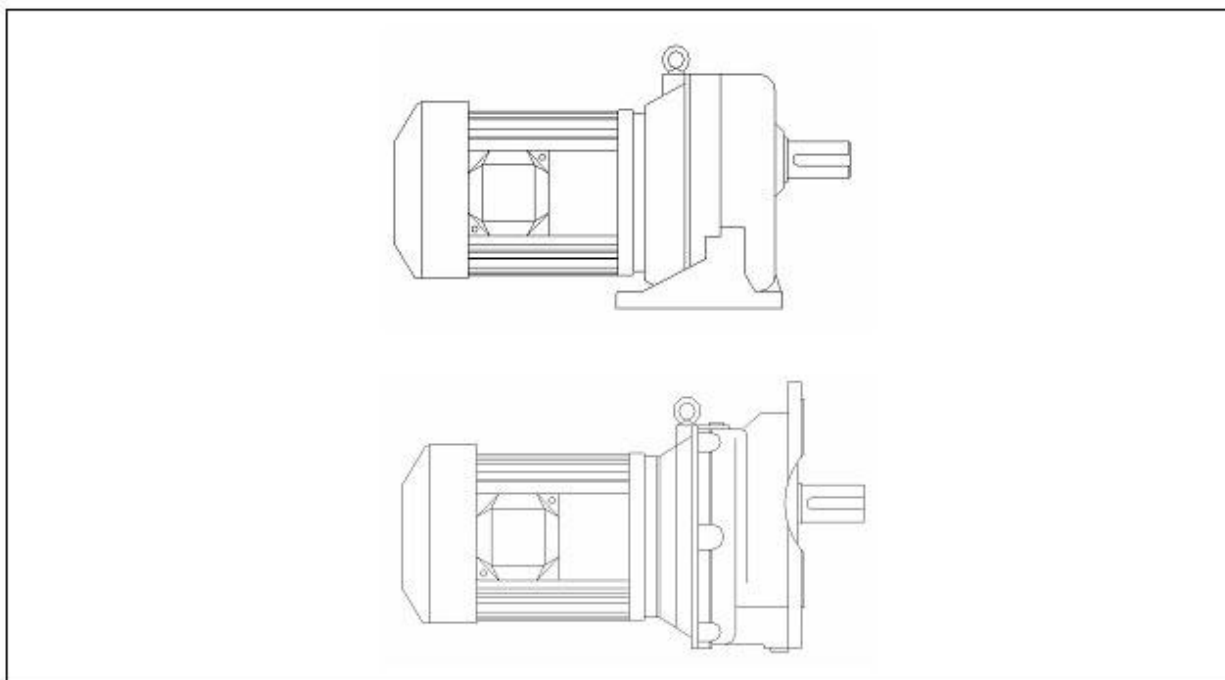




Geared motor

Instruction Manual






For safe operation

- The contents of this Instruction Manual should be carefully read and understood before operating this product.
- The Instruction Manual should be delivered to a person who actually operate this product.
- The Instruction Manual should carefully be kept in a convenient place for the operator.

For Safe Operation

In this Manual, the case of mishandling the equipment, are classified into two categories, "Danger" and "Caution". The definition of the classifications are given with the corresponding graphic symbol.

 Danger	The case that the mishandling of the equipment may result in dangerous situation and may lead to serious or fatal injury to personnel.
 Caution	The case that the mishandling of the equipment may result in dangerous situation and may lead to medium to light injury or the case that may result in damage to the equipment.

Please be aware that even items marked  **Caution** may cause fatal accidents. Therefore, be sure to follow the instructions.

Danger

- Be sure to use an explosion-proof motor where any explosive or flammable gases exist.

Failure to observe this warning may cause explosion, spark, fire, electric shock, physical injury and/or damage to the equipment.

- The operator in charge of transportation, installation, wiring, operation, maintenance, and inspection of the equipment should have enough knowledge and technical skill for the product.

