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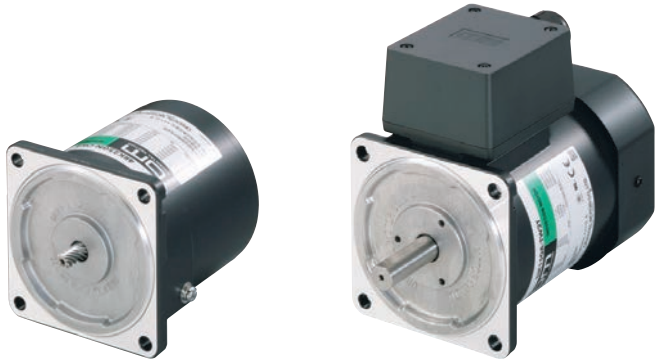
Oriental motor

HM-9447

World K Series

Induction Motors
Reversible Motors
Electromagnetic Brake Motors

OPERATING MANUAL



Thank you for purchasing an Oriental Motor product.
This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.
- Only qualified personnel of electrical and mechanical engineering should work with the product.
- Use the product correctly after thoroughly reading the section "Safety precautions."
  In addition, be sure to observe the contents described in warning and caution in this document.
- The product described in this document is designed and manufactured to be incorporated in general industrial equipment. Do not use for any other purpose.
  Oriental Motor Co., Ltd. is not responsible for any compensation for damage caused through failure to observe this warning.

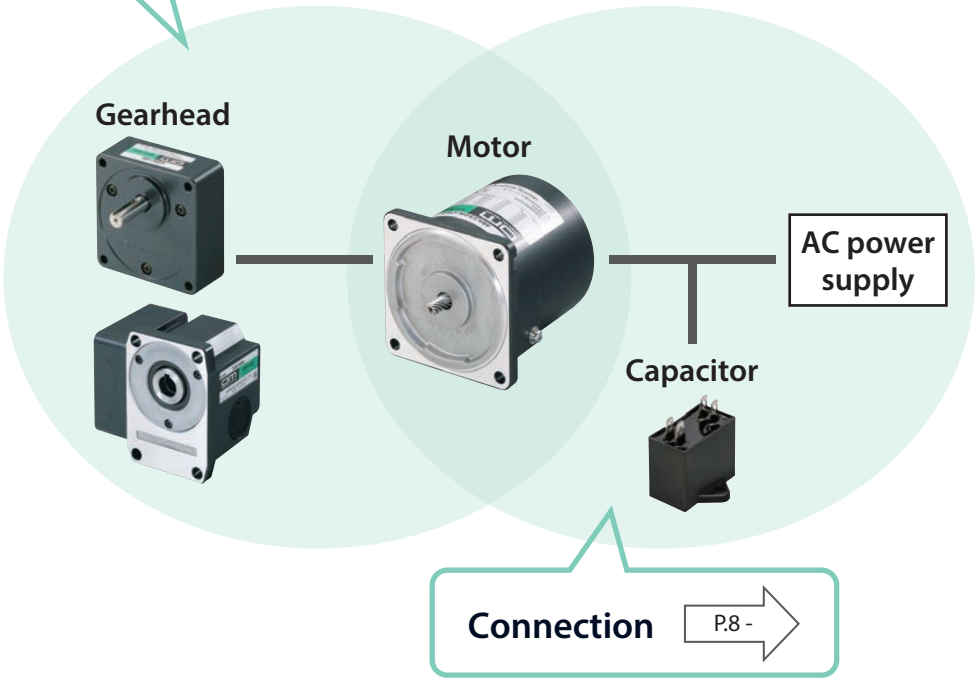
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Installation P.5 -

Refer to this chapter when assembling a motor and a gearhead.



Connection P.8 -

The model name and the connection diagram are shown on the same page.
Searching PDF by the model name can check the connection diagram corresponding to it.

Troubleshooting P.37 -

Refer to this chapter if the motor does not rotate or if the motor rotates in the opposite direction.

1. Safety precautions

Table of contents

The precautions described below are intended to ensure the safe and correct use of the product, and to prevent the user and other personnel from exposure to the risk of injury.
Use the product only after carefully reading and fully understanding these instructions.

Description of signs

⚠ WARNING	Handling the product without observing the instructions that accompany a "WARNING" symbol may result in serious injury or death.
⚠ CAUTION	Handling the product without observing the instructions that accompany a "CAUTION" symbol may result in injury or property damage.
Note	The items under this heading contain important handling instructions that the user should observe to ensure safe use of the product.
memo	The items under this heading contain related information and contents to gain a further understanding of the text in this manual.

Explanation of graphic symbols

⊘	Indicates "prohibited" actions that must not be performed.
❗	Indicates "compulsory" actions that must be performed.

⚠ WARNING

⊘	Do not use the product in explosive or corrosive environments, in the presence of flammable gases, in places subjected to splashing water, or near combustibles. Doing so may result in fire, electric shock, or injury.
	Do not transport, install, connect, or inspect the product while the power is supplied. Always turn off the power before carrying out these operations. This may result in electric shock or damage to equipment.
	Do not use the electromagnetic brake of the electromagnetic brake motor as a safety brake. Provide safety measures separately. This may result in injury or damage to equipment.
	Do not forcibly bend, pull, or pinch the lead wire and the cable. Doing so may result in fire, electric shock, or damage to equipment.
	Do not touch the connection terminal of the capacitor immediately after turning off the power supply (for a period of 30 seconds). Residual voltage may cause electric shock.
	Do not disassemble or modify the motor. Doing so may result in electric shock, injury, or damage to equipment. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.
❗	Only qualified and educated personnel should be allowed to perform installation, connection, operation and inspection/troubleshooting of the product. Handling by unqualified and uneducated personnel may result in fire, electric shock, injury, or damage to equipment.
	Turn off the power supply if the overheat protection device (thermal protector) of the motor is activated. The motor may suddenly start rotating when the overheat protection device is automatically returned, causing injury or damage to equipment.

⚠ WARNING

❗	When the overheat protection device (thermal protector) of the electromagnetic brake motor is activated, the electromagnetic brake does not hold the motor shaft (a load). Provide safety measures separately. This may result in injury or damage to equipment.
	The motor is Class I equipment. Install the motor so that it is out of the direct reach of users, or ground if users can touch it. Failure to do so may result in electric shock.
	Always keep the power supply voltage within the specified range. Failure to do so may result in fire or electric shock.
	Perform connections securely according to the connection diagram. Failure to do so may result in fire or electric shock.
	Insulate the connection terminals of the included capacitor. Failure to do so may result in electric shock.
	Turn off the power in the event of a power failure. Otherwise, the motor may suddenly start when the power is restored, causing injury or damage to equipment.

⚠ CAUTION

⊘	Do not use the motor beyond the specifications. Doing so may result in fire, electric shock, injury, or damage to equipment.
	Do not lift up the motor by holding the output shaft, the lead wire, or the cable. Doing so may result in injury.
	Do not touch the motor output shaft (shaft end or pinion section) with bare hands. Doing so may result in injury.
	Keep the area around the motor free of combustible materials. Failure to do so may result in fire or a skin burn(s).
	Do not leave anything around the motor that would obstruct ventilation. Doing so may result in damage to equipment.
	Do not touch the motor while operating or immediately after stopping. The surface of the motor is hot and it may cause a skin burn(s).
	Do not touch the rotating part (output shaft, cooling fan) while operating the motor. Doing so may result in injury.
❗	Provide a cover over the rotating part (output shaft). Failure to do so may result in injury.
	When an abnormality is generated, turn off the power immediately. Failure to do so may result in fire, electric shock, or injury.
	The motor surface temperature may exceed 70 °C (158 °F) even under normal operating conditions. If the operator is allowed to approach the operating motor, attach a warning label on a conspicuous position as shown in the figure. Failure to do so may result in a skin burn(s).  Warning label

2.1 Package contents

Verify that the items listed below are included.
Report any missing or damaged items to the branch or sales office from which you purchased the product.

☐ Motor..... 1 unit



☐ Capacitor (Single-phase motor only) ..... 1 piece



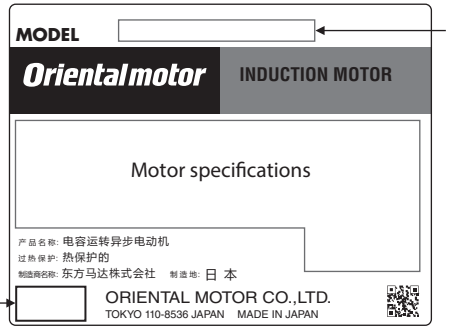
☐ Capacitor cap (Single-phase motor only) ..... 1 piece



☐ Instructions and Precautions for Safe Use ..... 1 copy

2.2 Information about nameplate

Tell us the model name, product serial number, and manufacturing date when you contact us.



memo The position describing the information may vary depending on the product.

2.3 How to identify the product model

Verify the model name of the purchased product against the model shown on the package label.
The model name describe on the motor nameplate does not have a code such as **J**, **U**, or **E** representing a capacitor type at the end of the model name.

5	R	K	40	GN	-	AW	2	M	_	J
1	2		3	4		5	6	7	8	9

1	Motor frame size	**0**: 42 mm (1.65 in.) **2**: 60 mm (2.36 in.) **3**: 70 mm (2.76 in.) **4**: 80 mm (3.15 in.) **5**: 90 mm (3.54 in.)
2	Motor type	**I**: Induction motor **R**: Reversible motor
3	Output power	**1**: 1 W **3**: 3 W **6**: 6 W **15**: 15 W **25**: 25 W **40**: 40 W **60**: 60 W **90**: 90 W **150**: 150 W
4	Motor shaft type, type of pinion	**A**: Round shaft type **GN**: **GN** type pinion shaft **GE**: **GE** type pinion shaft
5	Power supply voltage / Number of poles	**AW**: Single-phase 100 VAC, 110/115 VAC 4-pole **BW**: Single-phase 100 VAC, 110/115 VAC 2-pole **CW**: Single-phase 200 VAC, 220/230 VAC 4-pole **DW**: Single-phase 200 VAC, 220/230 VAC 2-pole **SW**: Three-phase 200/220/230 VAC 4-pole **TW**: Three-phase 200/220/230 VAC 2-pole **UW**: Three-phase 380/400/415 VAC 4-pole
6	Identification code	**2**, **3**
7	**M**: Electromagnetic brake motor	
8	**T**, **T2**: Terminal box type Blank: Lead wire type	
9	Included capacitor type	**J**: Capacitor for single-phase 100 VAC, 200 VAC **U**: Capacitor for single-phase 110/115 VAC **E**: Capacitor for single-phase 220/230 VAC Blank: Three-phase motor

3.1 Installation location

Install the product in a well-ventilated location that provides easy access for inspection.

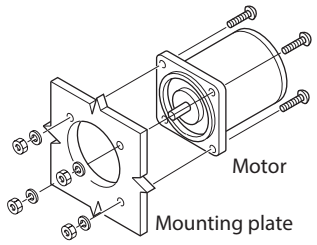
- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature*
  1 W, 3 W motors: –10 to +40 °C (+14 to +104 °F) (non-freezing)
  6 W to 90 W motors
  Single-phase 100 VAC, Single-phase 200 VAC, Three phase 200 VAC: –10 to +50 °C (+14 to +122 °F) (non-freezing)
  Other voltages: –10 to +40 °C (+14 to +104 °F) (non-freezing)
  * When a right-angle gearhead is assembled, the lower temperature limit is 0 °C (+32 °F).
- Operating ambient humidity: 85% or less (non-condensing)
- Area free of explosive atmosphere, toxic gas (such as sulfuric gas), or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area not subject to splashing water (rain, water droplets), oil (oil droplets) or other liquids
- Area free of excessive salt
- Area not subject to continuous vibration or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields, or vacuum
- Altitude: Up to 1000 m (3300 ft.) above sea level

3.2 Installing the motor

■ Round shaft type

Make a hole in the mounting plate and use screws to secure the motor. (Screws for mounting the motor are not included.)
Install so that there is no gap between the product and the mounting plate.

Model	Screw size	Tightening torque
0IK, **0RK**	M3	1.0 N·m (8.8 lb-in)
2IK, **2RK**	M4	2.0 N·m (17.7 lb-in)
3IK, **3RK**	M5	2.5 N·m (22 lb-in)
4IK, **4RK**		
5IK, **5RK**	M6	3.0 N·m (26 lb-in)

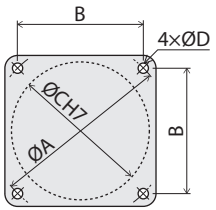


Note

Do not install the motor to the mounting hole diagonally or assemble the motor forcibly.
Doing so may damage the flange pilot section, thereby resulting in damage to the motor.

● Mounting hole dimensions [Unit: mm (in.)]

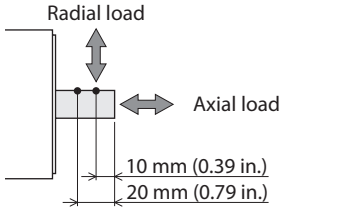
Model	ØA	B	ØCH7	ØD
0IK, **0RK**	48 (1.89)	33.94 (1.336)	$37.6^{+0.025}_{0}$ ($1.4803^{+0.0010}_{0}$)	3.5 (0.138)
2IK, **2RK**	70 (2.76)	49.50 (1.949)	$54^{+0.030}_{0}$ ($2.1260^{+0.0012}_{0}$)	4.5 (0.177)
3IK, **3RK**	82 (3.23)	57.98 (2.283)	$64^{+0.030}_{0}$ ($2.5197^{+0.0012}_{0}$)	5.5 (0.217)
4IK, **4RK**	94 (3.70)	66.47 (2.617)	$73^{+0.030}_{0}$ ($2.8740^{+0.0012}_{0}$)	5.5 (0.217)
5IK, **5RK**	104 (4.09)	73.54 (2.895)	$83^{+0.035}_{0}$ ($3.2677^{+0.0014}_{0}$)	6.5 (0.256)



ØC indicates the diameter of the flange pilot.

● Permissible radial load and permissible axial load

The radial load and the axial load have a great influence on the life of the bearings and the strength of the shaft. Make sure not to exceed the permissible radial load and the permissible axial load.



Distance from output shaft end

Model	Permissible radial load [N (lb.)]		Permissible axial load [N (lb.)]	
	Distance from motor output shaft end		Induction motor Reversible motor	Electromagnetic brake motor
	10 mm (0.39 in.)	20 mm (0.79 in.)		
0IK, **0RK**	40 (9.0)	–	3 (0.67)	–
2IK, **2RK**	50 (11.2)	110 (24)	10 (2.2)	10 (2.2)
3IK, **3RK**	40 (9.0)	60 (13.5)		
4IK, **4RK**	90 (20)	140 (31)	15 (3.3)	15 (3.3)
5IK40, **5RK40**	140 (31)	200 (45)	20 (4.5)	
5IK60, **5RK60**	240 (54)	270 (60)		16 (3.6)
5IK90, **5RK90**, **5IK150**				19 (4.2)

Note

Failure due to fatigue may occur when the bearings and output shaft are subject to repeated loading by a radial or axial load that is in excess of the permissible limit.

