



MID SERIES(0.1 kW to 2.2 kW)

Induction Gearmotor 3-Phase

Detailed Instruction Manual

<Please read this manual before using the product. >



NISSEI CORPORATION




Introduction

Thank you very much for purchasing our product.

Safety Precautions

- Be sure to carefully read the contents described in this instruction manual and to understand how to use product correctly before using it.
- Extents of hazard/damage expected to occur in the case of improper handling are classified and indicated in ranks of "DANGER", "WARNING", and "CAUTION." The definitions and indications are as follows.

■Description of symbols

 DANGER	Cases where it is expected that a degree of danger is extremely high such that improper handling possibly causes a dangerous situation to occur, which may lead to death or serious injury.
 WARNING	Cases where improper handling possibly causes a dangerous situation to occur, which may lead to death or serious injury.
 CAUTION	Cases where improper handling possibly causes a dangerous situation to occur, from which a minor or medium degree of injury may be incurred.









Even items described in "CAUTION" may lead to a serious results depending on the situation.
Be sure to observe every instruction which deals with important contents.

■The icons used in this document stand for the following:



	Nonspecific hazard warning		Nonspecific prohibition
	Burn injury hazard		Do not dismount or disassemble
	Electric shock hazard		Nonspecific obligations
	Fire hazard		Grounding required





































DANGER





























■General

 	When using the product for an application that may directly cause harm to human bodies, such as personnel transportation equipment, provide the equipment with a protective device to ensure safety. Otherwise, there is a risk of accident with casualties or damage to the equipment due to a loss of control or dropping.
 	If the product is used in a device such as a personnel transport device, make sure to install a protective device for safety purposes. Failure to implement safety measures may result in personal injury, death, and/or damage to the device.
 	Use an explosion-proof motor that complies with operation under the explosive atmosphere. Failure to follow this precaution may result in explosions, ignition of fire, fire, electric shocks, injuries, and/or damage to the device.
 	Never perform operations with wet hands. Failure to follow this precaution may result in electric shock.

■Transport

 	Do not enter underneath the product when it is lifted for transportation. Failure to follow this precaution may result in an accident with casualties due to dropping.
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■ Wiring	
 	Do not work while the product is energized. Be sure to turn off the power before work. Failure to follow this precaution may result in electric shock.
 	Make sure to ground the grounding terminal. Otherwise, it may result in electric shock.
■ Operation	
 	Never approach or touch the product while it is rotating. Failure to follow this precaution may result in injury due to entanglement.
 WARNING	
■ General	
 	Transportation, installation, piping, wiring, operation, handling, maintenance, and inspections must be performed by personnel having expertise and skills. Failure to follow this precaution may result in an explosion, ignition of fire, fire, electric shock, injury, or damage to the equipment.
 	Be sure not to get water or oil/grease into the brake unit. Failure to follow this precaution may result in falling or out-of-control accident due to the decreased brake torque.
 	Do not repair, disassemble, or remodel the product. Failure to follow this precaution may result in fire, electric shock, burns, injury, and/or damage to the product.
■ Operation	
 	When the operation has stopped due to the occurrence of error or activated safeguards, do not restart the operation until the causes of error are identified and countermeasures are taken. Failure to follow this precaution may result in fire, electric shock, burns, injury, and/or damage to the product.
 	When performing a trial operation, fix the product in place and disconnect it from the machine. Failure to observe this precaution may result in injury.
 CAUTION	
■ General	
 	Operate the product under the conditions specified in this instruction manual. Failure to follow this precaution may result in damage to the equipment or injury.
 	Do not expose the product to strong impacts/shocks. Failure to observe this precaution may result in failure of the product and/or injury.
 	Do not use the product under the conditions not specified on the nameplate or in the product specifications. Failure to follow this precaution may result in fire, electric shock, injury, and/or damage to the equipment.
 	Do not use damaged products. Failure to follow this precaution may result in fire, injury, and/or damage to the equipment.
 	Do not insert fingers or objects in the opening of the product. Failure to follow this precaution may result in fire, electric shock, injury, and/or damage to the equipment.
 	Do not remove the nameplate.
 	Products modified by a customer will not be covered by the warranty.
■ Transport	
 	The product must be transported correctly in accordance with its weight. Otherwise, it may result in injury and/or failure.
 	Do not overload/overstack the products. Failure to follow this precaution may result in injury and/or equipment failure.

■ Installation		
		When handling the product, be careful with the angles and sharp edges of the product. Failure to follow this precaution may result in injury.
		Ensure that the product is securely fixed onto the machine. Failure to follow this precaution may result in injury and/or damage to the product.
		Do not stand or hang on the product. Failure to follow this precaution may result in injury and/or damage to the product.
		Do not place heavy items on the product. Failure to follow this precaution may result in damage to the product.
		Do not put any object that may prevent air from being circulated around the product. Failure to follow this precaution may cause burns due to abnormal overheating, and/or fire.
		Do not put any combustible material near the product. Failure to follow this precaution may result in fire.
		Install an oil pan for a food machinery and other applications in which leakage cannot be present and may occur in the event of a failure, service life, etc. Otherwise, products may be defective due to oil leakage.
		Do not touch the keyways at the end of shaft, internal diameter, etc. with a bare hand. Failure to follow this precaution may result in injury.
		Confirm the rotational direction before connecting to the application. Incorrect rotational direction may result in injury or damage to the equipment.
■ Wiring		
		Be careful not to cause damage to the cable nor pull it strongly. Failure to follow this precaution may result in injury, fire, and/or electric shock.
		Make sure that the gearmotor is correctly wired. Failure to follow this precaution may result in injury due to damaged equipment.
■ Operation		
		Immediately stop the operation if there is any abnormality. Failure to follow this precaution may result in a fire, electric shock, and/or injury.
		Do not touch the product during operation or for a while after the operation is stopped as its surfaces may become very hot. Failure to follow this precaution may result in burns.
		Do not touch the rotating parts of the product. Failure to follow this precaution may result in injury.

Important

When disposing of the product, dispose of it as a general industrial waste. Please follow local laws and regulations if any apply and take care of the waste accordingly.

Notice

We shall assume no responsibility or liability for any troubles caused by use that violates the cautions above.

The contents of this Manual are subject to change without notice.

We have made every possible effort to make the contents of this manual easy to understand. If there is anything that is unclear or hard to understand, please feel free to contact us.

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1. Inspection upon Unpacking

⚠ CAUTION



Check whether the product is consistent with your order.
Injury, damage to the device, etc. may occur if a wrong product is installed.



Check the top and bottom of the package before opening it. Failure to follow this precaution may result in injury.

1-1. Checking Package Contents

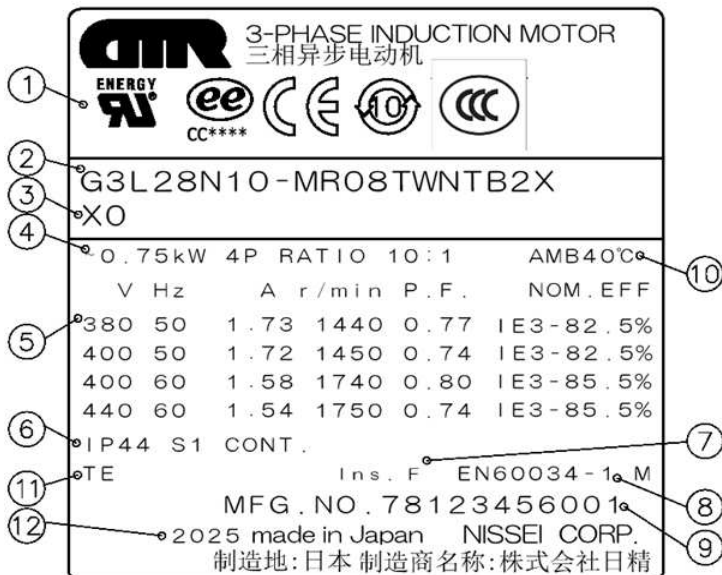
Check for the following items when unpacking the package.

Contact the dealer where you purchased the product or our nearest service office if you have any questions or if there are any defects.

- Is the information on the nameplate consistent with your order?
(Gearmotor Model, Reduction Ratio, Motor Capacity, Voltage, Frequency, etc.)
- Were any parts damaged during transportation?
- Are there any loose screws, bolts, and nuts?
- Are the accessories included in the package and consistent with the contents of the accessory statement?
(Accessory statement is not included if there is no accessories.)

1-2. Details of Nameplate

The following is a typical nameplate.



No.	Description
1	Compliant standards
2	Gearmotor model
3	Specification code
4	Capacity/No. of Poles/Reduction ratio
5	Motor characteristics
6	IP Rating
7	Insulation class
8	Standards number
9	Manufacturing number (MFG.NO.)
10	Ambient temperature
11	Motor structure
12	Year of manufacture

- Please refer to the next page for the gearmotor model.
- The specification code may not be listed.
- In case of inquiry, inform us of gear motor model/specification code, gear ratio and MFG.NO.

1-3. Gearmotor Model

Descriptions of the symbols for gearmotor model are as follows. Check if the model is consistent with your order.
The gearhead model and motor model are described separately.

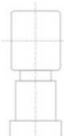
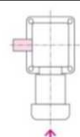
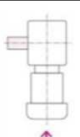
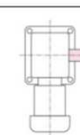
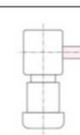
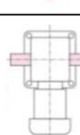
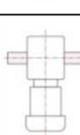
■ Gearhead Model

Gearhead Model				
[1]	[2]	[3]	[4]	[5]
Type	Mounting	Frame No.	Shaft	Reduction Ratio
G3	L	28	N	10

[1] Type		[2] Mounting	
G3	Parallel shaft	L	Foot mount
		F	Flange mount
		K	Small flange mount
H2	Right angle shaft	L	Foot mount
		F	Flange mount
F	Right angle shaft	S	Hollow shaft
		F	Solid shaft
FA	Right angle shaft	S	Hollow shaft
F3	Concentric right angle shaft	S	Concentric hollow shaft
		F	Concentric solid shaft

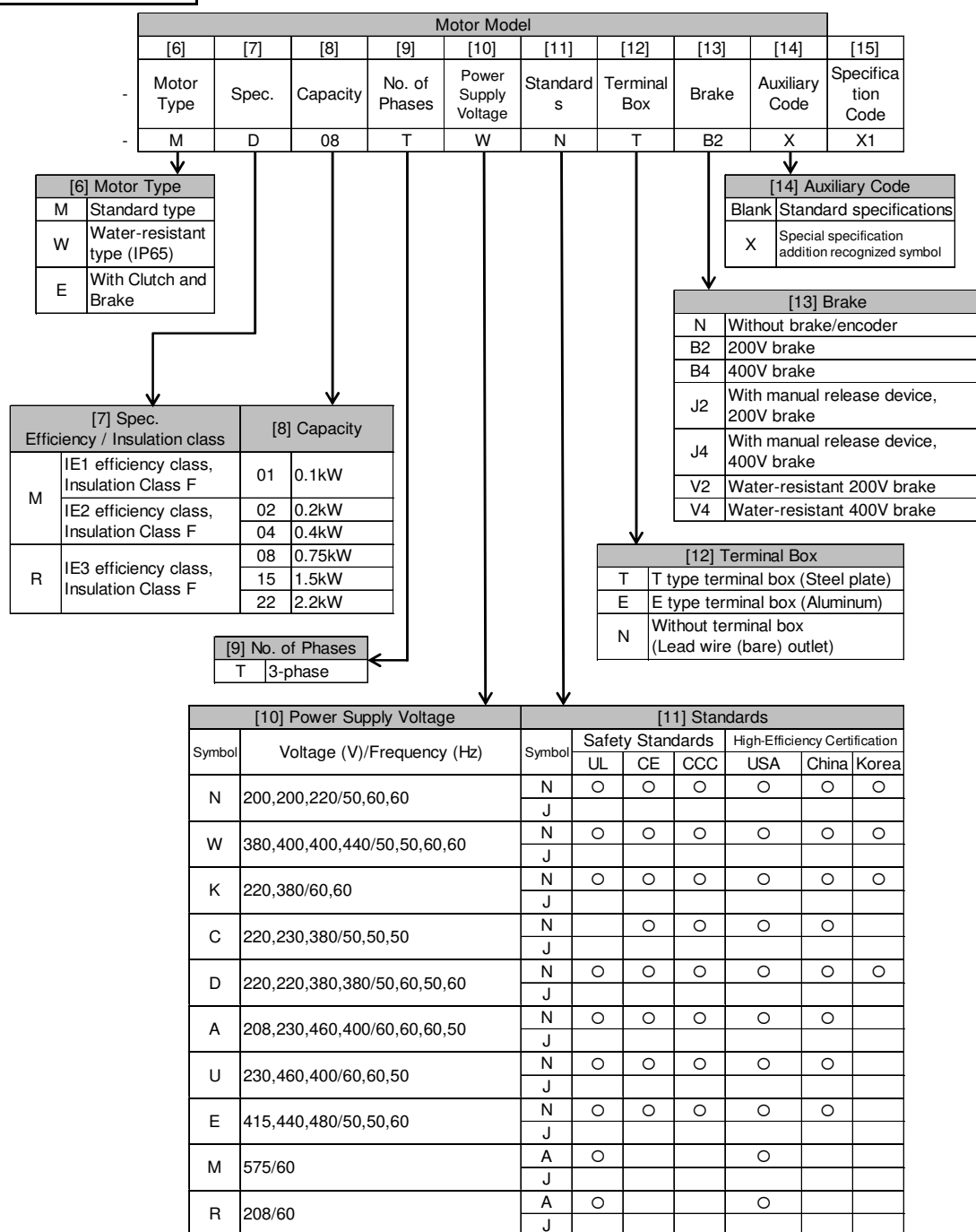
[5] Reduction Ratio	
5~15X	1/5~1/1500

[3] Frame No.	
<input type="checkbox"/>	Output shaft diameter

[4] Shaft				
Material		Output shaft direction of the right angle shaft type		
S43C	SUS420J2	Output Shaft Direction	H2	F/FA/F3
N	S	-	-	
L	H	Output shaft protrudes on the left when looking from the input shaft side (↑)		
R	M	Output shaft protrudes on the right when looking from the input shaft side (↑)		
T	B	Output shaft protrudes on both sides when looking from the input shaft side (↑)		

- Up to Frame No. 32 for Mounting[2] K: Small flange support of Type[1] G3 : Parallel shaft.
- Only Frame No. 22 for Mounting[2] F: Flange support of Type[1] H2 : Right angle shaft.
- Up to Capacity: 0.75 kW for Mounting[2] F: Solid shaft of Type[1] F : Right angle shaft.
- Type[1] FA : The gear head case is made of aluminum die-cast and only Frame No. 55 is supported.
- The Frame No.[3] depends on the lineup of each types.
- Reduction ratios[5] are 12X for 1200 and 15X for 1500 as they are displayed with up to three digits.

■ Motor Model



- Power supply voltage[10] D applies to motor capacity of 0.1 kW to 0.75 kW.
 - Power supply voltage[10] A applies to motor capacity of 0.1 kW to 0.4 kW.
 - Power supply voltage[10] U,R applies to motor capacity of 0.75 kW to 2.2 kW.
 - CCC Standards[11] is supported for motor capacity of 0.1kW to 0.75kW.
 - The motor capacity 0.75 kW or higher is supported for High-efficiency certification of Standards[11].
 - Specification code[15] is added for options and special specifications. Main options are as follows.
Wiring instruction for terminal box with built-in rectifier, terminal box mounting orientation, change of lead wire outlet hole direction, encoder, fan installation, etc.
- For more details regarding options, please refer to the catalog or contact us.
(Contact details described on the last page.)

2. Transportation

DANGER



Do not enter underneath the product when it is lifted for transportation. Otherwise, injury accidents caused by dropping may occur.

CAUTION



Dropping and falling of the product on transportation is dangerous. Please pay sufficient attention.