Failure to observe this warning may cause explosion, spark, fire, electric shock, physical injury and/or damage to the equipment.

- Do not repair or wire the equipment with the electric power on. Be sure to cut the power off before getting to work.

Failure to observe this warning may cause electrical shock.

- If the equipment is to be used in system of human transport, be sure to finish it with a protective device for safety.

Failure to observe this warning may cause physical injury and/or damage to the equipment by accidental falling.

- If the equipment is to be used with an elevator, be sure to finish it with a safety device to prevent the elevator from accidental falling.

Failure to observe this warning may cause physical injury and/or damage to the equipment by accidental falling.

- Be sure not to get water or oil/grease into the brake unit.

Failure to observe this warning may cause accidental falling and/or runaway accident by the decreased brake torque.

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Caution

- Do not use gearmotor under conditions other than specified in the name plate or the product specification.

Failure to observe this warning may cause explosion, spark, fire, electric shock, physical injury, and/or damage to the equipment.

- Do not insert your finger or any kind of object into the aperture of the gearmotor.

Failure to observe this warning may cause electrical shock, physical injury, fire and/or damage to equipment.

- Do not use damaged gearmotor.

Failure to observe this warning may cause physical injury and/or fire.

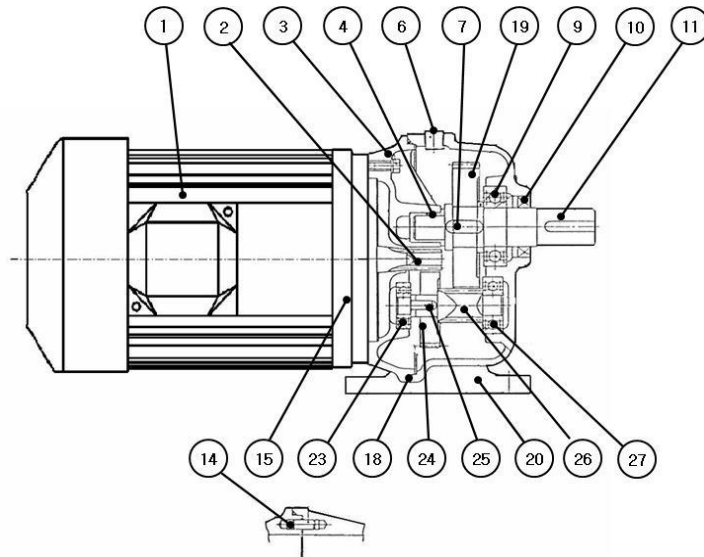
- Do not use damaged gearmotor.

Failure to observe this warning may cause physical injury and/or fire.

- The manufacture will not warrant and will not be responsible for the product modified or repaired by the user himself.

