Oriental motor

HM-9453

World K Series

Conforms to Power Supply Voltages in Asia

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.

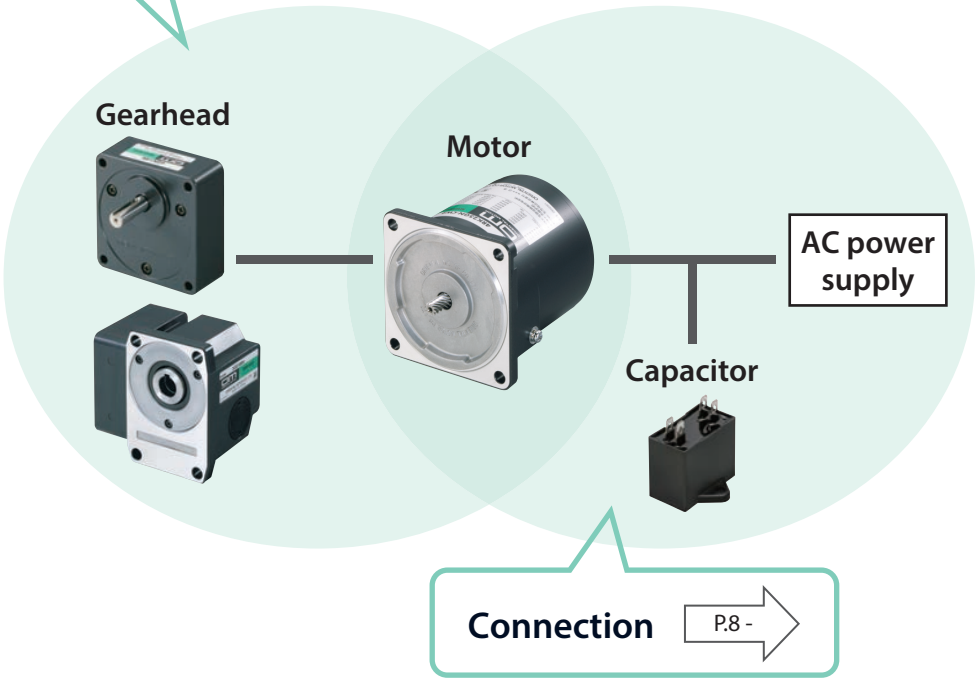
- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.
- Only qualified personnel of electrical and mechanical engineering should work with the product.
- Use the product correctly after thoroughly reading the section "Safety precautions."
  In addition, 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.

Table of contents

Click Table of contents on the upper right of each page to return to the "Table of contents."

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.30 -

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. Checking the product

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

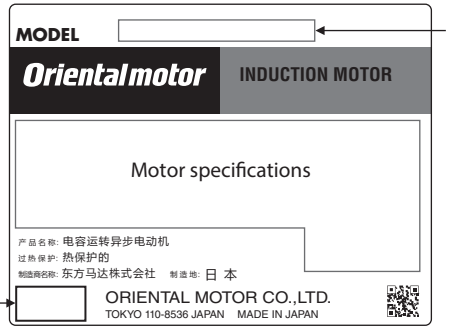
☐ Capacitor (Single-phase motor only) ..... 1 piece

☐ 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 **1** or **2** representing a capacitor type at the end of the model name.

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

1	Motor frame size	**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	**6**: 6 W **15**: 15 W **25**: 25 W **40**: 40 W **60**: 60 W **90**: 90 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 110 VAC 4-pole **CW**: Single-phase 220/230 VAC 4-pole **SW**: Three-phase 200/220 VAC 4-pole **UW**: Three-phase 380/400/415 VAC 4-pole
6	Identification code	**2**, **3**
7	**M**: Electromagnetic brake motor	
8	Blank: Lead wire type	
9	Included capacitor type	**1**, **2**: Capacitor for single-phase 110 VAC, single-phase 220 VAC, 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.

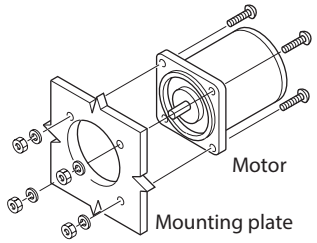
- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature: –10 to +40 °C (+14 to +104 °F) (non-freezing)
  For three-phase 200 VAC, the operating ambient temperature is –10 to +50 °C (+14 to +122 °F).
  When a right-angle gearhead is assembled, the lower temperature 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
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)

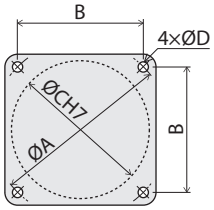


Note

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.)]

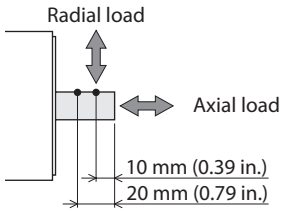
Model	ØA	B	ØCH7	ØD
2IK, 2RK	70 (2.76)	49.50 (1.949)	$54^{+0.030}_{0}$ ($2.1260^{+0.0012}_{0}$)	4.5 (0.177)
3IK, 3RK	82 (3.23)	57.98 (2.283)	$64^{+0.030}_{0}$ ($2.5197^{+0.0012}_{0}$)	5.5 (0.217)
4IK, 4RK	94 (3.70)	66.47 (2.617)	$73^{+0.030}_{0}$ ($2.8740^{+0.0012}_{0}$)	5.5 (0.217)
5IK, 5RK	104 (4.09)	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.)		
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				19 (4.2)

Note

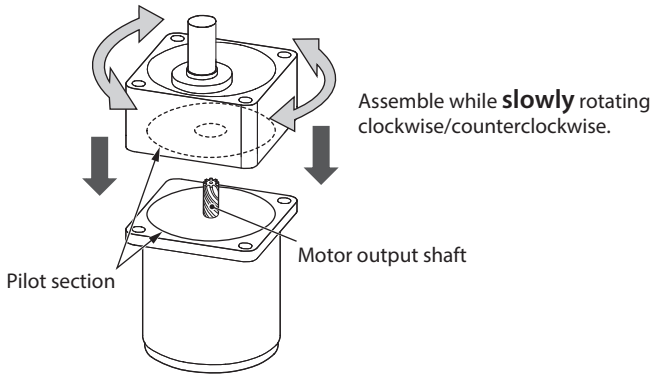
Failure due to fatigue may occur when the bearings and output shaft are subject to repeated loading by a radial or axial load that is in excess of the permissible limit.