■ Pinion shaft type

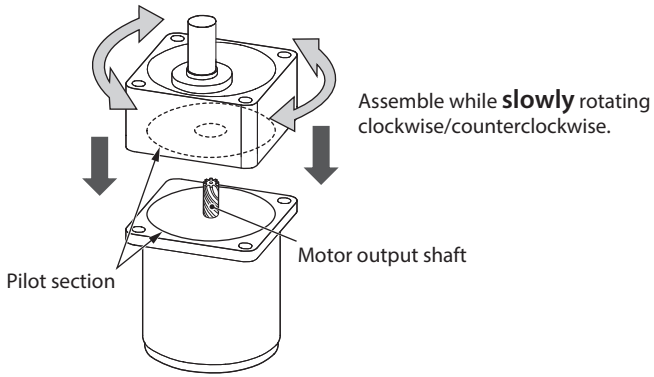
● Assembling the motor and gearhead

Check the model names for the motor and gearhead.
Only a motor and a gearhead having the same frame size and the same type of pinion can be combined.

[Example] • Motor model **4 IK25 GN -AW2** • Gearhead model **4 GN 25K**

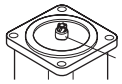
Frame size
Pinion type

Assemble the gearhead to the motor in a condition where the motor output shaft is set upward. Wipe off the grease if it is adhered to the pilot section of the gearhead.
Keep the pilot sections of the motor and gearhead in parallel, and assemble while slowly rotating the gearhead clockwise/counterclockwise. Also, assemble so that no gap remains between the motor and gearhead.
When using a decimal gearhead, install it between the motor and the gearhead.



Note

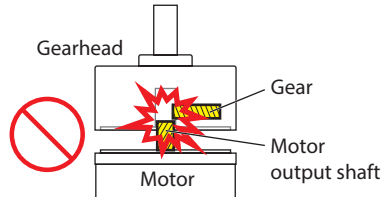
Do not remove the white grease-seal tube of the 1 W and 3 W motors. If the white grease-seal tube is removed, grease in the gearhead may penetrate into the inside of the motor, resulting in damage to the motor.



Refer to the following pages for assembling the hollow shaft gearhead and the solid shaft gearhead.
• Hollow shaft gearhead ⇨ p.29
• Solid shaft gearhead ⇨ p.33

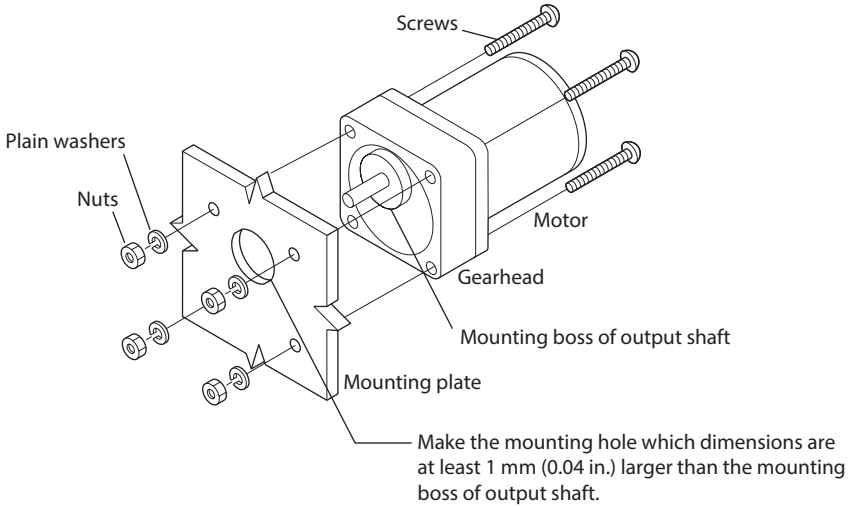
Precaution when assembling

Do not forcibly assemble a motor and a gearhead, or do not hit the motor output shaft with the gearhead or the gear.
Also, prevent metal objects or foreign substances from entering in the gearhead.
The motor output shaft or the gear may be damaged, resulting in noise or shorter service life.

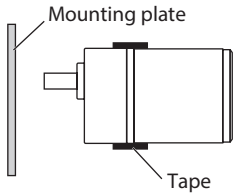


● Installing to equipment

Use the mounting screw set included with a gearhead to secure the motor and gearhead to the mounting plate.
Install so that there is no gap between the product and the mounting plate.
Use screws included with a decimal gearhead when using it.



If the motor and gearhead are about to come off when installing to equipment, temporarily fix the motor and gearhead with tape.

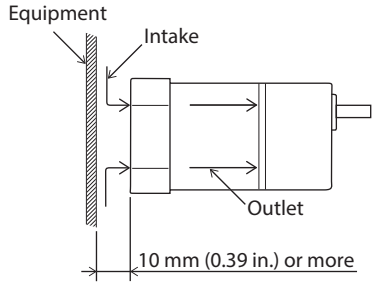


Refer to the page of each gearhead for mounting hole dimensions, mounting screw dimensions, and installation of a load.

- Parallel shaft gearhead ⇨ p.26
- Hollow shaft gearhead ⇨ p.30
- Solid shaft gearhead ⇨ p.34

■ Motor equipped with cooling fan

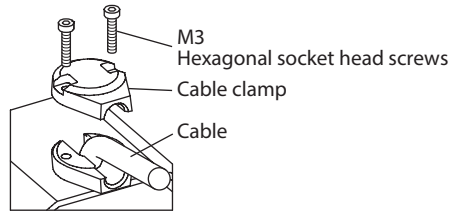
When installing a motor with cooling fan onto equipment, leave a space of 10 mm (0.39 in.) or more behind the fan cover or open a ventilation hole so that the intake on the rear part of the motor is not blocked.



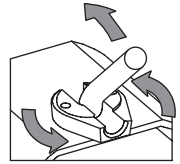
■ How to change the direction of the cable outlet position (Electromagnetic brake motor only)

In the case of 60 W and 90 W motors, the cable outlet position is set toward the direction of the motor output shaft at the time of shipment.
The direction of the cable outlet position can be changed by 180 degrees. Change the direction according to the following steps.

1. Remove the screws of the cable clamp, and remove the upper unit of the cable clamp.

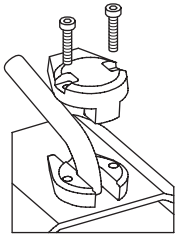


2. Change the direction of the cable by 180 degrees, and turn the cable clamp by 180 degrees.



3. Install the upper unit of the cable clamp and fix it with screws.

   Tightening torque of screw: 0.5 to 0.7 N·m (4.4 to 6.1 lb-in)



4.1 Lead wire type

4.1.1 Induction motors Single-phase type

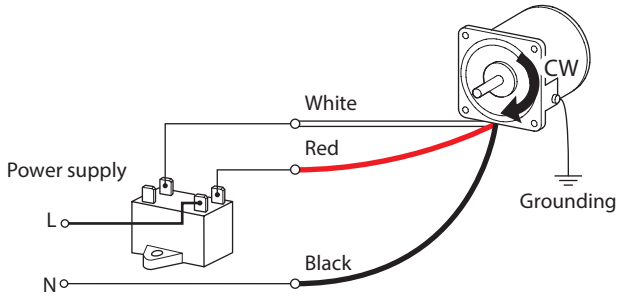
● Model

Output power	Model	Motor model	Capacitor model
1 W	**0IK1GN-AW2J**	0IK1GN-AW2	CH15FAUL
	0IK1A-AW2J	0IK1A-AW2	
	0IK1GN-AW3U	0IK1GN-AW3	CH10FAUL
	0IK1A-AW3U	0IK1A-AW3	
	0IK1GN-CW2J	0IK1GN-CW2	CH035BFAUL
	0IK1A-CW2J	0IK1A-CW2	
3 W	**0IK3GN-BW2J**	0IK3GN-BW2	CH18FAUL
	0IK3A-BW2J	0IK3A-BW2	
	0IK3GN-BW3U	0IK3GN-BW3	CH15FAUL
	0IK3A-BW3U	0IK3A-BW3	
	0IK3GN-DW2J	0IK3GN-DW2	CH045BFAUL
	0IK3A-DW2J	0IK3A-DW2	
6 W	**2IK6GN-AW2J**	2IK6GN-AW2	CH35FAUL2
	2IK6A-AW2J	2IK6A-AW2	
	2IK6GN-AW2U	2IK6GN-AW2	CH25FAUL2
	2IK6A-AW2U	2IK6A-AW2	
6 W	**2IK6GN-CW2J**	2IK6GN-CW2	CH08BFAUL
	2IK6A-CW2J	2IK6A-CW2	
	2IK6GN-CW2E	2IK6GN-CW2	CH06BFAUL
	2IK6A-CW2E	2IK6A-CW2	
15 W	**3IK15GN-AW2J**	3IK15GN-AW2	CH55FAUL2
	3IK15A-AW2J	3IK15A-AW2	
	3IK15GN-AW2U	3IK15GN-AW2	CH45FAUL2
	3IK15A-AW2U	3IK15A-AW2	
	3IK15GN-CW2J	3IK15GN-CW2	CH15BFAUL
	3IK15A-CW2J	3IK15A-CW2	
	3IK15GN-CW2E	3IK15GN-CW2	CH10BFAUL
	3IK15A-CW2E	3IK15A-CW2	
25 W	**4IK25GN-AW2J**	4IK25GN-AW2	CH80CFAUL2
	4IK25A-AW2J	4IK25A-AW2	
	4IK25GN-AW2U	4IK25GN-AW2	CH65CFAUL2
	4IK25A-AW2U	4IK25A-AW2	
	4IK25GN-CW2J	4IK25GN-CW2	CH20BFAUL
	4IK25A-CW2J	4IK25A-CW2	
	4IK25GN-CW2E	4IK25GN-CW2	CH15BFAUL
	4IK25A-CW2E	4IK25A-CW2	
40 W	**5IK40GN-AW2J**	5IK40GN-AW2	CH110CFAUL2
	5IK40A-AW2J	5IK40A-AW2	
40 W	**5IK40GN-AW2U**	5IK40GN-AW2	CH90CFAUL2
	5IK40A-AW2U	5IK40A-AW2	
	5IK40GN-CW2J	5IK40GN-CW2	CH30BFAUL
	5IK40A-CW2J	5IK40A-CW2	
	5IK40GN-CW2E	5IK40GN-CW2	CH23BFAUL
	5IK40A-CW2E	5IK40A-CW2	
60 W	**5IK60GE-AW2J**	5IK60GE-AW2	CH200CFAUL2
	5IK60A-AW2J	5IK60A-AW2	
	5IK60GE-AW2U	5IK60GE-AW2	CH180CFAUL2
	5IK60A-AW2U	5IK60A-AW2	
	5IK60GE-CW2J	5IK60GE-CW2	CH50BFAUL
	5IK60A-CW2J	5IK60A-CW2	
	5IK60GE-CW2E	5IK60GE-CW2	CH40BFAUL
	5IK60A-CW2E	5IK60A-CW2	
90 W	**5IK90GE-AW2J**	5IK90GE-AW2	CH280CFAUL2
	5IK90A-AW2J	5IK90A-AW2	
	5IK90GE-AW2U	5IK90GE-AW2	CH200CFAUL2
	5IK90A-AW2U	5IK90A-AW2	
	5IK90GE-CW2J	5IK90GE-CW2	CH70BFAUL
	5IK90A-CW2J	5IK90A-CW2	
	5IK90GE-CW2E	5IK90GE-CW2	CH60BFAUL
	5IK90A-CW2E	5IK90A-CW2	

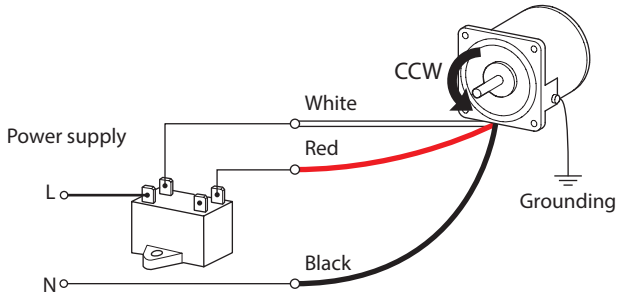
● Connection diagram

Insulate all the wire connections, such as the connection between the motor and the power supply and that between the motor and the capacitor.
Use the Protective Earth Terminal to ground the motor.
Use lead wires for power supply equal to or thicker than the lead wire size shown below.
Motors of 1 W and 3 W: AWG 24 (0.2 mm^2) or thicker
Motors of 6 W or larger: AWG 20 (0.5 mm^2) or thicker

Clockwise: CW



Counterclockwise: CCW



• Connecting/installing the capacitor ⇨ p.21
• Connecting the Protective Earth Terminal ⇨ p.21
Operation ⇨ p.22

• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.22

4.1.2 Induction motors
Single-phase
2-Pole high-speed type

● Model

Output power	Model	Motor model	Capacitor model
40 W	**4IK40A-BW2J**	4IK40A-BW2	CH90CFAUL2
	4IK40A-BW2U		CH75CFAUL2
	4IK40A-DW2J	4IK40A-DW2	CH23BFAUL
	4IK40A-DW3E	4IK40A-DW3	CH18BFAUL

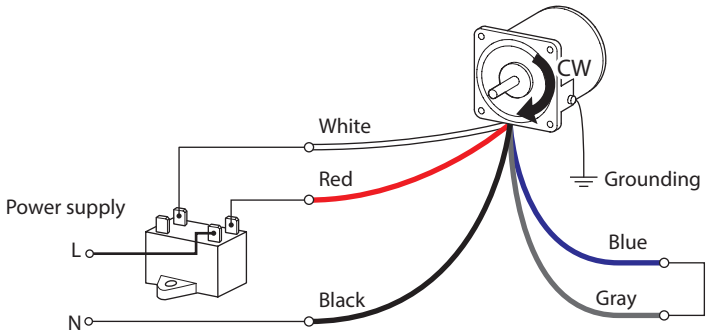
Output power	Model	Motor model	Capacitor model
60 W	**4IK60A-BW2J**	4IK60A-BW2	CH140CFAUL2
	4IK60A-BW2U		CH100CFAUL2
	4IK60A-DW2J	4IK60A-DW2	CH30BFAUL
	4IK60A-DW3E	4IK60A-DW3	CH25BFAUL
	5IK60A-BW2J	5IK60A-BW2	CH160CFAUL2
	5IK60A-BW2U		CH140CFAUL2
	5IK60A-DW2J	5IK60A-DW2	CH40BFAUL
	5IK60A-DW3E	5IK60A-DW3	CH30BFAUL

Output power	Model	Motor model	Capacitor model
90 W	**5IK90A-BW2J**	5IK90A-BW2	CH280CFAUL2
	5IK90A-BW2U		CH250CFAUL2
	5IK90A-DW2J	5IK90A-DW2	CH70BFAUL
	5IK90A-DW3E	5IK90A-DW3	CH60BFAUL
150 W	**5IK150A-BW2J**	5IK150A-BW2	CH400CFAUL2
	5IK150A-BW2U		CH300CFAUL2
	5IK150A-DW2J	5IK150A-DW2	CH100BFAUL
	5IK150A-DW3E	5IK150A-DW3	CH80BFAUL

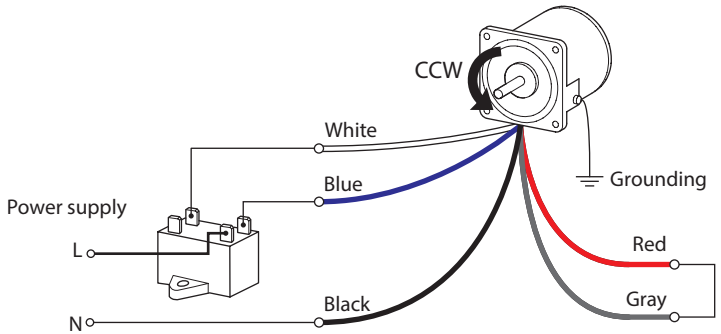
● Connection diagram

Insulate all the wire connections, such as the connection between the motor and the power supply and that between the motor and the capacitor.
Use the Protective Earth Terminal to ground the motor.
Use lead wires for power supply equal to or thicker than the lead wire size of AWG 20 (0.5 mm^2).

