the gear ratio is entered where the box (■) is located within the model name.

Motor Frame Size 60 mm (2.36 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR66M <input type="checkbox"/> -PS <input type="checkbox"/> -3	ARM66MC-PS <input type="checkbox"/>	5, 7, 2, 10	132 (5.20)	1.6 (3.5)	B672
		25, 36, 50	152 (5.98)	1.9 (4.2)	B673



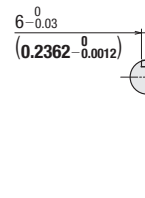
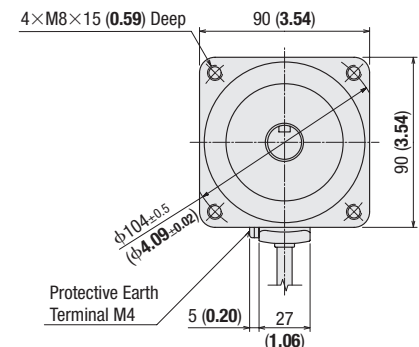
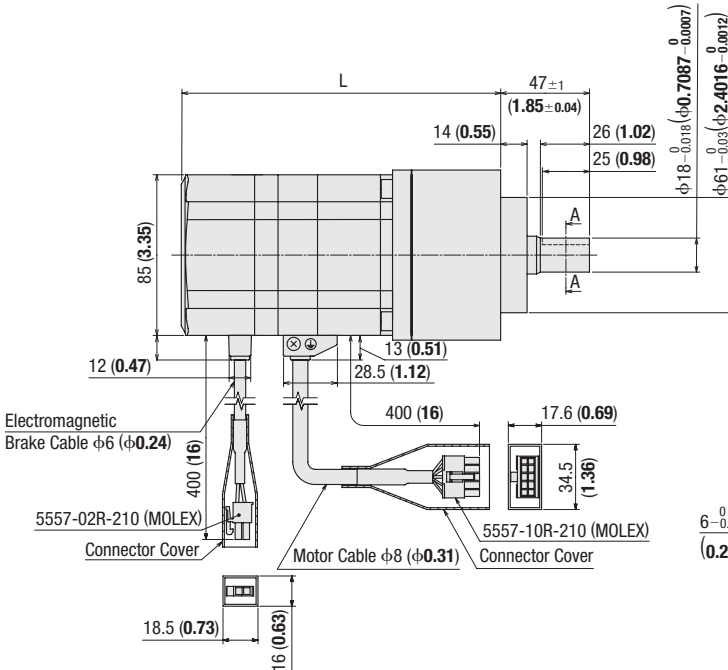
A-A



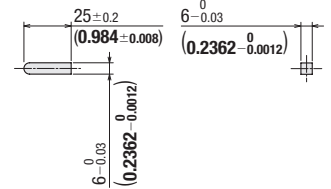
Parallel Key (Included)

Motor Frame Size 90 mm (3.54 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR98M <input type="checkbox"/> -PS <input type="checkbox"/> -3	ARM98MC-PS <input type="checkbox"/>	5, 7, 2, 10	169 (6.65)	3.9 (8.6)	B676
		25, 36, 50	196.5 (7.74)	4.7 (10.3)	B677



A-A



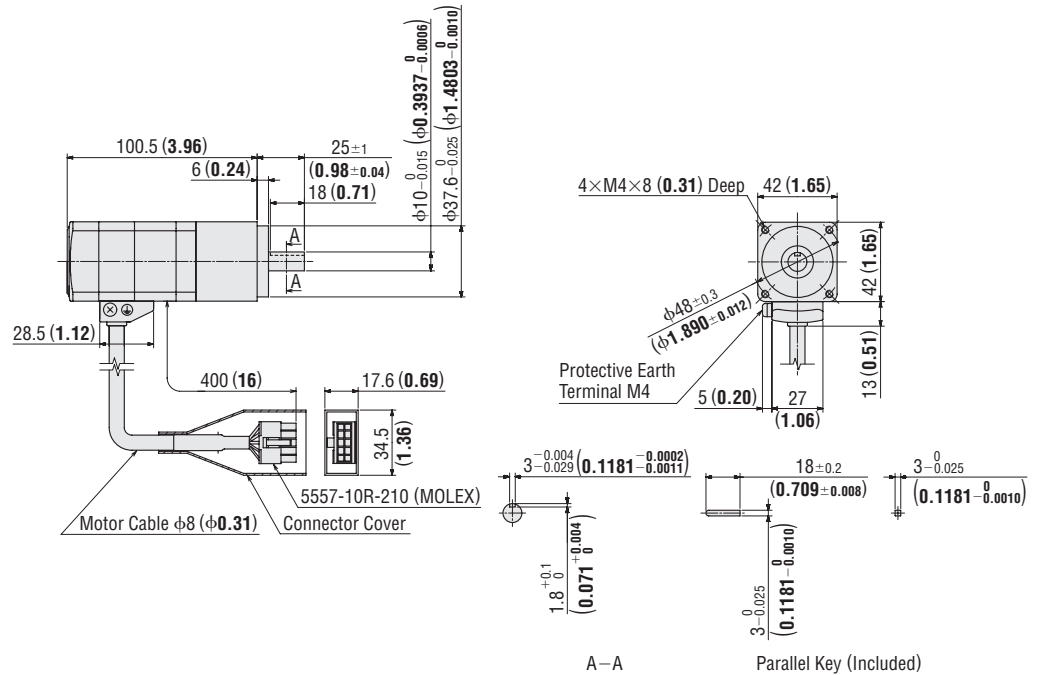
Parallel Key (Included)

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

◇ PN Geared Type

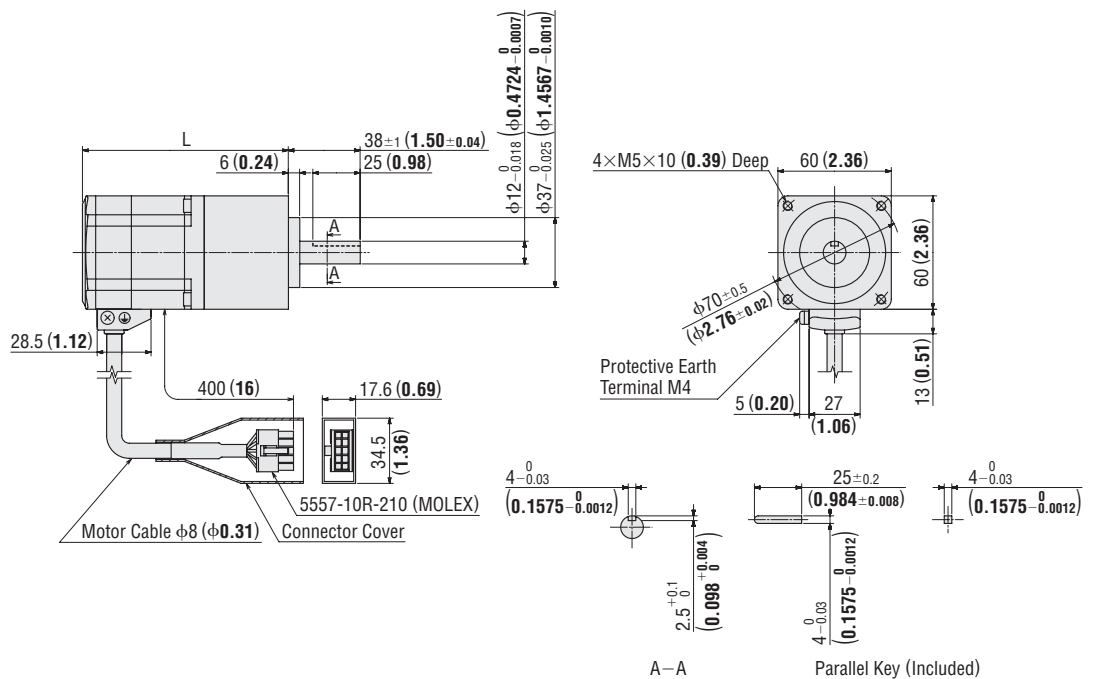
Motor Frame Size 42 mm (1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46A- <input type="checkbox"/> -N- <input type="checkbox"/> -3	ARM46AC-N- <input type="checkbox"/>	5, 7.2, 10	0.73 (1.61)	B476



Motor Frame Size 60 mm (2.36 in.)