■ 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.

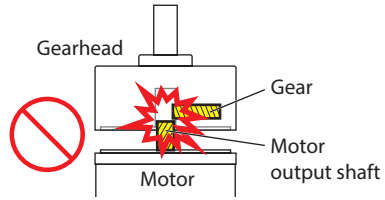
Assemble the gearhead to the motor in a condition where the motor output shaft is set upward. Wipe off the grease if it is adhered to the pilot section of the gearhead.
Keep the pilot sections of the motor and gearhead in parallel, and assemble while slowly rotating the gearhead clockwise/counterclockwise. 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.



Refer to the following pages for assembling the hollow shaft gearhead and the solid shaft gearhead.
• Hollow shaft gearhead ⇨ p.22
• Solid shaft gearhead ⇨ p.26

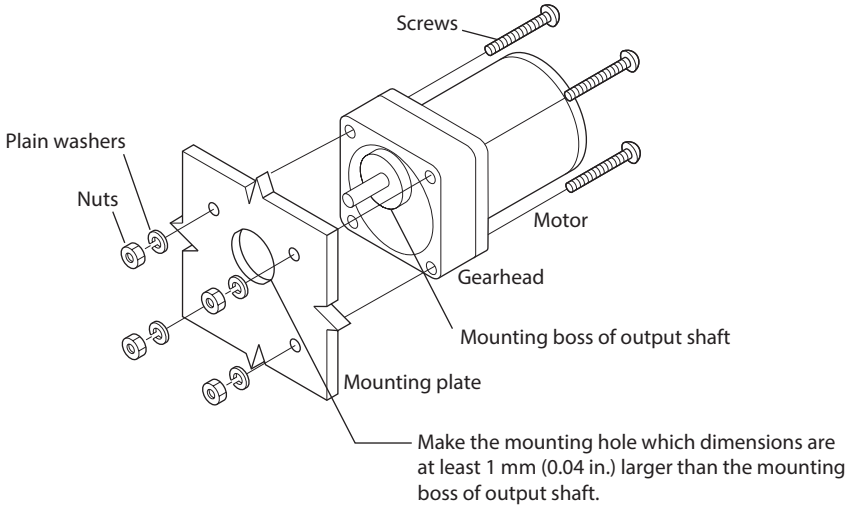
Precaution when assembling

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.

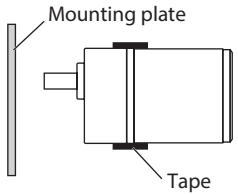


● Installing to equipment

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.

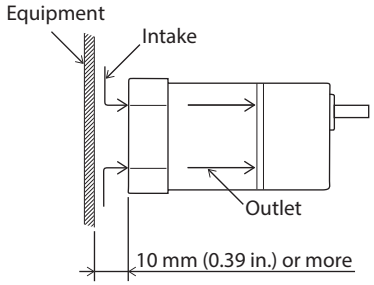


Refer to the page of each gearhead for mounting hole dimensions, mounting screw dimensions, and installation of a load.

- Parallel shaft gearhead ⇨ p.20
- Hollow shaft gearhead ⇨ p.23
- Solid shaft gearhead ⇨ p.27

■ Motor equipped with cooling fan

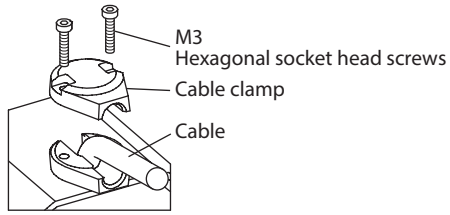
When installing a motor with cooling fan onto equipment, leave a space of 10 mm (0.39 in.) or more behind the fan cover or open a ventilation hole so that the intake on the rear part of the motor is not blocked.



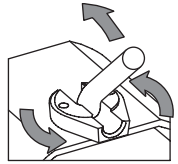
■ How to change the direction of the cable outlet position (Electromagnetic brake motor only)

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.

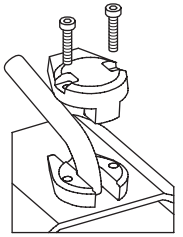


2. Change the direction of the cable by 180 degrees, and turn the cable clamp by 180 degrees.



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

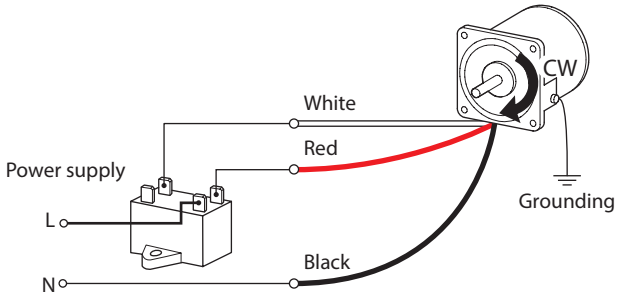
Output power	Model	Motor model	Capacitor model
6 W	**2IK6GN-AW2L2**	2IK6GN-AW2L	CH25FAUL2
	2IK6A-AW2L2	2IK6A-AW2L	
	2IK6GN-CW2L2	2IK6GN-CW2L	CH06BFAUL
	2IK6A-CW2L2	2IK6A-CW2L	
15 W	**3IK15GN-AW2L2**	3IK15GN-AW2L	CH45FAUL2
	3IK15A-AW2L2	3IK15A-AW2L	
	3IK15GN-CW2L2	3IK15GN-CW2L	CH10BFAUL
	3IK15A-CW2L2	3IK15A-CW2L	
25 W	**4IK25GN-AW2L2**	4IK25GN-AW2L	CH65CFAUL2
	4IK25A-AW2L2	4IK25A-AW2L	
	4IK25GN-CW2L2	4IK25GN-CW2L	CH15BFAUL
	4IK25A-CW2L2	4IK25A-CW2L	

Output power	Model	Motor model	Capacitor model
40 W	**5IK40GN-AW2L2**	5IK40GN-AW2L	CH90CFAUL2
	5IK40A-AW2L2	5IK40A-AW2L	
	5IK40GN-CW2L2	5IK40GN-CW2L	CH23BFAUL
	5IK40A-CW2L2	5IK40A-CW2L	
60 W	**5IK60GE-AW2L2**	5IK60GE-AW2L	CH180CFAUL2
	5IK60A-AW2L2	5IK60A-AW2L	
	5IK60GE-CW2L2	5IK60GE-CW2L	CH40BFAUL
	5IK60A-CW2L2	5IK60A-CW2L	
90 W	**5IK90GE-AW2L2**	5IK90GE-AW2L	CH200CFAUL2
	5IK90A-AW2L2	5IK90A-AW2L	
	5IK90GE-CW2L2	5IK90GE-CW2L	CH60BFAUL
	5IK90A-CW2L2	5IK90A-CW2L	