Clockwise: CW



Counterclockwise: CCW



• Connecting/installing the capacitor ⇨ p.21
• Connecting the Protective Earth Terminal ⇨ p.21
Operation ⇨ p.22

4.1.3 Induction motors Three-phase type

● Three-phase 200/220/230 VAC type model

Output power	Model (Motor model)	
6 W	**2IK6GN-SW2**	**2IK6A-SW2**
15 W	**3IK15GN-SW2**	**3IK15A-SW2**
25 W	**4IK25GN-SW2**	**4IK25A-SW2**
40 W	**5IK40GN-SW2**	**5IK40A-SW2**
60 W	**5IK60GE-SW2**	**5IK60A-SW2**
90 W	**5IK90GE-SW2**	**5IK90A-SW2**

● Three-phase 2-pole high-speed type model

Output power	Model (Motor model)
60 W	**5IK60A-TW2**
90 W	**5IK90A-TW2**
150 W	**5IK150A-TW2**

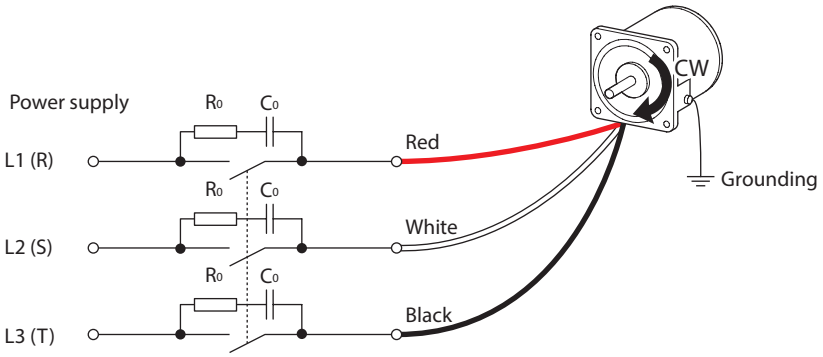
● Three-phase 380/400/415 VAC type model

Output power	Model (Motor model)	
25 W	**4IK25GN-UW2**	**4IK25A-UW2**
40 W	**5IK40GN-UW2**	**5IK40A-UW2**
60 W	**5IK60GE-UW2**	**5IK60A-UW2**
90 W	**5IK90GE-UW2**	**5IK90A-UW2**

● Connection diagram

Insulate all the wire connections, such as the connection between the motor and the power supply.
Use the Protective Earth Terminal to ground the motor.
The motor rotates in the clockwise direction (CW) if connected as the connection diagram below.
Changing the connection for any two wires of R, S, or T will rotate in the counterclockwise (CCW).
Use lead wires for power supply equal to or thicker than the lead wire size of AWG 20 (0.5 mm^2).

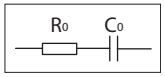
Clockwise: CW



• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.22

Protection of contact (Switch)

If the switch is used for starting/stopping the motor or switching the rotation direction, connect the CR circuit for surge suppression in order to protect the contacts.



R_0 = 5 to 200 Ω
C_0 = 0.1 to 0.2 µF 250 VAC*
* For three-phase 380/400/415 VAC
C_0 = 0.1 to 0.2 µF 450 VAC

• Connecting the Protective Earth Terminal ⇨ p.21

Operation ⇨ p.22

4.1.4 Reversible motors Single-phase type

● Model

Output power	Model	Motor model	Capacitor model
1 W	**0RK1GN-AW2J**	0RK1GN-AW2	CH18FAUL
	0RK1A-AW2J	0RK1A-AW2	
	0RK1GN-AW3U	0RK1GN-AW3	CH12FAUL
	0RK1A-AW3U	0RK1A-AW3	
	0RK1GN-CW2J	0RK1GN-CW2	CH045BFAUL
	0RK1A-CW2J	0RK1A-CW2	
6 W	**2RK6GN-AW2J**	2RK6GN-AW2	CH45FAUL2
	2RK6A-AW2J	2RK6A-AW2	
	2RK6GN-AW2U	2RK6GN-AW2	CH35FAUL2
	2RK6A-AW2U	2RK6A-AW2	
	2RK6GN-CW2J	2RK6GN-CW2	CH10BFAUL
	2RK6A-CW2J	2RK6A-CW2	
	2RK6GN-CW2E	2RK6GN-CW2	CH08BFAUL
	2RK6A-CW2E	2RK6A-CW2	

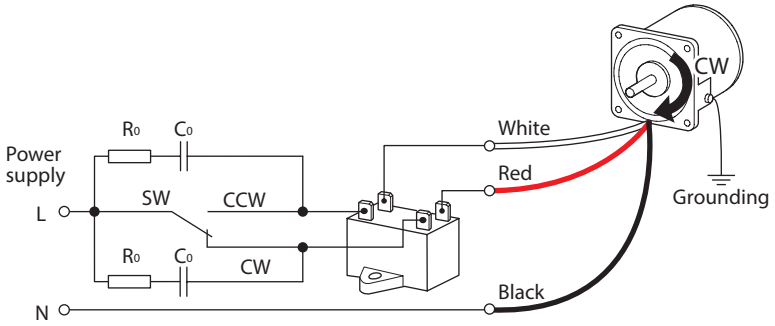
Output power	Model	Motor model	Capacitor model
15 W	**3RK15GN-AW2J**	3RK15GN-AW2	CH75CFAUL2
	3RK15A-AW2J	3RK15A-AW2	
	3RK15GN-AW2U	3RK15GN-AW2	CH60CFAUL2
	3RK15A-AW2U	3RK15A-AW2	
	3RK15GN-CW2J	3RK15GN-CW2	CH18BFAUL
	3RK15A-CW2J	3RK15A-CW2	
	3RK15GN-CW2E	3RK15GN-CW2	CH15BFAUL
	3RK15A-CW2E	3RK15A-CW2	
25 W	**4RK25GN-AW2J**	4RK25GN-AW2	CH100CFAUL2
	4RK25A-AW2J	4RK25A-AW2	
	4RK25GN-AW2U	4RK25GN-AW2	CH80CFAUL2
	4RK25A-AW2U	4RK25A-AW2	
	4RK25GN-CW2J	4RK25GN-CW2	CH30BFAUL
	4RK25A-CW2J	4RK25A-CW2	
	4RK25GN-CW2E	4RK25GN-CW2	CH25BFAUL
	4RK25A-CW2E	4RK25A-CW2	
40 W	**5RK40GN-AW2J**	5RK40GN-AW2	CH160CFAUL2
	5RK40A-AW2J	5RK40A-AW2	
	5RK40GN-AW2U	5RK40GN-AW2	CH120CFAUL2
	5RK40A-AW2U	5RK40A-AW2	

Output power	Model	Motor model	Capacitor model
40 W	**5RK40GN-CW2J**	5RK40GN-CW2	CH40BFAUL
	5RK40A-CW2J	5RK40A-CW2	
	5RK40GN-CW2E	5RK40GN-CW2	CH35BFAUL
	5RK40A-CW2E	5RK40A-CW2	
60 W	**5RK60GE-AW2J**	5RK60GE-AW2	CH250CFAUL2
	5RK60A-AW2J	5RK60A-AW2	
	5RK60GE-AW2U	5RK60GE-AW2	CH200CFAUL2
	5RK60A-AW2U	5RK60A-AW2	
	5RK60GE-CW2J	5RK60GE-CW2	CH60BFAUL
	5RK60A-CW2J	5RK60A-CW2	
	5RK60GE-CW2E	5RK60GE-CW2	CH50BFAUL
	5RK60A-CW2E	5RK60A-CW2	
90 W	**5RK90GE-AW2J**	5RK90GE-AW2	CH350CFAUL2
	5RK90A-AW2J	5RK90A-AW2	
	5RK90GE-AW2U	5RK90GE-AW2	CH300CFAUL2
	5RK90A-AW2U	5RK90A-AW2	
	5RK90GE-CW2J	5RK90GE-CW2	CH80BFAUL
	5RK90A-CW2J	5RK90A-CW2	
	5RK90GE-CW3E	5RK90GE-CW3	CH70BFAUL
	5RK90A-CW3E	5RK90A-CW3	

● Connection diagram

Insulate all the wire connections, such as the connection between the motor and the power supply and that between the motor and the capacitor.
Use the Protective Earth Terminal to ground the motor.
The motor rotates in the clockwise direction if the switch (SW) is connected to the CW side, and it rotates in the counterclockwise direction if connected to the CCW side.
Use lead wires for power supply equal to or thicker than the lead wire size shown below.
Motors of 1 W: AWG 24 (0.2 mm^2) or thicker
Motors of 6 W or larger: AWG 20 (0.5 mm^2) or thicker

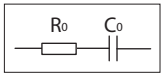
Clockwise: CW



• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.22

Protection of contact (Switch)

If the switch is used for starting/stopping the motor or switching the rotation direction, connect the CR circuit for surge suppression in order to protect the contacts.



R_0 = 5 to 200 Ω
C_0 = 0.1 to 0.2 μF 250 VAC

• Connecting/installing the capacitor ⇨ p.21
• Connecting the Protective Earth Terminal ⇨ p.21
Operation ⇨ p.22

4.2 Terminal box type

4.2.1 Induction motors Single-phase type

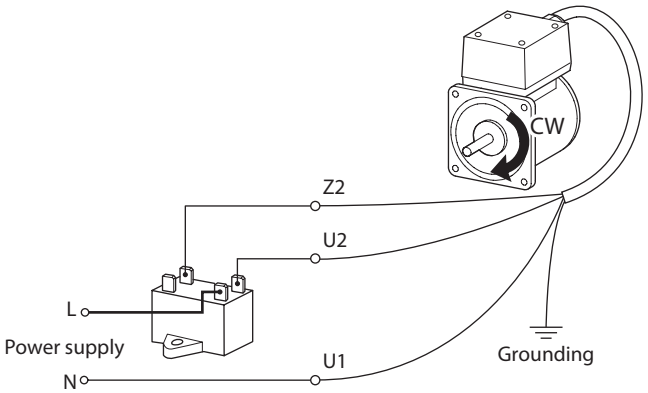
● Model

Output power	Model	Motor model	Capacitor model
25 W	**4IK25GN-AW2TJ**	4IK25GN-AW2T	CH80CFAUL2
	4IK25A-AW2TJ	4IK25A-AW2T	
	4IK25GN-AW2TU	4IK25GN-AW2T	CH65CFAUL2
	4IK25A-AW2TU	4IK25A-AW2T	
	4IK25GN-CW2TJ	4IK25GN-CW2T	CH20BFAUL
	4IK25A-CW2TJ	4IK25A-CW2T	
	4IK25GN-CW2TE	4IK25GN-CW2T	CH15BFAUL
	4IK25A-CW2TE	4IK25A-CW2T	
40 W	**5IK40GN-AW2TJ**	5IK40GN-AW2T	CH110CFAUL2
	5IK40A-AW2TJ	5IK40A-AW2T	
	5IK40GN-AW2TU	5IK40GN-AW2T	CH90CFAUL2
	5IK40A-AW2TU	5IK40A-AW2T	
	5IK40GN-CW2TJ	5IK40GN-CW2T	CH30BFAUL
	5IK40A-CW2TJ	5IK40A-CW2T	
	5IK40GN-CW2TE	5IK40GN-CW2T	CH23BFAUL
	5IK40A-CW2TE	5IK40A-CW2T	
60 W	**5IK60GE-AW2TJ**	5IK60GE-AW2T	CH200CFAUL2
	5IK60A-AW2TJ	5IK60A-AW2T	
	5IK60GE-AW2TU	5IK60GE-AW2T	CH180CFAUL2
	5IK60A-AW2TU	5IK60A-AW2T	
60 W	**5IK60GE-CW2TJ**	5IK60GE-CW2T	CH50BFAUL
	5IK60A-CW2TJ	5IK60A-CW2T	
	5IK60GE-CW2TE	5IK60GE-CW2T	CH40BFAUL
	5IK60A-CW2TE	5IK60A-CW2T	
90 W	**5IK90GE-AW2TJ**	5IK90GE-AW2T	CH280CFAUL2
	5IK90A-AW2TJ	5IK90A-AW2T	
	5IK90GE-AW2TU	5IK90GE-AW2T	CH200CFAUL2
	5IK90A-AW2TU	5IK90A-AW2T	
	5IK90GE-CW2TJ	5IK90GE-CW2T	CH70BFAUL
	5IK90A-CW2TJ	5IK90A-CW2T	
	5IK90GE-CW2TE	5IK90GE-CW2T	CH60BFAUL
	5IK90A-CW2TE	5IK90A-CW2T	

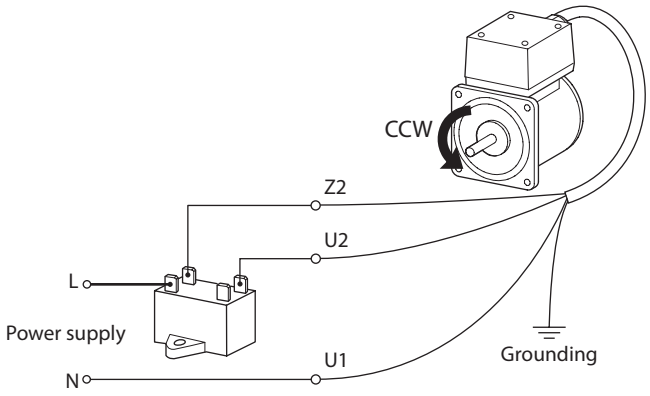
● Connection diagram

Insulate all the wire connections, such as the connection between the motor and the power supply and that between the motor and the capacitor.
Use the Protective Earth Terminal to ground the motor.
Z2, U2, and U1 in the connection diagram indicate terminal codes inside the terminal box.
Use lead wires for power supply equal to or thicker than the lead wire size of AWG 20 (0.5 mm^2).