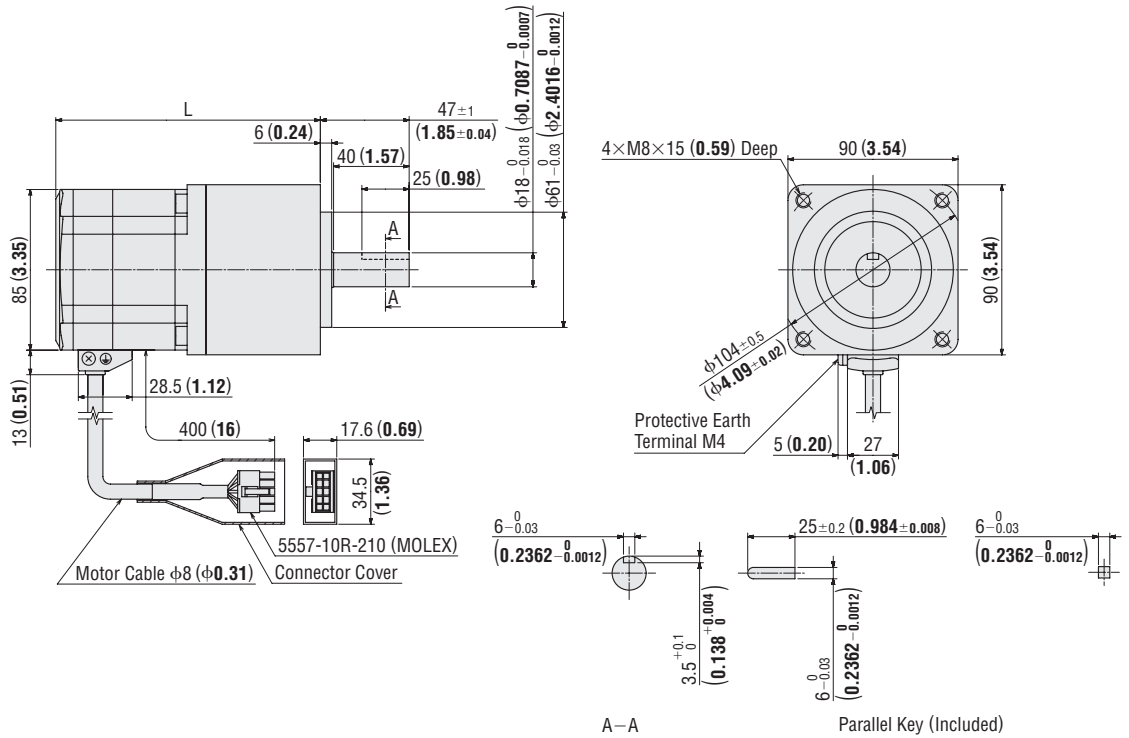
Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR66A- <input type="checkbox"/> -N- <input type="checkbox"/> -3	ARM66AC-N- <input type="checkbox"/>	5, 7.2, 10	109 (4.29)	1.5 (3.3)	B477
		25, 36, 50	125 (4.92)	1.73 (3.8)	B478



● 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.

Motor Frame Size 90 mm (3.54 in.)

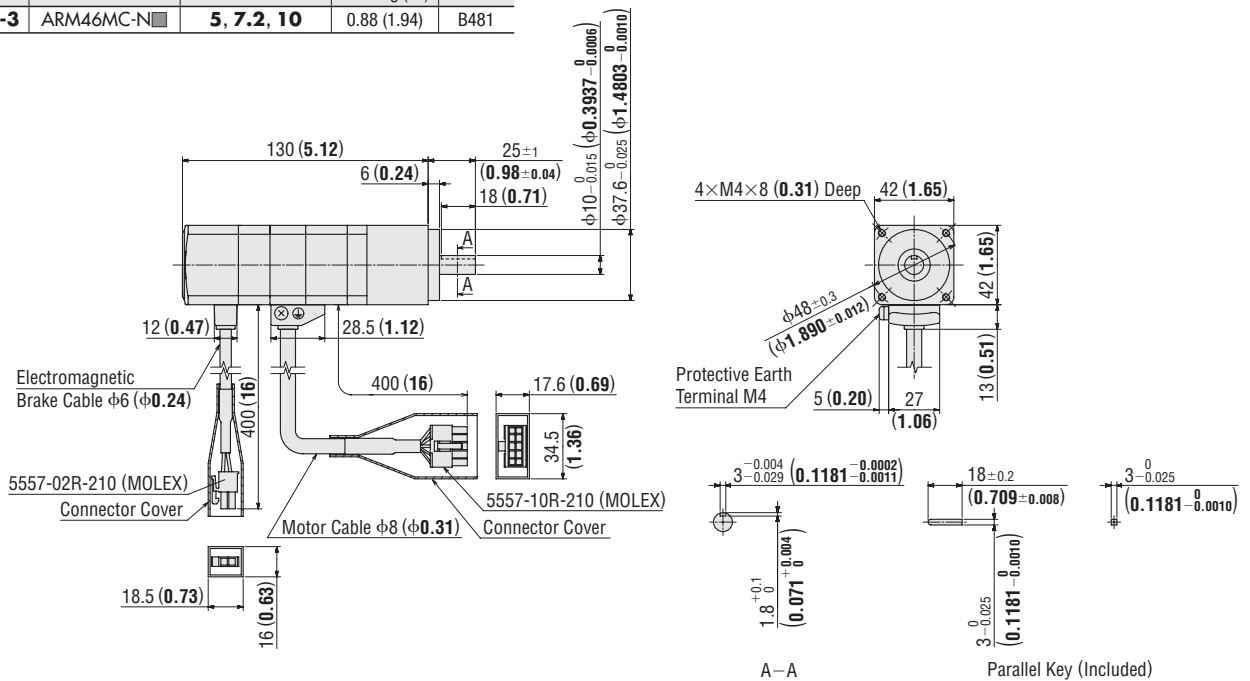
Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR98A <input type="checkbox"/> N <input type="checkbox"/> 3	ARM98AC-N <input type="checkbox"/>	5, 7.2, 10	140 (5.51)	3.8 (8.4)	B479
		25, 36, 50	163 (6.42)	4.5 (9.9)	B480



◇ PN Geared Type with Electromagnetic Brake

Motor Frame Size 42 mm (1.65 in.)

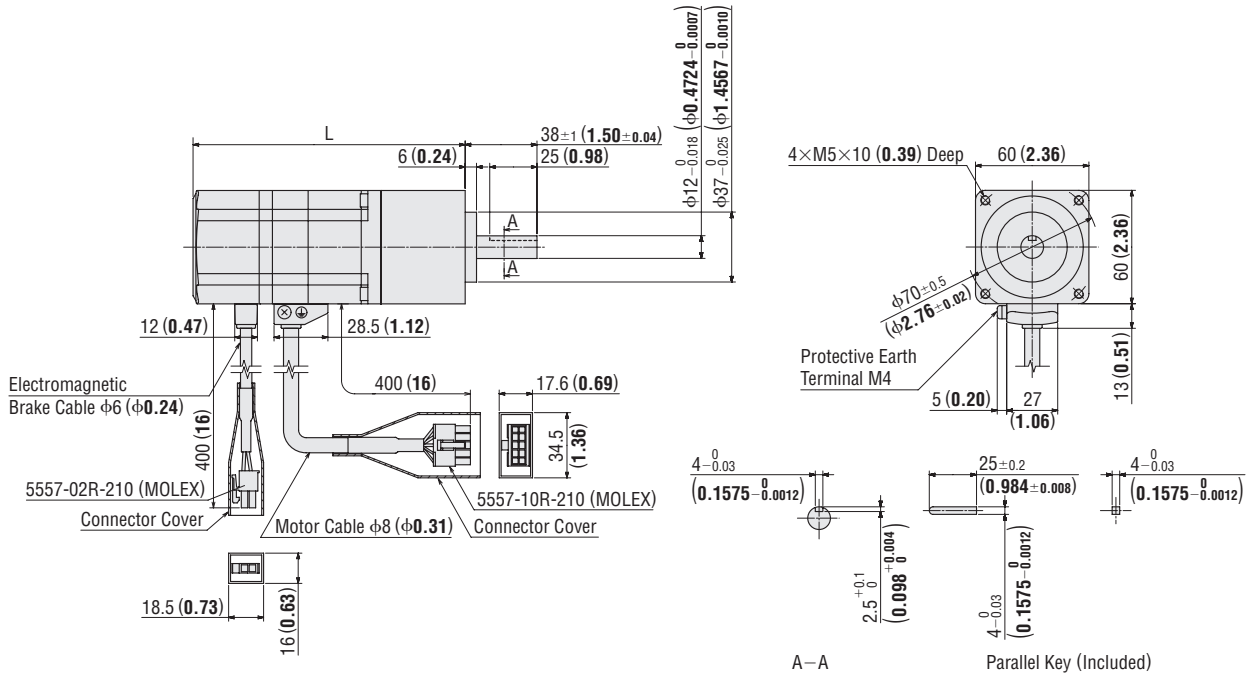
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46M <input type="checkbox"/> N <input type="checkbox"/> 3	ARM46MC-N <input type="checkbox"/>	5, 7.2, 10	0.88 (1.94)	B481



● 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.

