

Standard AC Motors

Constant Speed Motors

Low-Speed Synchronous Motors

Low-Speed Synchronous Motors

| |
|-----------------------------------|
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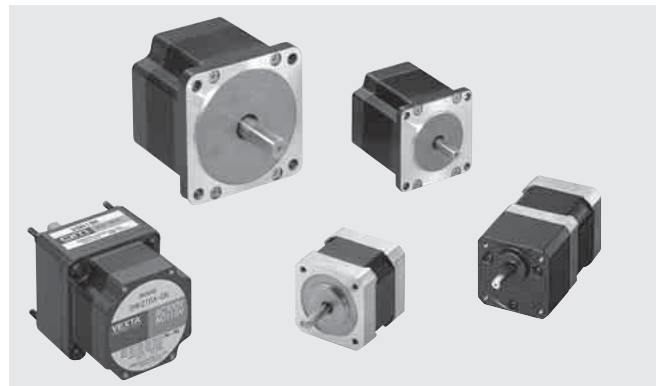
RoHS RoHS-Compliant
Low-Speed Synchronous Motors
SMK Series

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

Low-speed synchronous motors are the continuous rated synchronous motors in which quick bi-directional rotation is possible. The basic construction of low-speed synchronous motors is the same as that of stepping motors. Since they can be driven by an AC power supply, they are sometimes called AC stepping motors.



● List of safety standard approved products (Model, Standards, File No., Certification Body)
 → Page G-11



Features

● Low-Speed / Synchronous Rotation

The motor rotates at a speed proportional to and accurately synchronized with the frequency of the power supply.

A fluctuation in load does not affect the rotation speed.

At 50 Hz 60 r/min (30 r/min)*

At 60 Hz 72 r/min (36 r/min)*

* For **SMK014MA-A**

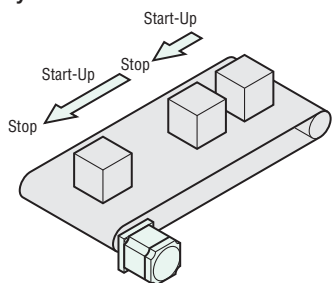
● Continuous Rated Capacitor-Run Motor

This is a capacitor-run motor that can be driven by a capacitor only (An external resistance is needed for **SMK5□**). This can be driven at a continuous rating even when bi-directional operation is required.

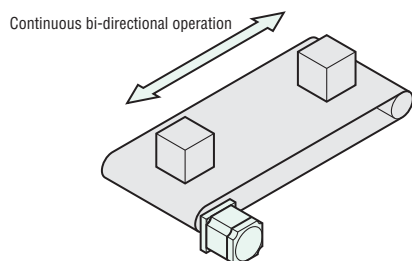
● Superb Starting, Stopping and Reversing Characteristics

If operated within the permissible load inertia, the motor can start, stop and reverse within 1.5 cycles (0.03 sec at 50 Hz, 0.025 sec at 60 Hz) of power supply frequency.

◇ Suitable for equipment that starts and stops repeatedly such as conveyors.



◇ Bi-directional operation can be repeated continuously.

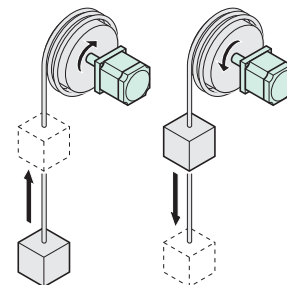


● Precise Positioning

The motor can be stopped instantly by turning off the power supply. The stopping accuracy within the motor's permissible load inertia is $\pm 10^\circ$. When a precision switch is used, simple and precise positioning is possible.

● Vertical Applications

Constant speed can be maintained even during gravitational operations. Low-speed synchronous motors are suitable for applications, such as an elevator system, whereby vertical operation at a constant speed is required.



● Holding Torque

Since a permanent-magnet, multi-poled rotor is used, the motor has holding torque even when the motor is not energized. When used with a gearhead, comparatively high holding torque can be utilized.

● When, at motor standstill, a DC power supply is used, a large holding torque almost equal to that of a stepping motor can be produced.

DC Excitation → Page A-213

● Long Life, Low Noise **GN-S** Gearhead is Available.

The "long life, low noise **GN-S** gearhead" achieves a long rated life of 10000 hours, twice the level of a conventional gearhead, by adopting innovative technologies and structure. Also, the gearhead is designed for low noise.

● Details of long life, low noise **GN-S** gearhead → Page A-21

● **SMK0A-□A** indicates a geared motor consisting of a special gearhead and a motor. The gearhead cannot be replaced.

● **RoHS** RoHS-Compliant

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

● Details of RoHS Directive → Page G-38

System Configuration

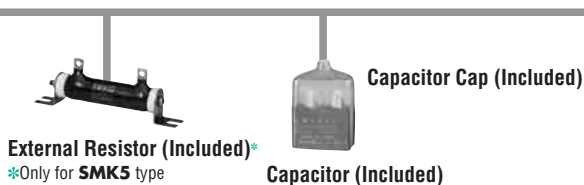
Gearhead (Sold separately)

Parallel Shaft Gearheads (→ Page A-21)



SMK Series

Motor (Round shaft)



AC Power Supply
(Main power supply)

Accessories (Sold separately)



① Mounting Brackets

(→ Page C-312. When combining a pinion shaft type with **2GN□SA** or **5GN□SA** → Page A-288)



② Flexible Couplings

(→ Page C-303. When combining a pinion shaft type with **2GN□SA** or **5GN□SA** → Page A-292)



③ CR Circuit for Surge Suppression

(→ Page A-302)

| No. | Product Name | Overview | Page |
|-----|----------------------------------|--|--------------|
| ① | Mounting Brackets | Dedicated mounting bracket for the motor and gearhead. | A-288, C-312 |
| ② | Flexible Couplings | Coupling that connects the motor shaft to the driven shaft. | A-292, C-303 |
| ③ | CR Circuit for Surge Suppression | Used to protect relay and switch contacts (EPCR1201-2). | A-302 |

● Example of System Configuration

(Sold separately)



● Gearheads cannot be combined with round shaft type motors.