Clockwise: CW

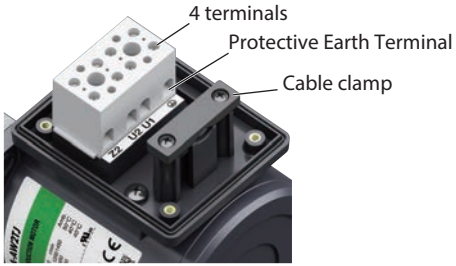


Counterclockwise: CCW



• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.22

● Inside the terminal box (Terminal box 1 ⇨ p.15)



• Connecting/installing the capacitor ⇨ p.21

Operation ⇨ p.22

4.2.2 Induction motors Three-phase type

● Three-phase 200/220/230 VAC type model

Output power	Model (Motor model)	
25 W	**4IK25GN-SW2T**	**4IK25A-SW2T**
40 W	**5IK40GN-SW2T**	**5IK40A-SW2T**
60 W	**5IK60GE-SW2T**	**5IK60A-SW2T**
90 W	**5IK90GE-SW2T**	**5IK90A-SW2T**

● Three-phase 2-pole high-speed type model

Output power	Model (Motor model)
150 W	**5IK150A-TW2T**

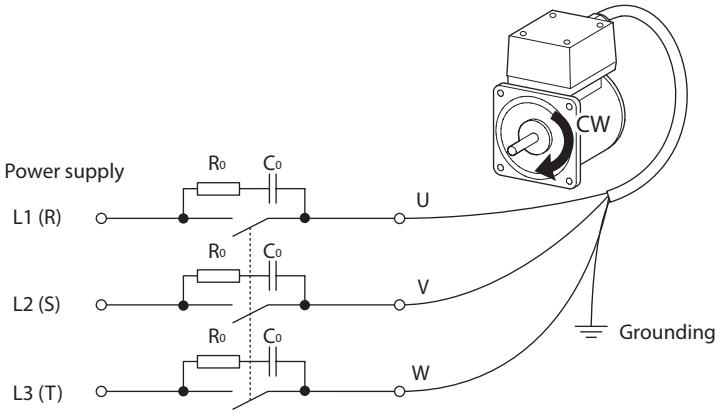
● Three-phase 380/400/415 VAC type model

Output power	Model (Motor model)	
25 W	**4IK25GN-UW2T2**	**4IK25A-UW2T2**
40 W	**5IK40GN-UW2T2**	**5IK40A-UW2T2**
60 W	**5IK60GE-UW2T2**	**5IK60A-UW2T2**
90 W	**5IK90GE-UW2T2**	**5IK90A-UW2T2**

● Connection diagram

Insulate all the wire connections, such as the connection between the motor and the power supply.
Use the Protective Earth Terminal to ground the motor.
U, V, and W in the connection diagram indicate terminal codes inside the terminal box.
The motor rotates in the clockwise direction (CW) if connected as the connection diagram below.
Changing the connection for any two wires of R, S, or T will rotate in the counterclockwise (CCW).
Use lead wires for power supply equal to or thicker than the lead wire size of AWG 20 (0.5 mm^2).

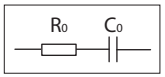
Clockwise: CW



• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.22

Protection of contact (switch)

If the switch is used for starting/stopping the motor or switching the rotation direction, connect the CR circuit for surge suppression in order to protect the contacts.

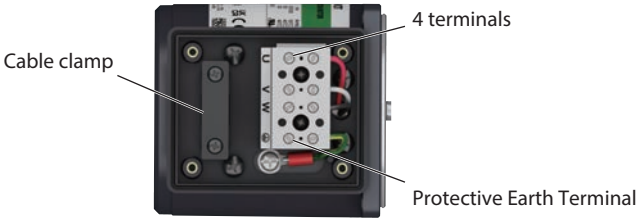


R_0 = 5 to 200 Ω
C_0 = 0.1 to 0.2 μF 250 VAC*
* For three-phase 380/400/415 VAC
C_0 = 0.1 to 0.2 μF 450 VAC

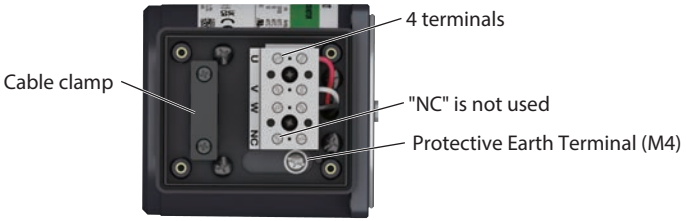
● Inside of terminal box

Three-phase 200/220/230 VAC type, three-phase 2-pole high-speed type (Terminal box 1 ⇨ p.15)

• Pinion shaft type



• Round shaft type



Three-phase 380/400/415 VAC type (Terminal box 2 ⇨ p.16)



Operation ⇨ p.22

4.2.3 Reversible motors Single-phase type

● Model

Output power	Model	Motor model	Capacitor model
25 W	**4RK25GN-AW2TJ**	4RK25GN-AW2T	CH100CFAUL2
	4RK25A-AW2TJ	4RK25A-AW2T	
	4RK25GN-AW2TU	4RK25GN-AW2T	CH80CFAUL2
	4RK25A-AW2TU	4RK25A-AW2T	
	4RK25GN-CW2TJ	4RK25GN-CW2T	CH30BFAUL
	4RK25A-CW2TJ	4RK25A-CW2T	
	4RK25GN-CW2TE	4RK25GN-CW2T	CH25BFAUL
	4RK25A-CW2TE	4RK25A-CW2T	

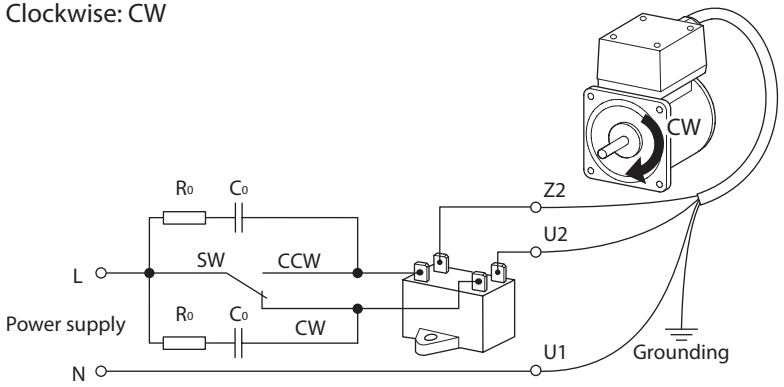
Output power	Model	Motor model	Capacitor model
40 W	**5RK40GN-AW2TJ**	5RK40GN-AW2T	CH160CFAUL2
	5RK40A-AW2TJ	5RK40A-AW2T	
	5RK40GN-AW2TU	5RK40GN-AW2T	CH120CFAUL2
	5RK40A-AW2TU	5RK40A-AW2T	
	5RK40GN-CW2TJ	5RK40GN-CW2T	CH40BFAUL
	5RK40A-CW2TJ	5RK40A-CW2T	
	5RK40GN-CW2TE	5RK40GN-CW2T	CH35BFAUL
	5RK40A-CW2TE	5RK40A-CW2T	
60 W	**5RK60GE-AW2TJ**	5RK60GE-AW2T	CH250CFAUL2
	5RK60A-AW2TJ	5RK60A-AW2T	
	5RK60GE-AW2TU	5RK60GE-AW2T	CH200CFAUL2
	5RK60A-AW2TU	5RK60A-AW2T	

Output power	Model	Motor model	Capacitor model
60 W	**5RK60GE-CW2TJ**	5RK60GE-CW2T	CH60BFAUL
	5RK60A-CW2TJ	5RK60A-CW2T	
	5RK60GE-CW2TE	5RK60GE-CW2T	CH50BFAUL
	5RK60A-CW2TE	5RK60A-CW2T	
90 W	**5RK90GE-AW2TJ**	5RK90GE-AW2T	CH350CFAUL2
	5RK90A-AW2TJ	5RK90A-AW2T	
	5RK90GE-AW2TU	5RK90GE-AW2T	CH300CFAUL2
	5RK90A-AW2TU	5RK90A-AW2T	
	5RK90GE-CW2TJ	5RK90GE-CW2T	CH80BFAUL
	5RK90A-CW2TJ	5RK90A-CW2T	
	5RK90GE-CW3TE	5RK90GE-CW3T	CH70BFAUL
	5RK90A-CW3TE	5RK90A-CW3T	

● Connection diagram

Insulate all the wire connections, such as the connection between the motor and the power supply and that between the motor and the capacitor.
Use the Protective Earth Terminal to ground the motor.
Z2, U2, and U1 in the connection diagram indicate terminal codes inside the terminal box.
The motor rotates in the clockwise direction if the switch (SW) is connected to the CW side, and it rotates in the counterclockwise direction if connected to the CCW side.
Use lead wires for power supply equal to or thicker than the lead wire size of AWG 20 (0.5 mm^2).

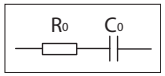
Clockwise: CW



• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.22

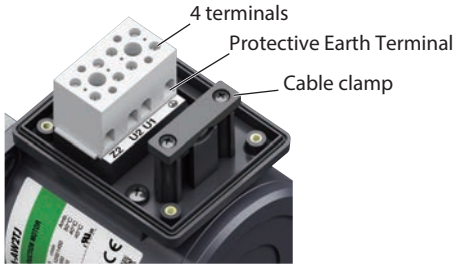
Protection of contact (switch)

If the switch is used for starting/stopping the motor or switching the rotation direction, connect the CR circuit for surge suppression in order to protect the contacts.



R_0 = 5 to 200 Ω
C_0 = 0.1 to 0.2 μF 250 VAC

● Inside the terminal box (Terminal box 1 ⇨ p.15)



• Connecting/installing the capacitor ⇨ p.21

Operation ⇨ p.22

4.2.4 Connecting to the terminal box

There are two types of terminal boxes.

Terminal box 1: 4 screws	Terminal box 2: 3 screws
	

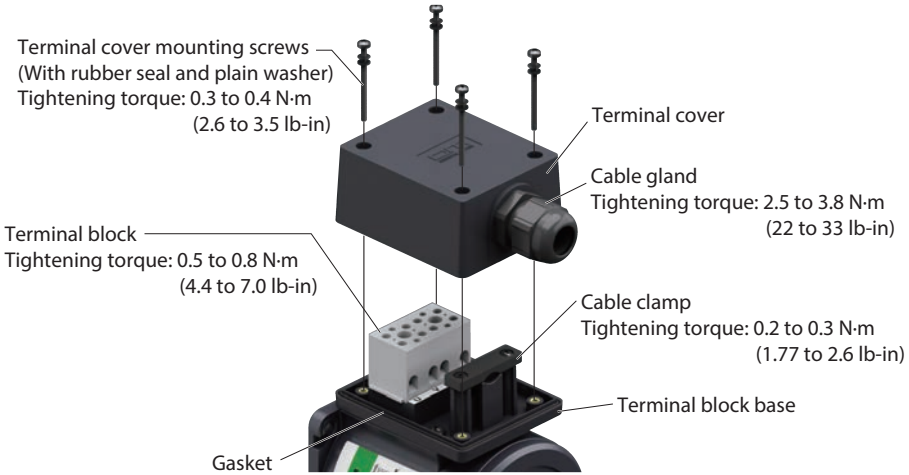
Note

- To maintain the sealing performance of the terminal box, keep the applicable cable size.
- Secure the cable exposed to the outside of the motor so that no stress is applied.

● Terminal box 1

Connect according to the following steps.

1. Loosen the terminal cover mounting screws (M4 × 4 pieces) to remove the terminal cover.
2. Pass the cable through the cable gland.
3. Loosen the two screws on the cable clamp. And pass the cable through the cable clamp to connect the lead wires to the terminal block. Connect the protective earth wire to the Protective Earth Terminal.
4. Attach the terminal cover to the terminal block base.

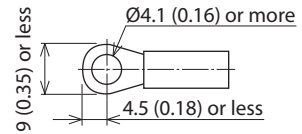


- Use a cable with the specifications below.
  Applicable cable diameter: Ø6 to 12 mm (Ø0.24 to 0.47 in.)
  Applicable lead wire: AWG 24 to 12 (0.2 to 3.5 mm^2)
  Stripping length 8 mm (0.31 in.)

- When connecting the Protective Earth Terminal of three-phase motor round shaft type, use the following crimp terminal.
  Terminal screw size: M4
  Tightening torque: 1.0 to 1.3 N·m (8.8 to 11.5 lb-in)
  Applicable lead wire: AWG 18 (0.75 mm^2) or thicker

Round crimp terminal with insulation cover

[Unit: mm (in.)]

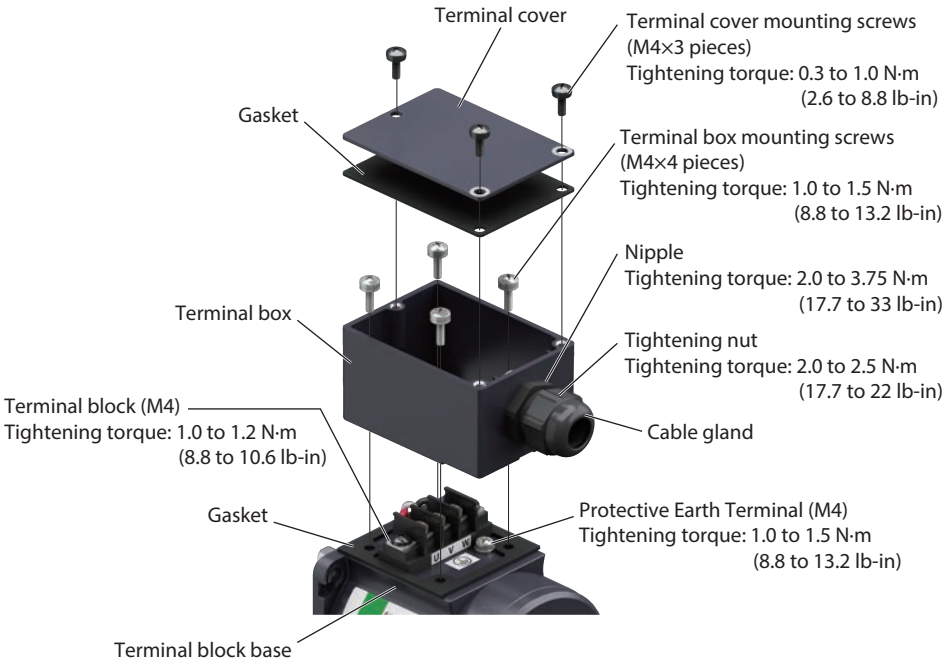


- Assemble so that foreign objects are not entered between the terminal cover and the terminal block base.
- The terminal cover mounting screw is specifically designed for fixing the terminal cover. This special screw is provided with a rubber seal and a plain washer so that the terminal box keeps dust-proof and splash-proof properties. To maintain the sealing performance of the terminal box, use only the terminal cover mounting screw.
  Also, the gasket on the matching surface of the terminal box is structured to prevent it from falling off. However, if it should come off, install it firmly in the groove of the terminal box.

● Terminal box 2

Connect according to the following steps.

1. Loosen the terminal cover mounting screws (M4 x 3 pieces) to remove the terminal cover and the gasket from the terminal box.
2. Pass the cable through the cable ground to connect the lead wires to the terminal block. Connect the protective earth wire to the Protective Earth Terminal.
3. Attach the gasket and the terminal cover to the terminal box.

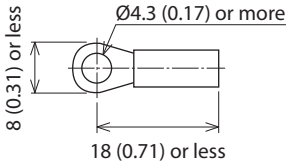


The terminal box can be removed. Loosen the terminal box mounting screws (M4 × 4 pieces) to remove the terminal box.

- Use a cable with the specifications below.
  Applicable cable diameter: Ø6 to 12 mm (Ø0.24 to 0.47 in.)
  Applicable lead wire: AWG 20 (0.5 mm^2)
- Use the following crimp terminal when connecting the cable to the terminal block or connecting the Protective Earth Terminal.