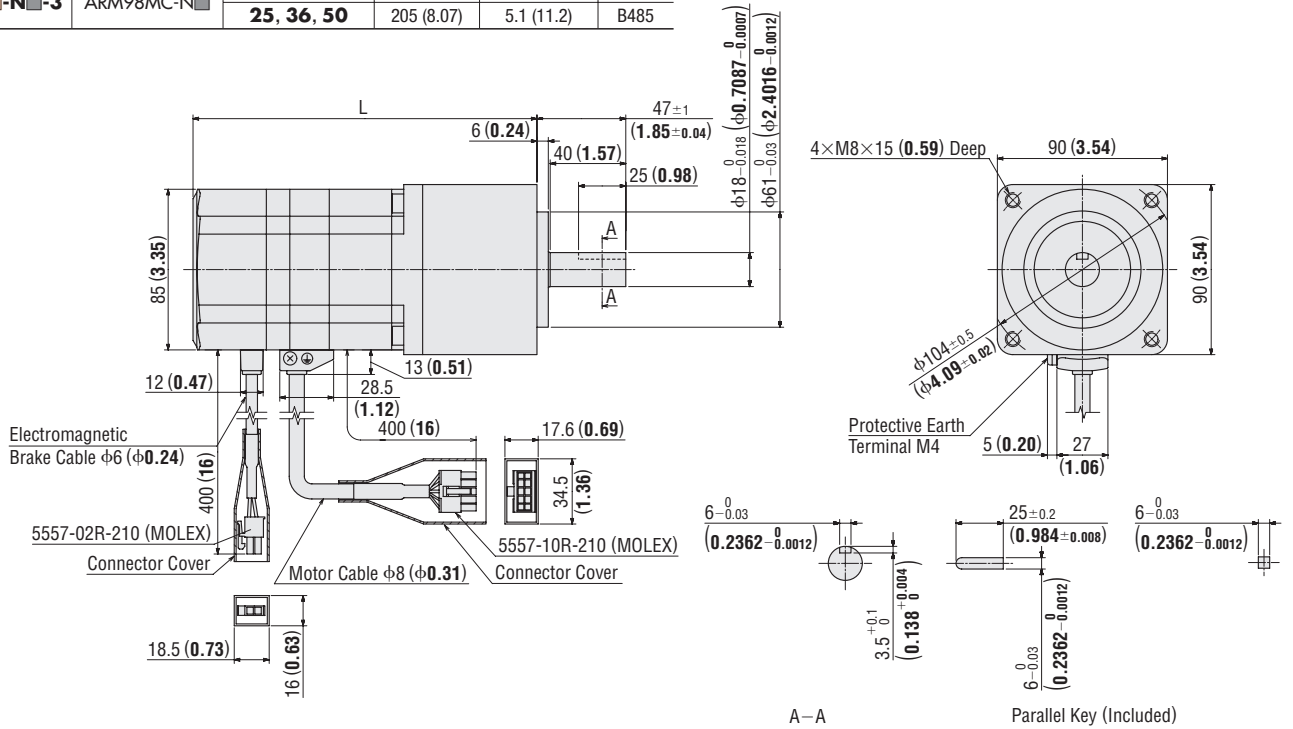
Motor Frame Size 60 mm (2.36 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR66M <input type="checkbox"/> -N <input type="checkbox"/> -3	ARM66MC-N <input type="checkbox"/>	5, 7.2, 10	144 (5.67)	1.8 (4.0)	B482
		25, 36, 50	160 (6.30)	2.0 (4.4)	B483



Motor Frame Size 90 mm (3.54 in.)

Model	Motor Model	Gear Ratio	L	Mass kg (lb.)	DXF
AR98M <input type="checkbox"/> -N <input type="checkbox"/> -3	ARM98MC-N <input type="checkbox"/>	5, 7.2, 10	182 (7.17)	4.4 (9.7)	B484
		25, 36, 50	205 (8.07)	5.1 (11.2)	B485

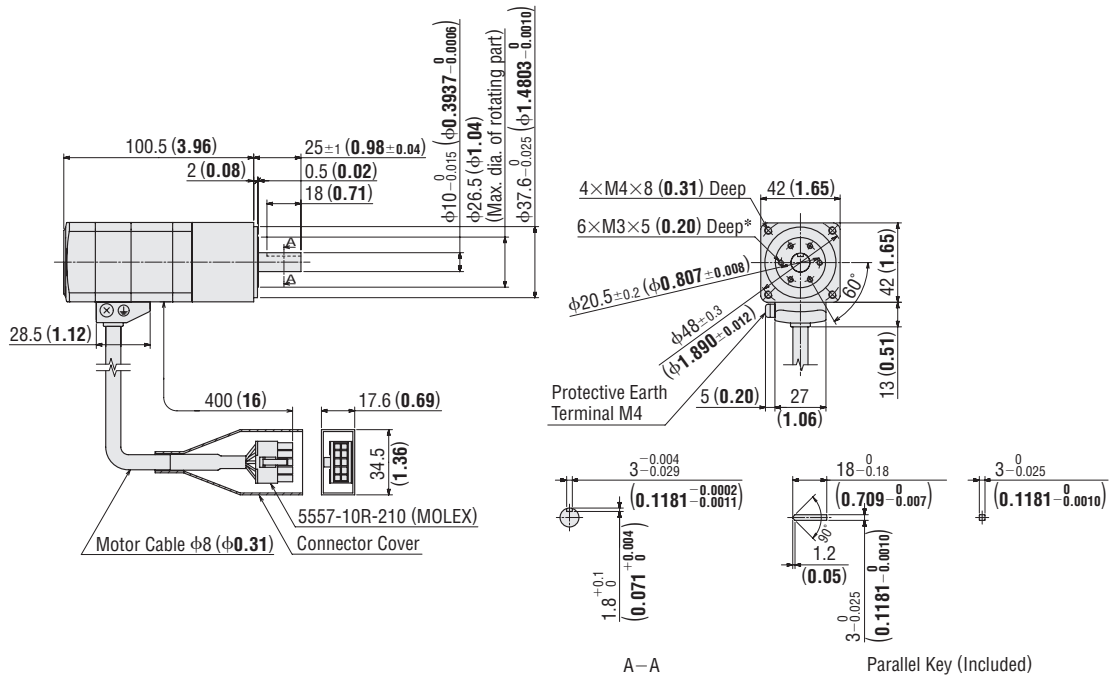


• Enter the power supply voltage (**A**, **C** or **S**) in the box () within the model name.
Enter the gear ratio in the box () within the model name.

◇ Harmonic Geared Type

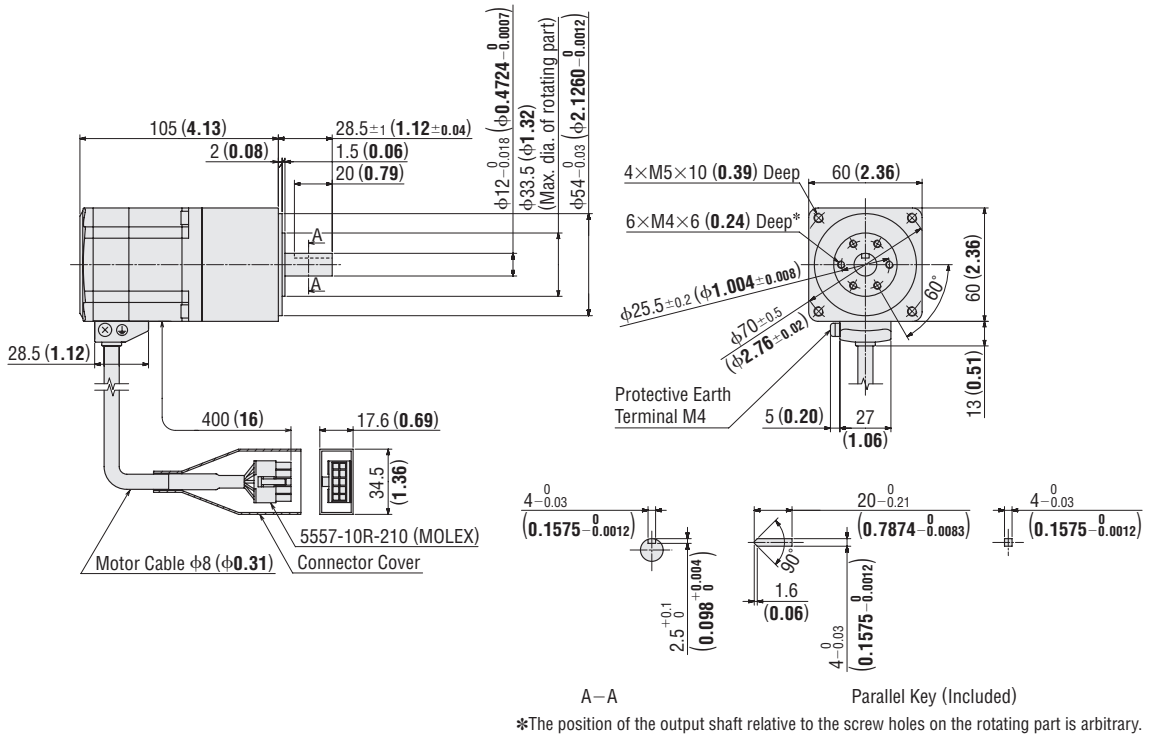
Motor Frame Size 42 mm (1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46A <input type="checkbox"/> H <input type="checkbox"/> -3	ARM46AC-H <input type="checkbox"/>	50, 100	0.68 (1.5)	B486



Motor Frame Size 60 mm (2.36 in.)