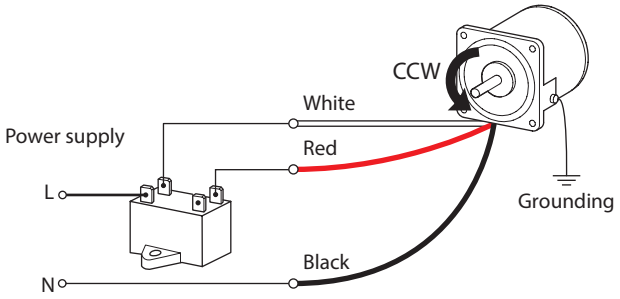
● Connection diagram

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



• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.16

• Connecting/installing the capacitor ⇨ p.15
• Connecting the Protective Earth Terminal ⇨ p.15
Operation ⇨ p.16

4.1.2 Induction motors Three-phase type

● Three-phase 200/220 VAC type model

Output power	Model (Motor model)	
6 W	**2IK6GN-SW2L**	**2IK6A-SW2L**
15 W	**3IK15GN-SW2L**	**3IK15A-SW2L**
25 W	**4IK25GN-SW2L**	**4IK25A-SW2L**
40 W	**5IK40GN-SW2L**	**5IK40A-SW2L**
60 W	**5IK60GE-SW2L**	**5IK60A-SW2L**
90 W	**5IK90GE-SW2L**	**5IK90A-SW2L**

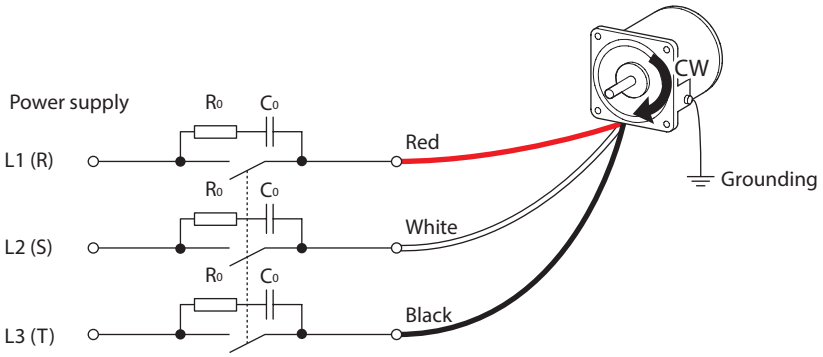
● Three-phase 380/400/415 VAC type model

Output power	Model (Motor model)	
25 W	**4IK25GN-UW2L**	**4IK25A-UW2L**
40 W	**5IK40GN-UW2L**	**5IK40A-UW2L**
60 W	**5IK60GE-UW2L**	**5IK60A-UW2L**
90 W	**5IK90GE-UW2L**	**5IK90A-UW2L**

● 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).

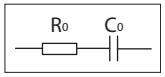
Clockwise: CW



• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.16

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.15

Operation ⇨ p.16

4.1.3 Reversible motors Single-phase type

● Model

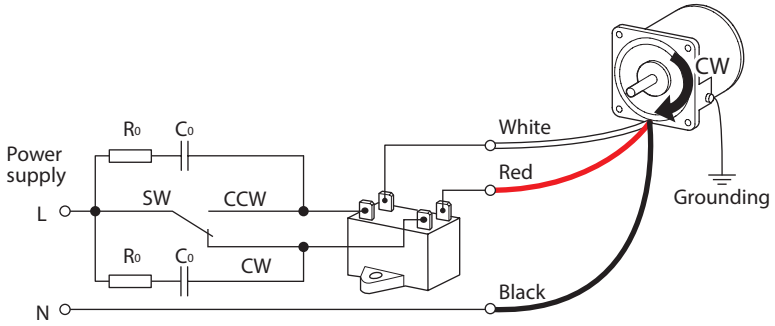
Output power	Model	Motor model	Capacitor model
6 W	**2RK6GN-AW2L2**	2RK6GN-AW2L	CH35FAUL2
	2RK6A-AW2L2	2RK6A-AW2L	
	2RK6GN-CW2L2	2RK6GN-CW2L	CH08BFAUL
	2RK6A-CW2L2	2RK6A-CW2L	
15 W	**3RK15GN-AW2L2**	3RK15GN-AW2L	CH60CFAUL2
	3RK15A-AW2L2	3RK15A-AW2L	
	3RK15GN-CW2L2	3RK15GN-CW2L	CH15BFAUL
	3RK15A-CW2L2	3RK15A-CW2L	
25 W	**4RK25GN-AW2L2**	4RK25GN-AW2L	CH80CFAUL2
	4RK25A-AW2L2	4RK25A-AW2L	
	4RK25GN-CW2L2	4RK25GN-CW2L	CH25BFAUL
	4RK25A-CW2L2	4RK25A-CW2L	

Output power	Model	Motor model	Capacitor model
40 W	**5RK40GN-AW2L2**	5RK40GN-AW2L	CH120CFAUL2
	5RK40A-AW2L2	5RK40A-AW2L	
	5RK40GN-CW2L2	5RK40GN-CW2L	CH35BFAUL
	5RK40A-CW2L2	5RK40A-CW2L	
60 W	**5RK60GE-AW2L2**	5RK60GE-AW2L	CH200CFAUL2
	5RK60A-AW2L2	5RK60A-AW2L	
	5RK60GE-CW2L2	5RK60GE-CW2L	CH50BFAUL
	5RK60A-CW2L2	5RK60A-CW2L	
90 W	**5RK90GE-AW2L2**	5RK90GE-AW2L	CH300CFAUL2
	5RK90A-AW2L2	5RK90A-AW2L	
	5RK90GE-CW3L2	5RK90GE-CW3L	CH70BFAUL
	5RK90A-CW3L2	5RK90A-CW3L	

● 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 of AWG 20 (0.5 mm^2).