Round crimp terminal with insulation cover

[Unit: mm (in.)]



- Be sure to install the gasket between the terminal box and the terminal cover. Also, assemble so that foreign objects are not entered between the terminal cover and the terminal box.

Changing the cable outlet position

- The cable outlet position can be changed to the left or right 90-degree direction.
  When changing the cable outlet position, loosen the terminal box mounting screws (M4 × 4 pieces) and turn the terminal box to change the mounting direction.
- A gasket is installed between the terminal box and terminal block base. When the terminal box is removed, be sure to install the gasket. Also, assemble so that foreign objects are not entered between the terminal box and the terminal block base.

4.3 Electromagnetic brake motors

4.3.1 Single-phase type

● Model

Output power	Model	Motor model	Capacitor model
6 W	**2RK6GN-AW2MJ**	2RK6GN-AW2M	CH45FAUL2
	2RK6A-AW2MJ	2RK6A-AW2M	
	2RK6GN-AW2MU	2RK6GN-AW2M	CH35FAUL2
	2RK6A-AW2MU	2RK6A-AW2M	
	2RK6GN-CW2MJ	2RK6GN-CW2M	CH10BFAUL
	2RK6A-CW2MJ	2RK6A-CW2M	
	2RK6GN-CW2ME	2RK6GN-CW2M	CH08BFAUL
	2RK6A-CW2ME	2RK6A-CW2M	
15 W	**3RK15GN-AW2MJ**	3RK15GN-AW2M	CH75CFAUL2
	3RK15A-AW2MJ	3RK15A-AW2M	
	3RK15GN-AW2MU	3RK15GN-AW2M	CH60CFAUL2
	3RK15A-AW2MU	3RK15A-AW2M	
	3RK15GN-CW2MJ	3RK15GN-CW2M	CH18BFAUL
	3RK15A-CW2MJ	3RK15A-CW2M	
	3RK15GN-CW2ME	3RK15GN-CW2M	CH15BFAUL
	3RK15A-CW2ME	3RK15A-CW2M	
25 W	**4RK25GN-AW2MJ**	4RK25GN-AW2M	CH100CFAUL2
	4RK25A-AW2MJ	4RK25A-AW2M	
	4RK25GN-AW2MU	4RK25GN-AW2M	CH80CFAUL2
	4RK25A-AW2MU	4RK25A-AW2M	
	4RK25GN-CW2MJ	4RK25GN-CW2M	CH25BFAUL
	4RK25A-CW2MJ	4RK25A-CW2M	
	4RK25GN-CW2ME	4RK25GN-CW2M	CH20BFAUL
	4RK25A-CW2ME	4RK25A-CW2M	
40 W	**5RK40GN-AW2MJ**	5RK40GN-AW2M	CH160CFAUL2
	5RK40A-AW2MJ	5RK40A-AW2M	
	5RK40GN-AW2MU	5RK40GN-AW2M	CH120CFAUL2
	5RK40A-AW2MU	5RK40A-AW2M	
	5RK40GN-CW2MJ	5RK40GN-CW2M	CH40BFAUL
	5RK40A-CW2MJ	5RK40A-CW2M	
	5RK40GN-CW2ME	5RK40GN-CW2M	CH35BFAUL
	5RK40A-CW2ME	5RK40A-CW2M	
60 W	**5RK60GE-AW2MJ**	5RK60GE-AW2M	CH250CFAUL2
	5RK60A-AW2MJ	5RK60A-AW2M	
	5RK60GE-AW2MU	5RK60GE-AW2M	CH200CFAUL2
	5RK60A-AW2MU	5RK60A-AW2M	
	5RK60GE-CW2MJ	5RK60GE-CW2M	CH60BFAUL
	5RK60A-CW2MJ	5RK60A-CW2M	
	5RK60GE-CW2ME	5RK60GE-CW2M	CH50BFAUL
	5RK60A-CW2ME	5RK60A-CW2M	
90 W	**5RK90GE-AW2MJ**	5RK90GE-AW2M	CH350CFAUL2
	5RK90A-AW2MJ	5RK90A-AW2M	
	5RK90GE-AW2MU	5RK90GE-AW2M	CH300CFAUL2
	5RK90A-AW2MU	5RK90A-AW2M	
	5RK90GE-CW2MJ	5RK90GE-CW2M	CH80BFAUL
	5RK90A-CW2MJ	5RK90A-CW2M	
	5RK90GE-CW2ME	5RK90GE-CW2M	CH70BFAUL
	5RK90A-CW2ME	5RK90A-CW2M	

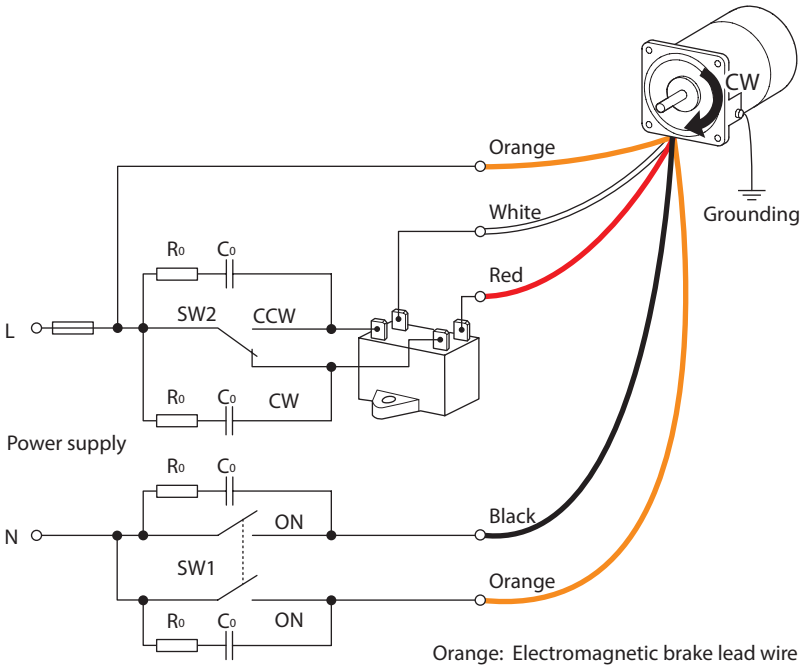
Refer to the next page for the connection diagram.

● Connection diagram

Insulate all the wire connections, such as the connection between the motor and the power supply and that between the motor and the capacitor. Use the Protective Earth Terminal to ground the motor.
For safety, install a breaker or a fuse in the power supply line.
The motor rotates in the clockwise direction if the switch (SW2) is connected to the CW side, and it rotates in the counterclockwise direction if connected to the CCW side.
Use lead wires for power supply equal to or thicker than the lead wire size of AWG 20 (0.5 mm^2).

Note In the case of electromagnetic brake motors of 60 W and 90 W types, do not damage the inner lead wire when stripping the outer sheath of the cable.

Clockwise: CW

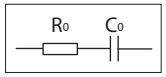


Orange: Electromagnetic brake lead wire

• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.22

Protection of contact (switch)

If the switch is used for starting/stopping the motor or switching the rotation direction, connect the CR circuit for surge suppression in order to protect the contacts.

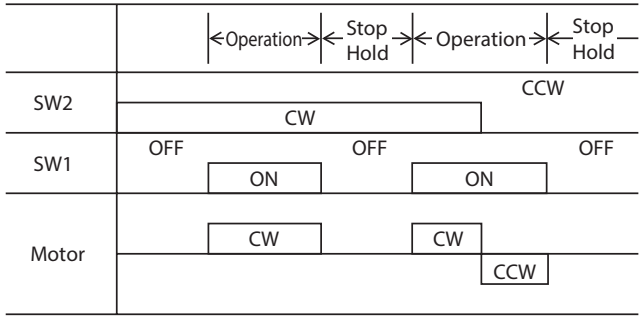


R_0 = 5 to 200 Ω
C_0 = 0.1 to 0.2 μF 250 VAC

● Specifications of SW1 and SW2

Output power	Number of switch	Contact capacity of switch		Note
		Single-phase 100/110/115 VAC input	Single-phase 200/220/230 VAC input	
6 W to 25 W	SW1	125 VAC, 3 A or more Inductive load	250 VAC, 1.5 A or more Inductive load	Switched simultaneously
	SW2			–
40 W to 90 W	SW1	125 VAC, 5 A or more Inductive load	250 VAC, 5 A or more Inductive load	Switched simultaneously
	SW2			–

● Example of timing chart of SW1 and SW2



● Operation/Stop

Refer to "5. Operation" on p.22 when operating.
SW1 is used for "Operation-Stop" of the motor. Turning SW1 ON releases the electromagnetic brake to rotate the motor. Turning SW1 OFF actuates the electromagnetic brake to stop the motor. A load may fall if the product is used in vertical drive. Operate it after thoroughly checking the load condition.

memo

- The electromagnetic brake is a friction type. Friction noise may occur when the electromagnetic brake is actuated, but this is not a problem.
- If the electromagnetic brake is released in advance, the motor can be started rotating more quickly. Release the electromagnetic brake at least 10 ms before starting the motor.
- If a current is applied between the two electromagnetic brake lead wires (orange) when the motor is stopped, the electromagnetic brake is released and the motor shaft can be rotated easily by hand.

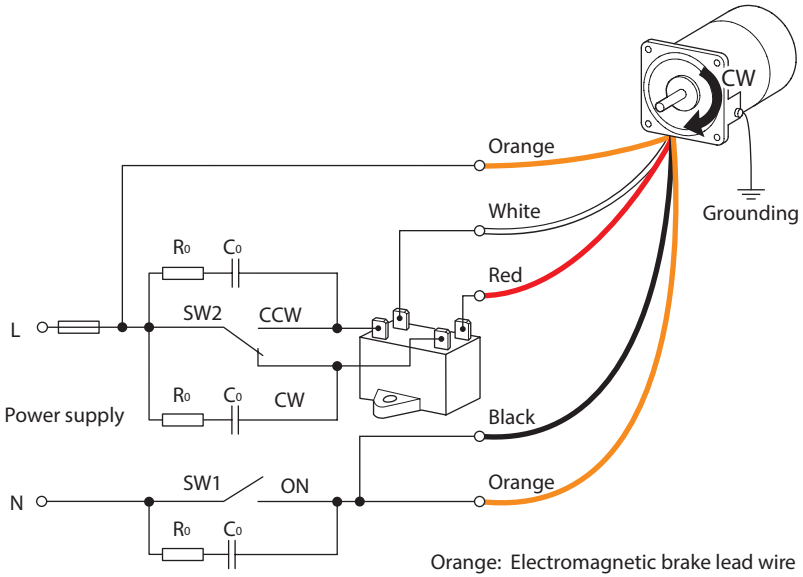
• Connecting/installing the capacitor ⇨ p.21
• Connecting the Protective Earth Terminal ⇨ p.21
Operation ⇨ p.22

● Simplified connection

Note Connection cannot be simplified for vertical drive operation and three-phase motors.

When operating the motor and the electromagnetic brake with a single switch (contact), connect the wiring as shown in the figure below.
However, since the magnetic energy of the motor affects the electromagnetic brake windings, the braking time is extended by approximately 50 ms compared to the connection diagram on p.18, causing the overrun to increase.

Clockwise: CW



Orange: Electromagnetic brake lead wire

4.3.2 Three-phase type

● Model

Output power	Model (Motor model)	
6 W	**2IK6GN-SW2M**	**2IK6A-SW2M**
15 W	**3IK15GN-SW2M**	**3IK15A-SW2M**

Output power	Model (Motor model)	
25 W	**4IK25GN-SW2M**	**4IK25A-SW2M**
40 W	**5IK40GN-SW2M**	**5IK40A-SW2M**

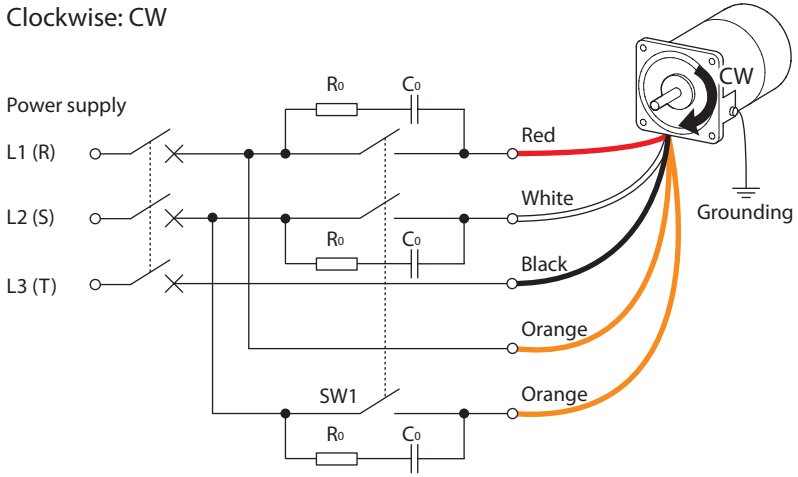
Output power	Model (Motor model)	
60 W	**5IK60GE-SW2M**	**5IK60A-SW2M**
90 W	**5IK90GE-SW2M**	**5IK90A-SW2M**

● Connection diagram

Insulate all the wire connections, such as the connection between the motor and the power supply. Use the Protective Earth Terminal to ground the motor. For safety, install a breaker in the power supply line.
The motor rotates in the clockwise direction (CW) if connected as the connection diagram below.
Changing the connection for any two wires of R, S, or T will rotate in the counterclockwise (CCW).
Use lead wires for power supply equal to or thicker than the lead wire size of AWG 20 (0.5 mm^2).

Note In the case of electromagnetic brake motors of 60 W and 90 W types, do not damage the inner lead wire when stripping the outer sheath of the cable.

Clockwise: CW

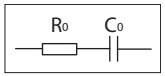


Orange: Electromagnetic brake lead wire

• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.22

Protection of contact (Switch)

If the switch is used for starting/stopping the motor or switching the rotation direction, connect the CR circuit for surge suppression in order to protect the contacts.



R_0 = 5 to 200 Ω
C_0 = 0.1 to 0.2 μF 250 VAC

● Specifications of SW1

Output power	Contact capacity of switch	Note
	Three-phase 200/220/230 VAC input	
6 W to 25 W	250 VAC, 1.5 A or more Inductive load	Switched simultaneously
40 W to 90 W	250 VAC, 5 A or more Inductive load	Switched simultaneously

● Operation/Stop

Refer to "5. Operation" on p.22 when operating.
SW1 is used for "Operation-Stop" of the motor. Turning SW1 ON releases the electromagnetic brake to rotate the motor. Turning SW1 OFF actuates the electromagnetic brake to stop the motor. A load may fall if the product is used in vertical drive. Operate it after thoroughly checking the load condition.

memo

- The electromagnetic brake is a friction type. Friction noise may occur when the electromagnetic brake is actuated, but this is not a problem.
- If the electromagnetic brake is released in advance, the motor can be started rotating more quickly. Release the electromagnetic brake at least 10 ms before starting the motor.
- If a current is applied between the two electromagnetic brake lead wires (orange) when the motor is stopped, the electromagnetic brake is released and the motor shaft can be rotated easily by hand.