For the gearmotor with a hanger, be sure to check that the hanger is not loose before using it. However, do not lift a machine with the hanger after the gearmotor is mounted to the machine. Otherwise, hanger damage, injury with dropping/falling and device damage may occur.



Check the weight of the gearmotor with the nameplate, package box, appearance diagram, catalog, etc. Do not lift the gearmotor whose mass is more than the rated load of the hanger. Otherwise, bolt damage, injury with dropping/falling and device damage may occur.



If the package is made of wood, it is unstable to shovel up the package from the bottom of it when a lift is used. It is recommended to use the belt.



Do not move the gearmotor by holding the terminal box. Otherwise, injury and device damage may occur.

3. Installation

Pay attention to the following points as installation quality affects the lifespan of the gearmotor.

CAUTION



Do not place flammable items around the gearmotor. Otherwise, fire may occur.



Do not place obstacles that disturb ventilation around the gearmotor. Cooling for the gearmotor may be disturbed and burn/fire may occur with abnormal overheating.



Do not step on/hang on to the gearmotor and terminal box. Otherwise, injury may occur.



Do not touch keyways of the shaft end part, internal diameter part, etc. of the gearmotor with a bare hand. Otherwise, injury may occur.



Install a damage preventive device such as an oil receiver for a food machinery and other devices for which especially oil must be avoided in case of possible oil leakage in the event of failure, service life, etc. Otherwise, products may be defective with oil leakage.



Wear debris of the brake, iron powder (metal pieces), etc. may be scattered. Mount a damage preventive device for a food machinery, etc. which will be defective due to contamination of foreign substances. Otherwise, the product, etc. may be defective.



The guidance value of vibration from the mounting surface of the gearmotor or applied externally is 0.5 G or less.



Dew condensation may occur inside of the box if the ambient temperature rapidly changes under high temperature/humidity atmosphere.

Pay attention to the transportation atmosphere because dew condensation especially occurs easily on sea transportation such as a ship. Dew condensation is a phenomenon where steam is condensed to be water drops and attach to terminals when atmosphere temperature rapidly changes from high to low under high temperature/humidity or the reducer is rapidly moved from low temperature to high temperature.



Pay attention to freezing under low temperature of 0°C or lower.

Freezing is a phenomenon where water becomes ice when atmosphere temperature becomes lower than 0°C while water attach to terminals under dew condensation and abnormally high humidity. Pay attention to electric shocks as freezing may cause a short circuit between terminals.

■ Location

Item	Standard specification	Water-resistant specification
Ingress protection rating	Differs depending on the model	IP65
Ambient temperature	-10°C~40°C	-10°C~40°C
Ambient humidity	85%RH or less (no dew condensation)	100%RH or less (no dew condensation)
Altitude	1000 m or lower	1000 m or lower
Atmosphere	A well ventilated place free from corrosive gas, explosive gas, vapor chemicals and/or dust. Not to be exposed to rain and direct sunlight. The brake should not be exposed to water, powders, grease, and/or oil mists. Models with protection rating of IPX0 should not be exposed to water directly.	A place free from corrosive gas, explosive gas and/or vapor. Not to be exposed to strong rain, wind and direct sunlight. Not suitable for use under water, under environments with exposure to high pressure water splashes, and under exposure to cleansing chemicals.

■ Orientation

- No restriction on installation orientation. (Since it uses a grease lubrication system)
- Make sure no foreign substances enter the opening part of the clutch and brake.

■ Procedure

[1] Foot Mount, Flange Mount

Secure the gearmotor with four bolts on a vibration-free and flat machine-processed surface (0.3 mm or less of flatness).

[2] Shaft Mount (torque arm)

The driven shaft must be able to carry the weight of the reducer.

Note) Force other than the rotation reaction force should not be applied to the torque arm.

■ Tightening Torque for Bolts for Installation (Reference value)

Mounting hole (mm)	Bolt size	Tightening torque	
		(N•m)	(kgf•m)
5.5	M5	2.9	0.3
6.5	M6	4.9	0.5
8.5	M8	13	1.3
9	M8	13	1.3
11	M10	25	2.6
13	M12	44	4.5
15	M14	69	7
18	M16	108	11
22	M20	294	30

4. Connecting with Other Equipment

CAUTION

Pay attention to centering, belt tensioning, parallel degree of pulley, etc. when the gearmotor is connected to the load.



In case of direct connection, make sure the connection is precise.

In case of using the belt, make sure to adjust the belt tension correctly.

Be sure to tighten the bolts for the pulley and couplings before operation.

Otherwise, injury and device damage may occur by scattering of broken pieces.



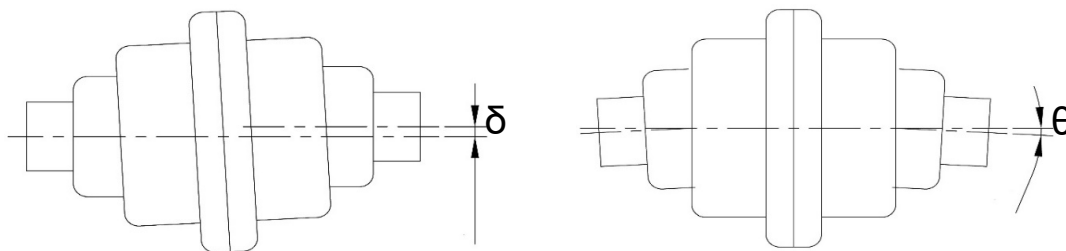
Apply a cover, etc. so that rotation parts are not touched. Otherwise, injury may occur.

Be sure to use the specified key to assemble the connection device (a coupling/sprocket/pulley/gear, etc.) to the reducer shaft with fitting of about H7 class.

4-1. When directly connected

Shaft center of the connecting machine and the shaft center of the reducer must be aligned in a straight line.

■Example of gear coupling

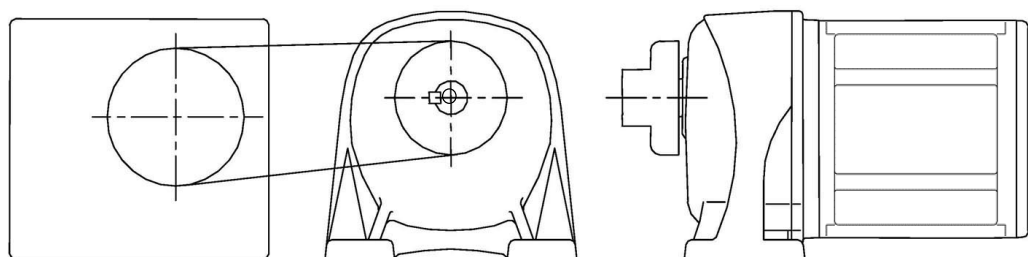


- The displacement amount of δ and θ should be minimized as small as possible.
- The δ and θ differ according to the type of coupling. Therefore, they should be within the allowable value defined by the manufacturer.
(Reference: In case of chain coupling, δ should be within 2% of the roller chain pitch and θ should be within 1°)

4-2. Attaching Chains, V-belts, Gears, etc.

- (1) Shaft center of the connecting machine and the shaft center of the reducer must be set parallel to each other.
- (2) Chain, V-belt tension and gear engagement must be at right angle to the shaft.
- (3) V-belt tension : If it is too tight, the bearing may become damaged.
Chain tension : If it is too tight, the bearing may become damaged. High impact force may also occur if it is too loose which would result in adverse effects on the reducer and application.
The tension of the chain should be correctly adjusted.

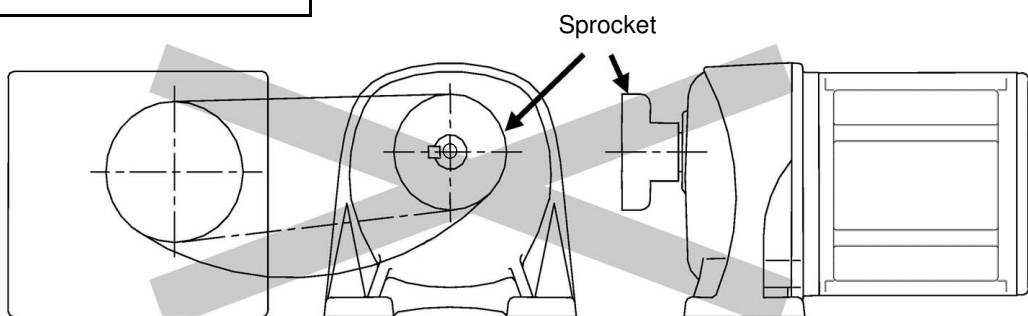
■Correct



Application

- The tension of V-belt and chain are properly set, also pulley and sprocket are properly positioned.

■Incorrect



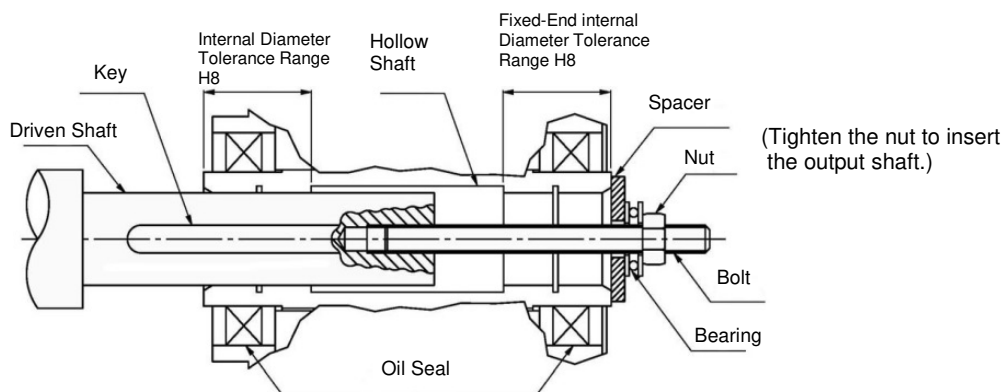
Application

- The chain is too loose.
- The sprocket is positioned in the reverse direction so that the load point moves to the shaft edge.

4-3. Installing/Removing FS/FAS/F3S Driven Shaft

■ Installing hollow shaft of reducer to the driven shaft

- Coat the driven shaft surface and interior surface of hollow shaft with a lubricant (molybdenum disulfide) suitable to the atmosphere in which they are used and connect the reducer to the driven shaft.
- When used with uniform loads, a driven shaft tolerance of h7 is recommended. Additionally, when dealing with impact loads or large radial loads, make sure they fit each other tightly. The tolerance of the interior surface of hollow shaft is designed to be H8.
- If the shafts are a tight fit, use a plastic hammer on the end of the hollow shaft to insert it. When doing so, be sure not to hit the casing. If you make a jig like the one in the diagram below, driven shaft insertion will be easier.



(Customers need to provide their own spacer, nuts, bolts, keys and shaft bearings.)

- For the length of the turn-stop key for the driven shaft, tolerance range H8 for the internal diameter on the fixed side is recommended.
- It is recommended that axial runout for the shaft be 0.05 mm or less at the shaft end. If major wobbling occurs during operation, it may have a negative effect on the reducer.

■ Connecting reducer to driven shaft

[1] When there are steps on the drive shaft

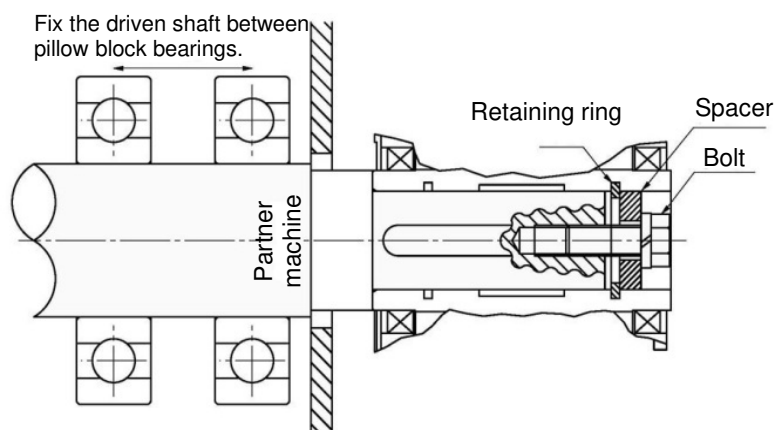


Figure. Attachment Using a Spacer and Retaining Ring
(Customers need to provide their own spacer, bolts, and retaining rings.)

Note) Be careful when tightening the bolt, as tightening it too much can distort the shape of the retaining ring.

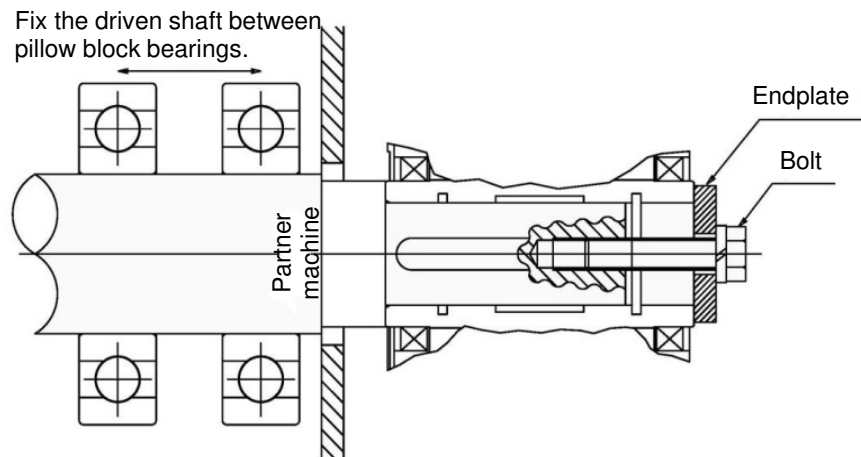


Figure. Attachment Using an Endplate
(Customers need to provide their own endplates and bolts.)

Note) Please understand that mounting of resin cover which is the F/FA Type accessory is unavailable.
In addition, please take safety measures such as applying a protective cover so that there is no entanglement at the output shaft.

[2] When the driven shaft has no steps

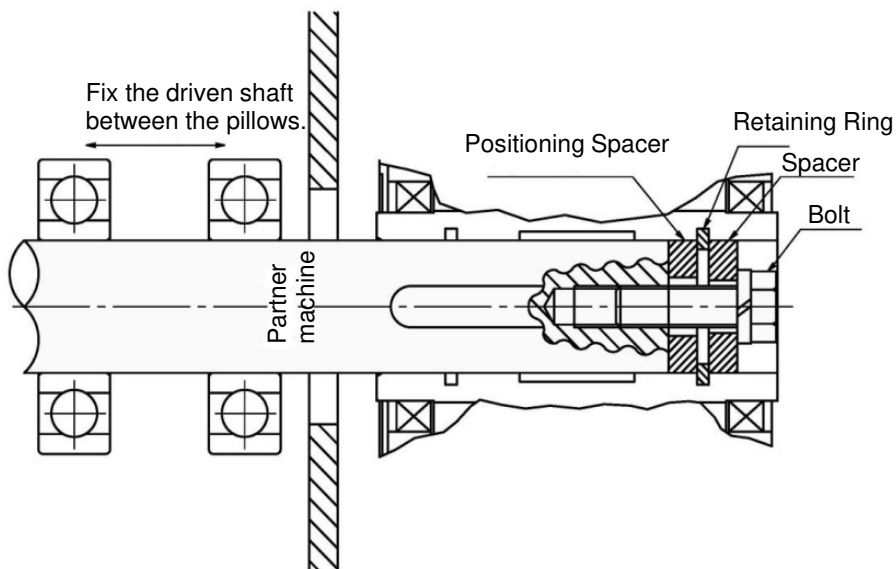
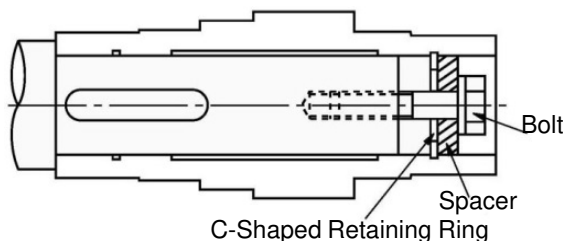


Figure. Attachment Using a Spacer and Retaining Ring
(Customers need to provide their own spacer, positioning spacers, bolts, and retaining rings.)