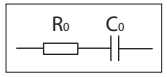
Clockwise: CW



• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.16

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.15
• Connecting the Protective Earth Terminal ⇨ p.15
Operation ⇨ p.16

4.2 Electromagnetic brake motors

4.2.1 Single-phase type

● Model

Output power	Model	Motor model	Capacitor model
6 W	**2RK6GN-AW2ML2**	2RK6GN-AW2ML	CH35FAUL2
	2RK6A-AW2ML2	2RK6A-AW2ML	
	2RK6GN-CW2ML2	2RK6GN-CW2ML	CH08BFAUL
	2RK6A-CW2ML2	2RK6A-CW2ML	
15 W	**3RK15GN-AW2ML2**	3RK15GN-AW2ML	CH60CFAUL2
	3RK15A-AW2ML2	3RK15A-AW2ML	
	3RK15GN-CW2ML2	3RK15GN-CW2ML	CH15BFAUL
	3RK15A-CW2ML2	3RK15A-CW2ML	
25 W	**4RK25GN-AW2ML2**	4RK25GN-AW2ML	CH80CFAUL2
	4RK25A-AW2ML2	4RK25A-AW2ML	
	4RK25GN-CW2ML1	4RK25GN-CW2ML	CH25BFAUL
	4RK25A-CW2ML1	4RK25A-CW2ML	
	4RK25GN-CW2ML2	4RK25GN-CW2ML	CH20BFAUL
	4RK25A-CW2ML2	4RK25A-CW2ML	
40 W	**5RK40GN-AW2ML2**	5RK40GN-AW2ML	CH120CFAUL2
	5RK40A-AW2ML2	5RK40A-AW2ML	
	5RK40GN-CW2ML1	5RK40GN-CW2ML	CH40BFAUL
	5RK40A-CW2ML1	5RK40A-CW2ML	
	5RK40GN-CW2ML2	5RK40GN-CW2ML	CH35BFAUL
	5RK40A-CW2ML2	5RK40A-CW2ML	

Output power	Model	Motor model	Capacitor model
60 W	**5RK60GE-AW2ML2**	5RK60GE-AW2ML	CH200CFAUL2
	5RK60A-AW2ML2	5RK60A-AW2ML	
	5RK60GE-CW2ML1	5RK60GE-CW2ML	CH60BFAUL
	5RK60A-CW2ML1	5RK60A-CW2ML	
	5RK60GE-CW2ML2	5RK60GE-CW2ML	CH50BFAUL
	5RK60A-CW2ML2	5RK60A-CW2ML	
90 W	**5RK90GE-AW2ML2**	5RK90GE-AW2ML	CH300CFAUL2
	5RK90A-AW2ML2	5RK90A-AW2ML	
	5RK90GE-CW2ML1	5RK90GE-CW2ML	CH80BFAUL
	5RK90A-CW2ML1	5RK90A-CW2ML	
	5RK90GE-CW2ML2	5RK90GE-CW2ML	CH70BFAUL
	5RK90A-CW2ML2	5RK90A-CW2ML	

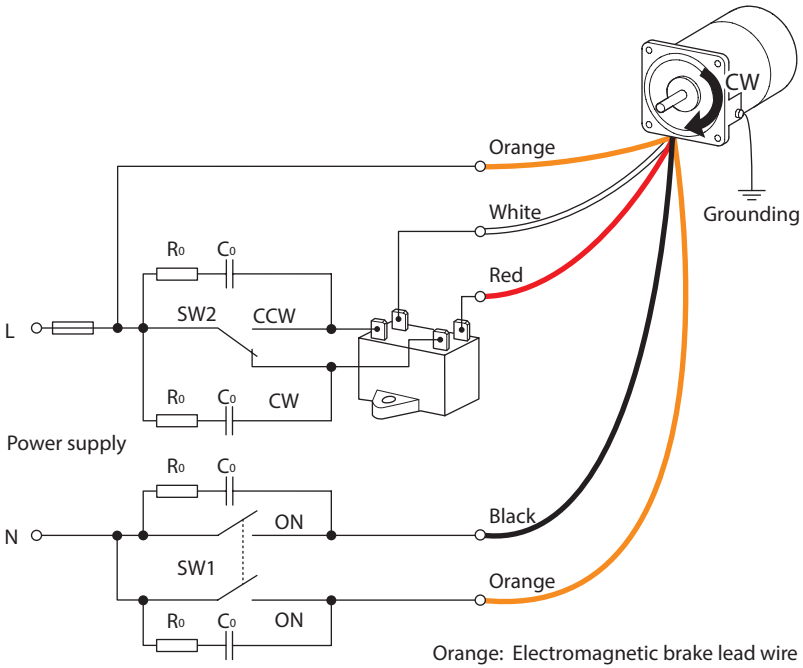
Refer to the next page for the connection diagram.

● 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

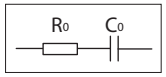


Orange: Electromagnetic brake lead wire

• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.16

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.

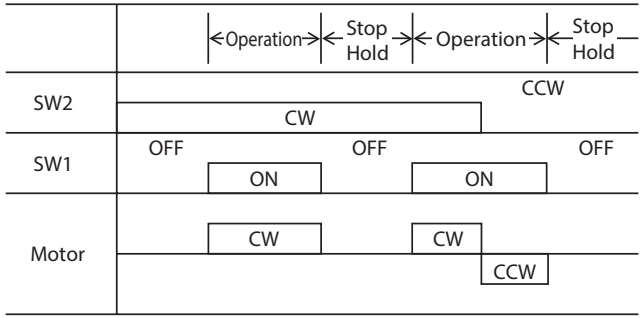


R_0 = 5 to 200 Ω
C_0 = 0.1 to 0.2 μF 250 VAC

● Specifications of SW1 and SW2

Output power	Number of switch	Contact capacity of switch		Note
		Single-phase 110 VAC input	Single-phase 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.16 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.15
• Connecting the Protective Earth Terminal ⇨ p.15