• Connecting the Protective Earth Terminal ⇨ p.21

Operation ⇨ p.22

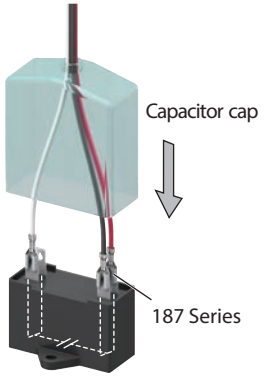
4.4 Connecting/installing the capacitor (Single-phase type only)

Note

- For lead wire connection, use one lead wire for each individual terminal.
- Install a capacitor at least 10 cm (3.94 in.) away from the motor. If it is located closer, the capacitor life may be shortened due to the heat of the motor.

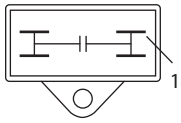
● Connection

Before installing the included capacitor, check the capacitor's capacitance matches that described on the motor nameplate.
If crimp terminals are used, select the FASTON Terminal 187 Series (TE Connectivity).
Use the included capacitor cap to insulate the capacitor terminal connection.



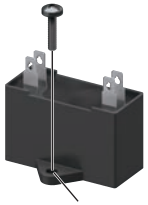
The capacitor has four terminals that are internally connected as shown in the figure.

<Capacitor internal wiring diagram>



● Installation

Use a M4 screw (not included) to install the capacitor securely.



Ø4.3 mm (0.17 in.)
Tightening torque: 1.0 N·m (8.8 lb-in)

4.5 Connecting the Protective Earth Terminal

Be sure to ground using the Protective Earth Terminal ⏚ on the motor or inside the terminal box.

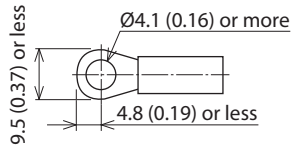
Note

Be sure to use the screw for protective earth attached on the product.

● Lead wire type

Applicable crimp terminal: Round crimp terminal with insulation cover
Terminal screw size: M4
Tightening torque: 1.0 to 1.3 N·m (8.8 to 11.5 lb-in)
Applicable lead wire: AWG 18 (0.75 mm^2) or thicker

[Unit: mm (in.)]



● Terminal box type

Refer to "4.2.4 Connecting to the terminal box" on p.15.

The motor rotates when the power supply is turned on.
For protection against electric shock, do not turn on the power supply until the wiring is completed.

Note

- Make sure that the motor case temperature does not exceed 90°C (194 °F) when operating the motor. Operating the motor in a state where the case temperature exceeds 90°C (194 °F) causes the lives of windings and ball bearings of the motor to shorten. Measure to check the motor case temperature using a thermometer, thermo tape, or thermocouple.
- Use the included capacitor for a single-phase motor, and always connect the capacitor even after the motor starts rotating.
- Switch the rotation direction of the single-phase induction motor after the motor has completely stopped. If the rotation direction is switched during operation, it may not be switched or it may take a long time to switch the direction.
- Do not perform operation switching the motor rotation direction instantaneously for three-phase motors. This may damage the motor and the gearhead.
- Three-phase 380/400/415 VAC motors cannot be used in combination with an inverter. This may cause the insulation of the motor windings to deteriorate, resulting in damage to the motor.

5.1 Time rating

■ Induction Motors

Continuous operation can be performed (continuous rating).

■ Reversible motors

Continuous operation can be performed for 30 minutes. (30 minutes rating: "30 min" is described on the motor nameplate.)

5.2 Rotation direction of the gearhead output shaft

The rotation direction of the gearhead output shaft varies with that of the motor output shaft depending on the gear ratio of the gearhead.
The gear ratio and the rotation direction for each gearhead are shown in the table below.
The rotation direction represents that when viewed from the output shaft side.
The box (□) in the model name indicates a number representing the gear ratio.
In the case of inch output shaft gearheads, "**A**" is entered in the box (◆) in the model name.

: The gearhead output shaft rotates in the **same** direction as the motor output shaft.

: The gearhead output shaft rotates in the **opposite** direction to the motor output shaft.

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
2GN□K◆ 2GN□S◆ 3GN□K◆ 3GN□S◆ 4GN□K◆ 4GN□S◆ 5GN□K◆ 5GN□S◆																				
0GN□K◆ 5GE□S◆																				
4GN□RH 4GN□RA◆ 5GN□RH 5GN□RA◆ 5GE□RH 5GE□RA◆																				

When a decimal gearhead is connected to these gearheads, the rotation speed will be one-tenth.
The rotation direction is the same.

6. Burning protection for locked condition

Table of contents

The motor is equipped with a protective function to prevent the motor from burning when the output shaft is locked.
The protective methods are the following two types.

6.1 Thermal protection

"TP" is described on the motor nameplate. This motor contains a built-in automatic return type thermal protector in the motor windings. If the motor internal temperature exceeds the specified value, the thermal protector will be activated to stop the motor.
When the electromagnetic brake motor is used, since the electromagnetic brake remains in a state of releasing the motor shaft, a load will not be held. Provide safety measures separately.
Always turn off the power before performing maintenance or inspection.

■ Thermal protector activation temperature

Open (to stop the motor) 130±5 °C (266±9 °F)
Close (to resume operation) 85±20 °C (185±36 °F)

6.2 Impedance protection

"ZP" is described on the motor nameplate. This motor is designed with higher impedance in the motor windings. Even if the motor is locked, the increase in current (input) will be minimized and the internal temperature will not rise above a certain level.

7.1 Checking the product

■ Package contents

Verify that the items listed below are included.
Report any missing or damaged items to the branch or sales office from which you purchased the product.

● Parallel shaft gearheads

☐ Gearhead ..... 1 unit



☐ Mounting screw ..... 1 set
[Screws, nuts, plain washers 4 pieces each]*
☐ Parallel key ..... 1 piece
(included with a gearhead having a key slot on the output shaft)

* Spring washers (4 pieces) are also included with some products.

● Hollow shaft gearheads, Solid shaft gearheads

☐ Gearhead ..... 1 unit

Hollow shaft gearhead



Solid shaft gearhead



☐ Assembly screw ..... 1 set (for assembling a motor and a gearhead)
[Hexagonal socket head screws, spring washers, plain washers 4 pieces each]
☐ Parallel key ..... 1 piece
☐ Gasket ..... 1 piece
☐ Safety cover ..... 1 set (included with a hollow shaft gearhead only)
[Safety cover: 1 piece, mounting screw for safety cover: 2 pieces)

■ Information about nameplate

Tell us the model name, product serial number, and manufacturing date when you contact us.



memo The position describing the information may vary depending on the product.

■ How to identify the product model

Verify the model name of the purchased product against the model shown on the nameplate of the gearhead.

5	GN	50	K	_
1	2	3	4	5

1	Gearhead frame size	**0**: 42 mm (1.65 in.) **2**: 60 mm (2.36 in.) **3**: 70 mm (2.76 in.) **4**: 80 mm (3.15 in.) **5**: 90 mm (3.54 in.)
2	Type of pinion	**GN**: **GN** type pinion **GE**: **GE** type pinion
3	Gear ratio	(Example) **50**: Gear ratio 1 : 50 **10X** is a decimal gearhead with a gear ratio of 1 : 10.
4	Gearhead type	**K**, **S**: Parallel shaft gearhead **RH**: Right-angle, hollow shaft gearhead **RA**: Right-angle, solid shaft gearhead
5	Gearhead output shaft type	Blank: mm output shaft **A**: Inch output shaft

7.2 Precautions for use

■ Grease measures for gearhead

On rare occasions, grease may ooze out from the gearhead. If there is concern over possible environmental contamination resulting from the leakage of grease, check for grease stains during regular inspections. Alternatively, install an oil pan or other device to prevent damage resulting from contamination. Grease leakage may lead to problems in the user's equipment or products.

■ When using in low temperature environment

When using under low ambient temperature environments, the motor may take time to start rotating or may fall the rotation speed. This is due to an increase in friction torque of the oil seal used for the gearhead output shaft. As the operation time passes, the sliding part of the oil seal will warm up and fit, and the friction torque is decreased, enabling operation at the required rotation speed.

■ Rotation direction of the gearhead output shaft

The rotation direction of the gearhead output shaft may vary with that of the motor output shaft depending on the gearhead.
Refer to "5.2 Rotation direction of the gearhead output shaft" on p.22 for details.

■ Permissible torque

The permissible torque is specified by the size and gear ratio of the gearhead. Use the gearhead within the permissible torque according to each gear ratio. Check on the Oriental Motor Website for the permissible torque values. Do not stop the shaft rotation of motor/gearhead forcibly by hitting an object. Stopping in such a way may cause impact, leading to damage to the gearhead.

■ Permissible radial load and permissible axial load

The radial load and the axial load have a great influence on the life of the bearings and the strength of the shaft. Make sure not to exceed the permissible radial load and the permissible axial load. Check the permissible radial load and the permissible axial load on the page of each gearhead.

7.3 Parallel shaft gearheads

■ Assembling a motor and a gearhead

Check the model names for the motor and gearhead. Only a motor and a gearhead having the same frame size and the same type of pinion can be combined.

[Example] • Motor model **4IK25GN-AW2** • Gearhead model **4GN25K**

Frame size

Pinion type

Refer to p.6 for how to assemble a motor and a gearhead.

■ Installing to equipment

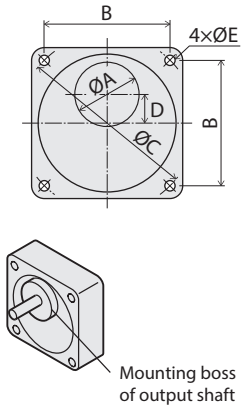
Refer to p.7 for how to install to equipment.

The box (□) in the model name indicates a number representing the gear ratio.

In the case of inch output shaft gearheads, "**A**" is entered in the box (◆) in the model name.

● Mounting hole dimensions [Unit: mm (in.)]

Model	ØA	B	ØC	D	ØE
0GN□K◆	18 (0.71)	33.94 (1.336)	48 (1.89)	8 (0.31)	3.5 (0.138)
2GN□K◆ **2GN□S◆**	24 (0.94)	49.50 (1.949)	70 (2.76)	10 (0.39)	4.5 (0.177)
3GN□K◆ **3GN□S◆**	30 (1.18)	57.98 (2.283)	82 (3.23)	15 (0.59)	5.5 (0.217)
4GN□K◆ **4GN□S◆**	34 (1.34)	66.47 (2.617)	94 (3.70)	15 (0.59)	5.5 (0.217)
5GN□K◆ **5GN□S◆**	36 (1.42)	73.54 (2.895)	104 (4.09)	18 (0.71)	6.5 (0.256)
5GE□S◆	34 (1.34)	73.54 (2.895)	104 (4.09)	18 (0.71)	6.5 (0.256)



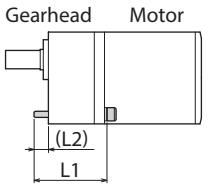
ØA indicates the size for the mounting boss of output shaft of the gearhead.

Make the mounting hole which dimensions is at least 1 mm (0.04 in.) larger than the mounting boss of output shaft.

● Mounting screw size

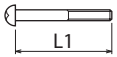
Parallel shaft gearheads

Model	□: Gear ratio	Screw size	L1 [mm (in.)]	L2 [mm (in.)]
0GN□K	**3** to **180**	M3	40 (1.57)	9 (0.35)
2GN□K **2GN□S**	**3** to **18**	M4	50 (1.97)	12 (0.47)
	25 to **180**		60 (2.36)	12 (0.47)
3GN□K **3GN□S**	**3** to **18**	M5	50 (1.97)	10 (0.39)
	25 to **180**		65 (2.56)	15 (0.59)
4GN□K **4GN□S**	**3** to **18**		50 (1.97)	10 (0.39)
	25 to **180**		65 (2.56)	15 (0.59)
5GN□K **5GN□S**	**3** to **18**	M6	65 (2.56)	14 (0.55)
	25 to **180**		80 (3.15)	11 (0.43)
5GE□S	**3** to **180**		95 (3.74)	21 (0.83)



Parallel shaft gearheads (inch output shaft)

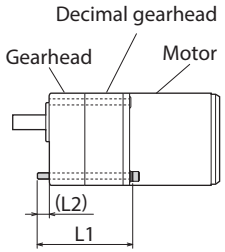
Model	□: Gear ratio	Screw size	L1 [mm (in.)]
0GN□KA	**3** to **180**	No.4-40UNC	40 (1.57)
2GN□KA **2GN□SA**	**3** to **18**	No.8-32UNC	50 (1.97)
	25 to **180**		60 (2.36)
3GN□KA **3GN□SA**	**3** to **18**	No.10-24UNC	50 (1.97)
	25 to **180**		65 (2.56)
4GN□KA **4GN□SA**	**3** to **18**		50 (1.97)
	25 to **180**		65 (2.56)
5GN□KA **5GN□SA**	**3** to **18**	1/4-20UNC	69.9 (2.75)
	25 to **180**		82.6 (3.25)
5GE□SA	**3** to **180**		95.3 (3.75)



Decimal gearheads

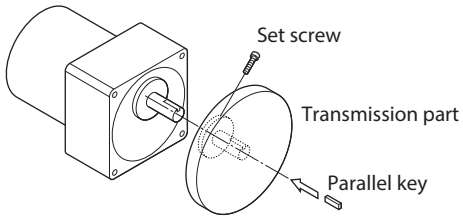
Model	Combined gearhead		Screw size	L1 [mm (in.)]	L2 [mm (in.)]
	Model	□: Gear ratio			
2GN10XK **2GN10XS**	**2GN□K◆** **2GN□S◆**	**3** to **18**	M4	85 (3.35)	21 (0.83)
		25 to **180**			11 (0.43)
3GN10XK **3GN10XS**	**3GN□K◆** **3GN□S◆**	**3** to **18**	M5	90 (3.54)	20 (0.79)
		25 to **180**			10 (0.39)
4GN10XK **4GN10XS**	**4GN□K◆** **4GN□S◆**	**3** to **18**		95 (3.74)	23 (0.91)
		25 to **180**			13 (0.51)
5GN10XK **5GN10XS**	**5GN□K◆** **5GN□S◆**	**3** to **18**	M6	120 (4.72)	32 (1.26)
		25 to **180**			14 (0.55)
5GE10XS	**5GE□S◆**	**3** to **180**		140 (5.51)	26 (1.02)

These are dimensions of screws included with decimal gearheads.

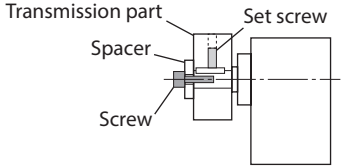


■ Installing a load

The gearhead output shaft is finished to an outer diameter tolerance of h7 and is provided with a key slot for installing the transmission parts (such as coupling or pulley).
(A flat section is provided on the output shaft for some products.)
Be sure to fit the output shaft and the transmission parts by a clearance fit when installing.
In addition, always fix the parallel key to the output shaft with a screw to prevent the transmission parts from rattling or spinning.

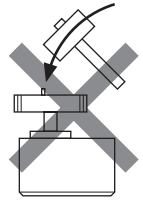


Use a tap hole [M5/No.10-24UNC, effective depth 10 mm (0.39 in.)] provided at the end of the output shaft of **5GE□S**/**5GE□SA** as an auxiliary means for preventing the transmission parts from disengaging.