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

Product Number Code

Motor

SMK 0 14 M A - A

① ② ③ ④ ⑤ ⑥

Gearhead

5 GN 50 SA

① ② ③ ④

Geared Motor

SMK 0 A - 120 A

① ② ③ ④ ⑤

Product Line

Motor (RoHS)

| Power Supply Voltage | Shaft Type | Model |
|-----------------------------|----------------------|--|
| Single-Phase 100/115 VAC | Round Shaft | SMK014A-A |
| | | SMK014MA-A |
| | | SMK237A-A |
| | | SMK5100A-AA |
| | GN Type Pinion Shaft | SMK5160A-AA |
| | | SMK216A-GN SMK550A-GN |

Geared Motor (RoHS)

| Power Supply Voltage | Model | Gear Ratio |
|-----------------------------|-----------------|---|
| Single-Phase 100/115 VAC | SMK0A-□A | 3, 3.6, 7.5, 9, 15, 18, 30, 36, 50, 60, 100, 120 |

The following items are included in each product.
 Motor, Capacitor, Capacitor Cap, External Resistor*, Operating Manual
 *Only for **SMK5□** type

| | |
|------------------------|--|
| ① Series | SMK: SMK Series |
| ② Motor Frame Size | 0: 42 mm (1.65 in.) 2: 56.4 mm (2.22 in.) [GN Pinion Shaft Type 60 mm (2.36 in.)] 5: 85 mm (3.35 in.) [GN Pinion Shaft Type 90 mm (3.54 in.)] |
| ③ Motor Torque | 14: 0.14 N-m (19.8 oz-in.) 16: 0.16 N-m (22 oz-in.) 37: 0.37 N-m (52 oz-in.) 50: 0.5 N-m (71 oz-in.) 100: 1.0 N-m (142 oz-in.) 160: 1.6 N-m (220 oz-in.) |
| ④ Speed | Blank: 60/72 r/min (50/60 Hz) M: 30/36 r/min (50/60 Hz) |
| ⑤ Power Supply Voltage | A: Single-Phase 100/115 VAC |
| ⑥ Motor Shaft Type | A, AA: Round Shaft GN: GN Type Pinion Shaft |

| | |
|--|---|
| ① Gearhead Frame Size | 2: 60 mm (2.36 in.) 5: 90 mm (3.54 in.) |
| ② Type of Pinion | GN: GN Type Pinion |
| ③ Gear Ratio | (Example) 50: Gear Ratio of 50:1 |
| ④ SA: Long Life, Low Noise GN-S Gearhead, RoHS-Compliant | |

| | |
|------------------------|---|
| ① Series | SMK: SMK Series |
| ② Motor Frame Size | 0: 42 mm (1.65 in.) |
| ③ Power Supply Voltage | A: Single-Phase 100/115 VAC |
| ④ Gear Ratio | (Example) 120: Gear Ratio of 120:1 |
| ⑤ Motor Shaft Type | A: Single Shaft |

Parallel Shaft Gearhead (Sold separately)

◇ Long Life, Low Noise GN-S Gearhead (RoHS)

| Applicable Motor (Pinion shaft) | Model | Gear Ratio |
|----------------------------------|---------------|---|
| Frame Size □60 mm (□2.36 in.) | 2GN□SA | 3, 3.6, 5, 6, 7.5, 9, 12.5, 15, 18, 25, 30, 36, 50, 60, 75, 90, 100, 120, 150, 180 |
| Frame Size □90 mm (□3.54 in.) | 5GN□SA | |

The following items are included in each product.
 Gearhead, Mounting Screws, Operating Manual

Following gearheads are also available. For details, please refer to website (<http://www.orientalmotor.com/>) or contact the nearest Oriental Motor sales office.

| Gearhead Type | | Gearhead Model | Gear Ratio |
|----------------|----------------------|----------------|--------------|
| Parallel Shaft | (RoHS) | 2GN□KA | 3~180 |
| | GN-K Gearhead | 5GN□KA | 3~180 |