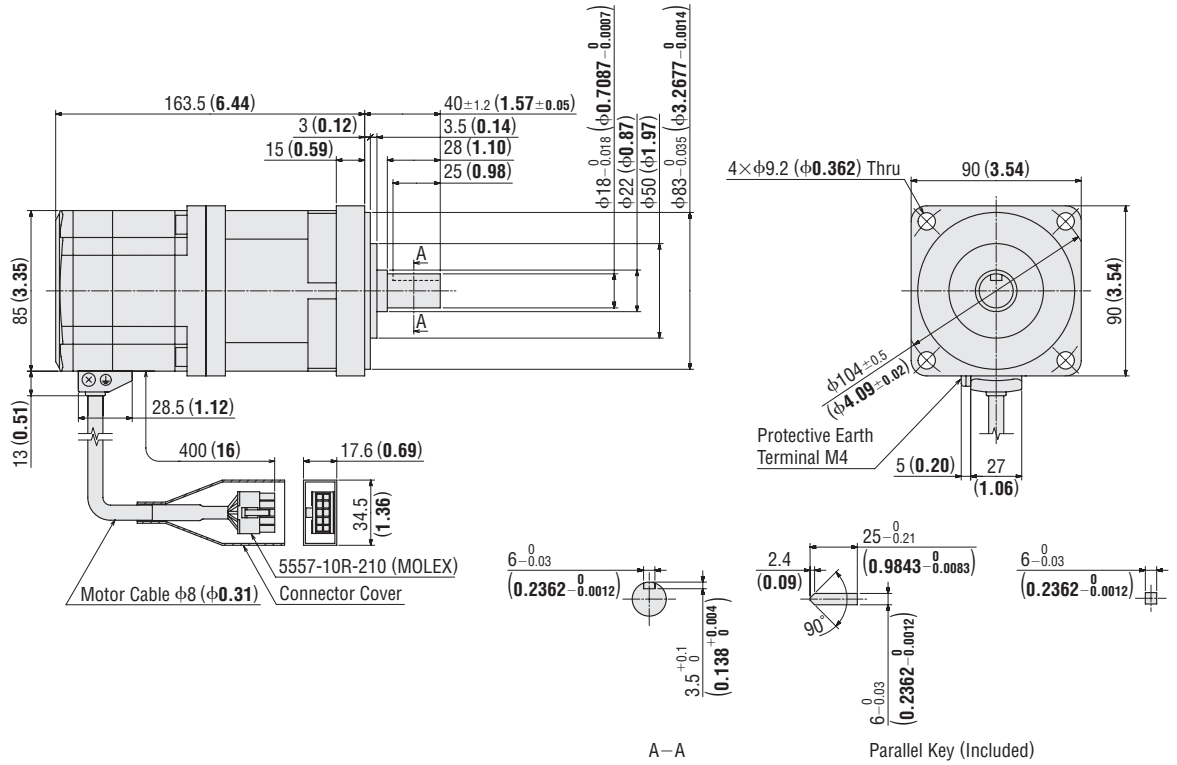
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66A <input type="checkbox"/> H <input type="checkbox"/> -3	ARM66AC-H <input type="checkbox"/>	50, 100	1.41 (3.1)	B487



● 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.

Motor Frame Size 90 mm (3.54 in.)

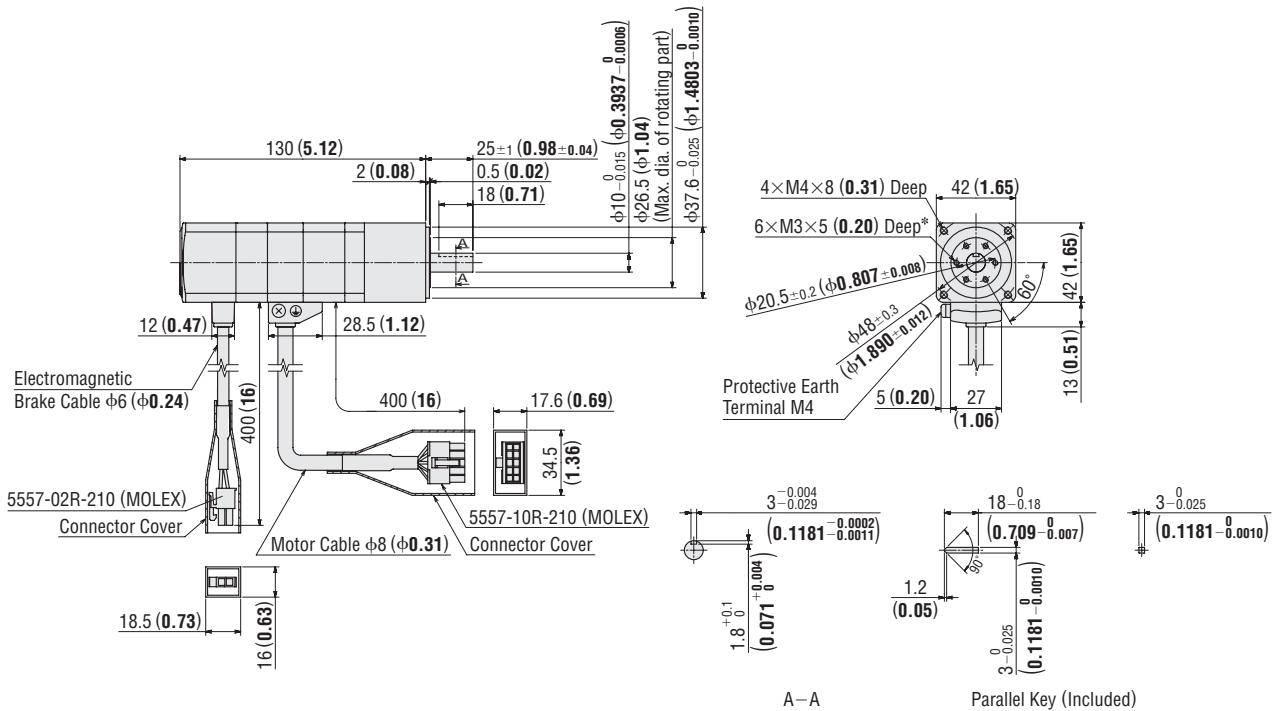
Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98A- <input type="checkbox"/> H-3	ARM98AC-H	50, 100	4.0 (8.8)	B488



◇ Harmonic Geared Type with Electromagnetic Brake

Motor Frame Size 42 mm (1.65 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR46M- <input type="checkbox"/> H-3	ARM46MC-H	50, 100	0.83 (1.83)	B489