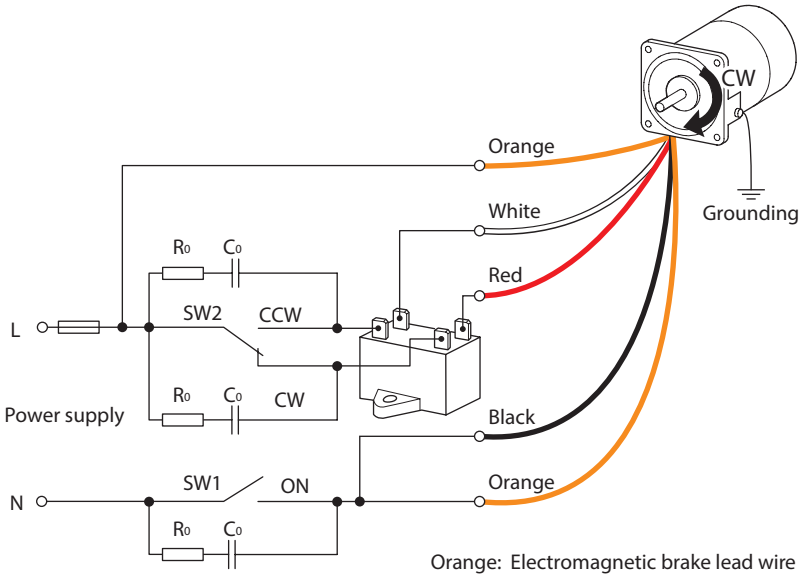
Operation ⇨ p.16

● 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.12, causing the overrun to increase.

Clockwise: CW



Orange: Electromagnetic brake lead wire

4.2.2 Three-phase type

● Model

Output power	Model (Motor model)	
6 W	**2IK6GN-SW2ML**	**2IK6A-SW2ML**
15 W	**3IK15GN-SW2ML**	**3IK15A-SW2ML**

Output power	Model (Motor model)	
25 W	**4IK25GN-SW2ML**	**4IK25A-SW2ML**
40 W	**5IK40GN-SW2ML**	**5IK40A-SW2ML**

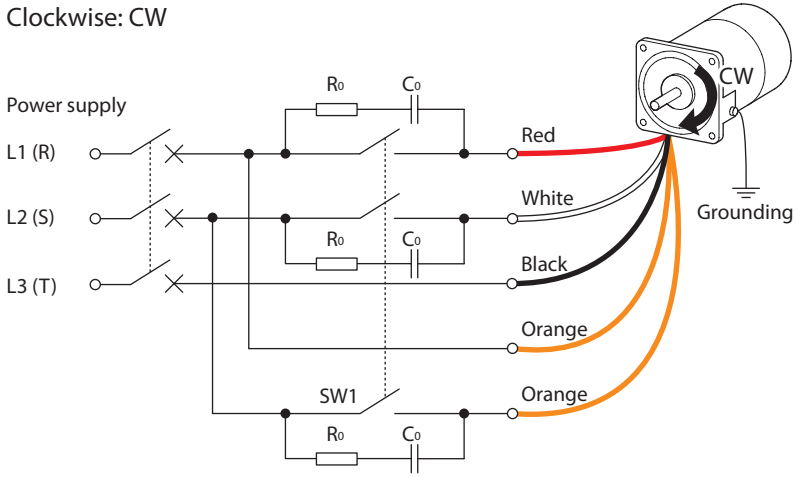
Output power	Model (Motor model)	
60 W	**5IK60GE-SW2ML**	**5IK60A-SW2ML**
90 W	**5IK90GE-SW2ML**	**5IK90A-SW2ML**

● 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

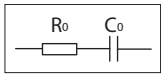


Orange: Electromagnetic brake lead wire

• The rotation direction varies depending on the gear ratio of the gearhead. ⇨ p.16

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 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.16 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.15

Operation ⇨ p.16

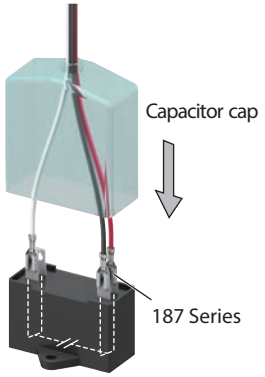
4.3 Connecting/installing the capacitor (Single-phase type only)

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.

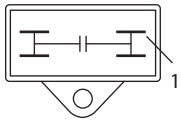
● Connection

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.



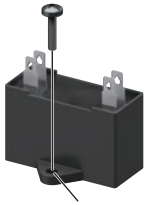
The capacitor has four terminals that are internally connected as shown in the figure.

<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)

4.4 Connecting the Protective Earth Terminal

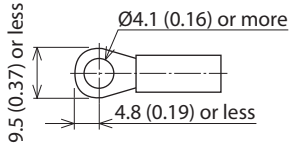
Be sure to ground using the Protective Earth Terminal ⏚ on the motor.

Note

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

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.)]



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.

: 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□KF 3GN□KF 4GN□KF 5GN□KF																				
5GE□KBF																				
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)

● Hollow shaft gearheads, Solid shaft gearheads

☐ Gearhead ..... 1 unit

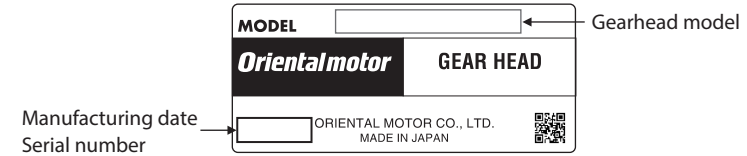
Hollow shaft gearhead

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 F
1 2 3 4 5

1	Gearhead frame size	**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**, **KB**: Parallel shaft gearhead **RH**: Right-angle, hollow shaft gearhead **RA**: Right-angle, solid shaft gearhead
5	Identification code	

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.16 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.

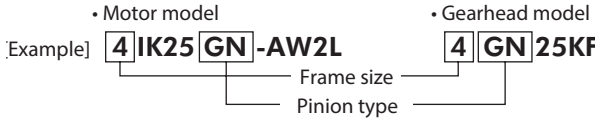
■ Permissible radial load and permissible axial load

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.



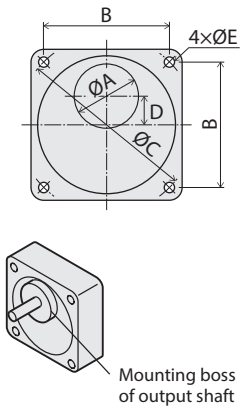
Refer to p.6 for how to assemble a motor and a gearhead.