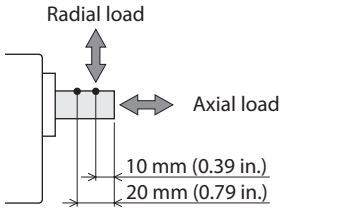
Note

Do not apply excessive force onto the gearhead output shaft using a hammer or other tools. Doing so may cause damage to the output shaft or bearings.



■ Permissible radial load and permissible axial load

The radial load and the axial load have a great influence on the life of the bearings and the strength of the shaft. Make sure not to exceed the permissible radial load and the permissible axial load.



The box (☐) in the model name indicates a number representing the gear ratio.
In the case of inch output shaft gearheads, "**A**" is entered in the box (◆) in the model name.

Model	☐: Gear ratio	Permissible radial load [N (lb.)] Distance from output shaft end of the gearhead		Permissible axial load [N (lb.)]
		10 mm (0.39 in.)	20 mm (0.79 in.)	
0GN☐K◆	**3** to **180**	20 (4.5)	–	15 (3.3)
2GN☐K◆ **2GN☐S◆**	**3** to **18**	50 (11.2)	80 (18)	30 (6.7)
	25 to **180**	120 (27)	180 (40)	
3GN☐K◆ **3GN☐S◆**	**3** to **18**	80 (18)	120 (27)	40 (9)
	25 to **180**	150 (33)	250 (56)	
4GN☐K◆ **4GN☐S◆**	**3** to **18**	100 (22)	150 (33)	50 (11.2)
	25 to **180**	200 (45)	300 (67)	
5GN☐K◆ **5GN☐S◆**	**3** to **18**	250 (56)	350 (78)	100 (22)
	25 to **180**	300 (67)	450 (101)	
5GE☐S◆	**3** to **9**	400 (90)	500 (112)	150 (33)
	12.5 to **18**	450 (101)	600 (135)	
	25 to **180**	500 (112)	700 (157)	

Note Failure due to fatigue may occur when the bearings and output shaft are subject to repeated loading by a radial or axial load that is in excess of the permissible limit.

7.4 Hollow shaft gearheads

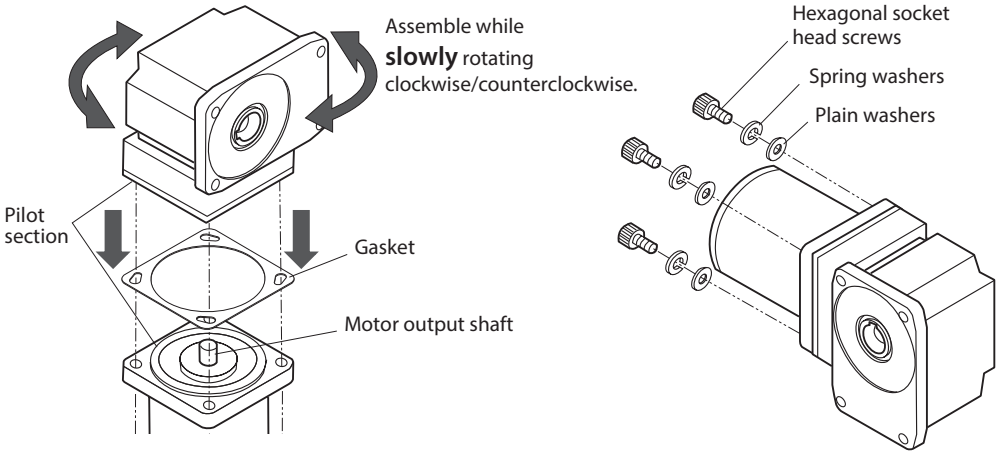
■ Assembling a motor and a gearhead

Check the model names for the motor and gearhead.
Only a motor and a gearhead having the same frame size and the same type of pinion can be combined.

[Example] • Motor model **4IK25GN-AW2** • Gearhead model **4GN25RH**

Frame size
Pinion type

Assemble the gearhead to the motor in a condition where the motor output shaft is set upward. Wipe off the grease if it is adhered to the pilot section of the gearhead.
Install the attached gasket between the motor and the gearhead.
Keep the pilot sections of the motor and gearhead in parallel, and assemble while slowly rotating the gearhead clockwise/counterclockwise.
Check no gap remains between the motor and the gearhead, and secure them using the included assembly screw set.



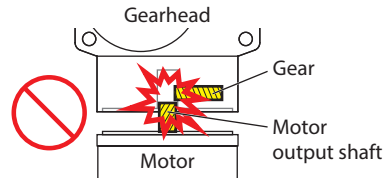
The box (☐) in the model name indicates a number representing the gear ratio.

Model	Screw size	Tightening torque
4GN☐RH	M5	3.8 N·m (33 lb-in)
5GN☐RH **5GE☐RH**	M6	6.4 N·m (56 lb-in)

Note Do not bend or damage the gasket. Doing so may cause grease to leak.

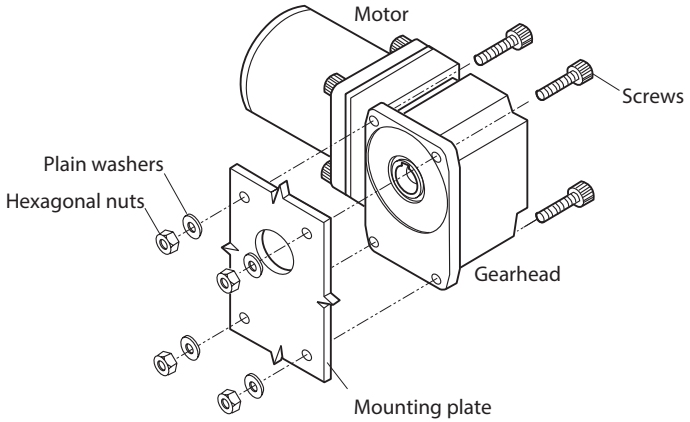
Precaution when assembling

Do not forcibly assemble a motor and a gearhead, or do not hit the motor output shaft with the gearhead or the gear. Also, prevent metal objects or foreign substances from entering in the gearhead.
The motor output shaft or the gear may be damaged, resulting in noise or shorter service life.



■ Installing to equipment

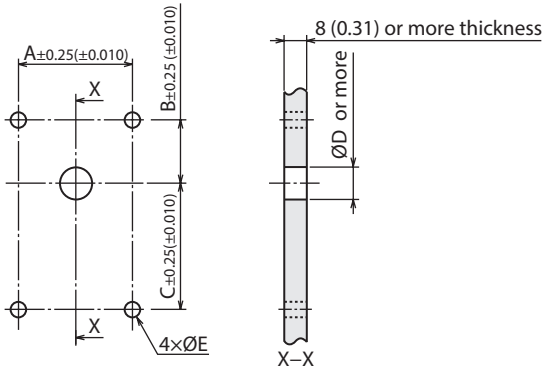
Assemble a motor and a gearhead before installing to equipment. When installing, use a mounting plate of about 8 mm (0.31 in.) thick and provide screws long enough to secure the product.



● Mounting hole dimensions [Unit: mm (in.)]

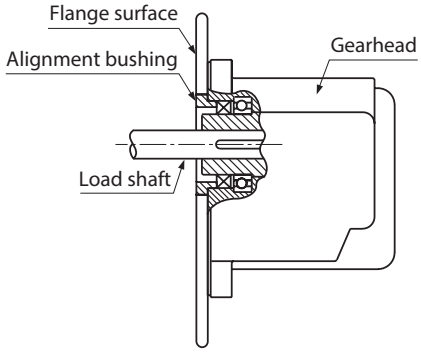
The box (□) in the model name indicates a number representing the gear ratio.

Model	A	B	C	ØD	ØE
4GN□RH	56 (2.20)	25 (0.98)	55 (2.17)	16 (0.63)	5.5 (0.217)
5GN□RH	58 (2.28)	33 (1.30)	57 (2.24)	16 (0.63)	6.5 (0.256)
5GE□RH	60 (2.36)	33 (1.30)	67 (2.64)	18 (0.71)	8.5 (0.335)



Note

When using the gearhead flange to install the gearhead to equipment, proper alignment between the hollow shaft inside section and the load shaft is necessary. Use the alignment bushing for centering as shown in the figure. Use the pilot section of the gearhead as a guide for fitting the alignment bushing. Keep the alignment tolerance within 0.02 mm (0.0008 in.). Insufficient alignment may result in damage to the gearhead internal bearings.



■ Installing a load

Refer to the table below for the hollow output shaft inner diameter and the recommended load shaft dimensions. Installation of a load varies depending on the shape of the load shaft. Refer to the right figures.
The hollow output shaft is finished to an inner diameter tolerance of H8 and is provided with a key slot for installing a load shaft.
A load shaft tolerance of h7 is recommended. Apply molybdenum disulfide grease for preventing seizure on the surface of the load shaft and the inner walls of the hollow output shaft. Install the included safety cover as a protection cover for the rotating part of the gearhead.

Note

- Do not apply excessive or abrupt force to the hollow output shaft when inserting a load shaft into the hollow output shaft. Excessive or abrupt force may damage the gearhead internal bearings.
- The output shaft of **5GE120RH** to **5GE180RH** cannot be rotated manually. Operate the motor for position adjustment and alignment to equipment.
- Be sure to fix the parallel key to the load shaft to be inserted into the hollow output shaft.

Hollow output shaft inner diameter and recommended load shaft dimensions [Unit: mm (in.)]

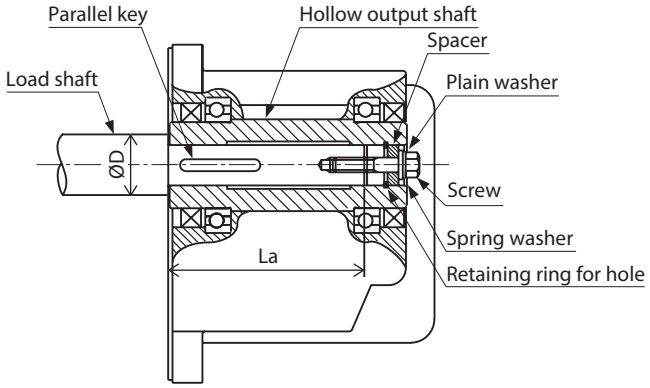
The box (□) in the model name indicates a number representing the gear ratio.

Model	4GN□RH	5GN□RH	5GE□RH
Inner diameter of hollow shaft (H8)	Ø15 $^{+0.027}_{0}$ (Ø0.5906 $^{+0.0011}_{0}$)		Ø17 $^{+0.027}_{0}$ (Ø0.6693 $^{+0.0011}_{0}$)
Load shaft diameter (h7)	Ø15 $^{0}_{-0.018}$ (Ø0.5906 $^{0}_{-0.0007}$)		Ø17 $^{0}_{-0.018}$ (Ø0.6693 $^{0}_{-0.0007}$)
Nominal diameter of retaining ring for hole	Ø15 (Ø0.59) C-shaped		Ø17 (Ø0.67) C-shaped
Applicable screws	M5		
Spacer thickness*	4 (0.16)		
Stepped shaft outer diameter ØD	25 (0.98)		30 (1.18)
Stepped shaft length La	58 to 60 (2.28 to 2.36)	68 to 70 (2.68 to 2.76)	

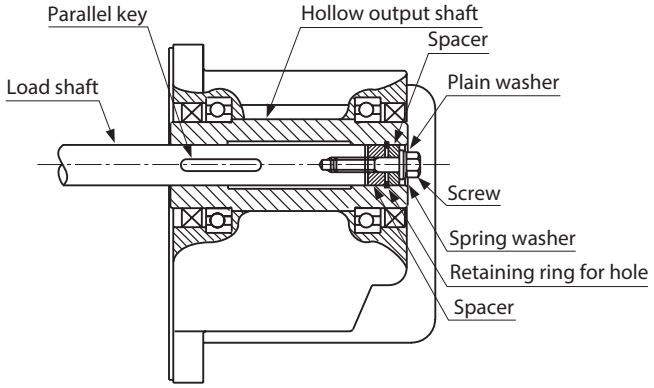
* Make sure the spacer thickness is the dimensions shown in the table. If it is exceeded this dimension, the screw will come out and the safety cover may not be installed.

- A retaining ring for hole, spacer, and screw for fixing the load shaft are not included with the product. Provide them separately.

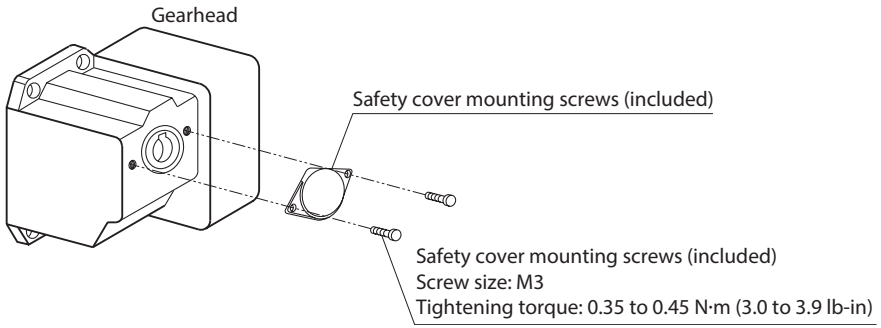
● Installation method for stepped load shaft



● Installation method for non-stepped load shaft

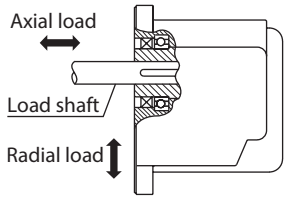


● Installation method for safety cover



■ Permissible radial load and permissible axial load

The radial load and axial load have a great influence on the life of the bearings and strength of the shaft. Do not exceed the permissible radial load and permissible axial load.



The box (□) in the model name indicates a number representing the gear ratio.

Model	□: Gear ratio	Permissible radial load [N (lb.)] Distance from flange-mounting surface		Permissible axial load [N (lb.)]
		10 mm (0.39 in.)	20 mm (0.79 in.)	
4GN□RH	**3** to **180**	250 (56)	220 (49)	100 (22)
5GN□RH	**3** to **180**	350 (78)	310 (69)	200 (45)
5GE□RH	**3** to **180**	560 (126)	500 (112)	250 (56)

Note Failure due to fatigue may occur when the bearings and output shaft are subject to repeated loading by a radial or axial load that is in excess of the permissible limit.

7.5 Solid shaft gearheads

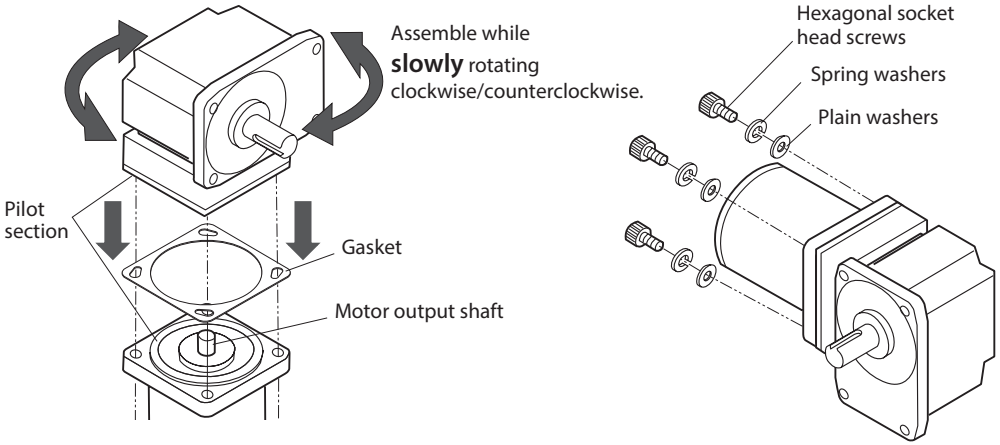
■ Assembling a motor and a gearhead

Check the model names for the motor and gearhead.
Only a motor and a gearhead having the same frame size and the same type of pinion can be combined.