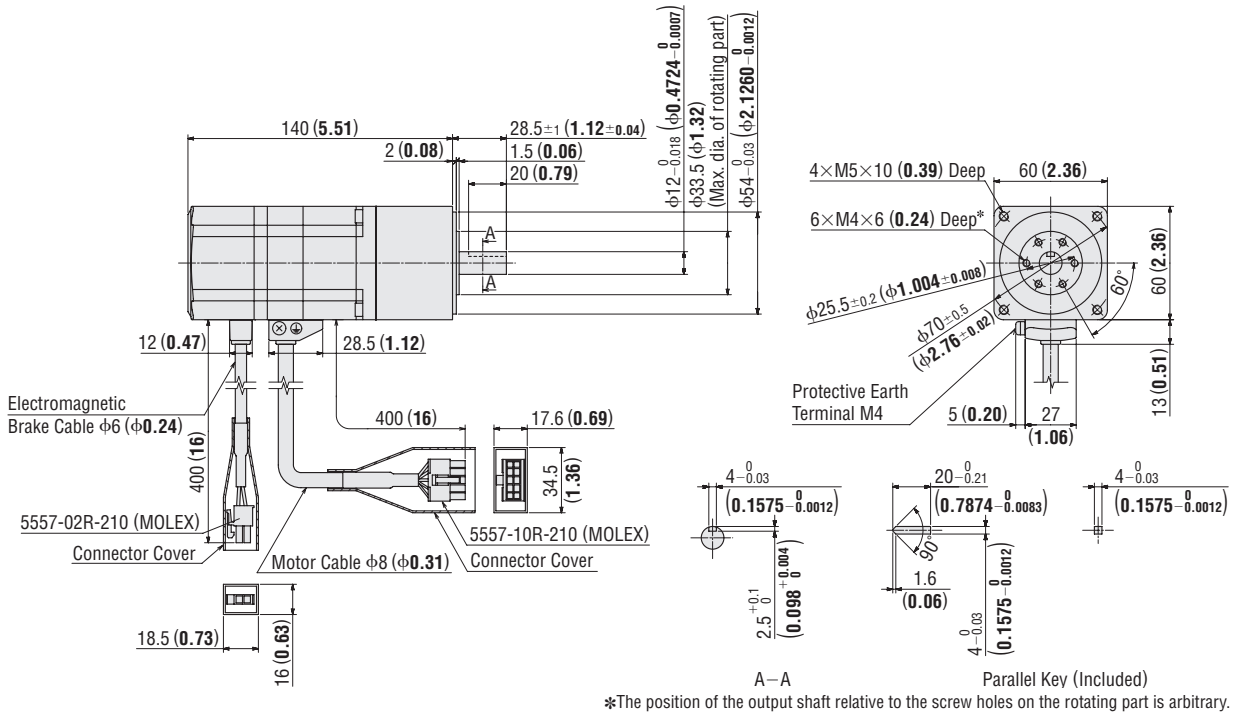


*The position of the output shaft relative to the screw holes on the rotating part is arbitrary

● 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.

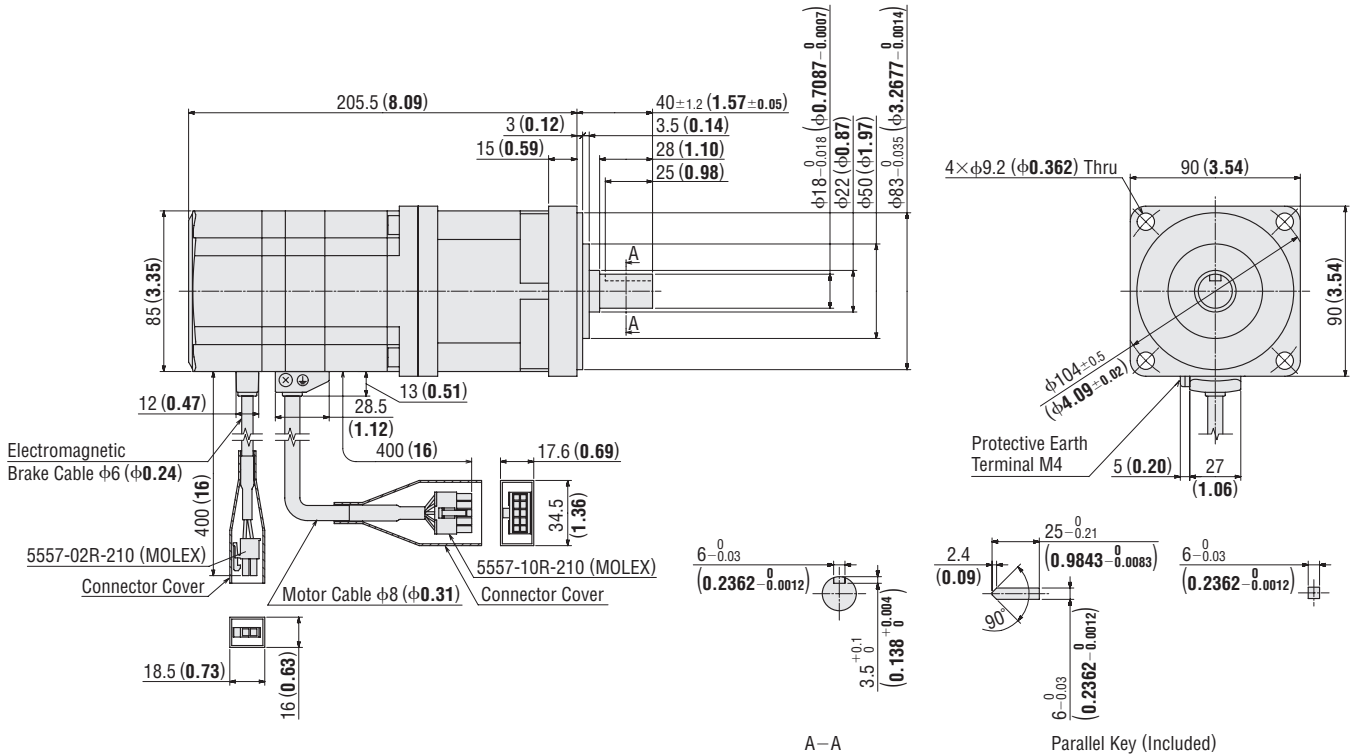
Motor Frame Size 60 mm (2.36 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR66M <input type="checkbox"/> -H <input type="checkbox"/> -3	ARM66MC-H	50, 100	1.71 (3.8)	B490



Motor Frame Size 90 mm (3.54 in.)

Model	Motor Model	Gear Ratio	Mass kg (lb.)	DXF
AR98M <input type="checkbox"/> -H <input type="checkbox"/> -3	ARM98MC-H	50, 100	4.6 (10.1)	B491

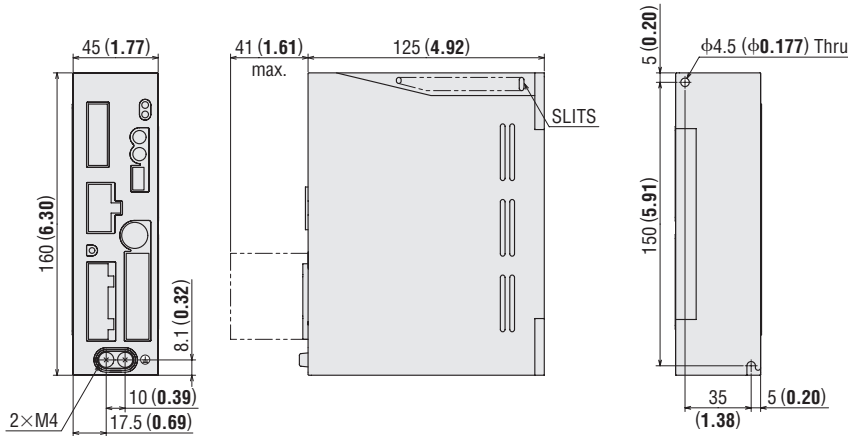


● Enter the power supply voltage (**A**, **C** or **S**) in the box (□) within the model name.
Enter the gear ratio in the box (□) within the model name.

● Driver

Mass: 0.75 kg (1.65 lb.)

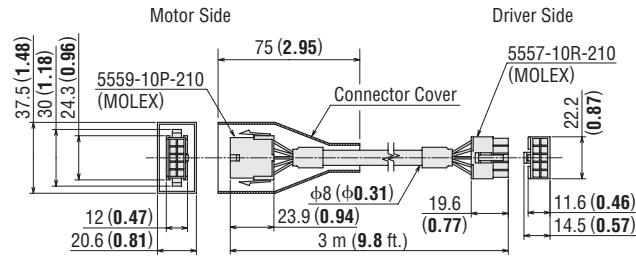
DXF B454



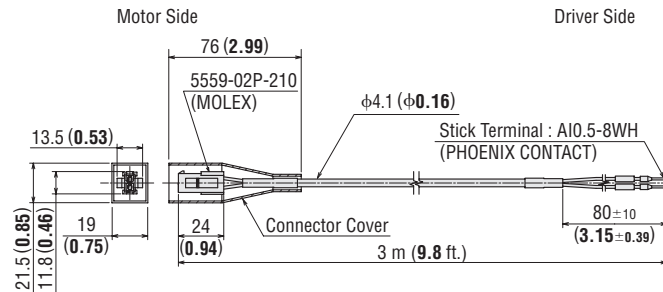
- Control I/O Connector (CN5)
Cover Assembly: 10336-52A0-008 (SUMITOMO 3M)
Connector: 10136-3000PE (SUMITOMO 3M)
- Connector for Regeneration Unit Input/Main Power Supply Input Terminal (CN3)
Connector: 54928-0570 (MOLEX)
- Connector for 24 VDC Power Supply Input/Regeneration Unit Thermal Input/Electromagnetic Brake Output Terminal (CN1)
Connector: MC1.5/6-STF-3.5 (PHOENIX CONTACT)