■ Installing to equipment

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

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

Model	ØA	B	ØC	D	ØE
2GN□KF	24 (0.94)	49.50 (1.949)	70 (2.76)	10 (0.39)	4.5 (0.177)
3GN□KF	30 (1.18)	57.98 (2.283)	82 (3.23)	15 (0.59)	5.5 (0.217)
4GN□KF	34 (1.34)	66.47 (2.617)	94 (3.70)	15 (0.59)	5.5 (0.217)
5GN□KF	36 (1.42)	73.54 (2.895)	104 (4.09)	18 (0.71)	6.5 (0.256)
5GE□KBF	34 (1.34)	73.54 (2.895)	104 (4.09)	18 (0.71)	6.5 (0.256)

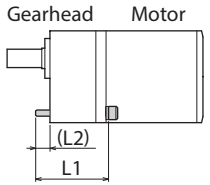


ØA indicates the size for the mounting boss of output shaft of the gearhead.
Make the mounting hole which dimensions is at least 1 mm (0.04 in.) larger than the mounting boss of output shaft.

● Mounting screw size

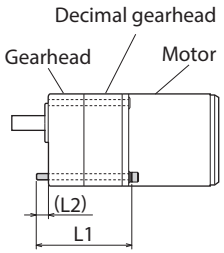
Parallel shaft gearheads

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



Decimal gearheads

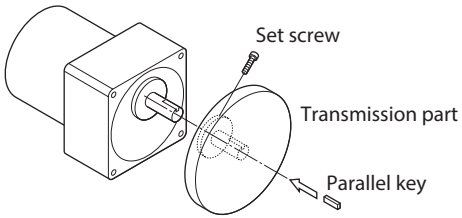
Model	Combined gearhead		Screw size	L1 [mm (in.)]	L2 [mm (in.)]
	Model	□: Gear ratio			
2GN10XKF	**2GN□KF**	**3** to **18**	M4	85 (3.35)	21 (0.83)
		25 to **180**			11 (0.43)
3GN10XKF	**3GN□KF**	**3** to **18**	M5	90 (3.54)	20 (0.79)
		25 to **180**			10 (0.39)
4GN10XKF	**4GN□KF**	**3** to **18**		95 (3.74)	23 (0.91)
		25 to **180**			13 (0.51)
5GN10XKF	**5GN□KF**	**3** to **18**	M6	120 (4.72)	32 (1.26)
		25 to **180**			14 (0.55)
5GE10XKBF	**5GE□KBF**	**3** to **180**		140 (5.51)	26 (1.02)



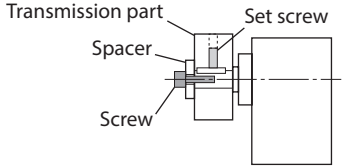
These are dimensions of screws included with decimal gearheads.

■ 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 the **2GN** type gearhead.)
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.

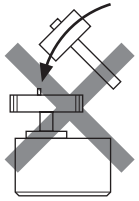


Use a tap hole [M4, effective depth 15 mm (0.59 in.)] provided at the end of the output shaft of **5GN□KF** as an auxiliary means for preventing the transmission parts from disengaging.



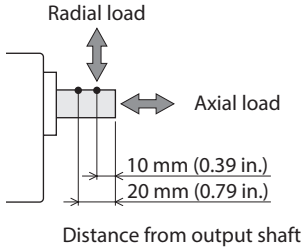
Note

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.



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.)	
2GN□KF	**3** to **18**	50 (11.2)	80 (18)	30 (6.7)
	25 to **180**	120 (27)	180 (40)	
3GN□KF	**3** to **18**	80 (18)	120 (27)	40 (9)
	25 to **180**	150 (33)	250 (56)	
4GN□KF	**3** to **18**	100 (22)	150 (33)	50 (11.2)
	25 to **180**	200 (45)	300 (67)	
5GN□KF	**3** to **18**	250 (56)	350 (78)	100 (22)
	25 to **180**	300 (67)	450 (101)	
5GE□KBF	**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

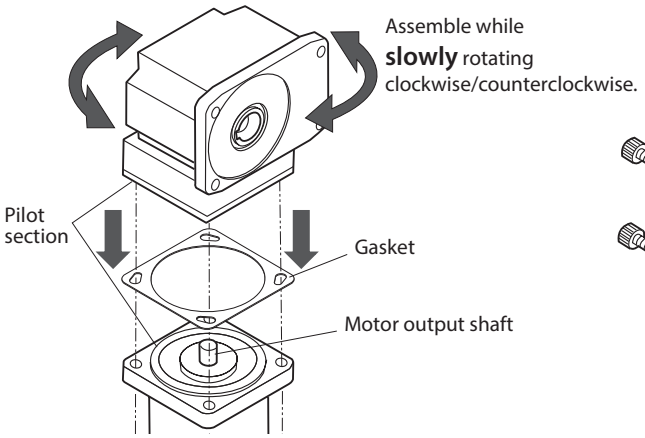
■ Assembling a motor and a gearhead

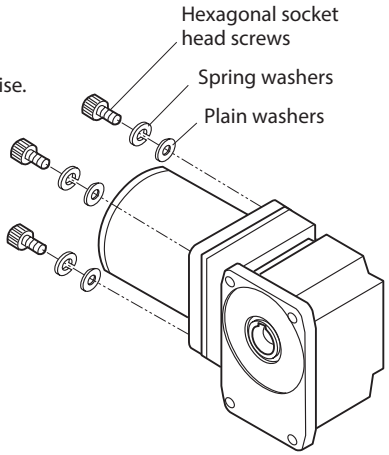
Check the model names for the motor and gearhead.
Only a motor and a gearhead having the same frame size and the same type of pinion can be combined.

[Example] • Motor model **4IK25GN-AW2L** • 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.



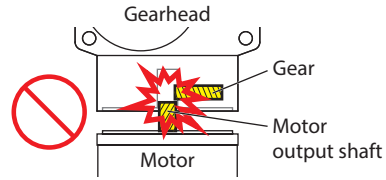


Model	Screw size	Tightening torque
4GN□RH	M5	3.8 N·m (33 lb-in)
5GN□RH **5GE□RH**	M6	6.4 N·m (56 lb-in)

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

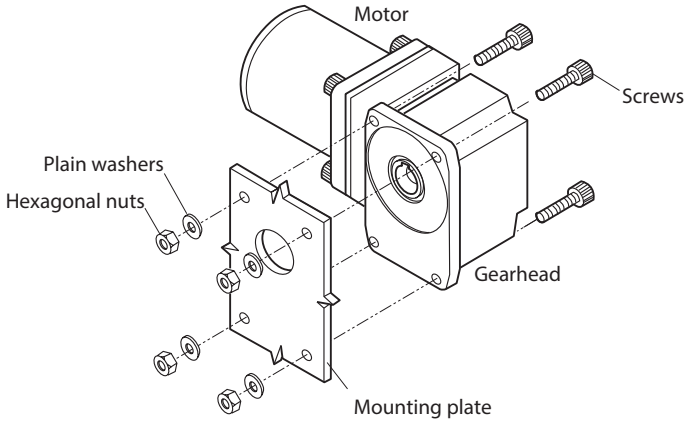
Precaution when assembling

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.