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

Specifications – Continuous Rating

● Motor **(RoHS)**



| Model | Voltage VAC | Frequency Hz | Current A | Torque N·m (oz-in) | Speed r/min | Holding Torque mN·m (oz-in) | Rotor Inertia J kg·m ² (oz-in ²) | Capacitor μF | External Resistor | |
|-------------------------|------------------|--------------|-----------|--------------------|-------------|-----------------------------|---|--------------|-------------------|----|
| | | | | | | | | | Ω | W |
| (ZP) SMK014A-A | Single-Phase 100 | 50 | 0.043 | 0.11 (15.6) | 60 | 9 (1.27) | 55×10 ⁻⁷ (0.3) | 0.6 | - | - |
| | | 60 | 0.046 | 0.12 (17.0) | 72 | | | | | |
| | Single-Phase 115 | 60 | 0.053 | 0.13 (18.4) | 72 | | | | | |
| (ZP) SMK014MA-A | Single-Phase 100 | 50 | 0.043 | 0.11 (15.6) | 30 | 4.5 (0.63) | 55×10 ⁻⁷ (0.3) | 0.6 | - | - |
| | | 60 | 0.046 | 0.12 (17.0) | 36 | | | | | |
| | Single-Phase 115 | 60 | 0.053 | 0.13 (18.4) | 36 | | | | | |
| (ZP) SMK237A-A | Single-Phase 100 | 50 | 0.08 | 0.37 (52) | 60 | 25 (3.5) | 300×10 ⁻⁷ (1.64) | 1.2 | - | - |
| | | 60 | 0.09 | 0.37 (52) | 72 | | | | | |
| | Single-Phase 115 | 60 | 0.10 | 0.37 (52) | 72 | | | | | |
| (ZP) SMK216A-GN | Single-Phase 100 | 50 | 0.08 | 0.16 (22) | 60 | 15 (2.1)* | 120×10 ⁻⁷ (0.66) | 1.2 | - | - |
| | | 60 | 0.09 | 0.16 (22) | 72 | | | | | |
| | Single-Phase 115 | 60 | 0.10 | 0.16 (22) | 72 | | | | | |
| (ZP) SMK5100A-AA | Single-Phase 100 | 50 | 0.17 | 1.0 (142) | 60 | 36 (5.1) | 1400×10 ⁻⁷ (7.7) | 2.5 | 400 | 30 |
| | | 60 | 0.20 | 1.0 (142) | 72 | | | | | |
| | Single-Phase 115 | 60 | 0.21 | 1.1 (156) | 72 | | | | | |
| (ZP) SMK5160A-AA | Single-Phase 100 | 50 | 0.23 | 1.6 (220) | 60 | 89 (12.6) | 2700×10 ⁻⁷ (14.8) | 2.5 | 400 | 30 |
| | | 60 | 0.26 | 1.8 (250) | 72 | | | | | |
| | Single-Phase 115 | 60 | 0.28 | 2.1 (290) | 72 | | | | | |
| (ZP) SMK550A-GN | Single-Phase 100 | 50 | 0.06 | 0.5 (71) | 60 | 36 (5.1)* | 1400×10 ⁻⁷ (7.7) | 0.6 | 400 | 30 |
| | | 60 | 0.07 | 0.5 (71) | 72 | | | | | |
| | Single-Phase 115 | 60 | 0.07 | 0.5 (71) | 72 | | | | | |

* To calculate holding torque for gearmotors, use the following formula: listed holding torque × gear ratio.
 Note that the gearmotor holding torque should be lower than the permissible torque on the gear output shaft.

● **SMK014**□ is not a standard certified product.

(ZP): Impedance protected

● Geared Motor **(RoHS)**

| Model | Voltage VAC | Frequency Hz | Current A | Speed*1 r/min | Holding Torque*2 mN·m (oz-in) | Rotor Inertia J kg·m ² (oz-in ²) | Capacitor μF |
|----------------------|------------------|------------------|-----------|---------------|-------------------------------|---|--------------|
| (ZP) SMK0A-□A | Single-Phase 100 | 50 | 0.043 | 60 | 9 (1.27) | 55×10 ⁻⁷ (0.3) | 0.6 |
| | | 60 | 0.046 | 72 | | | |
| | | Single-Phase 115 | 60 | 0.053 | | | |

*1 50 Hz: Gear output shaft speed = 60/Gear Ratio [r/min]

60 Hz: Gear output shaft speed = 72/Gear Ratio [r/min]

*2 To calculate holding torque for gearmotors, use the following formula: listed holding torque × gear ratio.

Note that the gearmotor holding torque should be lower than the permissible torque on the gear output shaft.

● Gearmotor - Torque Table → Page A-208

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

(ZP): Impedance protected

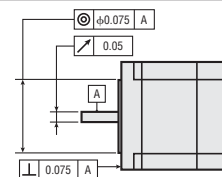
General Specifications

| Item | Specifications |
|-----------------------|--|
| Insulation Resistance | 100 MΩ or more when 500 VDC megger is applied between the windings and the case after rated operation under normal ambient temperature and humidity. |
| Dielectric Strength | Sufficient to withstand 1.5 kVAC at 50 Hz or 60 Hz applied between the windings and the case for 1 minute after rated operation under normal ambient temperature humidity. |
| Temperature Rise | Temperature rise of motor case is 55°C (99°F) or less measured by thermometer method after rated operation under normal ambient temperature and humidity. |
| Insulation Class | UL, CSA: Class A [105°C (221°F)] EN: Class E [120°C (248°F)] |
| Overheat Protection | Impedance protection |
| Ambient Temperature | -10~+40°C (+14~+104°F) (non-freezing) |
| Shaft Runout | 0.05 mm (0.002 in.) T.I.R.*1 |
| Concentricity | 0.075 mm (0.003 in.) T.I.R.*1 |
| Perpendicularity | 0.075 mm (0.003 in.) T.I.R.*1 |
| Shaft Radial Play*2 | 0.025 mm (0.001 in.) maximum [Load 5 N (1.12 lb.)] |
| Shaft Axial Play*3 | 0.075 mm (0.003 in.) maximum [Load 10 N (2.2 lb.)] |
| Step Accuracy | ±3.6° |

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

*2 Radial Play: Displacement in shaft position in the radial direction, when a 5 N (1.12 lb.) load is applied in the vertical direction to the tip of the motor's shaft.