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

● Cable for Motor

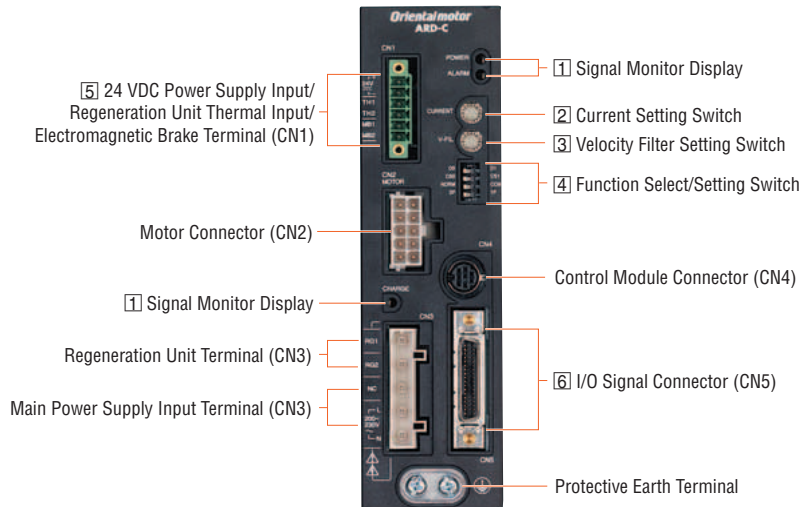


● Cable for Electromagnetic Brake (Only for electromagnetic brake type)



Connection and Operation

Names and Functions of Driver Parts



1 Signal Monitor Displays

◇ LED Displays

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

◇ Alarms

Blink Count	Function	When Activated
2	Overheat	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.
9	EEPROM error	A motor control parameter is damaged.

2 Current Setting Switch

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

3 Velocity Filter Setting Switch

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

4 Function Select/Setting Switches

Indication	Switch Name	Function
DO/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]
CS0/CS1 (3)		"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>
NORM/CCM (2)		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.

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

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)

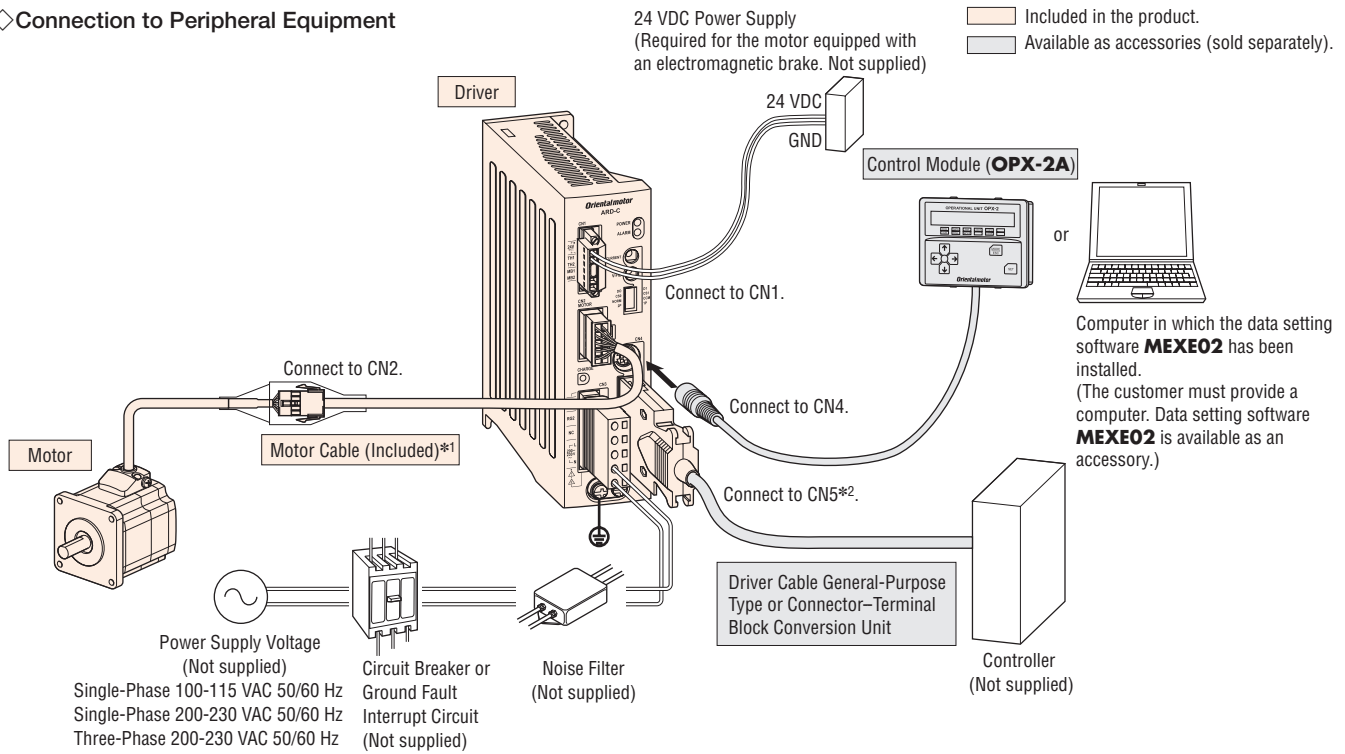
Indication	Input/Output	Pin No.	Signal		Signal Name	
			Positioning Operation	Push-Motion Operation*1	Positioning Operation	Push-Motion Operation*1
CN5	Output	1	-		-	
		2	GND		Ground connection	
		3	ASG+		A-phase pulse output (line driver)	
		4	ASG-			
		5	BSG+		B-phase pulse output (line driver)	
		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+ /AL0+*1		Operation ready complete output/Alarm code output 0*1	
		16	READY- /AL0-*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	
	22	IN-COM		Input signal common		
	23	C-ON		Current on input*2		
	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	-		MO*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, excitation OFF		
	31	PLS+ /CW+		Pulse input/CW pulse input (+5 V/line driver)		
	32	PLS- /CW-				
	33	PLS+24 /CW+24V		Pulse input/CW pulse input (+24 V)		
	34	DIR+24 /CCW+24V		Direction input/CCW pulse input (+24 V)		
	35	DIR+ /CCW+		Direction input/CCW pulse input (+5 V/line driver)		
	36	DIR- /CCW-				
36	Input					

*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 The factory setting of the C-ON input is normally open. Be sure to turn the C-ON input ON when operating the motor. Set the C-ON input to normally close with a control module (**OPX-2A**, sold separately) or a data setting software (**MEXE02**, sold separately) when the C-ON input is not used.

● Connection Diagram

◇ Connection to Peripheral Equipment

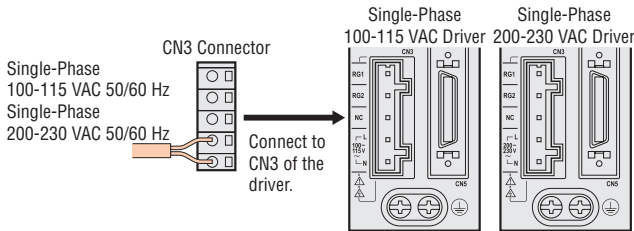


*1 Each model comes with a motor cable 3 m (9.8 ft.) long. If you need a cable of a different length or a flexible cable, select an appropriate cable from among the accessories (sold separately).
 *2 Each model comes with a control I/O connector (CN5), but you must select the driver cable general-purpose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

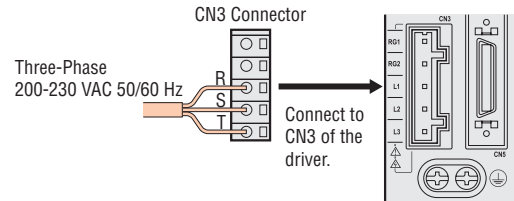
◇ Connecting a Main Power Supply

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

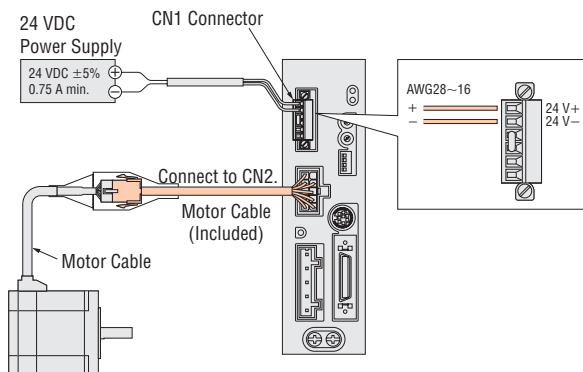


• Three-Phase 200-230 VAC



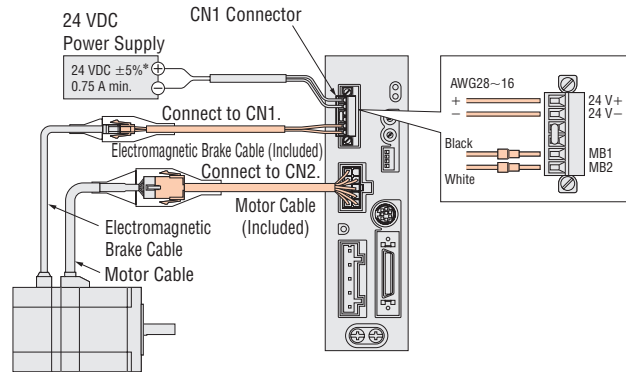
◇ Connecting the Control Power Supply

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.