Note) Make sure there is a gap between the outer diameter of the spacer and the internal diameter of the hollow shaft. If the fit is too tight and the outer diameter of the spacer is inaccurate, axial runout of the driven shaft and hollow shaft can result.
The positioning spacer is used to position the reducer. It is not required if you know the length of the driven shaft in advance. In addition, attaching the positioning spacer allows for smooth removal from the hollow shaft. (Refer to "■ Removal from the hollow shaft" on next page for more on removal from the hollow shaft.)

■Recommended Sizes for the Fixing Elements of the Drive Shaft

For the attachment of the hollow shaft in general use, we recommend you to refer to the dimensions shown on the right as a guideline for the strength when designing.

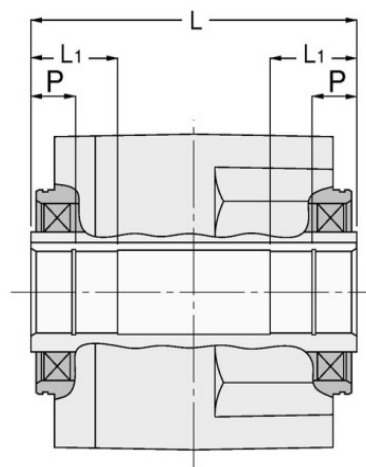


<Recommended Sizes for the Fixing Elements of the Drive Shaft>(mm)

Hollow shaft hole diameter	Bolt size	Spacer dimensions			C-shaped retaining ring for holes (Nominal)
		Outer diameter	Internal diameter	Width	
φ 20	M6	φ 19.5	φ 7	3	20
φ 25	M6	φ 24.5	φ 7	4	25
φ 30	M8	φ 29.5	φ 9	5	30
φ 35	M10	φ 34.5	φ 11	5	35
φ 45	M10	φ 44.5	φ 11	5	45
φ 50	M12	φ 49.5	φ 13	6	50
φ 55	M12	φ 54.5	φ 13	6	55

■Driven Shaft Length

Make sure the driven shaft reaches both ends of L1 (See figure at right.) However, look at the dimension leeway for spacers in the section titled "■Removal from the hollow shaft."



■Driven Shaft Key Length

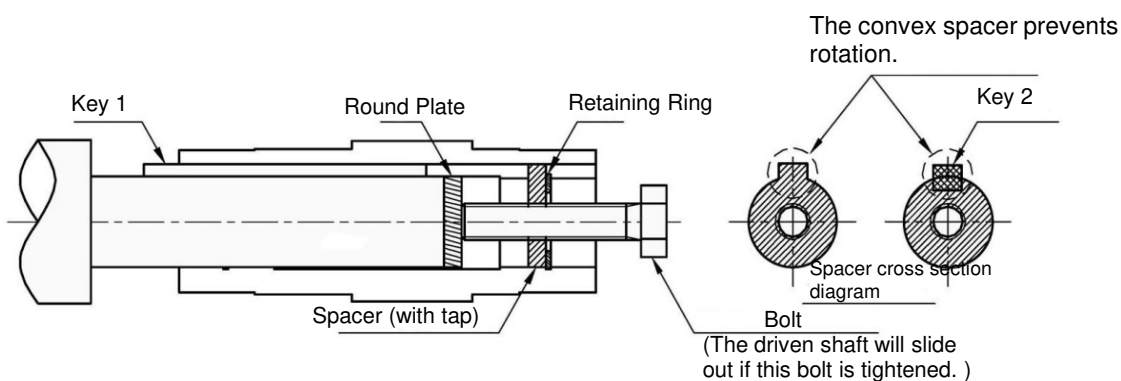
The length of the key should be at least 1.5 times of the diameter of the hollow shaft.

Additionally, the key is inserted in such a position that at least half its length is in L1. (See figure at right.)

■Removal from the hollow shaft

Make sure there is room to spare between the casing and the hollow shaft.

If you make and use a jig like the one below, driven shaft removal will be easier.



(Customers need to provide their own spacers, round plates, bolts and retaining ring keys.)

4-4. Installing Flange/Torque Arm

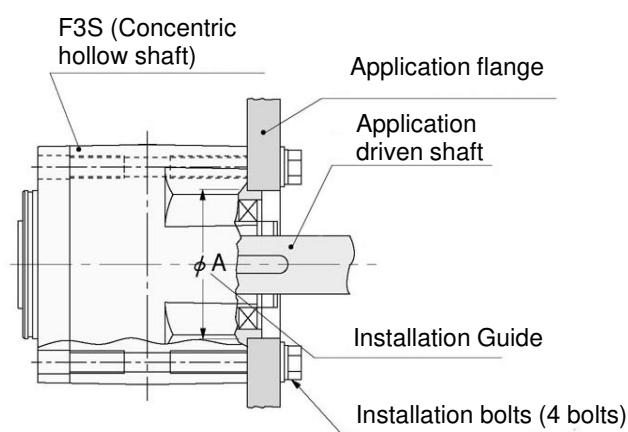
<Advantages and disadvantages of flange and torque arm installation>

	Advantages	Disadvantages
Flange Installation	<ul style="list-style-type: none"> ● Can be installed directly on the device. ● Saves space. 	<ul style="list-style-type: none"> ● Centering with the application is required. ● Requires four(4) tapped holes for mounting to the application. (F/FA Type)
Torque Arm Installation	<ul style="list-style-type: none"> ● Makes centering with the application easy. ● Fastening to the application only requires one detent. 	<ul style="list-style-type: none"> ● Requires a torque arm. ● Requires space for installing a torque arm.

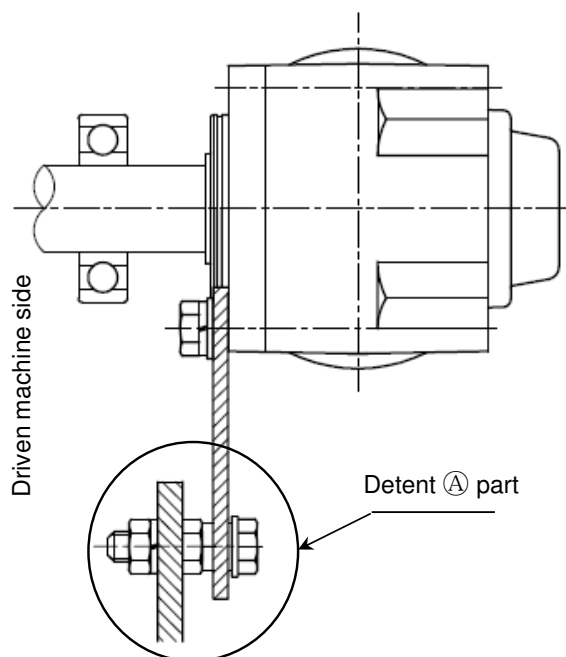
■ Installing flange

When the hollow bore is installed directly to the flange of an application, it can cause motor burn-out or bearing damage if it is off-center, so be sure to center it properly.

There is an installation guide, as shown in the diagram at the right. The dimension tolerance for ϕA for the installation guide is h7 in the case of F3 type. The installation bolts are installed as shown in the diagram at the right. Four bolts should be used.



■ Fastening the Reducer and Torque Arm



- Install the the torque arm detent to the driven machine side.
- Because the torque arm sustains a reactive force from rotation, consideration needs to be given to impact loads particularly during startup and braking. Bolts and plates that are sufficiently strong must be used. It is best to use an optional torque arm.
- To install the torque arm and reducer, fasten them using spring washers and flat washers with the installation bolts.

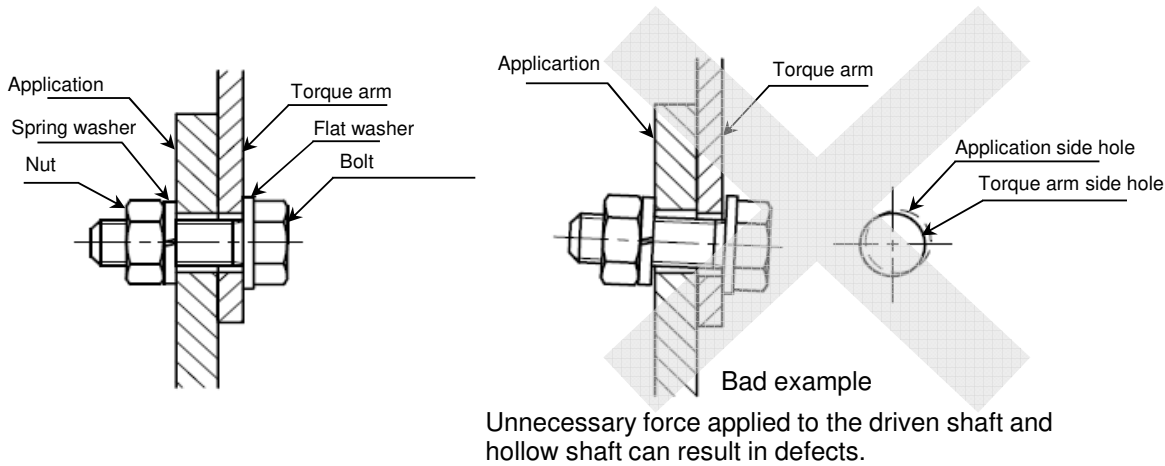
<Bolt Size and Tightening Torque> (Reference value)

Bolt size	Tightening torque N·m {kgf·m}
M8	13 { 1.3 }
M10	25 { 2.6 }
M12	44 { 4.5 }
M14	69 { 7.0 }
M16	108 { 11 }

● How to install the Torque Arm Detent ㊤ part

[1] For normal/reverse rotation operation and unidirectional operation (intermittently)

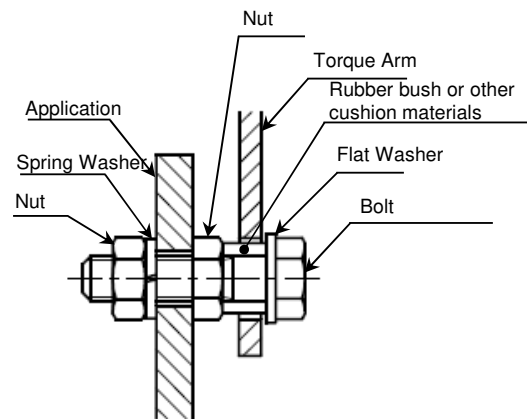
Fasten the torque arm detent so there is no looseness or wobble. When doing this, center the detent hole with that of the application to make sure that no radial load (suspension load) is applied against the driven shaft and hollow shaft of the reducer. (Refer to the diagram below.)



Note) If mounting has a looseness, impact may be applied to the torque arm with each startup and defects such as loosen bolts may occur.

If mounting without looseness are not allowed for some reason, rubber bush or other cushion materials shall be used between the torque arm and the bolt as a protective measure.

Bolts with sufficient strength shall be used. (Refer to the right diagram.)

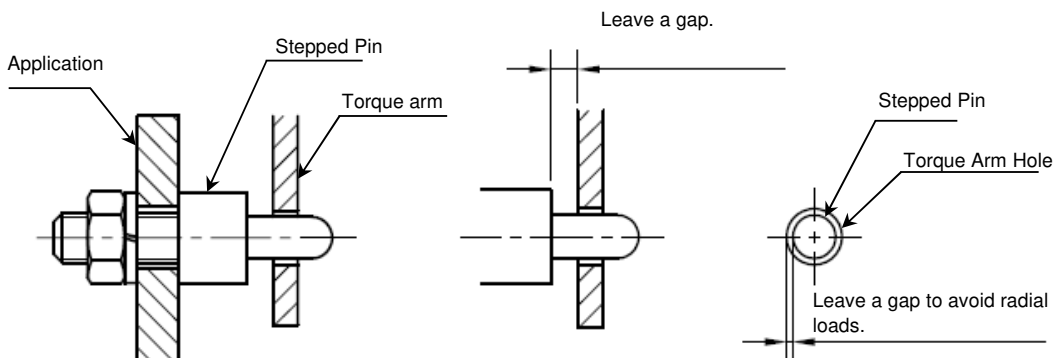


[2] Unidirectional operation (consecutive)

For unidirectional operation (consecutive) which has no frequent start-up torque applied, the torque arm can be used without a detent. However, it is still necessary to fasten the driven shaft to the hollow shaft.

(Refer to "4-3. Installing/Removing FS/FAS/F3S Driven Shaft".)

In this case, it is necessary to provide sufficient clearance for looseness in both radial and thrust directions for alignment between the application and detent. (Refer to the diagram below.)



Example of Stepped Pin Usage

5. Rotational Direction

CAUTION



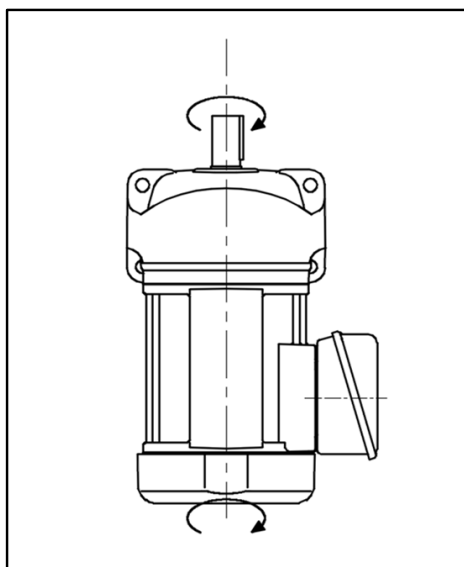
Check the rotational direction before the gearmotor is connected to the device. Difference in rotational direction may cause injury and/or damage to the device.

The relationship between the input shaft (motor) and output shaft rotational direction of this product are as follows. The following rotational direction is the rotation when “6. Wiring.” is connected as normal rotation.