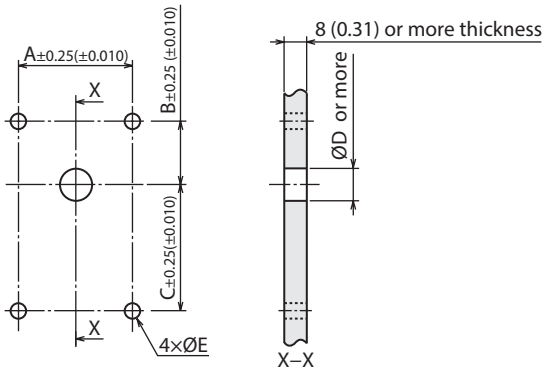
■ Installing to equipment

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.



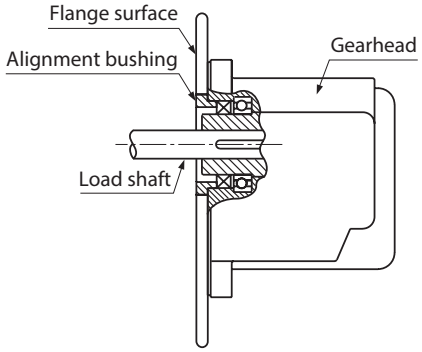
● Mounting hole dimensions [Unit: mm (in.)]

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.

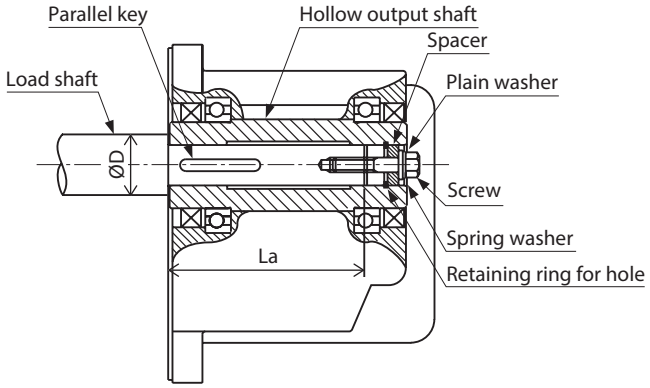
Hollow output shaft inner diameter and recommended load shaft dimensions [Unit: mm (in.)]

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)	

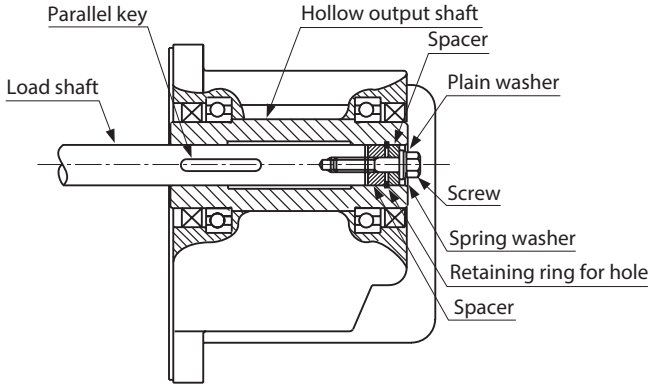
* Make sure the spacer thickness is the dimensions shown in the table. If it is exceeded this dimension, the screw will come out and the safety cover may not be installed.

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

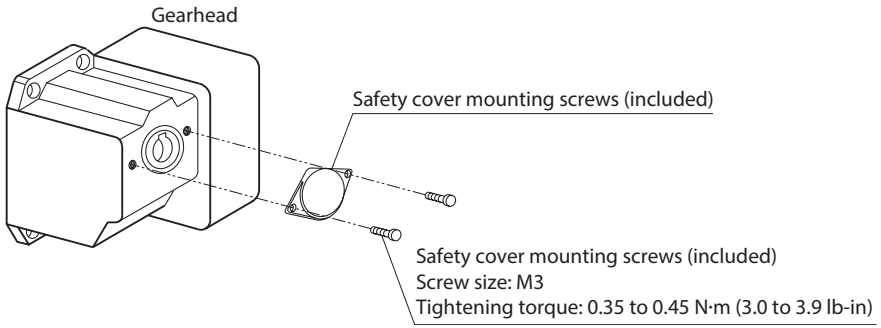
● Installation method for stepped load shaft



● Installation method for non-stepped load shaft

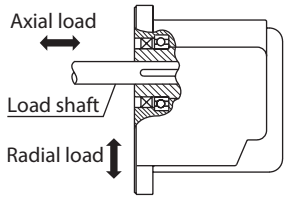


● Installation method for safety cover



■ 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.



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

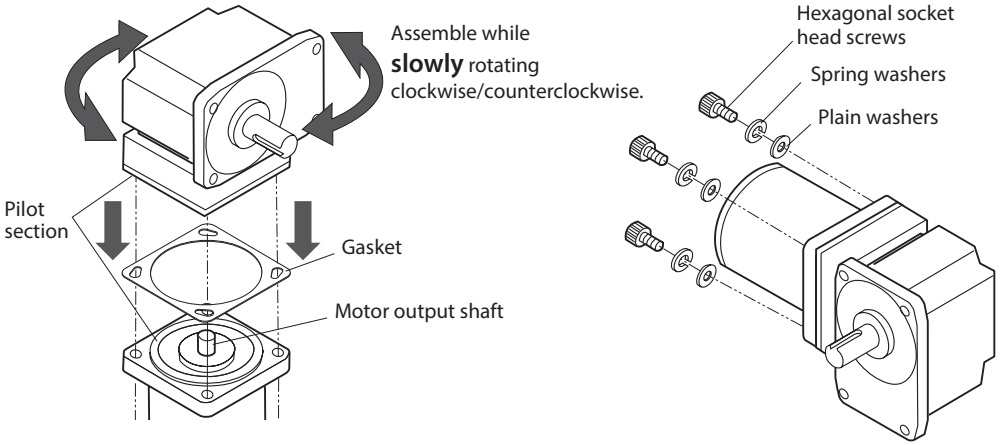
■ Assembling a motor and a gearhead

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-AW2L** • 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.