*3 Axial Play: Displacement in shaft position in the axial direction, when a 10 N (2.2 lb.) load is applied to the motor's shaft in the axial direction.



■ Gearmotor – Torque Table

● Motor/Gearhead

Unit = Upper values: N-m/Lower values: lb-in

| Model \ Gear Ratio | 3 | 3.6 | 5 | 6 | 7.5 | 9 | 12.5 | 15 | 18 | 25 | 30 | 36 | 50 | 60 | 75 | 90 | 100 | 120 | 150 | 180 |
|---|---|-------------|-------------|-------------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|
| | SMK216A-GN/2GN <input type="checkbox"/> SA | 0.40 3.5 | 0.50 4.4 | 0.70 6.1 | 0.80 7 | 1.0 8.8 | 1.2 10.6 | 1.5 13.2 | 1.8 15.9 | 1.9 16.8 | 2.1 18.5 | 2.4 21 | 2.8 24 | 3 26 | 3 26 | 3 26 | 3 26 | 3 26 | 3 26 | 3 26 |
| SMK550A-GN/5GN <input type="checkbox"/> SA | 1.4 12.3 | 1.7 15.0 | 2.3 20 | 2.8 24 | 3.5 30 | 4.3 38 | 4.5 39 | 5.0 44 | 6.0 53 | 7.5 66 | 9.0 79 | 9.0 79 | 10 88 | 10 88 | 10 88 | 10 88 | 10 88 | 10 88 | 10 88 | 10 88 |

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

● A colored background (□) indicates gear shaft rotation in the same direction as the motor shaft, while the others rotate in the opposite direction.

● Geared Motor

Unit = Upper values: N-m/Lower values: lb-in

| Model \ Gear Ratio | 3 | 3.6 | 7.5 | 9 | 15 | 18 | 30 | 36 | 50 | 60 | 100 | 120 |
|--------------------|---|--------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | SMK0A - <input type="checkbox"/> A | 0.15 1.32 | 0.18 1.59 | 0.35 3.0 | 0.35 3.0 | 0.35 3.0 | 0.35 3.0 | 0.35 3.0 | 0.37 3.2 | 0.41 3.6 | 0.47 4.1 | 0.47 4.1 |

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

● A colored background (□) indicates gear shaft rotation in the same direction as the motor shaft, while the others rotate in the opposite direction.

■ Permissible Overhung Load and Permissible Thrust Load

● Motor, Geared Motor

Unit = N (lb.)

| Motor Model | Permissible Overhung Load | | | | | Permissible Thrust Load |
|---|---------------------------|----------------|------------------|------------------|------------------|--|
| | Distance from Shaft End | | | | | |
| | 0 mm (0 in.) | 5 mm (0.2 in.) | 10 mm (0.39 in.) | 15 mm (0.59 in.) | 20 mm (0.79 in.) | |
| SMK014 | 20 (4.5) | 25 (5.6) | 34 (7.6) | 52 (11.7) | – | The permissible thrust load shall be no greater than the motor mass. |
| SMK237 | 54 (12.1) | 67 (15) | 89 (20) | 130 (29) | – | |
| SMK5100, SMK5160 | 260 (58) | 290 (65) | 340 (76) | 390 (87) | 480 (108) | |
| SMK0A - <input type="checkbox"/> | 10 (2.2) | 15 (3.3) | 20 (4.5) | 30 (6.7) | – | |

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

● Gearhead

Unit = N (lb.)

| Model | Gear Ratio | Overhung Load | | Permissible Thrust Load |
|--|---------------|------------------------------------|------------------|-------------------------|
| | | Distance from Shaft End [mm (in.)] | | |
| | | 10 mm (0.39 in.) | 20 mm (0.79 in.) | |
| 2GN <input type="checkbox"/> SA | 3~18 | 50 (11.2) | 80 (18) | 30 (6.7) |
| | 25~180 | 120 (27) | 180 (40) | |
| 5GN <input type="checkbox"/> SA | 3~18 | 250 (56) | 350 (78) | 100 (22) |
| | 25~180 | 300 (67) | 450 (101) | |

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

Permissible Load Inertia J

Starting, stopping and reversing characteristics vary according to the amount of load inertia directly coupled to the motor. Permissible load inertia, therefore, refers to the upper limit of load inertia under which the motor can be operated normally when the load is connected directly to the motor shaft. When the amount of load inertia is too great, the motor may vibrate or reverse direction. It is recommended to use flexible couplings when connecting the load to the motor shaft.

Permissible Load Inertia J of Motors

| Model | Permissible Load Inertia J ×10 ⁻⁴ kg·m ² (oz·in ²) |
|--------------------|---|
| SMK014A-A | 0.275 (1.50) |
| SMK014MA-A | |
| SMK237A-A | 2.5 (13.7) |
| SMK5100□-AA | 7 (38) |
| SMK5160A-AA | 12 (66) |

Permissible Load Inertia J of Gearhead

Motor/Gearhead

Unit = Upper values: ×10⁻⁴kg·m²/Lower values: oz·in²

| Model | Gear Ratio | | | | | | | | | | | | | | | | | | | |
|--------------------------|------------|-------------|------------|-------------|---------------|-------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | 3 | 3.6 | 5 | 6 | 7.5 | 9 | 12.5 | 15 | 18 | 25 | 30 | 36 | 50 | 60 | 75 | 90 | 100 | 120 | 150 | 180 |
| SMK216A-GN/2GN□SA | 5.4 30 | 7.7 42 | 15 82 | 21.6 118 | 33.7 184 | 48.6 270 | 93.7 510 | 135 740 | 155 850 | 155 850 | 155 850 | 155 850 | 155 850 | 155 850 | 155 850 | 155 850 | 155 850 | 155 850 | 155 850 | 155 850 |
| SMK550A-GN/5GN□SA | 63 340 | 90.7 500 | 175 960 | 252 1380 | 393.7 2200 | 567 3100 | 1093 6000 | 1575 8600 | 1875 10300 | 1875 10300 | 1875 10300 | 1875 10300 | 1875 10300 | 1875 10300 | 1875 10300 | 1875 10300 | 1875 10300 | 1875 10300 | 1875 10300 | 1875 10300 |