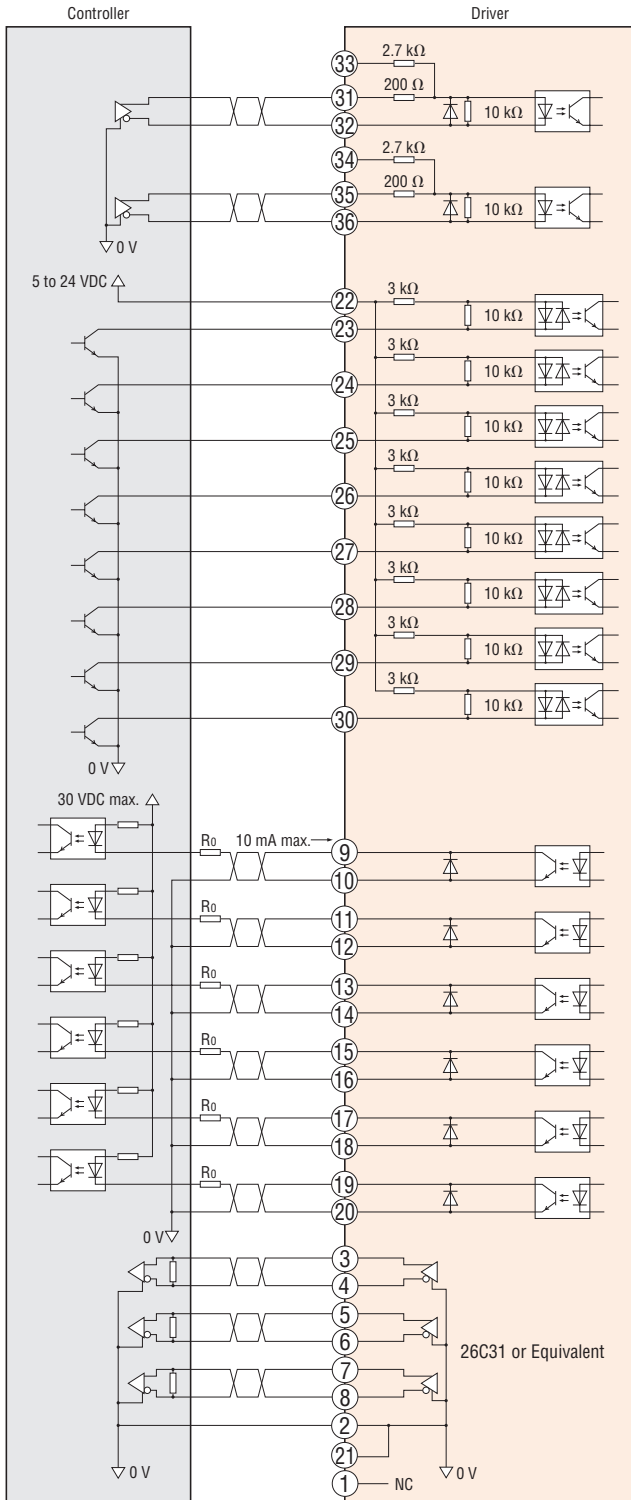
* If the distance between the motor and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of 24 VDC $\pm 4\%$.

Introduction
AC Input Motor & Driver
0.36° / Geared / GATEP AR
0.72° / Geared / GATEP AS
0.9° / 1.8° / Geared / RK
0.9° / 1.8° / Geared / UMK
DC Input Motor & Driver
0.36° / Geared / GATEP AR
0.36° / Geared / GATEP ASX
0.36° / 0.72° / Geared / CRK
0.9° / 1.8° / Geared / CMK
1.8° / Geared / RBK
0.36° / Geared / PK
0.72° / Geared / PK
Motor Only
0.9° / Geared / PK
1.8° / Geared / PK/PV
Geared / PK
Controllers / SCX10 / EMP400 / SG8030J
Accessories

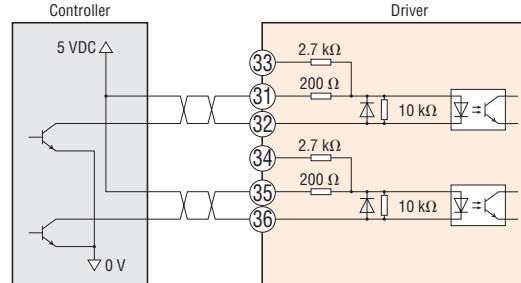
◇ Connecting to a Host Controller

● Connecting to a Current Sink Output Circuit

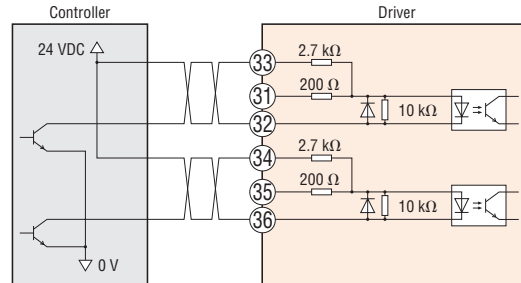
When pulse input is of line driver type



When pulse input is of 5 VDC type



When pulse input is of 24 VDC type



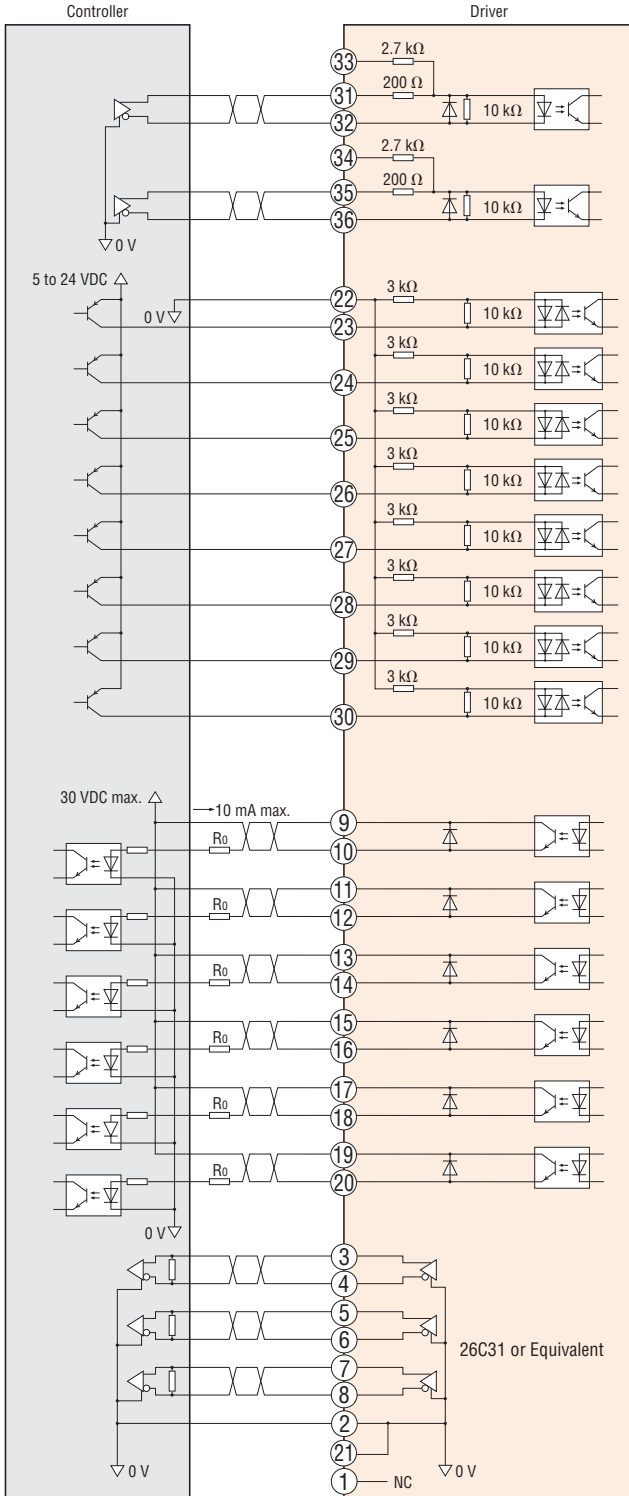
Notes

- 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 24 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 200 mm (7.9 in.) between the control I/O signal lines and power lines (AC lines, motor lines and other large-current circuits).