[Example] • Motor model **4IK25GN-AW2** • Gearhead model **4GN25RA**

Frame size
Pinion type

Assemble the gearhead to the motor in a condition where the motor output shaft is set upward. Wipe off the grease if it is adhered to the pilot section of the gearhead.
Install the attached gasket between the motor and the gearhead.
Keep the pilot sections of the motor and gearhead in parallel, and assemble while slowly rotating the gearhead clockwise/counterclockwise.
Check no gap remains between the motor and the gearhead, and secure them using the included assembly screw set.



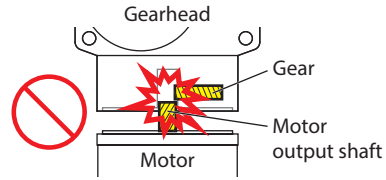
The box (□) in the model name indicates a number representing the gear ratio.
In the case of inch output shaft gearheads, "**A**" is entered in the box (◆) in the model name.

Model	Screw size	Tightening torque
4GN□RA◆	M5	3.8 N·m (33 lb-in)
5GN□RA◆ **5GE□RA◆**	M6	6.4 N·m (56 lb-in)

Note Do not bend or damage the gasket. Doing so may cause grease to leak.

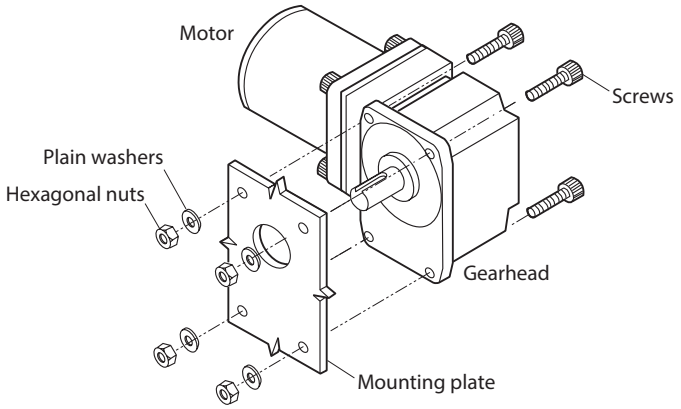
Precaution when assembling

Do not forcibly assemble a motor and a gearhead, or do not hit the motor output shaft with the gearhead or the gear.
Also, prevent metal objects or foreign substances from entering in the gearhead.
The motor output shaft or the gear may be damaged, resulting in noise or shorter service life.



■ Installing to equipment

Assemble a motor and a gearhead before installing to equipment. When installing, use a mounting plate of about 8 mm (0.31 in.) thick and provide screws long enough to secure the product.

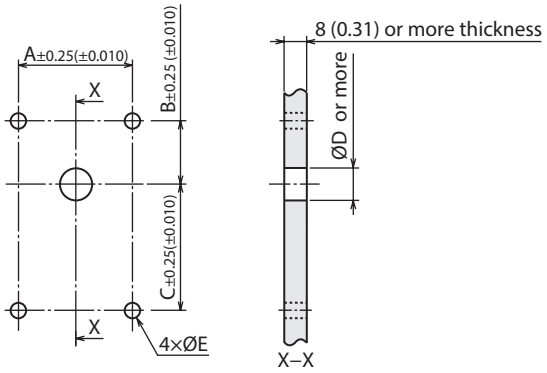


● Mounting hole dimensions [Unit: mm (in.)]

The box (□) in the model name indicates a number representing the gear ratio.
In the case of inch output shaft gearheads, "**A**" is entered in the box (◆) in the model name.

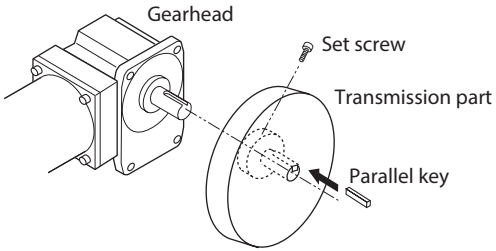
Model	A	B	C	ØD	ØE
4GN□RA◆	56 (2.20)	25 (0.98)	55 (2.17)	35 (1.38)	5.5 (0.217)
5GN□RA◆	58 (2.28)	33 (1.30)	57 (2.24)	37 (1.46)	6.5 (0.256)*
5GE□RA◆	60 (2.36)	33 (1.30)	67 (2.64)	35 (1.38)	8.5 (0.335)

* It is 6.8 (0.268) in the case of **5GN□RAA**.

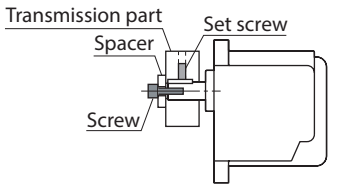


■ Installing a load

The gearhead output shaft is finished to an outer diameter tolerance of h7 and is provided with a key slot for installing the transmission parts (such as coupling or pulley). (A flat section is provided on the output shaft for some products.)
Be sure to fit the output shaft and the transmission parts by a clearance fit when installing.
In addition, always fix the parallel key to the output shaft with a screw to prevent the transmission parts from rattling or spinning.

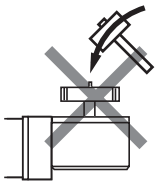


Use a tap hole [M5/No.10-24UNC, effective depth 10 mm (0.39 in.)] provided at the end of the output shaft of **5GE□RA**/**5GE□RAA** as an auxiliary means for preventing the transmission parts from disengaging.



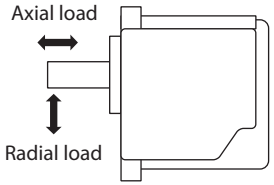
Note

- Do not apply excessive force onto the gearhead output shaft using a hammer or other tools. Doing so may cause damage to the output shaft or bearings.
- The output shaft of **5GE120RA** to **5GE180RA**/**5GE120RAA** to **5GE180RAA** cannot be rotated manually. Operate the motor for position adjustment and alignment to equipment.



■ Permissible radial load and permissible axial load

The radial load and axial load have a great influence on the life of the bearings and strength of the shaft. Do not exceed the permissible radial load and permissible axial load.



The box (□) in the model name indicates a number representing the gear ratio.
In the case of inch output shaft gearheads, "**A**" is entered in the box (◆) in the model name.

Model	□: Gear ratio	Permissible radial load [N (lb.)] Distance from output shaft end of the gearhead		Permissible axial load [N (lb.)]
		10 mm (0.39 in.)	20 mm (0.79 in.)	
4GN□RA◆	**3** to **18**	100 (22)	150 (33)	100 (22)
	25 to **180**	200 (45)	300 (67)	
5GN□RA◆	**3** to **18**	250 (56)	350 (78)	200 (45)
	25 to **180**	300 (67)	450 (101)	
5GE□RA◆	**3** to **9**	400 (90)	500 (112)	250 (56)
	12.5 to **25**	450 (101)	600 (135)	
	30 to **180**	500 (112)	700 (157)	

Note Failure due to fatigue may occur when the bearings and output shaft are subject to repeated loading by a radial or axial load that is in excess of the permissible limit.

8.1 Inspection

It is recommended that periodic inspections are conducted for the items listed below after each operation of the motor. If an abnormality occurs, discontinue any use and contact your nearest Oriental Motor sales office.

■ Inspection item

- Check if any of the mounting screws of the motor and gearhead is loose.
- Check if the bearing part (ball bearings) of the motor generates unusual noises.
- Check if the bearing part (ball bearings) or gear meshing part of the gearhead generates unusual noises.
- Check if the output shaft of the motor and gearhead and a load shaft are out of alignment.

8.2 Warranty

Check on the Oriental Motor Website for the product warranty.

8.3 Disposal

Dispose the product correctly in accordance with laws and regulations, or instructions of local governments.

9. Troubleshooting

Table of contents

When the motor cannot be operated properly, refer to the contents described in this section and take an appropriate remedial action.
If the problem persists, contact your nearest Oriental Motor sales office.

Condition	Check item	Remedial action
A motor does not rotate. A motor may not rotate.	Check if the correct voltage is applied.	Verify the voltage specifications with the nameplate of the motor, and apply the suitable voltage.
	Check if the power supply and the motor are connected properly.	Refer to the connection diagram, and connect properly.
	(For single-phase motors) Check if the capacitor is connected properly. Check if the capacitance of the capacitor is correct.	Refer to the connection diagram, and connect the capacitor properly. Use a capacitor with the same capacitance as that described on the motor nameplate.
	Check if there is disconnection or improper connection.	Check the connection for the wiring, terminal block, and crimp terminals, and connect properly.
	Check if an overload is occurred.	Reduce a load.
	(For electromagnetic brake motors) Check if the electromagnetic brake is released.	Refer to the connection diagram. Connect the lead wires (orange) for electromagnetic brake properly and release the electromagnetic brake.
The motor rotates in the reverse direction.	Check if the power supply and the motor are connected properly.	Refer to the connection diagram, and connect properly.
	(For single-phase motors) Check if the capacitor is connected properly.	Refer to the connection diagram, and connect the capacitor properly.
	(When a gearhead is used) Check if the gear ratio that causes the gearhead output shaft to rotate in the opposite direction to the motor output shaft is used. (Refer to p.22.)	Check the rotation direction of the motor output shaft and that of the gearhead output shaft, and perform connection properly.
	Check if the direction viewed is correct.	The rotation direction represents that when viewed from the motor output shaft side. Check the direction from which the product is viewed.
The motor becomes unusually hot. [The motor case temperature exceeds 90 °C (194 °F).]	Check if the correct voltage is applied.	Verify the voltage specifications with the nameplate of the product, and apply the suitable voltage.
	(For single-phase motors) Check if the capacitance of the capacitor is correct.	Use a capacitor with the same capacitance as that described on the motor nameplate.
	Check if an overload is occurred.	Reduce a load.
	Check if the ambient temperature exceeds the operating range.	Reconsider the ventilation condition.
	Check if operating and stopping the motor are repeated in a short cycle. Check if operated exceeding the rating of specifications.	Reconsider the operating cycle such as extending the stop time. Perform forced cooling using a fan or reconsider the ventilation conditions.
Noise is generated.	Check if the type off pinion for the motor and gearhead is the same.	Refer to “Assembling the motor and gearhead” on p.6, and assemble a gearhead having the same type of pinion as the motor pinion shaft.
	(When a gearhead is used) Check if the sound becomes smaller when a load is increased.	If the sound becomes smaller when a load is increased, it may be due to backlash of the gearhead. The noise can be suppressed if a friction load is applied.

10.1 Specifications

Check on the Oriental Motor Website for the product specifications.

10.2 General specifications

Degree of protection		Induction Motors	Lead wire type	IP20
			Terminal box type	IP54 (Excluding the mounting surface of the round shaft type)
		Reversible motors	Lead wire type	IP20
			Terminal box type	IP40
		Electromagnetic brake motors		6 W, 15 W, 25 W, 40 W: IP20 60 W, 90 W: IP40
Operating environment	Ambient temperature	1 W, 3 W motors: –10 to +40 °C (+14 to +104 °F) (non-freezing) 6 W to 90 W motors Single-phase 100 VAC, Single-phase 200 VAC, Three phase 200 VAC: –10 to +50 °C (+14 to +122 °F) (non-freezing) Other voltages: –10 to +40 °C (+14 to +104 °F) (non-freezing)		
	Ambient humidity	85% or less (non-condensing)		
	Altitude	Up to 1,000 m (3,300 ft.) above sea level		
	Surrounding atmosphere	No corrosive gas or dust. No water or oil. Cannot be used in radioactive materials, magnetic field, vacuum or other special environments.		
Storage environment Shipping environment	Ambient temperature	–25 to +70 °C [–13 to +158 °F] (non-freezing)		
	Ambient humidity	85% or less (non-condensing)		
	Altitude	Up to 3,000 m (10,000 ft.) above sea level		
	Surrounding atmosphere	No corrosive gas, dust. No water or oil. Cannot be used in radioactive materials, magnetic field, vacuum or other special environment.		

11. Regulations and standards

Table of contents

Check on the Oriental Motor Website for details about standards.

■ UL Standards, CSA Standards

This product is recognized by UL under UL and CSA Standards.
Thermal class: 130 (B)*
* 1 W, 3 W motors: UL/CSA Standards 105(A), EN Standards 120 (E)

■ Electrical Appliance and Material Safety Law

The round shaft type motors with terminal box of three-phase 220/220/230 VAC is affixed with (PS E) Mark under the Electrical Appliance and Material Safety Law.

■ China Compulsory Certification System (CCC System)

This product is affixed with the CCC Mark under the China Compulsory Certification System.
It is also certified by CQC.

■ CE Marking/UKCA Marking

This product is affixed with the marks under the following directives/regulations.

● EU Low Voltage Directive / UK Electrical Equipment (Safety) Regulation

Installation conditions

Lead wire type: Overvoltage category Ⅱ, Pollution degree 2, Class Ⅰ equipment
Terminal box type: Overvoltage category Ⅱ, Pollution degree 2*, Class Ⅰ equipment

* Pollution degree 3 for induction motors. Excluding the motor mounting surface.

If the overvoltage category Ⅲ and pollution degree 3 are required for the equipment, install the motor in an enclosure whose degree of protection is equivalent to IP54 or higher, and supply a rated voltage to the motor via the insulation transformer.

■ Motor temperature rise tests

Temperature rise tests required by the standards are conducted for the pinion shaft type motors in a state of attaching a gearhead. For the 90 W reversible motors, the tests are conducted in a state of attaching a gearhead and heat radiation plate [heat radiation plate size: 200×200 mm (7.87×7.87 in.), thickness: 5 mm (0.20 in.), material: aluminum alloy]. The tests for the round shaft type motors are conducted in a state of attaching a heat radiation plate. The size, thickness and material of the heat radiation plates are as follows.

Model	Size [mm (in.)]	Thickness [mm (in.)]	Material
0IK, **0RK**	80 × 80 (3.15 × 3.15)	5 (0.20)	Aluminum alloy
2IK, **2RK**	115 × 115 (4.53 × 4.53)		
3IK, **3RK**	125 × 125 (4.92 × 4.92)		
4IK, **4RK**	135 × 135 (5.31 × 5.31)		
5IK40, **5RK40**	165 × 165 (6.50 × 6.50)		
5IK60, **5RK60**, **5IK90**, **5IK150**	200 × 200 (7.87 × 7.87)		
5RK90		10 (0.39)*	

* The thickness of the heat sink is 5 mm (0.20 in.) for the 90 W type electromagnetic brake motor.

■ EU RoHS Directive/UK RoHS Regulation

This product does not contain the substances exceeding the restriction values.

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