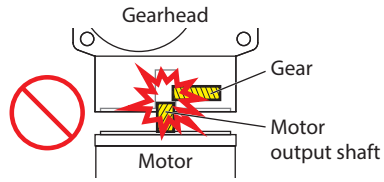


Model	Screw size	Tightening torque
4GN□RA	M5	3.8 N·m (33 lb-in)
5GN□RA **5GE□RA**	M6	6.4 N·m (56 lb-in)

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

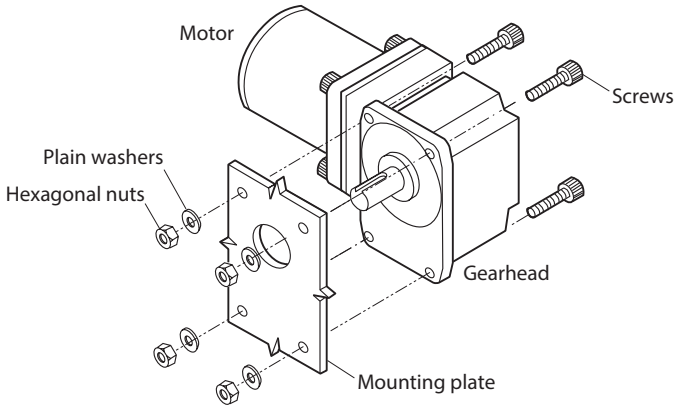
Precaution when assembling

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.



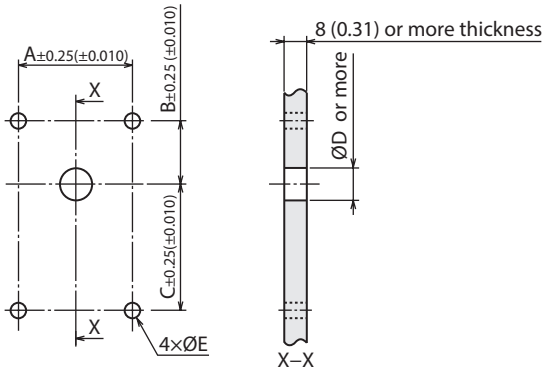
■ Installing to equipment

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.



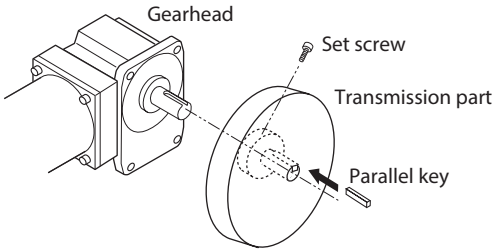
● Mounting hole dimensions [Unit: mm (in.)]

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)

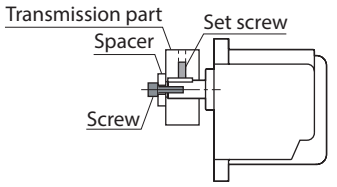


■ Installing a load

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).
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.

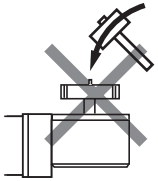


Use a tap hole [M5, effective depth 10 mm (0.39 in.)] provided at the end of the output shaft of **5GE□RA** as an auxiliary means for preventing the transmission parts from disengaging.



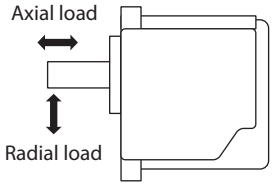
Note

- 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** 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.



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.16.)	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

Thermal class		130(B)	
Degree of protection		Induction Motors	IP20
		Reversible motors	IP20
		Electromagnetic brake motors	6 W, 15 W, 25 W, 40 W: IP20 60 W, 90 W: IP40
Operating environment	Ambient temperature	−10 to +40 °C (+14 to +104 °F) (non−freezing) For three−phase 200 VAC, the operating ambient temperature is −10 to +50 °C (+14 to +122 °F).	
	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.

■ 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

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

● EU Low Voltage Directive

Installation conditions

Overvoltage category Ⅱ, Pollution degree 2, Class Ⅰ equipment
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
2IK, **2RK**	115 × 115 (4.53 × 4.53)	5 (0.20)	Aluminum alloy
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**	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

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

Published in March 2023

• Please contact your nearest Oriental Motor office for further information.

ORIENTAL MOTOR U.S.A. CORP.
Technical Support Tel:800-468-3982
8:30am EST to 5:00pm PST (M-F)
www.orientalmotor.com

ORIENTAL MOTOR (EUROPA) GmbH
Schiessstraße 44, 40549 Düsseldorf, Germany
Technical Support Tel:00 800/22 55 66 22
www.orientalmotor.de

ORIENTAL MOTOR (UK) LTD.
Unit 5 Faraday Office Park, Rankine Road,
Basingstoke, Hampshire RG24 8QB UK
Tel:+44-1256347090
www.oriental-motor.co.uk

ORIENTAL MOTOR (FRANCE) SARL
Tel:+33-1 47 86 97 50
www.orientalmotor.fr

ORIENTAL MOTOR ITALIA s.r.l.
Tel:+39-02-93906347
www.orientalmotor.it

ORIENTAL MOTOR CO., LTD.
4-8-1Higashiueno,Taito-ku,Tokyo 110-8536
Japan
Tel:+81-3-6744-0361
www.orientalmotor.co.jp

ORIENTAL MOTOR ASIA PACIFIC PTE. LTD.
Singapore
Tel:1800-842-0280
www.orientalmotor.com.sg

ORIENTAL MOTOR (MALAYSIA) SDN. BHD.
Tel:1800-806-161
www.orientalmotor.com.my

ORIENTAL MOTOR (THAILAND) CO., LTD.
Tel:1800-888-881
www.orientalmotor.co.th

ORIENTAL MOTOR (INDIA) PVT. LTD.
Tel:1800-120-1995 (For English)
1800-121-4149 (For Hindi)
www.orientalmotor.co.in

TAIWAN ORIENTAL MOTOR CO., LTD.
Tel:0800-060708
www.orientalmotor.com.tw

SHANGHAI ORIENTAL MOTOR CO., LTD.
Tel:400-820-6516
www.orientalmotor.com.cn

INA ORIENTAL MOTOR CO., LTD.
Korea
Tel:080-777-2042
www.inaom.co.kr