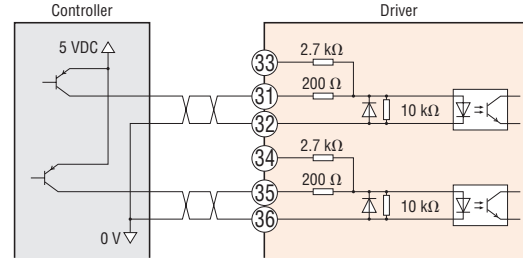
◇ Connecting to a Host Controller

● Connecting to a Current Source Output Circuit

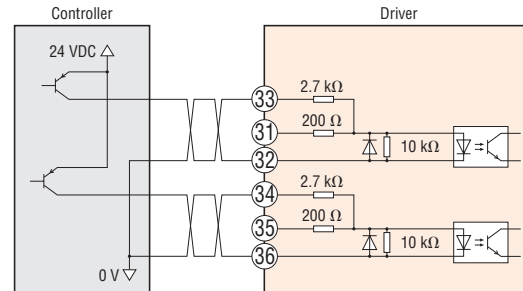
When pulse input is of line driver type



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 24 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 200 mm (7.9 in.) between the control I/O signal lines and power lines (AC lines, motor lines and other large-current circuits).

Introduction	AC Input Motor & Driver	DC Input Motor & Driver
AR	0.36° / Geared / ASTEP	0.36° / Geared / CRK
AS	0.72° / Geared / RK	0.36° / Geared / CMK
	0.9° / 1.8° / UMK	0.9° / 1.8° / RBK
	0.36° / Geared / AR	1.8° / Geared / PK
	0.36° / Geared / ASX	0.36° / PK
	0.36° / 0.72° / Geared / CRK	0.72° / PK
	0.9° / 1.8° / Geared / CMK	0.9° / PK
	1.8° / Geared / RBK	Motor Only
	0.36° / PK	1.8° / PK/PV
	0.72° / PK	Geared / PK
	0.9° / PK	Controllers / SCX10 / EMP400 / 5G8030J
	1.8° / PK/PV	Accessories

List of Motor and Driver Combinations

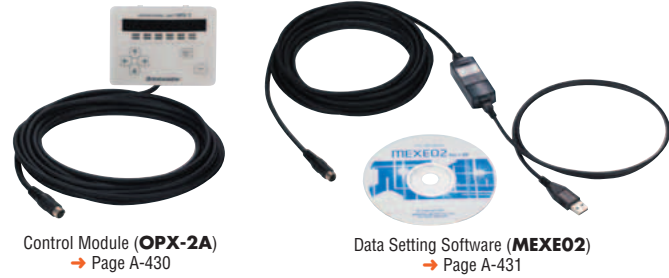
Model names for motor and driver combinations are shown below.

Type	Model	Motor Model	Driver Model
Standard Type	AR46□□-3	ARM46□C	ARD-□
	AR66□□-3	ARM66□C	
	AR69□□-3	ARM69□C	
	AR98□□-3	ARM98□C	
	AR911□□-3	ARM911□C	
TH Geared Type	AR46□□-T3.6-3	ARM46□C-T3.6	ARD-□
	AR46□□-T7.2-3	ARM46□C-T7.2	
	AR46□□-T10-3	ARM46□C-T10	
	AR46□□-T20-3	ARM46□C-T20	
	AR46□□-T30-3	ARM46□C-T30	
	AR66□□-T3.6-3	ARM66□C-T3.6	
	AR66□□-T7.2-3	ARM66□C-T7.2	
	AR66□□-T10-3	ARM66□C-T10	
	AR66□□-T20-3	ARM66□C-T20	
	AR66□□-T30-3	ARM66□C-T30	
	AR98□□-T3.6-3	ARM98□C-T3.6	
	AR98□□-T7.2-3	ARM98□C-T7.2	
	AR98□□-T10-3	ARM98□C-T10	
	AR98□□-T20-3	ARM98□C-T20	
	AR98□□-T30-3	ARM98□C-T30	
PS Geared Type	AR46□□-PS5-3	ARM46□C-PS5	ARD-□
	AR46□□-PS7-3	ARM46□C-PS7	
	AR46□□-PS10-3	ARM46□C-PS10	
	AR46□□-PS25-3	ARM46□C-PS25	
	AR46□□-PS36-3	ARM46□C-PS36	
	AR46□□-PS50-3	ARM46□C-PS50	
	AR66□□-PS5-3	ARM66□C-PS5	
	AR66□□-PS7-3	ARM66□C-PS7	
	AR66□□-PS10-3	ARM66□C-PS10	
	AR66□□-PS25-3	ARM66□C-PS25	
	AR66□□-PS36-3	ARM66□C-PS36	
	AR66□□-PS50-3	ARM66□C-PS50	
	AR98□□-PS5-3	ARM98□C-PS5	
	AR98□□-PS7-3	ARM98□C-PS7	
	AR98□□-PS10-3	ARM98□C-PS10	
PN Geared Type	AR46□□-N5-3	ARM46□C-N5	ARD-□
	AR46□□-N7.2-3	ARM46□C-N7.2	
	AR46□□-N10-3	ARM46□C-N10	
	AR66□□-N5-3	ARM66□C-N5	
	AR66□□-N7.2-3	ARM66□C-N7.2	
	AR66□□-N10-3	ARM66□C-N10	
	AR66□□-N25-3	ARM66□C-N25	
	AR66□□-N36-3	ARM66□C-N36	
	AR66□□-N50-3	ARM66□C-N50	
	AR98□□-N5-3	ARM98□C-N5	
	AR98□□-N7.2-3	ARM98□C-N7.2	
	AR98□□-N10-3	ARM98□C-N10	
	AR98□□-N25-3	ARM98□C-N25	
	AR98□□-N36-3	ARM98□C-N36	
	AR98□□-N50-3	ARM98□C-N50	
Harmonic Geared Type	AR46□□-H50-3	ARM46□C-H50	ARD-□
	AR46□□-H100-3	ARM46□C-H100	
	AR66□□-H50-3	ARM66□C-H50	
	AR66□□-H100-3	ARM66□C-H100	
	AR98□□-H50-3	ARM98□C-H50	
	AR98□□-H100-3	ARM98□C-H100	

● Enter the power supply voltage **A** (single-phase 100-115 VAC), **C** (single-phase 200-230 VAC) or **S** (three-phase 200-230 VAC) in the box (□) within the model name.
Enter **A** (single shaft), **B** (double shaft) or **M** (electromagnetic brake) in the box (□) within the standard type model names of **AR46**, **AR66**, **AR69** and **AR98**.
Enter **A** (single shaft) or **B** (double shaft) in the box (□) within the standard type model name of **AR911**.

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 A-430

Data Setting Software (**MEXE02**)
→ Page A-431

Parameter Setting

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

Parameter Category	Parameter Name	Description	
Application Parameter	Operating current	Current value assigned to the operating current setting switch	
	Speed filter	Filter time constant assigned to the speed filter setting switch	
	I/O		Input signal mode, Positioning operation/push-motion operation switching
			Alarm code signal enabled/disabled
			C-ON input logic
	Normal mode		Output condition for END signal (output width)
			Current value applicable to push-motion operation
			Standstill current in the normal mode
	Current control mode		Speed difference gain in the normal 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
	Alarm/Warning		Damping control vibration frequency in the current control mode
			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

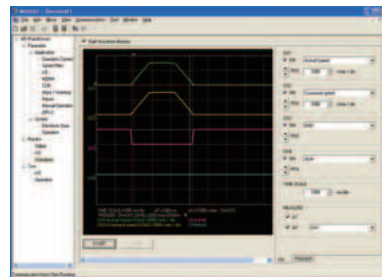
You can monitor various signals, alarms and motor speeds/positions, and also perform test operations.

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