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

Geared Motor

Unit = Upper values: ×10⁻⁴kg·m²/Lower values: oz·in²

| Model | Gear Ratio | | | | | | | | | | | |
|-----------------|-------------|-------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | 3 | 3.6 | 7.5 | 9 | 15 | 18 | 30 | 36 | 50 | 60 | 100 | 120 |
| SMK0A-□A | 2.4 13.1 | 3.5 19.2 | 15 82 | 22 122 | 40 220 | 40 220 | 40 220 | 40 220 | 40 220 | 40 220 | 40 220 | 40 220 |

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

Dimensions Unit = mm (in.)

Mounting screws are included with gearheads (except for geared motor). Dimensions for mounting screws → Page A-310

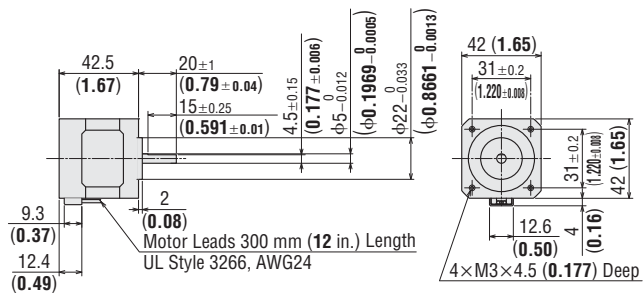
42 mm (1.65 in.)

Motor

SMK014A-A, SMK014MA-A

Mass: 0.3 kg (0.66 lb.)

DXF B301



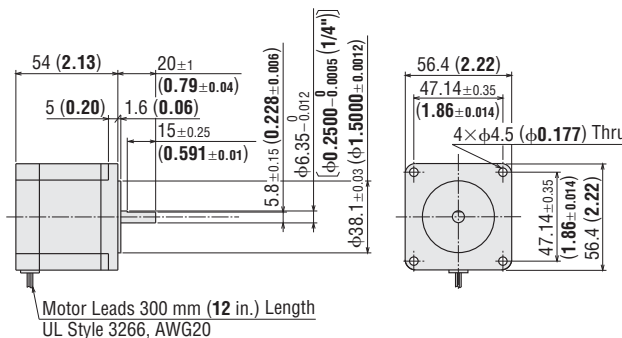
56.4 mm (2.22 in.)

Motor

SMK237A-A

Mass: 0.7 kg (1.5 lb.)

DXF B126



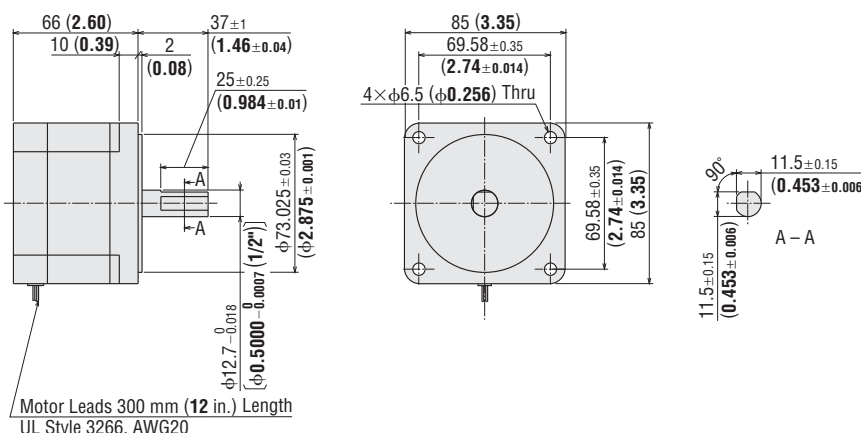
85 mm (3.35 in.)

Motor

SMK5100A-AA

Mass: 1.7 kg (3.7 lb.)

DXF B127U

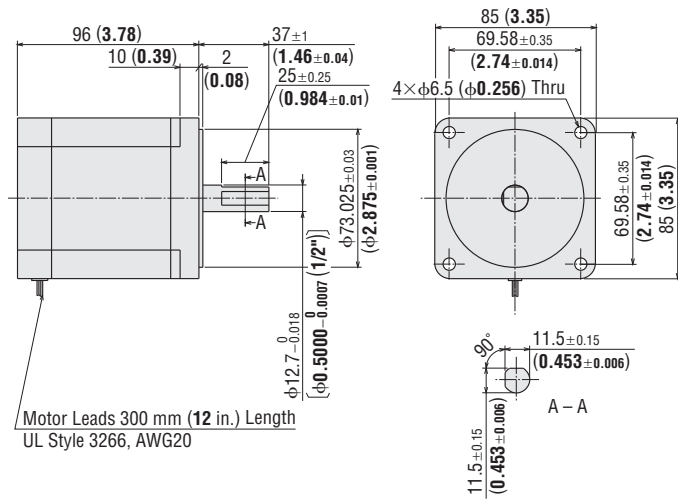


◇ Motor

SMK5160A-AA

Mass: 2.8 kg (6.2 lb.)