■For G3 Type

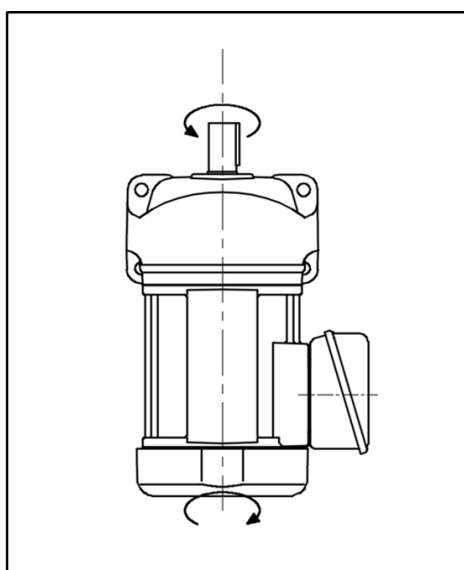
0.1 kW 1/5 to 1/50 and 1/300 to 1/1200

0.2 to 2.2 kW 1/5 to 1/30 and 1/300 to 1/1200



0.1 kW 1/60 to 1/200

0.2 to 2.2 kW 1/40 to 1/200

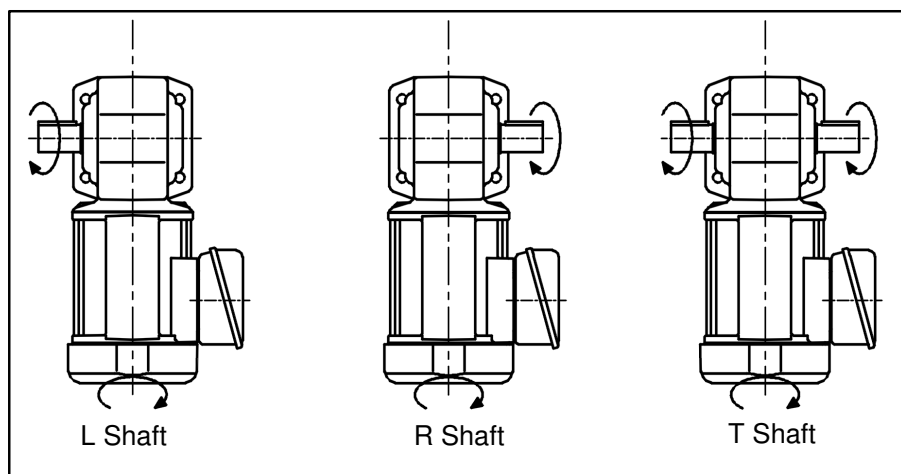


■For H2 Type

0.1 and 0.2 kW 1/5 to 1/60 and 1/600 to 1/1500

0.4 to 0.75 kW 1/5 to 1/60 and 1/300 to 1/1500

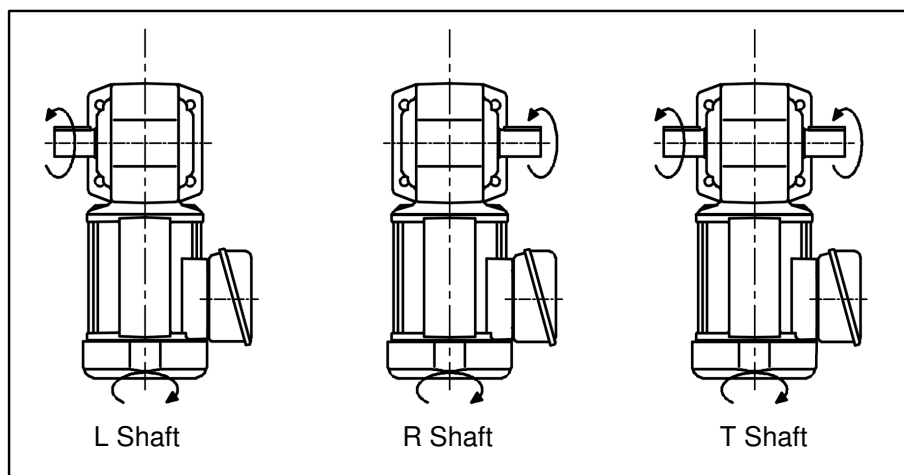
1.5 and 2.2 kW 1/5 to 1/30



0.1 and 0.2 kW 1/80 to 1/450

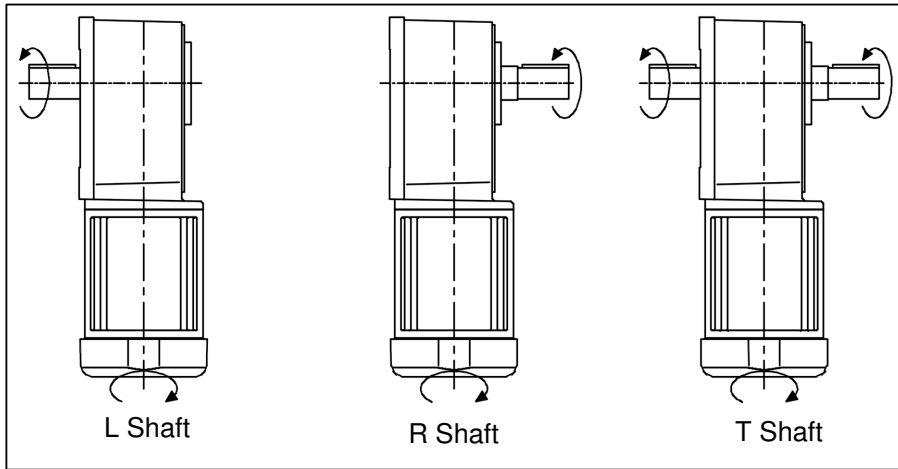
0.4 to 0.75 kW 1/80 to 1/240

1.5 and 2.2 kW 1/40 to 1/240

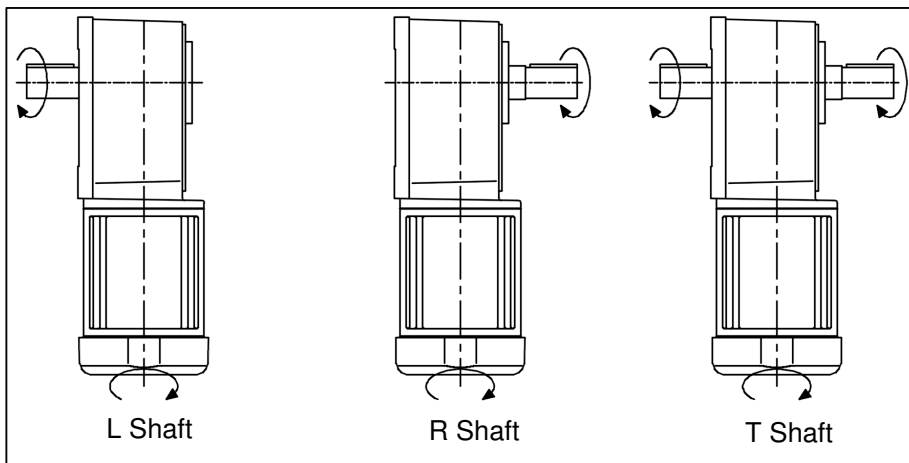


■For F/FA Type

0.1 to 0.75 kW 1/5 to 1/60 and 1/300 to 1/1500
1.5 and 2.2 kW 1/5 to 1/30

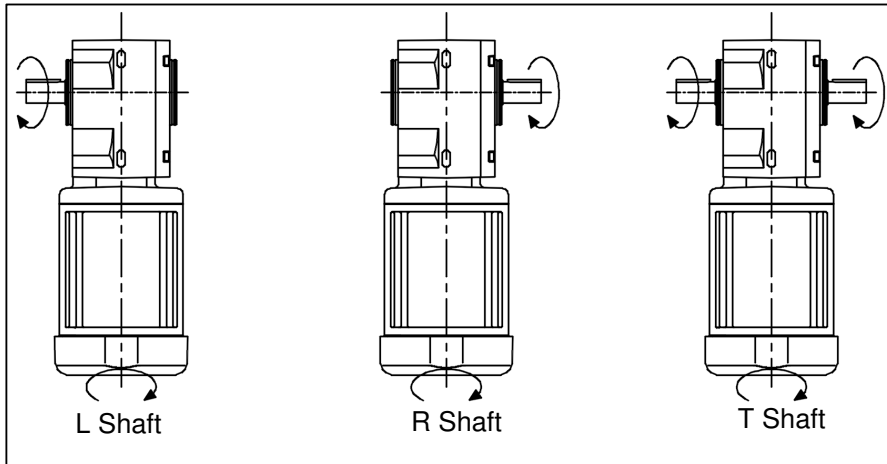


0.1 to 0.75 kW 1/80 to 1/240
1.5•2.2 kW 1/40 to 1/240

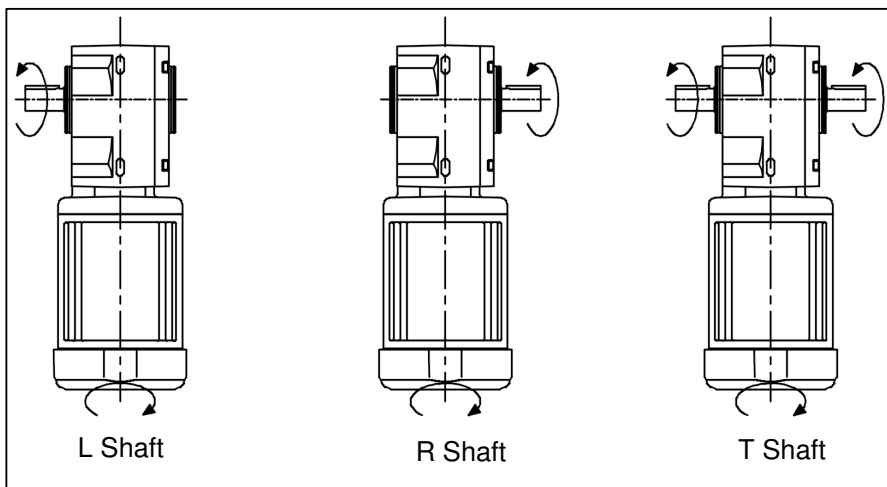


■For F3 Type










0.1 kW	1/5 to 1/60 and 1/300 to 1/1500
0.2 kW	1/5 to 1/60 and 1/300 to 1/1200
0.4 kW	1/5 to 1/60 and 1/300 to 1/600
0.75 kW	1/5 to 1/60 and 1/300
1.5 and 2.2 kW	1/5 to 1/60


























0.1 to 1.5 kW	1/80 to 1/240
2.2 kW	1/80 to 1/120



6. Wiring

 DANGER	
 	Perform connection of the power cable according to the wiring diagram within the terminal box or the instruction manual. Otherwise, an electric shock and/or fire may occur. (For a gear motor without a terminal box, please be sure that the connection parts of the gear motor are properly insulated.)
 	Do not forcibly bend, pull or pinch the power cable and motor lead wire. Otherwise, an electric shock may occur.
 	Be sure to ground the grounding terminal. Otherwise, an electric shock may occur.
 	Be sure to use the power supply described on the nameplate. Otherwise, motor burn damage and fire may occur.

 CAUTION	
 	Do not touch the terminal when measuring the insulation resistance. Otherwise, an electric shock may occur.
 	Perform wiring according to the electric facility technology standards and internal wire regulations. Otherwise, burn damage, an electric shock, fire and/or injury may occur.
 	The motor has no protective device as an accessory. Mounting an overload protective device is obligatory with the electric facility technical standards. It is recommended that a protective device (such as a power leakage insulator, etc.) other than the overload protective device is mounted. Otherwise, damage, an electric shock, fire and/or injury may occur.
 	When running the motor alone, please remove the temporarily attached key from the output shaft. Not doing so may result in injury.
 	Check the rotational direction before the gearmotor is connected to the partner machine. Running a machine in the wrong rotational direction may cause injury and apparatus damage.
 	If the motor is driven with an 400V class inverter, mount a suppression filter and reactor on the inverter side. Otherwise, damage and fire may occur upon insulation breakdown.
 	The voltage drop with wiring shall be 2% or lower. If the wiring distance is long, the voltage drop will be large and the gearmotor may not start.
 	For reverse rotation, be sure to once stop the motor completely before starting the reverse rotation. Otherwise, the apparatus may be damaged with the normal/reverse operation by plugging.
 	For a gearmotor with brake, do not execute continuous energizing of the brake coil while the motor is at a stop. Otherwise, coil burn damage and/or fire may occur.
 	For a gearmotor with clutch/brake, do not energize the clutch brake coil continuously while the motor is stationary. Otherwise, coil burn damage and/or fire may occur due to reduced ventilation.
 	If a gearmotor with brake is utilized for lifting applications, please be sure to utilize the DC switch connection. Failing to do so may result in a drop-accident.

6-1. Gearmotor Wiring <Common Items>

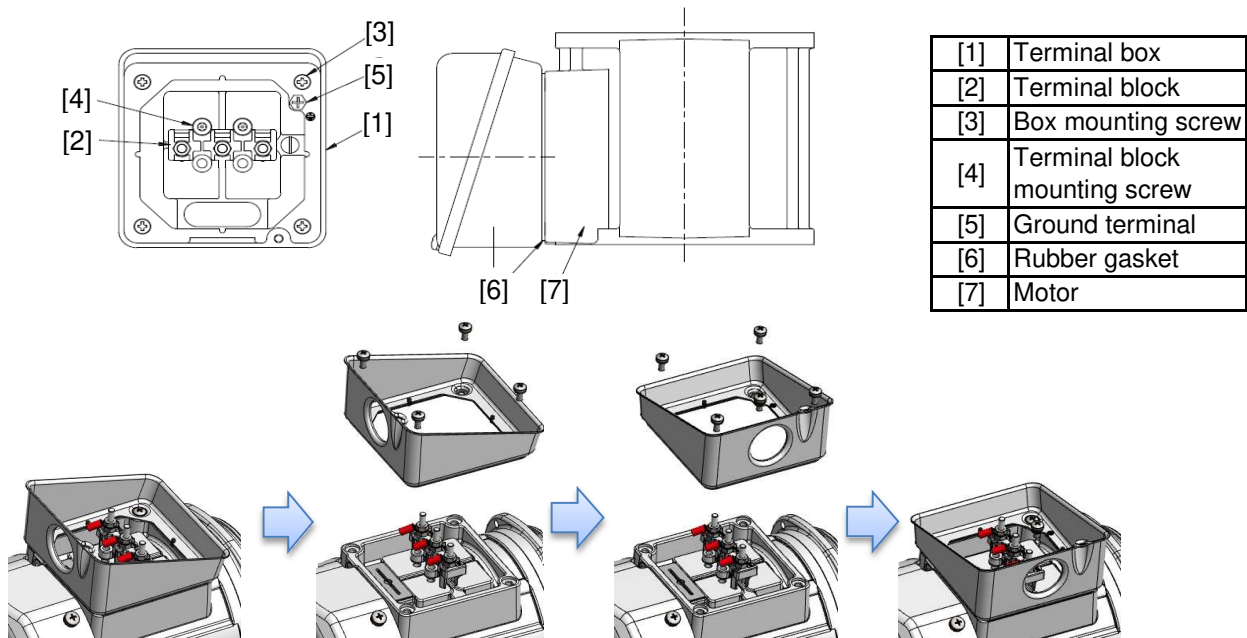
■Precautions for Terminal Box/Terminal Block

- Use the nuts and short circuit plate included for terminal block connection.
(Short circuit plates are not included for motors with three lead wires since it is unnecessary.)
- The tightening torque of the nut mounted on the terminal block is 1.2 to 1.5 N·m (12 to 15 kgf·cm).
- The tightening torque for the ground terminal is 1.2 to 1.5 N·m (12 to 15kgf·cm).
- Be sure to assemble and fasten the terminal box lid with fixing screws after wiring.
- The tightening torque for the lid on the T type terminal box is 0.4 to 0.8 N·m (4 to 8kgf·cm).
- Refer to “■How to Change Terminal Box Mounting Direction” if the direction of the terminal box cable outlet must be changed.
- Please contact your nearest service office if the rubber gasket of the terminal box is cut or damaged. An electric shock and apparatus damage may occur if the motor is used with a damaged gasket. (Refer to the final page for details.)
- A rubber grommet with a membrane is attached to the opening part of the T type terminal box to protect the cable or the lead wire. Cut open the surface when performing wire connection.
- A rubber sheet for insulation and water-proof is attached to the lid of E type terminal box.
Please do not remove the rubber sheet. Otherwise, a short circuit and electric shock may occur.
If by any chance the rubber sheet comes off, be sure to put it back on the lid so that the rubber sheet fits properly on the lid.
- The tightening torque for the lid on the E type terminal box is 1.2 to 1.5 N·m (12 to 15kgf·cm).

■How to Change Terminal Box Mounting Direction

Change the terminal box mounting direction as follows if the direction of the terminal box cable outlet must be changed.

* Note that malfunctions due to this procedure not being performed correctly is not covered by our warranty.



(1) Loosen four of Terminal box mounting screws [3] and remove the terminal box.

*Rubber gasket [6] is attached to the bottom part of the terminal box. Be careful not to remove the rubber gasket.

(2) Mount the terminal box in your desired direction and tighten the mounting screws.

The tightening torque for the mounting screws are 1.2 to 1.5 N·m (12 to 15 kgf·cm).

Mount the box carefully so that lead wires for the motor and brake are not pinched between the motor and box.

Note) Do not change the mounting direction of Terminal block [2] .

Defects caused by a customer changing the terminal block mounting direction are not covered by the warranty.