DXF B128U



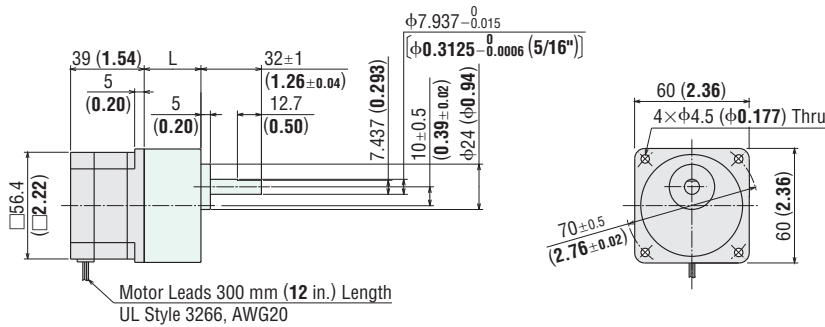
● □ 60mm (□ 2.36 in.)

◇ Motor/Gearhead

| Motor Model | Gearhead Model | Gear Ratio | L | DXF |
|-------------------|----------------|---------------|-----------|--------|
| SMK216A-GN | 2GN□SA | 3~18 | 30 (1.18) | A609AU |
| | | 25~180 | 40 (1.57) | A609BU |

Mass: Motor 0.45 kg (0.99 lb.)

Gearhead 0.4 kg (0.88 lb.)



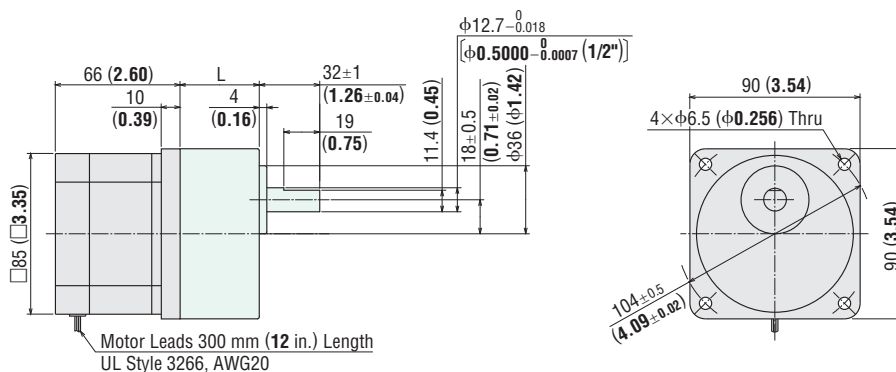
● □ 90mm (□ 3.54 in.)

◇ Motor/Gearhead

| Motor Model | Gearhead Model | Gear Ratio | L | DXF |
|-------------------|----------------|---------------|-----------|--------|
| SMK550A-GN | 5GN□SA | 3~18 | 42 (1.65) | A610AU |
| | | 25~180 | 60 (2.36) | A610BU |

Mass: Motor 1.7 kg (3.7 lb.)

Gearhead 1.5 kg (3.3 lb.)



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

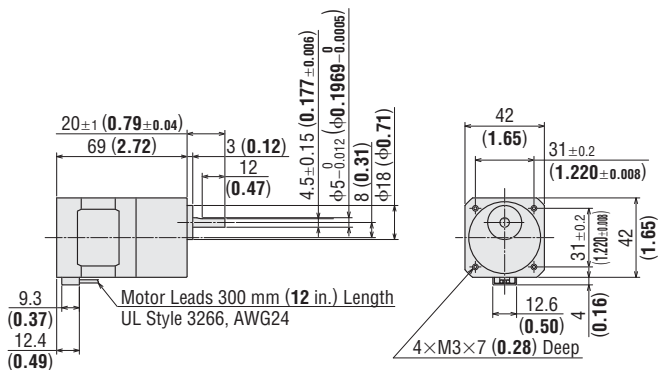
● □42mm (□1.65 in.)

◇ Geared Motor

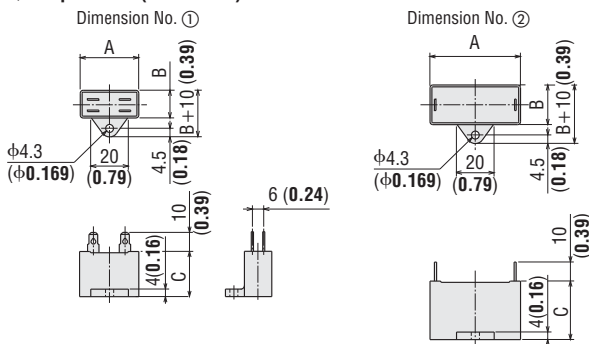
SMK0A-□A

Mass: Motor 0.5 kg (1.1 lb.)