■ Precautions on Gearmotor with Brake Wiring

- The brake voltage is 90V DC for the 200V class brake and 180V DC for the 400V class brake.
The brake lead wires are blue for the 200V class brake and yellow for the 400V class brake.
- Please note that in case of products(power type:K/C/D/A/U)where voltage of both 200V class and 400V class are displayed on the motor nameplate, the voltage that can be used will vary depending on the brake voltage.
※200V Class Brakes (Blue lead wires) cannot be used with 400V power.
※400V Class Brakes (Yellow lead wires) cannot be used with 200V power.
- Utilize "DC Switching" if the motor is used for lifting applications.
- Connect a surge suppressor (option) between the contacts for DC Switching connection.
Please contact your local service office for details of the surge suppressor. (Optional Accessory).
(The varistor voltage is 423V to 517V for the 200V class brake and 820V to 1000V for the 400V class brake.)
- Use switches of 110V DC <220V DC> and with contact point capacity rating of 13 DC to block the inductive load (DC coil) when using DC Switching. Please contact your local service office for further details.
*"Contact point rating of 13 DC" is a type of classification under JIS C 8201-5-1 (Low voltage switching device and control device) for coil load applications.
*The value within < > is for motor with a 400V Class Brake.
- Note that the rectifier has a diode built in, which may become unusable if a short circuit occurs due to improper connections, etc.
- Input voltage to the rectifier must be within the range as specified below. Please beware that repeated operation beyond the range may cause malfunction.
[200V Class] A200-D90-UL : AC200V~230V
[400V Class] A400-D180 : AC380V~480V

■ Precautions when Wiring a Gearmotor with a Clutch Brake

- DC 90V is required to operate the clutch brake. Please install the included rectifier and surge suppressor according to the wiring diagram.
- For the protection of the rectifier, please install a fuse (1A capacity) either on the input or output side of the circuit
- Please use a contactor with a capacity of DC110V, and with a utilization category of DC-13 to block the inductive load (DC coil) on the relay for the clutch brake.
*"A Contact point rating of 13 DC" is a classification under JIS C 8201-5-1 (Low voltage switching device and control device) for coil load applications.
- The rectifier has a diode built in, which may become unusable if a short circuit occurs due to improper connections, etc.
- The input voltage to the rectifier must be within the range specified below.
Please be aware that repeated operation beyond this range may cause a malfunction.
A200-D90 : AC200V~220V

■ Brake Lag Time : t_a

Time(seconds) taken from switch off to start of braking.
(Differs from the braking time.)

Standard Type (Brake Model: B2, B4, J2, J4)

Capacity	DC Switching	AC Switching (A)	AC Switching (B)
0.1 kW to 0.75 kW	0.005 to 0.020	0.05 to 0.15	0.15 to 0.25
1.5 kW, 2.2 kW	0.015 to 0.030	0.15 to 0.30	0.5 to 0.6

Water-resistant Type IP65 (Brake Model: V2, V4)

Capacity	DC Switching	AC Switching (A)	AC Switching (B)
0.1 kW to 0.75 kW	0.005 to 0.015	0.03 to 0.13	0.1 to 0.3

6-2. Gearmotor Wiring <Direct Power Input Operation>

Refer to the relevant motor wiring diagram in the connection table below to perform wiring for your gearmotor.

For the motor rotational direction of the connection below, "Forward" is defined as clockwise rotation seen from the back-side of the motor.

The rotational direction of the output shaft depends on the reduction ratio of the gear head. Check the reduction ratio before connection.

Securely ground the ground terminal to avoid risks of electric shocks.

The ground terminal is located on the motor frame for motors without a terminal box, or inside the terminal box for motors with a terminal box.

■ 3-phase Motor Connection Table (Direct Power Input Operation)

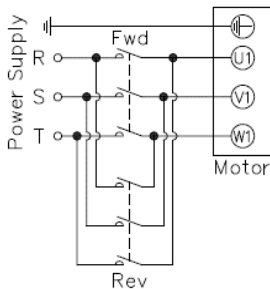
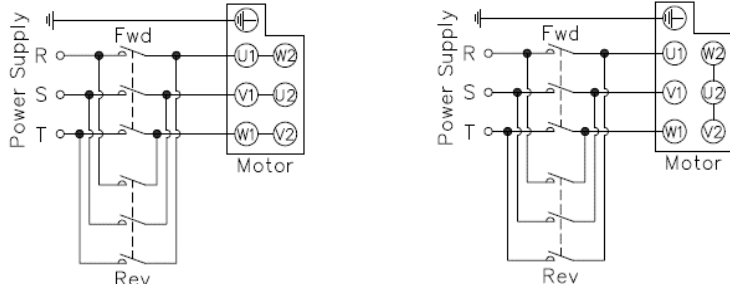
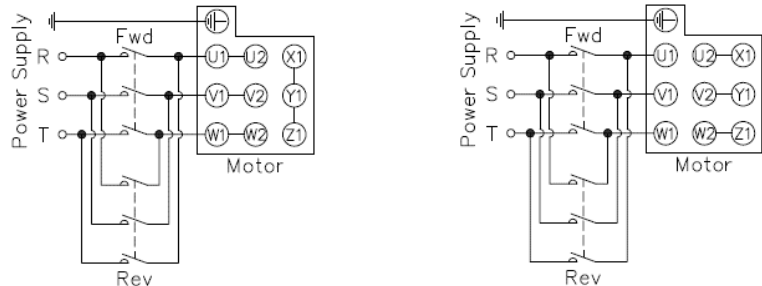
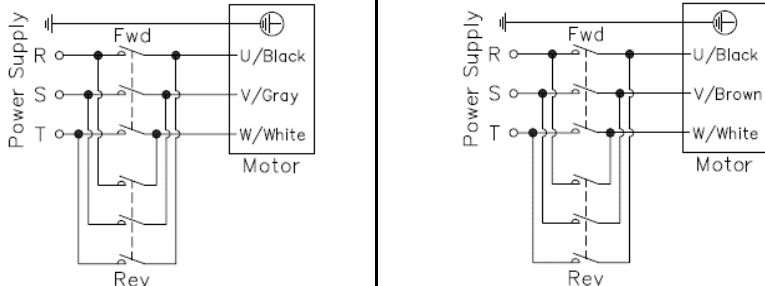
*The figure number in () is an optional specification for the built-in rectifier.

Power Supply		Motor		Wiring diagram number				
Model No.	Voltage/frequency	Number of Lead wires	Terminal box	Without brake	With brake			With Clutch and Brake
					AC Switching (B)	AC Switching (A)	DC Switching	
N	200/50	3	w/ Box	Fig.-[1]	Fig.-[6] (Fig.-AB)	Fig.-[7] (Fig.-AA)	Fig.-[8] (Fig.-DC)	Fig.-[26]
	200/60 220/60		w/o Box (Lead wire (bare) outlet)	Fig.-[4]	Fig.-[14]	Fig.-[15]	Fig.-[16]	Fig.-[26]
W	380/50	3 9 Note)	w/ Box	Fig.-[1]	Fig.-[9] (Fig.-AB)	Fig.-[10] (Fig.-AA)	Fig.-[11] (Fig.-DC)	Fig.-[27]
	400/50 400/60 440/60		w/o Box (Lead wire (bare) outlet)	Fig.-[5]	Fig.-[17]	Fig.-[18]	Fig.-[19]	-
K	220/60	6	w/ Box	Fig.-[2]	Fig.-[6] (Fig.-AB)	Fig.-[7] (Fig.-AA)	Fig.-[8] (Fig.-DC)	-
	380/60				Fig.-[9] (Fig.-AB)	Fig.-[10] (Fig.-AA)	Fig.-[11] (Fig.-DC)	
C	220/50	6	w/ Box	Fig.-[2]	Fig.-[6] (Fig.-AB)	Fig.-[7] (Fig.-AA)	Fig.-[8] (Fig.-DC)	-
	230/50 380/50				Fig.-[9] (Fig.-AB)	Fig.-[10] (Fig.-AA)	Fig.-[11] (Fig.-DC)	
D	220/50	6	w/ Box	Fig.-[2]	Fig.-[6] (Fig.-AB)	Fig.-[7] (Fig.-AA)	Fig.-[8] (Fig.-DC)	-
	220/60 380/50 380/60				Fig.-[9] (Fig.-AB)	Fig.-[10] (Fig.-AA)	Fig.-[11] (Fig.-DC)	
A	208/60	9	w/ Box	Fig.-[3]	Fig.-[20] (Fig.-AB)	Fig.-[21] (Fig.-AA)	Fig.-[22] (Fig.-DC)	-
	230/60 460/60 400/50				Fig.-[23] (Fig.-AB)	Fig.-[24] (Fig.-AA)	Fig.-[25] (Fig.-DC)	
U	230/60	9	w/ Box	Fig.-[3]	Fig.-[20] (Fig.-AB)	Fig.-[21] (Fig.-AA)	Fig.-[22] (Fig.-DC)	-
	460/60 400/50				Fig.-[23] (Fig.-AB)	Fig.-[24] (Fig.-AA)	Fig.-[25] (Fig.-DC)	
E	415/50 440/50 480/60	3	w/ Box	Fig.-[1]	Fig.-[9] (Fig.-AB)	Fig.-[10] (Fig.-AA)	Fig.-[11] (Fig.-DC)	-
M	575/60	3	w/ Box	Fig.-[1]	-	Fig.-[12]	Fig.-[13]	-
R	208/60	3	w/ Box	Fig.-[1]	Fig.-[6] (Fig.-AB)	Fig.-[7] (Fig.-AA)	Fig.-[8] (Fig.-DC)	-

Note) 400V class motor with clutch and brake has 9 lead wires.

■ 3-phase Motor Connection List (Direct Power Input Operation)

*200V Class : 200V to 230V, 400V Class : 380V to 480V

Number of Motor lead wires	Terminal box	Brake connection	Wiring diagram (Direct power input operation)	
3	w/ Box	-	Fig. - [1]	Common for 200V Class/400V Class/575V
				
6	w/ Box	-	Fig. - [2]	Low Voltage (200V Class) High Voltage (400V Class)
				
※Use the included short board to switch between 200V/400V power.				
9	w/ Box	-	Fig. - [3]	Low Voltage (200V Class) High Voltage (400V Class)
				
※Use the included short board to switch between 200V/400V power.				
3	w/o Box	-	Fig. - [4]	200V Class
			Fig. - [5]	400V Class
				

*200V Class : 200V to 230V, 400V Class : 380V to 480V

Number of Motor lead wires	Terminal box	Brake connection	Wiring diagram (Direct power input operation)	
3 / 6	w/ Box	AC Switching (B)	Fig. - [6] Motor : 200V Class Brake : 200V Class <p>※Please short the A200-D90-UL rectifier's blue-blue wires. ※B1・B2 terminals located in the terminal box.</p>	Fig. - [9] Motor : 400V Class Brake : 400V Class <p>※Please short the A400-D180 rectifier's blue-blue wires. ※B1・B2 terminals located in the terminal box.</p>
			Fig. - [7] Motor : 200V Class Brake : 200V Class <p>※Please short the A200-D90-UL rectifier's blue-blue wires. ※B1・B2 terminals located in the terminal box.</p>	Fig. - [10] Motor : 400V Class Brake : 400V Class <p>※Please short the A400-D180 rectifier's blue-blue wires. ※B1・B2 terminals located in the terminal box.</p>
3 / 6	w/ Box	DC Switching	Fig. - [8] Motor : 200V Class Brake : 200V Class <p>※B1・B2 terminals located in the terminal box.</p>	Fig. - [11] Motor : 400V Class Brake : 400V Class <p>※B1・B2 terminals located in the terminal box.</p>
3	w/ Box	AC Switching (A)	Fig. - [12] Motor : 575V Brake : 200V Class <p>※Please short the A200-D90-UL rectifier's blue-blue wires. ※B1・B2 terminals located in the terminal box.</p>	

—N—: Surge suppressor (option)

*200V Class : 200V to 230V, 400V Class : 380V to 480V

Number of Motor lead wires	Terminal box	Brake connection	Wiring diagram (Direct power input operation)	
3	w/Box	DC Switching		<p>Fig. - [13] Motor : 575V Brake : 200V Class</p> <p>※B1・B2 terminals located in the terminal box.</p>
3	w/o Box	AC Switching (B)	<p>Fig. - [14] Motor : 200V Class Brake : 200V Class</p> <p>※Please short the A200-D90-UL rectifier's blue-blue wires.</p>	<p>Fig. - [17] Motor : 400V Class Brake : 400V Class</p> <p>※Please short the A400-D180 rectifier's blue-blue wires.</p>
3	w/o Box	AC Switching (A)	<p>Fig. - [15] Motor : 200V Class Brake : 200V Class</p> <p>※Please short the A200-D90-UL rectifier's blue-blue wires.</p>	<p>Fig. - [18] Motor : 400V Class Brake : 400V Class</p> <p>※Please short the A400-D180 rectifier's blue-blue wires.</p>
3	w/o Box	DC Switching	<p>Fig. - [16] Motor : 200V Class Brake : 200V Class</p> <p>※Please short the A200-D90-UL rectifier's blue-blue wires.</p>	<p>Fig. - [19] Motor : 400V Class Brake : 400V Class</p> <p>※Please short the A400-D180 rectifier's blue-blue wires.</p>

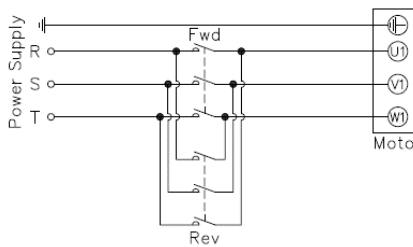
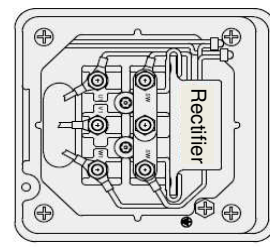
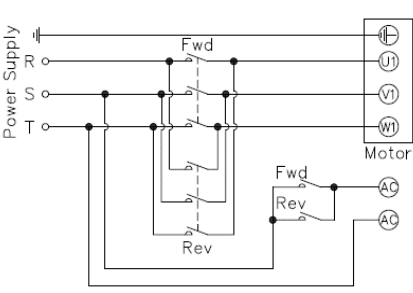
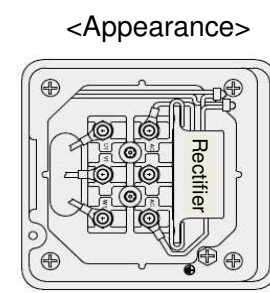
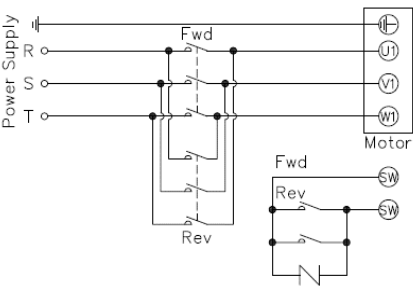
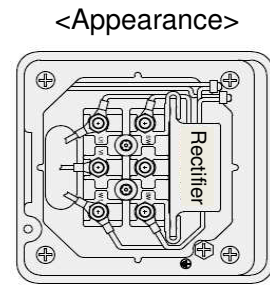
—|—: Surge suppressor (option)

*200V Class : 200V to 230V, 400V Class : 380V to 480V

Number of Motor lead wires	Terminal box	Brake connection	Wiring diagram (Direct power input operation)	
9	w/ Box	AC Switching (B)	Fig. - [20] Motor : 200V Class Brake : 200V Class 	Fig. - [23] Motor : 400V Class Brake : 400V Class
			※Please short the A200-D90-UL rectifier's blue-blue wires. ※Brake lead wire(blue) is located inside the terminal box.	※Please short the A400-D180 rectifier's blue-blue wires. ※Brake lead wire(yellow) is located inside the terminal box.
9	w/ Box	AC Switching (A)	Fig. - [21] Motor : 200V Class Brake : 200V Class 	Fig. - [24] Motor : 400V Class Brake : 400V Class
			※Please short the A200-D90-UL rectifier's blue-blue wires. ※Brake lead wire(blue) is located inside the terminal box.	※Please short the A400-D180 rectifier's blue-blue wires. ※Brake lead wire(yellow) is located inside the terminal box.
9	w/ Box	DC Switching	Fig. - [22] Motor : 200V Class Brake : 200V Class 	Fig. - [25] Motor : 400V Class Brake : 400V Class
			※Brake lead wire(blue) is located inside the terminal box.	※Brake lead wire(yellow) is located inside the terminal box.

: Surge suppressor (option)

*200V Class : 200V to 230V, 400V Class : 380V to 480V

Number of Motor lead wires	Terminal box	Brake connection	Wiring diagram (Direct power input operation)	
3 / 6 / 9	w/ Box	AC Switching (B)	Fig. - AB	Common for 200V Class/400V Class
			 <p><Appearance></p>  <p>※The voltage supplied to the brake shall be the same as the supply voltage of the motor. ※The rectifier type would be "A200-D90-UL" for 200V type, and "A400-D180" for 400V type.</p>	
3 / 6 / 9	w/ Box	AC Switching (A)	Fig. - AA	Common for 200V Class/400V Class
			 <p><Appearance></p>  <p>※Terminal "AC" located in the terminal box. ※The rectifier type would be "A200-D90-UL" for 200V type, and "A400-D180" for 400V type.</p>	
3 / 6 / 9	w/ Box	DC Switching	Fig. - DC	Common for 200V Class/400V Class
			 <p><Appearance></p>  <p>※Terminal "SW" located in the terminal box. ※The voltage supplied to the brake shall be the same as the supply voltage of the motor. ※The rectifier type would be "A200-D90-UL" for 200V type, and "A400-D180" for 400V type.</p>	

—N—: Surge suppressor (option)

*200V Class : 200V to 220V, 400V Class : 380V to 440V

Number of Motor lead wires	Terminal box	Brake connection	Wiring diagram (Direct power input operation)
3	w/o Box w/ Box	—	<p>Fig. - [26]</p> <p>Motor : 200V Class Clutch and Brake : 200V Class</p>
9	w/ Box	—	<p>Fig. - [27]</p> <p>Motor : 400V Class Clutch and Brake : 200V Class</p>

MC : Relay Coil

Mca : Magnetic Contactor, Contact a

MCb : Magnetic Contactor, Contact b

PB : Push Button Switch

—: Surge suppressor (accessory)

6-3. Gearmotor Wiring <Inverter Operation>

■ Precautions for Inverter Operation

- For general usage, please use the gearmotor within the range of 5Hz to 120Hz.
*5 to 60 Hz for gearmotors with clutch and brake
- The vibration/noise is increased with high speed operation that exceeds 60Hz. In addition, the higher shaft speed may shorten the life-span of the oil seal.
- Note that abnormal temperature increase may occur with low speed operation due to the reduced cooling effect of the motor fan.
- The torque characteristics (limit) of the motor largely varies with the type of the inverter used and the control method.
- In case of wiring a gearmotor with brake or clutch/brake, it is recommended to bypass the inverter as voltage fluctuation may cause braking malfunction. (Supply from the primary side of the inverter)
- If the gearmotor is operated with a 400V class inverter, a surge voltage is generated between the motor terminals and the voltage may degrade the motor insulation. To suppress such surge voltage, common methods include suppressing the rise of voltage (Output reactor) and/or suppressing the peak value (Output filter).
Note that the descriptions above is a general suggestion. Please consult with your inverter manufacturer for more details.

Refer to the relevant motor wiring diagram in the connection table below to perform wiring for the gearmotor.

The rotational direction of the output shaft depends on the reduction ratio of the gearhead. Check the reduction ratio before connection.

Securely ground the ground terminal to avoid risks of electric shocks.

The ground terminal is located on the motor frame for motors without terminal box, or in the terminal box for motors with a terminal box.

■ 3-phase Motor Connection Table (Inverter Operation)

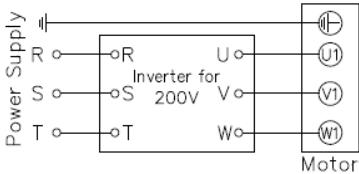
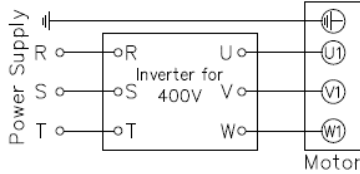
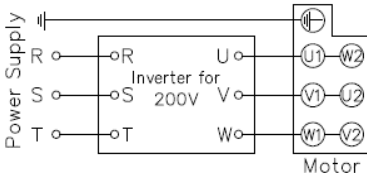
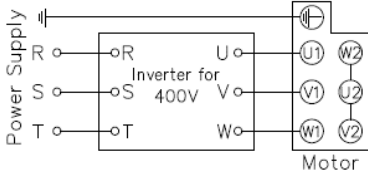
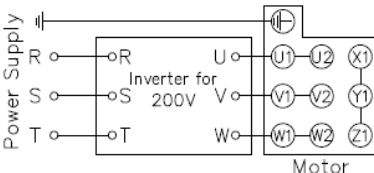
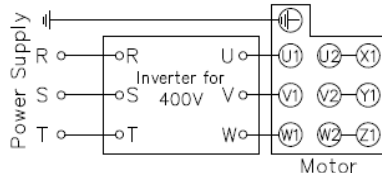
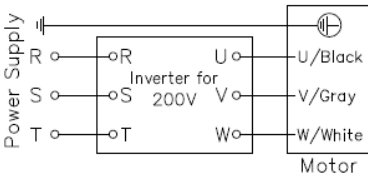
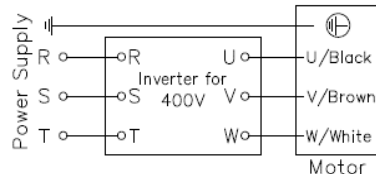
*The figure number in () is an optional specification for the built-in rectifier.

Power Supply Mode I No.	Voltage/frequency	Motor Number of Lead wires	Terminal box	Wiring diagram number				
				Without brake	With brake			With Clutch and Brake
					AC Switching (B)	AC Switching (A)	DC Switching	
N	200/50	3	w/ Box	Fig.-V[1]	-	Fig.-V[7] (Fig.-VAA)	Fig.-V[8]	Fig.-V[21]
	200/60 220/60		w/o Box (Lead wire (bare) outlet)	Fig.-V[5]	-	Fig.-V[13]	Fig.-V[14]	Fig.-V[21]
W	380/50	3 9 Note)	w/ Box	Fig.-V[2]	-	Fig.-V[9] (Fig.-VAA)	Fig.-V[10]	Fig.-V[22]
	400/50 400/60 440/60		w/o Box (Lead wire (bare) outlet)	Fig.-V[6]	-	Fig.-V[15]	Fig.-V[16]	-
K	220/60	6	w/ Box	Fig.-V[3]	-	Fig.-V[7] (Fig.-VAA)	Fig.-V[8]	-
	380/60				-	Fig.-V[9] (Fig.-VAA)	Fig.-V[10]	-
C	220/50	6	w/ Box	Fig.-V[3]	-	Fig.-V[7] (Fig.-VAA)	Fig.-V[8]	-
	230/50 380/50				-	Fig.-V[9] (Fig.-VAA)	Fig.-V[10]	-
D	220/50	6	w/ Box	Fig.-V[3]	-	Fig.-V[7] (Fig.-VAA)	Fig.-V[8]	-
	220/60 380/50 380/60				-	Fig.-V[9] (Fig.-VAA)	Fig.-V[10]	-
A	208/60	9	w/ Box	Fig.-V[4]	-	Fig.-V[17] (Fig.-VAA)	Fig.-V[18]	-
	230/60 460/60 400/50				-	Fig.-V[19] (Fig.-VAA)	Fig.-V[20]	-
U	230/60	9	w/ Box	Fig.-V[4]	-	Fig.-V[17] (Fig.-VAA)	Fig.-V[18]	-
	460/60 400/50				-	Fig.-V[19] (Fig.-VAA)	Fig.-V[20]	-
E	415/50 440/50 480/60	3	w/ Box	Fig.-V[2]	-	Fig.-V[9] (Fig.-VAA)	Fig.-V[10]	-
M	575/60	3	w/ Box	Fig.-V[2]	-	Fig.-V[11]	Fig.-V[12]	-
R	208/60	3	w/ Box	Fig.-V[1]	-	Fig.-V[7] (Fig.-VAA)	Fig.-V[8]	-

Note) 400V class motor with clutch and brake has 9 lead wires.

■ 3-phase Motor Connection List (Inverter Operation)

*200V Class : 200V to 230V, 400V Class : 380V to 480V

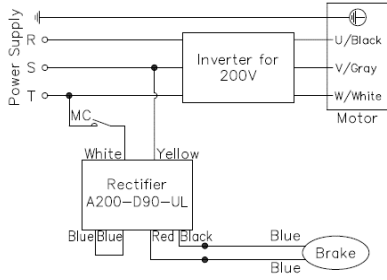
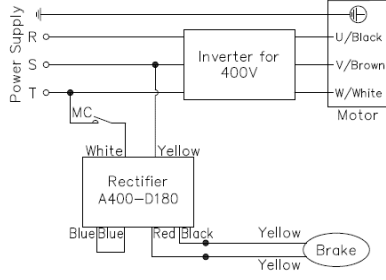
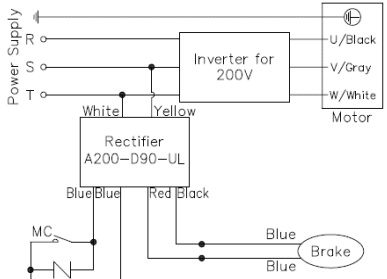
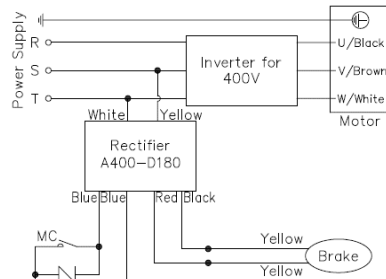
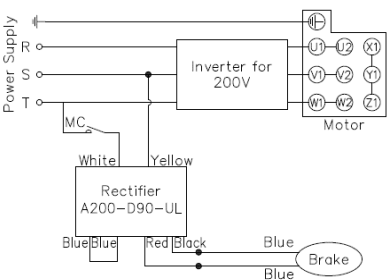
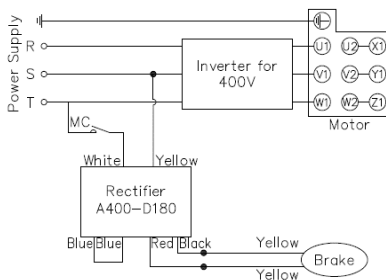
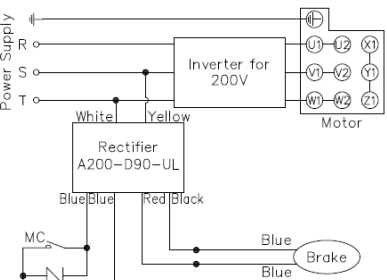
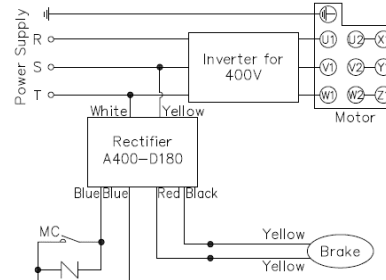
			Wiring diagram (Inverter operation)	
Number of Motor lead wires	Terminal box	Brake connection		
3	w/ Box	-	Fig. - V [1] 200V Class	Fig. - V [2] 400V Class
				
6	w/ Box	-	Fig. - V [3] Low Voltage (200V Class)	High Voltage (400V Class)
				
※Use the included short board to switch between 200V/400V power.				
9	w/ Box	-	Fig. - V [4] Low Voltage (200V Class)	High Voltage (400V Class)
				
※Use the included short board to switch between 200V/400V power.				
3	w/o Box	-	Fig. - V [5] 200V Class	Fig. - V [6] 400V Class
				

*200V Class : 200V to 230V, 400V Class : 380V to 480V


Number of Motor lead wires	Terminal box	Brake connection	Wiring diagram (Inverter operation)	
3 / 6	w/ Box	AC Switching (A)	Fig. - V [7] Motor : 200V Class Brake : 200V Class	Fig. - V [9] Motor : 400V Class Brake : 400V Class
			※B1・B2 terminals located in the terminal box.	※B1・B2 terminals located in the terminal box.
3 / 6	w/ Box	DC Switching	Fig. - V [8] Motor : 200V Class Brake : 200V Class	Fig. - V [10] Motor : 400V Class Brake : 400V Class
			※B1・B2 terminals located in the terminal box.	※B1・B2 terminals located in the terminal box.
3	w/ Box	AC Switching (A)		Fig. - V [11] Motor : 575V Brake : 200V Class
				※B1・B2 terminals located in the terminal box.
3	w/ Box	DC Switching		Fig. - V [12] Motor : 575V Brake : 200V Class
				※B1・B2 terminals located in the terminal box.

MC : Magnetic Contactor
 : Surge suppressor (option)

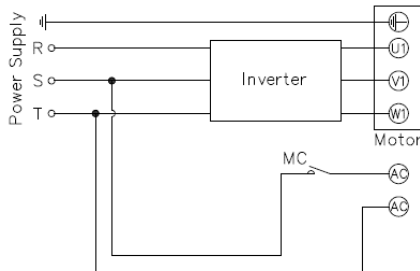
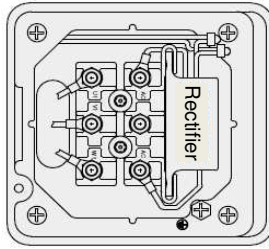
*200V Class : 200V to 230V, 400V Class : 380V to 480V

Number of Motor lead wires	Terminal box	Brake connection	Wiring diagram (Inverter operation)	
3	w/o Box	AC Switching (A)	Fig. - V [13] Motor :200V Class Brake:200V Class  <p>※Please short the A200-D90-UL rectifier's blue-blue wires.</p>	Fig. - V [15] Motor :400V Class Brake:400V Class  <p>※Please short the A400-D180 rectifier's blue-blue wires.</p>
			Fig. - V [14] Motor :200V Class Brake:200V Class 	Fig. - V [16] Motor :400V Class Brake:400V Class 
9	w/ Box	AC Switching (A)	Fig. - V [17] Motor :200V Class Brake:200V Class  <p>※Please short the A200-D90-UL rectifier's blue-blue wires. ※Brake lead wire(blue) is located inside the terminal box.</p>	Fig. - V [19] Motor :400V Class Brake:400V Class  <p>※Please short the A400-D180 rectifier's blue-blue wires. ※Brake lead wire(yellow) is located inside the terminal box.</p>
			Fig. - V [18] Motor :200V Class Brake:200V Class  <p>※Brake lead wire(blue) is located inside the terminal box.</p>	Fig. - V [20] Motor :400V Class Brake:400V Class  <p>※Brake lead wire(yellow) is located inside the terminal box.</p>

MC : Magnetic Contactor

 : Surge suppressor (option)

*200V Class : 200V to 230V, 400V Class : 380V to 480V

Number of Motor lead wires	Terminal box	Brake connection	Wiring diagram (Inverter operation)	
3 / 6 / 9	w/ Box	AC Switching (A)	Fig. - VAA	Common for 200V Class/400V Class
				<p><Appearance></p> 
			※Terminal "AC" is located in the terminal box. ※The rectifier type would be "A200-D90-UL" for 200V type, and "A400-D180" for 400V type.	

: Surge suppressor (option)

*200V Class : 200V to 220V, 400V Class : 380V to 440V

Number of Motor lead wires	Terminal box	Brake connection	Wiring diagram (Inverter operation)
3	w/o Box w/ Box	—	<p>Fig. - V [21]</p> <p>Motor : 200V Class Clutch and Brake : 200V Class</p>
9	w/ Box	—	<p>Fig. - V [22]</p> <p>Motor : 400V Class Clutch and Brake : 200V Class</p> <p>※Prepare separate 200V power supply for the input lead wire(white/yellow) of the rectifier.</p>

MC : Relay Coil

Mca : Magnetic Contactor, Contact a

MCb : Magnetic Contactor, Contact b

PB : Push Button Switch

—|— : Surge suppressor (accessory)

7. Operation

DANGER



Do not operate the motor while the terminal box cover is removed.
Mount the terminal box cover to the original position after work. Otherwise, an electric shock may occur.