DXF B323



◇ Capacitor (included)

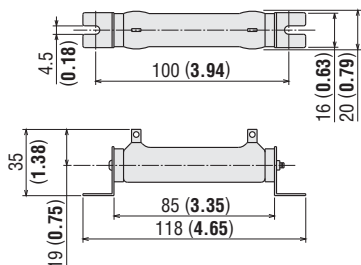


◇ Capacitor Dimensions Unit = mm (in.)

| Motor Model | Capacitor Model | A | B | C | Mass g (oz.) | Dimension No. | Capacitor Cap |
|--|-----------------|--------------|----------------|----------------|--------------|---------------|---------------|
| SMK014A-A SMK014MA-A SMK0A-□A | CH06BFAUL | 31 (1.22) | 14.5 (0.57) | 23.5 (0.93) | 15 (0.53) | ① | Included |
| SMK237A-A SMK216A-GN | CH12UL | 31 (1.22) | 14.5 (0.57) | 23.5 (0.93) | 17 (0.6) | ② | |
| SMK5100A-AA SMK5160A-AA | CH25UL | 31 (1.22) | 17 (0.67) | 27 (1.07) | 20 (0.71) | ② | |
| SMK550A-GN | CH06BUL | 31 (1.22) | 14.5 (0.57) | 23.5 (0.93) | 15 (0.53) | ② | |

◇ External Resistor (included with **SMK5□** only)

Mass: 60 g (2.1 oz.)

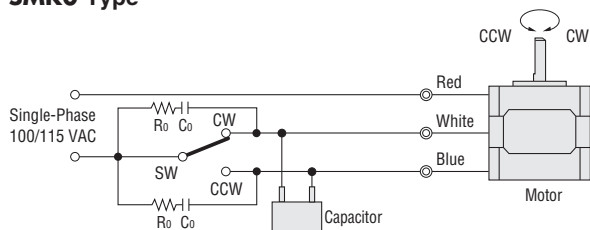


● Enter the gear ratio in the box (□) within the model name.

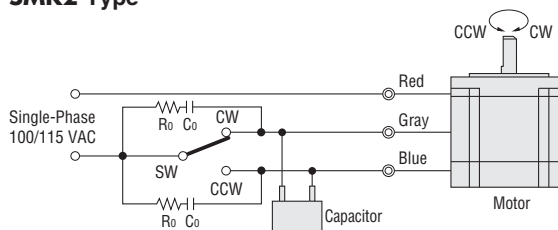
Connection and Operation

When the switch is set to "CW", the motor rotates in the clockwise direction. When set to "CCW", the motor rotates in the counterclockwise direction. The motor can be stopped instantly by turning off the power supply. The direction of motor rotation is as viewed from the shaft end of the motor. The capacitor and external resistor (for **SMK5**□ only) are included with the motor.

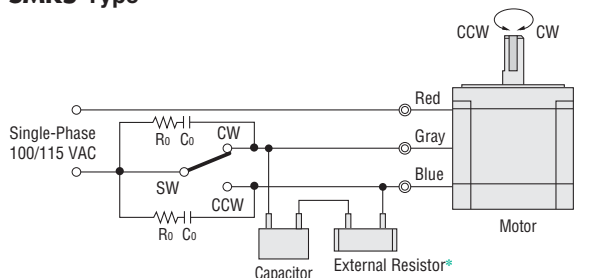
SMK0 Type



SMK2 Type



SMK5 Type



* Please note that the external resistor may generate heat depending on the operating conditions.

- To protect the contact point of relays and switches, always connect a CR circuit for surge suppression.

The **EPCR1201-2** surge suppressor circuit is available as an accessory.

→ Page A-302

- When the geared motor or **GN** gearheads are used, the rotating direction of output shaft differs the gear ratio. → Page A-208

- How to connect a capacitor → Page A-313

Starting Time

Low-speed synchronous motors offer superb starting, stopping and reversing characteristics. Provided that the motor is operating within permissible load inertia limits, it can be started, stopped or reversed within 1.5 cycles of the applied frequency. The motor will start and reach a steady speed in the time shown in the table.

As seen in this table, there is a certain amount of variation in the time required for the motor to reach the set speed. This is attributable to factors linked with the phase of the power source and the relative positions of the rotor and stator when the current is applied. One method of reducing these variations is to use a zero cross switch.

| Model | Load Inertia: J | | Starting Time (ms) | | Stopping Time (ms) | |
|--|------------------------|--------------------|--------------------|----------|--------------------|----------|
| | kg·m ² | oz·in ² | Start Up | Settling | Settle Down | Settling |
| SMK014A-A SMK014MA-A SMK0A-□A | 0 | 0 | 2~15 | 19~37 | 3~5 | 7~23 |
| | 137×10^{-7} | 0.75 | 3~16 | 25~38 | 4~7 | 11~27 |
| | 275×10^{-7} | 1.50 | 6~22 | 14~48 | 5~9 | 23~32 |
| SMK237A-A | 0 | 0 | 2~15 | 19~37 | 3~5 | 7~23 |
| | 1250×10^{-7} | 6.8 | 3~16 | 25~38 | 4~7 | 11~27 |
| SMK216A-GN | 2500×10^{-7} | 13.7 | 6~22 | 14~48 | 5~9 | 23~32 |
| | 0 | 0 | 2~15 | 19~37 | 3~5 | 7~23 |
| SMK5100A-AA SMK550A-GN | 300×10^{-7} | 1.64 | 3~16 | 25~38 | 4~7 | 11~27 |
| | 600×10^{-7} | 3.3 | 6~22 | 14~48 | 5~9 | 23~32 |
| SMK5160A-AA | 0 | 0 | 2~15 | 19~37 | 3~5 | 7~23 |
| | 3500×10^{-7} | 19.1 | 3~16 | 25~38 | 4~7 | 11~27 |
| | 7000×10^{-7} | 38 | 6~22 | 14~48 | 5~9 | 23~32 |
| SMK5160A-AA | 0 | 0 | 2~15 | 19~37 | 3~5 | 7~23 |
| | 6000×10^{-7} | 33 | 3~16 | 25~38 | 4~7 | 11~27 |
| | 12000×10^{-7} | 66 | 6~22 | 14~48 | 5~9 | 23~32 |

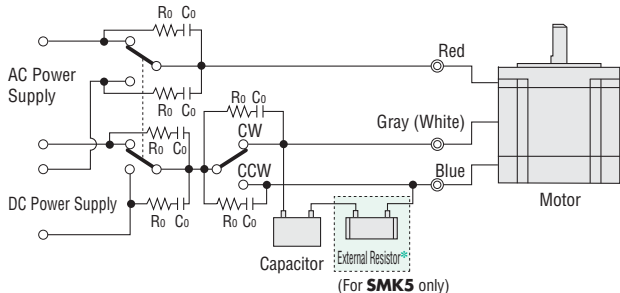
● Enter the gear ratio in the box (□) within the model number.