Do not approach or touch rotating bodies (output shafts, etc.) while the product is running.
Otherwise, entanglement and injury may occur.



Be sure to turn off the power switch when power failure occurs.
Otherwise, sudden power recovery may cause injury and device damage.



Do not use a gearmotor with clutch and brake for lifting(elevation) application.
Drop accidents may occur when power fails.

CAUTION



Do not touch the gearmotor which may be hot when energized or for a while after the power-off.
It may result in burns.



Immediately stop operation of the gearmotor if there is any abnormality. Otherwise, an electric shock, injury and fire may occur.



Do not use the motor with load that exceeds the rating. Otherwise, injury and device damage may occur.



Do not perform impact stop to the motor. Otherwise, this may give a negative impact to the gearmotor and the connecting machine.



Do not remove the fan of the gearmotor without brake whose capacity is 0.4 kW or more.
If once removed, it will be impossible to install properly.
Securing it to the motor shaft will be incomplete and it may come off. If it is removed, please contact our nearest service office.

■Pre-Operation Checks

- Is the wiring correctly performed?
- Is the capacity of the fuse and the thermal relay appropriate?
- Is the product correctly connected to the application?
- Is the product correctly installed?
- Is the ground connection properly done?

■Trial Operation Checks

- Switch on for 1 to 2 seconds under no load to check the rotational direction before installing to the driven machine.
If the direction is wrong, refer to “6. Wiring.” and change the wiring.
- Connect to the machine and operate at no load.
If there is no abnormality, gradually increase the load up to full load.

■Routine Operation Checks

- Refer to the details of the daily inspection and check the state of operation.
Immediately stop the operation if there is any abnormality.
Otherwise, device damage, injury, fire, an electric shock and burn may occur.
- Refer to “10. Troubleshooting,” etc. for the diagnosis when an abnormality occurred and do not operate the motor until the causes of the error are found and corrective actions are taken.

8. Standards

■ Gearmotor Safety Standards

Country Name	U.S.A.	Canada	Europe (EU)	China
No. of Phases	3-phase	3-phase	3-phase	3-phase
Standards	UL	CSA	EN	GB
Standards No.	UL1004-1	CSA C22.2 No.100	EN60034-1 EN60034-5	GB/T12350-2022
UL File No.	PRGY2. E172621	PRGY8. E172621		

■ Low Voltage 3-phase Induction Motor Efficiency Regulation Support Status

Country Name		U.S.A.	Canada	Europe (EU)		China	Korea
Law		EISA	EEAct	COMMISSION REGULATION		电动机能效限定值及能效等级	Energy Consumption Efficiency Class Display System
Standards		NEMA MG1-12-12	CSA C390	IEC60034-30-1		GB18613-2020	KS C 4202
Support Details	Capacity Range	0.75kW/1HP to 2.2 kW/3HP	0.75 kW/1HP to 2.2 kW/3HP	0.2kW to 0.4kW	0.75kW to 2.2kW	0.75kW to 2.2 kW	0.75kW to 2.2 kW
	No. of Poles	4	4	4	4	4	4
	Efficiency Class	IE3	IE3	IE2	IE3	Class 3	IE3

- Support details are applicable to gearmotor efficiency regulations.
- The contents above are subject to change without a prior notification in accordance with change of standards, etc.
- Clutch/brake gearmotors are not supported.

■ Efficiency values for High-Efficiency Gearmotor for Europe

Rated efficiency value under 50Hz and under 75 % and 50 % rated load.

*Please refer to the product name plate for the rated efficiency at 100% load.

(Efficiency : %)						
Efficiency Class	Motor power	Voltage codes	Voltage	Frequency	Load factor	
					50%	75%
IE2	0.2kW	N	200V	50Hz	64.1	68.2
		W	380V	50Hz	64.9	68.8
			400V	50Hz	63.7	68.2
		C D	220V	50Hz	66.1	70.2
			230V	50Hz	64.5	69.4
			380V	50Hz	64.9	68.8
		A	400V	50Hz	64.1	68.7
			415V	50Hz	64.9	67.9
	0.4kW	E	440V	50Hz	63.3	67.3
		N	200V	50Hz	72.7	75.0
		W	380V	50Hz	74.3	75.4
			400V	50Hz	74.4	75.4

(Efficiency : %)

Efficiency Class	Motor power	Voltage codes	Voltage	Frequency	Load factor	
					50%	75%
IE2	0.4kW	C D	220V	50Hz	73.6	74.9
			230V	50Hz	72.2	74.8
			380V	50Hz	74.3	75.4
		A E	400V	50Hz	70.1	73.3
			415V	50Hz	72.6	74.5
			440V	50Hz	69.4	73.1
IE3	0.75kW	N W	200V	50Hz	81.9	84.7
			380V	50Hz	83.4	85.1
			400V	50Hz	82.4	84.7
		C	220V	50Hz	84.3	86.1
			230V	50Hz	83.1	85.7
			380V	50Hz	83.7	85.6
		D	220V	50Hz	82.2	84.6
			380V	50Hz	82.3	84.7
		U	400V	50Hz	82.0	84.5
		E	415V	50Hz	83.9	85.3
			440V	50Hz	82.9	85.0
	1.5kW	N W	200V	50Hz	81.6	84.2
			380V	50Hz	82.6	84.5
			400V	50Hz	81.0	83.9
		C	220V	50Hz	81.9	84.4
			230V	50Hz	81.0	83.8
			380V	50Hz	82.3	84.6
		U	400V	50Hz	80.6	83.4
		E	415V	50Hz	82.1	84.5
			440V	50Hz	80.1	83.5
	2.2kW	N W	200V	50Hz	85.5	87.9
			380V	50Hz	89.6	89.9
			400V	50Hz	89.4	90.1
		C	220V	50Hz	87.9	89.1
			230V	50Hz	87.4	89.0
			380V	50Hz	89.6	89.9
		U	400V	50Hz	88.6	89.9
		E	415V	50Hz	87.0	88.9
			440V	50Hz	85.9	88.4

Target law : COMMISSION REGULATION (EU) 2019/1781

■ By Country (Area)


1. U.S.A.

● Safety Standards

<Target Standards and UL File>

No. of Phases	Target Standards	UL File No.	Capacity	Support Details [power/standards] ^(※)						
				NN	WN	KN	CN	AN	EN	MA
				DN				UN		RA
3-phase	UL1004-1 (Standard for Rotating Electrical Machines – General Requirements)	PRGY2. E172621	0.1kW to 0.4kW							
			0.75kW to 2.2kW							



● High-efficiency Regulation

No. of Phases	Target Standards	UL File No.	Capacity	Support Details [power/standards] (※)						
				NN	WN	KN	CN		EN	MA
				DN				UN		RA
3-phase	NEMA MG1-12-12	ZWKG. E172621	0.75kW to 2.2kW	 CC303B						


2. Canada

● Safety Standards

<Target Standards and UL File>


No. of Phases	Target Standards	UL File No.	Capacity	Support Details [power/standards] (※)						
				NN	WN	KN	CN	AN	EN	MA
				DN				UN		RA
3-phase	C22.2 No.100 (Motors and Gearmotors)	PRGY8. E172621	0.1kW to 0.4kW							
			0.75kW to 2.2kW							

● High-efficiency Regulation


No. of Phases	Target Standards	UL File No.	Capacity	Support Details [power/standards] (※)						
				NN	WN	KN	CN		EN	MA
				DN				UN		RA
3-phase	CSA C390	ZYKH. E172621	0.75kW to 2.2kW							

3. Europe

● Safety Standards


No. of Phases	EU Directive	Target Standards	Capacity	Support Details [power/standards] (※)						
				NN	WN	KN	CN	AN	EN	MA
				DN				UN		RA
3-phase	Low Voltage Directive 2014/35/EU Low Voltage Directive	EN60034-1: Rotating Electrical Machine - Part 1: Rating and Characteristics EN60034-5: Rotating Electrical Machine - Part 5: Classification of Protection Ratings with Integrated Type Design for Rotating Electrical Machine (IP Code)	0.1kW to 2.2kW							

● High-efficiency Regulation

No. of Phases	Target Standards	Capacity	Support Details [power/standards] (※)						
			NN	WN	KN	CN	AN	EN	MA
			DN				UN		RA
3-phase	IEC 60034-30-1	0.2kW to 2.2kW							


4. China

● Safety Standards

No. of Phases	Target Standards	Capacity	Support Details [power/standards] (※)						
			NN	WN	KN	CN	AN	EN	MA
			DN				UN		RA
3-phase	GB/T12350-2022 Safety requirements of small power motors	0.1kW to 0.75kW							


Note) Please be careful when using CCC specifications of 0.2 kW and 0.4 kW. They are certified as rated for a short time(S2 rated).

● High-efficiency Regulation

No. of Phases	Target Standards	Capacity	Support Details [power/standards] (※)						
			NN	WN	KN	CN		EN	MA
			DN				UN		RA
3-phase	GB18613-2020 Minimum Allowable Values of Energy Efficiency and Values of Efficiency Grades for Motors	0.75kW to 2.2kW							






















5. Korea










● High-efficiency Regulation

No. of Phases	Target Standards	Capacity	Support Details [power/standards] (※)						
			NN	WN	KN	CN		EN	MA
			DN				UN		RA
3-phase	KS C 4202	0.75kW to 2.2kW							

※) The applicable range for power supply type D is 0.1 to 0.75 kW, the applicable range for A is 0.1 to 0.4 kW, and the applicable range for U/R is 0.75 to 2.2 kW.

9. Inspection and Adjustments

 DANGER	
	 Do not touch rotating bodies (output shafts, etc.) when the gearmotor is being maintained/inspected while it is running. Otherwise, entanglement and injury accidents may occur.
	 Do not remove the internal inspection cover while the gearmotor is running. Otherwise, high-temperature lubricant may disperse causing burns.
	 Be sure to stop rotation of the driving machine/driven machine when checking the tooth surface condition of the stopped gear. Otherwise, entanglement to the gear engagement part and injury accidents may occur.
	 Be sure to stop rotation of the driving machine/driven machine and wait for that inside of the product to sufficiently cool down to inspecting the inside of the product while ventilating the inside well. Furthermore, please allocate a third personnel to constantly check for safety while the inspection is conducted by the inspector. In addition, the inspector shall confirm that the inside of the product is sufficiently lubricated, and that all safety measures are properly implemented. Otherwise, accidents with injury may occur.
	 Do not operate the product while the safety cover, etc. is removed for inspection. Otherwise, entanglement and injury may occur.
	 Do not operate the product while the brake is manually released via the manual release lever. Otherwise, an out-of-control accident may occur.
	 Never energize the gearmotor when the brake gap is inspected/adjusted. Otherwise, an electric shock, injury and device damage may occur.
	 Do not operate the product with the fan cover (brake cover) removed after the brake gap inspection/adjustment. Otherwise, entanglement and injury may occur.
	 Turn ON and OFF the power to check the brake operation before operating the motor after the inspection/adjustment of brake gap. Otherwise, an out-of-control accident may occur.
	 If the motor is used for lifting, do not release the brake while a load is lifted. Otherwise, a drop accident may occur.

 CAUTION	
	 Do not touch the terminal when the insulation resistance is measured. Otherwise, an electric shock may occur.
	 Do not touch the gearmotor surface with your bare hand. The surface may become very hot, which may cause burns.
	 Execute diagnosis based on the instruction manual in case of abnormalities. Never operate a motor until you properly identify and resolve any abnormalities.
	 Be sure that repair/disassembly/assembly is done by an authorized expert. Otherwise, an electric shock, injury, fire, etc. may occur.

Note) If you need parts replaced (grease / oil seal/ O-ring, etc) for maintenance/inspection purposes, please contact your nearest service office (described on the final page of the instruction manual). Please note that defects caused by the replacing of parts by a customer are not covered by our warranty.

■ Grease/Oil Seal/O-Ring

- All the models that we offer use a grease lubrication system; they do not need grease replacement/replenishment.
- The product is designed for 10,000 hours of operation.
- The service life of oil seals may vary depending on the conditions of use, and replacements may be required even before the 10,000 hours of usage. Please note that the replacement must be performed at our factory.
- Though the oil seals etc. should prevent grease and oil leakage, we highly recommend that you apply protection such as oil pans in case of unexpected events.
Oil leakage may cause your product failure. (There are risks of grease and oil leakage during a product failure or at the product's life-end.)

■Daily Inspection

To be performed every 2 to 3 days.

Inspection item	Method	Inspection Details
Load Current	Ammeter	Within the rated current described on the nameplate.
Noise	Auditory Observation	No abnormal sound (Rattling sound, periodic sound). No increase from the normal level *Apply a listening rod to the bearing part to check abnormal sound.
Vibration	By touch	No abnormal vibration of the gear case and motor frame. No increase from the normal level
Surface Temperature	Thermometer	No rapid increase or decrease of normal temperature.
Grease Leakage	Visual Observation	No leakage from the joint part of the case, oil seal, bracket, etc.

■Regular Inspection

Based on 8 hours/day operation.

Inspection item	Inspection frequency	Inspection Details
Mounting Bolt	Every 6 months	Check the looseness with a spanner. Tighten it if it is loose.
Chain and V-belt	Every 6 months	Check the tension. Adjust if too loose or too tense.
Motor Insulation Resistance	Every 6 months	Measure with an insulation resistance tester. Resistance must be 1 MΩ or higher under 500V.
Gap Amount (Brake)	Annually or every 1 to 1.5 million times of brake usage	Check whether it is within the appropriate gap range. For inspection and adjustment methods, please refer to the adjustment method in the next page.

*Refer to “10. Troubleshooting” and execute measures/treatments if errors are recognized with the inspection.

■Brake Specifications

Standard Type (Brake model: B2, B4, J2, J4)

Capacity [kW]	Brake power supply AC voltage [V]	Brake power supply DC voltage [V]	Braking torque [N·m]	Gap [mm]			Recommended tightening torque [N·m]	Screw size
				Initial	Limitation	Adjustable		
0.1	200 (400)	90 (180)	1.0	0.05 to 0.25	0.4	0.3	2.1 to 2.3	M4
0.2			1.96	0.05 to 0.25	0.4	0.3	2.1 to 2.3	M4
0.4			3.92	0.05 to 0.25	0.4	0.35	2.1 to 2.3	M4
0.75			7.35	0.05 to 0.25	0.45	0.4	2.1 to 2.3	M4
1.5			14.7	0.05 to 0.25	0.55	0.5	6.9 to 7.6	M6
2.2			21.6	0.05 to 0.35	0.55	0.5	6.9 to 7.6	M6

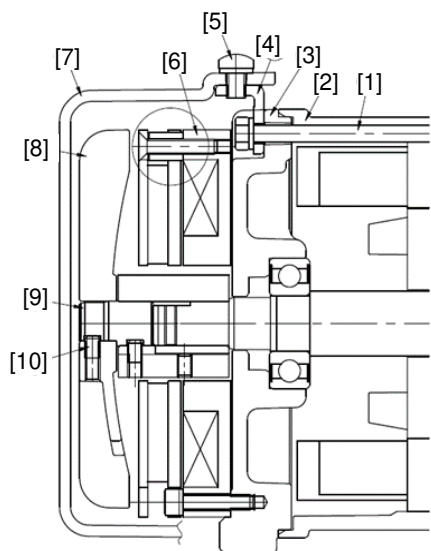
Water-resistant Type IP65 (Brake model: V2, V4)

Capacity [kW]	Brake power supply AC voltage [V]	Brake power supply DC voltage [V]	Braking torque [N·m]	Gap [mm]			Recommended tightening torque [N·m]	Screw size
				Initial	Limitation	Adjustable		
0.1	200 (400)	90 (180)	1.0	0.05 to 0.15	0.45	0.4	2.1 to 2.3	M4
0.2			1.96	0.05 to 0.15	0.45	0.4	2.1 to 2.3	M4
0.4			3.92	0.05 to 0.15	0.45	0.4	2.1 to 2.3	M4
0.75			7.35	0.05 to 0.15	0.5	0.4	2.1 to 2.3	M4

- Due to the structure of the brake, the lining may make an abrasive noise during motor operation, however, this does not affect the performance of the brake.
- Due to the structure of the brake, operating the motor via an inverter may increase the noise level coming from the brake part.
This however, does not affect the performance of the brake.

■ Brake Structure

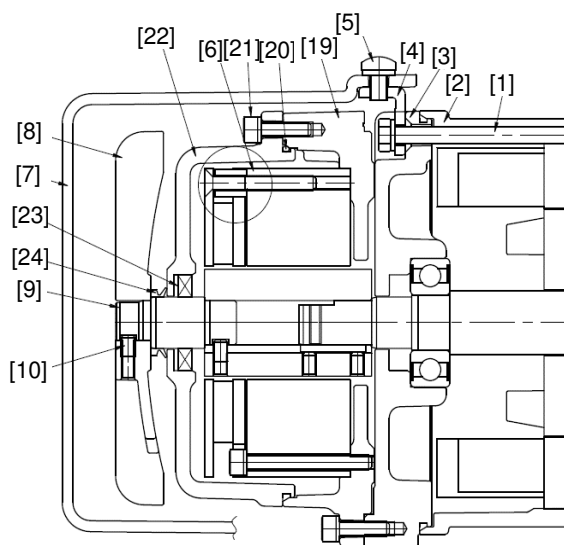
Standard Type (Brake model: B2, B4, J2, J4)



[1]	Through bolt
[2]	Motor frame
[3]	Bracket
[4]	Stay
[5]	Fan cover fixing screw
[6]	Brake
[7]	Fan cover
[8]	Fan
[9]	Relay shaft
[10]	Fan fixing screw
[11]	Magnet ASSY
[12]	Collar
[13]	Shim
[14]	Plate screw
[15]	Plate
[16]	Disk
[17]	Armature
[18]	Gap

※ 0.1kW has no fans as they are Totally Enclosed Non-ventilated type.

Water-resistant Type IP65 (Brake model: V2, V4)



[1]	Through bolt
[2]	Motor frame
[3]	Bracket
[4]	Stay
[5]	Fan cover fixing screw
[6]	Brake
[7]	Fan cover
[8]	Fan
[9]	Relay shaft
[10]	Fan fixing screw
[11]	Magnet ASSY
[12]	Collar
[13]	Shim
[14]	Plate screw
[15]	Plate
[16]	Disk
[17]	Armature
[18]	Gap
[19]	Spacer
[20]	O-Ring
[21]	Cover fixing bolt
[22]	Brake cover
[23]	Oil seal
[24]	V-Ring

※ 0.1kW Water-resistant type has no fan cover, fan, and V-Ring as they are Totally Enclosed Non-ventilated type.

■ How to Inspect Brake Gap

(1) Loosen Fan cover fixing screw [5] and remove Fan cover [7].

For water-resistant models, loosen Fan fixing screw [10] and remove Fan [8] and V-Ring [24].

Then, loosen Cover fixing bolt [21] and remove Brake cover [22].

※ Be sure the Oil seal [23] does not get damaged as it may lose water-resistant ability.

(2) Check the Gap [18] between Magnet ASSY [11] and Armature [17] is equal to or less than the limitation gap with a clearance gauge, etc.

Note) Be sure to turn off the power before adjustment.

■How to Adjust Brake Gap

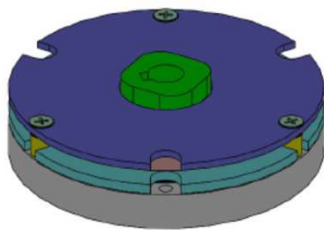
If the disk is worn out after long term usage and the Gap [18] between Magnet ASSY [11] and Armature [17] exceeds the gap limitation value described in the brake specifications, malfunctions of the brake may occur. Please Adjust the brake gap as follows.

Even though the gap is not exceeded the limitation gap, the brake gap can be adjusted if it is more than the adjustable gap.

The brake gap adjustment can only be done once.

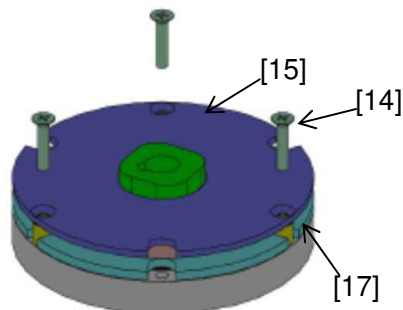
Note) If the gap is below of that of the adjustable gap, do not attempt to adjust the gap. This may result in malfunction

<Gap adjustment procedure>



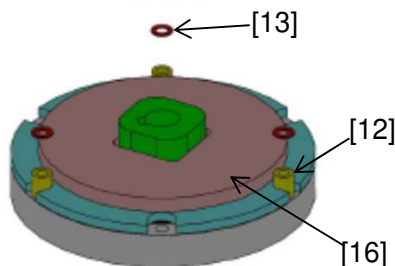
•For standard type brake

- (1) Loosen Fan cover fixing screw [5] and remove Fan cover [7].
- (2) Check that the brake gap is equal to or more than the adjustable gap of <■Brake Specifications> under no energization state.
- (3) Loosen Fan fixing screw [10] and remove Fan [8] .
* The brake for 0.1 kW has no fan.



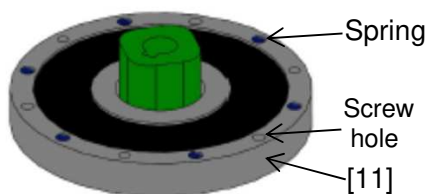
•For water-resistant type brake

- (1) Loosen Fan cover fixing screw [5] and remove Fan cover [7].
Then, loosen Fan fixing screw [10] and remove Fan [8] and V-Ring [24].
※ 0.1kW has no fan cover, fan, and v-ring.
- (2) Loosen Cover fixing bolt [21] remove Brake cover [22].
※ Be sure the oil seal does not get damaged as it may lose water-resistant ability.
- (3) Check that the brake gap is equal to or more than the adjustable gap of <■Brake Specifications> under no energization state.



•Common procedure

- (4) Remove any wear debris with an air gun.
* The gap is the space between Magnet ASSY [11] and Armature [17] under no power
- (5) Remove Plate screw [14] .
- (6) Clean attachments on the screw part.
* If the screw has a scratch, etc. , please replace it with a new one.
- (7) Remove Plate [15] .
* Pay attention so that friction surfaces of parts are not made dirty.
* Check that friction surfaces have no scratch or other abnormalities.
- (8) Pull out all Shims [13] .
- (9) Remove Collar [12] and Armature [17] and clean the wear debris attached to Magnet ASSY [11] with an air gun.
* Be cautious not to lose the spring.
- (10) Clean the screw hole of Magnet ASSY [11] with an air gun.
* Check the passing state of the screw after cleaning.
- (11) Apply adhesive on the screw to prevent looseness to the screw hole.
(Recommended adhesive: Loctite 243 by Henkel)
- (12) Put all parts except for the shims back to the original positions and tighten Plate screw [14] .
* Refer to the <■Brake Specifications> for the tightening torque.
- (13) Check that Brake gap [18] is within the initial gap value on the <■Brake Specifications> table.
- (14) Check the operations of the brake (Brake release/brake actuation).



■ Brake Replacement Work

The brake gap adjustment can only be done once.

If the gap between the magnet ASSY and the armature exceeds the limitation gap described on the <■ Brake Specifications> table due to the disk wear after the gap adjustment, the brake must be replaced. Please contact your nearest service office.

* For the brake replacement procedure, please check the replacement instruction which comes with the new brake package. However, please note that defects caused by the customer replacing their own brake are not covered by our warranty.

■ Brake Gap Adjustment for Gearmotor with Clutch/Brake

Gap adjustment for the clutch and brake are not required as unique auto-gap mechanism is built into our clutch and brake gearmotors.

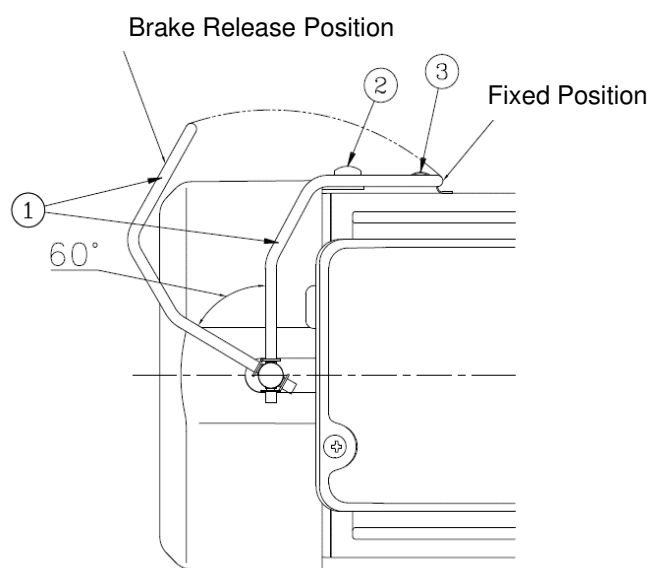
■ How to Use Manual Release Brake

- (1) Turn the manual release lever attached to the lever fixing metal fitting at the upper part of the fan cover backward of the motor for 60° to release the brake.

*Do not exceed 90° for releasing.

*Turn the manual release lever while holding the lever fixing metal fitting. Failure to follow this instruction may result in unexpected injury.

- (2) Be sure to return the lever to its original position (fixing position) after the manual release work is completed.



- ① Manual Release Lever
- ② Screw for Fixing Metal Fitting
- ③ Lever fixing Metal Fitting

■ Precautions on Use of Manual Release Brake

- Operate the manual release lever by hand.
- Do not carry the gearmotor by holding the manual release lever. This may cause the lever to come off and result in you dropping the motor.

■ Warning Label

“Warning labels” with handling precautions for the brake manual release device is attached to a gearmotor with a brake manual release device.

If the “Warning label” is peeled off or became unable to read, please immediately contact our nearest service office.

10. Troubleshooting

■ Gearmotor Troubleshooting

Failure detail	Cause	Measures
The motor does not run under no load.	Power failure	Check the power supply. / Contact the power company.
	Defective connection line	Inspect the circuit/wiring parts.
	Defective contact of the short circuit plate	Inspect the circuit/wiring parts.
	Defective contact of the switch	Repair or replace it.
	Disconnection of the stator winding	Repair it at our factory.
	1-phase power voltage supplied to 3-phase motor	Check the terminal voltage.
	Broken gear/shaft/bearing	Repair it at our factory.
The motor does not turn when a load is applied.	Voltage drop	Check the wiring length.
	Worn gear	Repair it at our factory.
	Overload operation	Lower the load.
The motor generates abnormal heat.	Overload operation	Lower the load.
	Frequent startup/stop	Lower the frequency.
	Damaged bearing	Repair it at our factory.
	Too high/low voltage	Check the voltage.
The sound is high.	Continuous sound - Damaged bearing/worn gear	Repair it at our factory.
	Intermittent sound - Scratch of the gear or foreign substance mixture	Repair it at our factory.
The vibration is large.	Worn gear	Repair it at our factory.
	Defective installation/loose bolt	Tighten it.
Grease leaks.	Loose fastening part	Tighten it.
	Damaged oil seal	Repair it at our factory.

■ Gearmotor with Brake Troubleshooting

Failure detail	Cause	Measures
The brake does not work.	Wrong connection	Check the connection.
	Defective switch	Replace/repair it.
The braking time is long.	Oil/dust, etc. attached to the friction plate	Clean it or repair it at our factory.
	Life time of the friction plate	Replace it or repair it at our factory.
	Large load inertia moment	Lower the load.
	AC switching connection	Change it to DC switching.
The motor does not rotate. (The speed is not increasing.) The motor generates abnormal heat. The thermal relay operates. The brake sound is large.	Wrong brake connection	Check the connection.
	Large brake gap	Adjust the gap.
	Defective rectifier	Replace it.
	Brake coil disconnection or short circuit	Replace it or repair it at our factory.
The motor generates abnormal heat.	Defective contact of the switch	Replace/repair it.
	Frequent braking	Lower the frequency.
	Large load torque/inertia moment	Lower the load.

■ Gearmotor with Clutch and Brake Troubleshooting

Failure detail	Cause	Measures
The clutch and brake do not work.	Wrong connection	Check the connection.
	Defective rectifier	Replace it.
	Clutch/brake coil disconnection or short circuit	Repair it at our factory.
	Defective switch	Replace/repair it.
The start-up is not good. The brake does not work well.	Oil/dust, etc. attached to the friction plate	Clean it or repair it at our factory.
	Life of the friction plate	Replace/repair it.
	Large load torque/inertia moment	Lower the load.

■ Replacement Parts

For inquiries regarding supply of brake-related parts, please contact our nearest service office described on the last page of the instruction manual.

However, defects caused by the replacement of the parts by a customer are not covered by our warranty.

11. Disposal

CAUTION



When disposing of the product, dispose of it as a general industrial waste. Please follow local laws and regulations if any apply and take care of the waste accordingly.

12. Storage

1. Storage Place

- (1) When the product is stored for six months or longer, it shall be stored in a place indoors, with good ventilation, dried place, without direct sunlight, temperature change, humidity, dust, and/or corrosive gas.
- (2) Do not directly place the product on the ground when it is stored.
- (3) If there is a micro vibration, the bearing may be damaged by fretting corrosion even when the product is stored. Please store the product in a place without vibration.

2. Operation During Storage

- (1) To prevent the bearings from getting rusty, operate the motor for every six months to check if the motor rotates smoothly and there is no abnormal sound.
- (2) Measure the insulation resistance with an insulation resistance tester with 500V measuring voltage to check if it is 1 MΩ or higher.
- (3) Apply rust prevention to the output shaft and the flange side and other uncoated processed surfaces for every six months.

3. Use After Storage

- (1) Check that there is no abnormal sound, vibration, heat generation and other abnormalities on initial operation.
- (2) For gearmotors with a brake, check that the brake operates properly.
If any abnormality is found, please immediately contact our nearest service office.

13. Warranty

1. Warranty Period

18 months from the factory shipment date or 12 months after installation; whichever comes first.

2. Warranty Coverage

- (1) The warranty coverage is limited to our production range.
- (2) If a failure that prevents function of the delivered product occurs under the conditions with normal installation/connection and handling (inspection/maintenance) described in this instruction manual during the warranty period, the product will be repaired without any additional cost.
However, NISSEI CORPORATION will not be liable for any costs for removing or installing our products from the user's device for replacement or repair, costs for transportation for repairs, and/or indirect damages.

3. Warranty Exclusions

- (1) Repair, part replacement or delivery of alternative products caused by product wear of disassembling and remodeling by customers.
- (2) When the product is operated under conditions that are outside of the rated data described in our catalog/instruction manual or specifications mutually agreed
- (3) When there is a defect(centering of coupling etc.) in the power transmission part with the customer's device.
- (4) When inevitable accidents such as extraordinary natural disaster (Example: Earthquake, lightning, fire and flooding) or artificial malfunction is a cause of a failure.
- (5) Secondary failure caused by defects of customer's equipment.
- (6) Failure due to a part supplied by the customer or designated parts, drive units(Example: motor, servo motor, hydraulic unit, etc)
- (7) When storage, maintenance management of the delivered product is not performed properly and handling is not carried out correctly.
(Refer to "12. Storage" for descriptions of storage.)
- (8) Failure due to items that cannot be attributed to our manufacturing responsibility other than the above.

Contact Us

■ Inquiries for gearmotors

● Overseas Sales

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NISSEI CORPORATION