DC Excitation

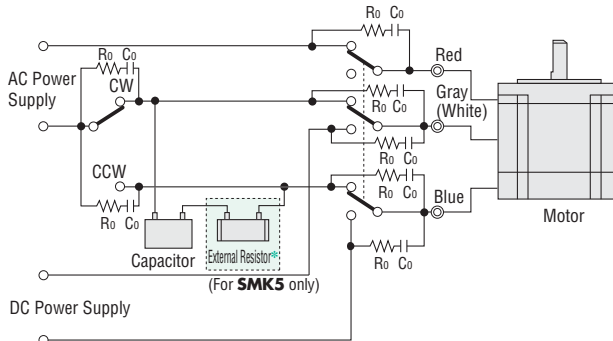
When a holding torque larger than the static holding torque of the stopped motor is required, apply a DC voltage after the AC power supply off.

Connection Diagrams

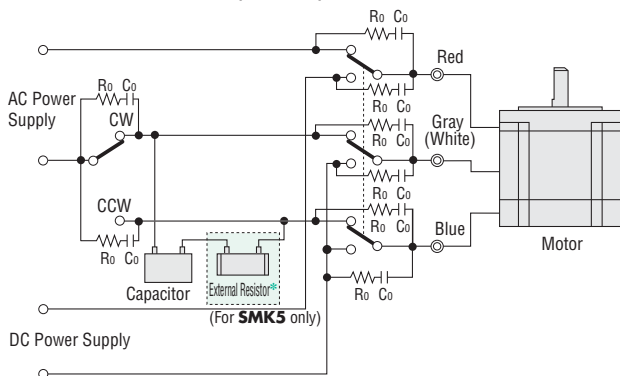
1-Phase Excitation



2-Phase Excitation (Series)



2-Phase Excitation (Parallel)



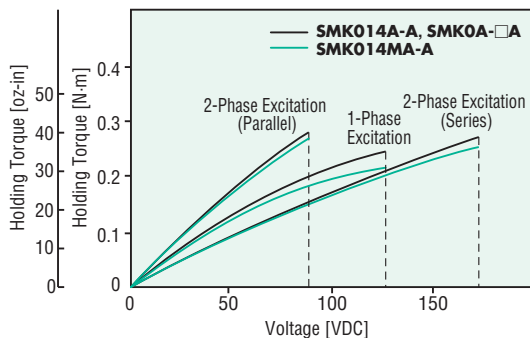
- * Please note that the external resistor may generate heat depending on the operating conditions.
- The white leads listed in parentheses are only for the **SMK0**.
- Connect the supplied external resistor to the capacitor in series for the **SMK5** model.
- External resistors are not needed for the **SMK0** and **SMK2** models.
- To prevent DC power supply damage caused by voltage surges, connect a surge suppressor circuit between the contact points of the relays and switches.
The **EPCR1201-2** surge suppressor circuit is available as an accessory. → Page A-302

Characteristics for DC Excitation

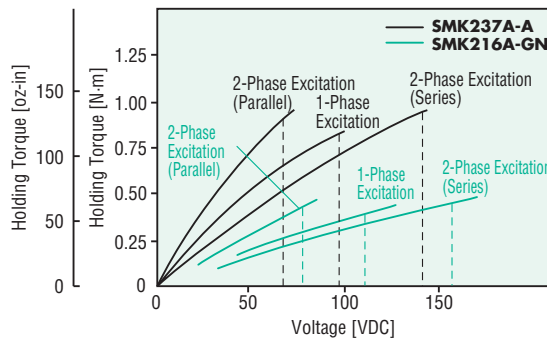
- These values apply to the motor only.
- To calculate holding torque for gearmotors, use the following formula: listed holding torque × gear ratio
Note that the gearmotor holding torque should be lower than the permissible torque on the gear output shaft.
Gearmotor – Torque Table → Page A-208
- ---- on the chart indicates permissible applied voltage.

SMK014A-A, SMK014MA-A

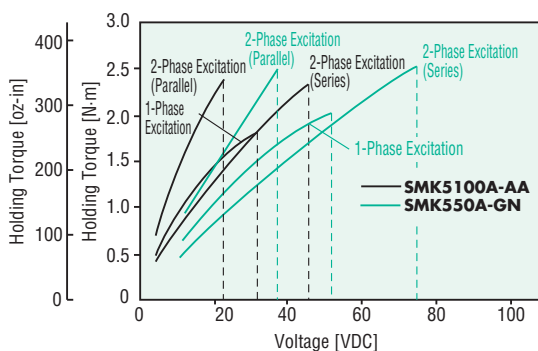
SMK0A-□A



SMK237A-A, SMK216A-GN



SMK5100A-AA, SMK550A-GN



SMK5160A-AA