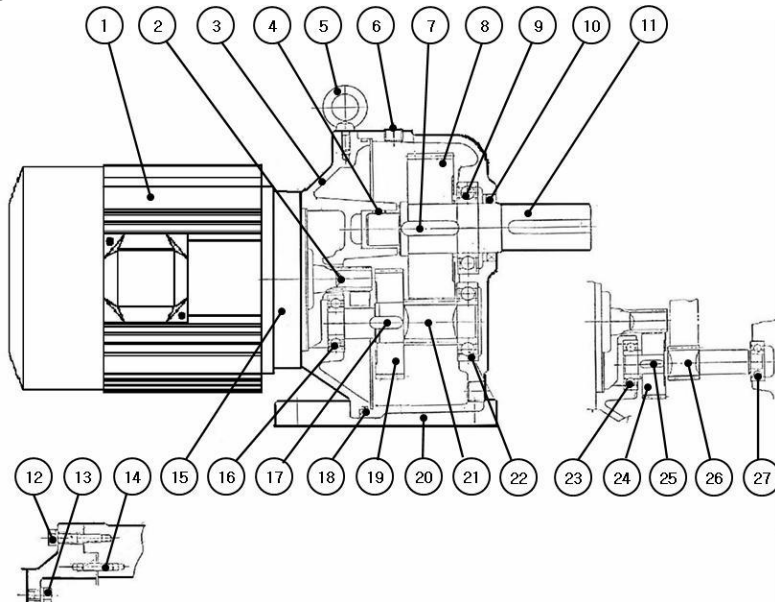
1. Motor Designation

■ 2 Reduction Stage



1	MOTOR	7	Key	13	Bolt	19	2nd gear	25	Key
2	Motor shaft	8	3rd gear	14	Pin	20	Case	26	2nd pinion
3	H-S-RING	9	bearing	15	End bracket	21	Pinion	27	Bearing
4	BEARING	10	Oil seal	16	Bearing	22	Bearing		
5	EYE BOLT	11	Output shaft	17	Key	23	Bearing		
6	Oil inlet plug	12	Bolt	18	O-Ring	24	1st gear		

■ 3 Reduction Stage



2. Check at packing

When unpacking the carton, please check up the following. If you have any problems or questions, please do not hesitate to contact the nearest sales office or agent.

Caution

Check whether the product is same product as you ordered.

Installing wrong equipment may cause physical injury and/or damage to the equipment.

2.1 The ordered product and the contents indicated in the nameplate are correct.

Type, Reduction ratio, Motor capacity, Voltage, Frequency, ect

2.2 No accidental damage to the product during transportation, moisture, dust.

2.3 Screws or nuts are not loose.

2.4 Check the product condition(load, frequency of use, etc.) with connection machine is same as you ordered.

3. Transportation

Danger

When a product is lifted up for transportation, be sure not to enter underneath of the lifted product.

Falling of product may cause serious injury

Caution

Be careful when transporting products to avoid falling down.

When an eyebolt or eyeplate is provided with gearmotor, be sure to confirm if there is any loosening before using it.

After installing gearmotor to the other equipment, do not hoist the entire machine using an eyebolt.

Failure to observe this warning may cause physical injury and/or damage to the equipment.

4. Installation

Proper installation of a product will ensure reliable service and maximum life.

Caution

- Do not place any inflammable object near the gearmotor.

Failure to observe this warning may cause fire.

- Do not place any object which may interfere with the ventilation around the gearmotor.

Failure to observe this warning may cause abnormal overheating caused by the block of cool air, which may cause burn injury and/or fire.

- Do not step up on a gearmotor or hang on it.

Failure to observe this warning may cause physical injury.

- Do not touch the edge of gearmotor or key groove in the bore with wet hand.

Failure to observe this warning may cause physical injury.

- In equipments like food machines, which must avoid oil, furnish with protective device like oil pan, in order to protect from the oil leakage caused by failure or life of the manufactured product.

Leaking oil may cause defective product.

- Vibrations that come out from the installation surface of gearmotor or from other source should be minimized to under 0.5G.

4.1 Proper location for installation

Ambient Temperature : -10°C ~ 40°C

Ambient Humidity : 85% max

Altitude : Sea level to 1,000 m max

Environment : Well ventilated place free from vapor and/or dust,
circumstances where any explosive and flammable gases exist.

Installation Location : Indoors

4.2 Direction of Installation

The product can be installed in any direction.(Due to a grease lubrication system.
No inversion of foreign article to the brake.

4.3 Method for Installation

Fix the product with the four bolts on a flat (Roughness of the surface should be less than 0.2mm) and machine surface free from vibration.

5. Connecting with other equipment

Danger

- When connecting the gearmotor with load, make sure of the alignment of shaft, the tension of the belt and parallelism of pulleys. In direct coupling, be sure to check whether the alignment of shaft is extremely precise.

If the belt is to be used, be sure to adjust its tension properly.

Also, before operation, inspect whether the setting bolts for pulleys and coupling are securely tightened.

Failure to observe this warning may cause serious injury and/or damage to equipment due to broken parts.

- Safe guards should be furnished around rotating part.

Failure to observe this warning may cause serious injury.

Please remove the rust protecting cover on the out put before you operate.

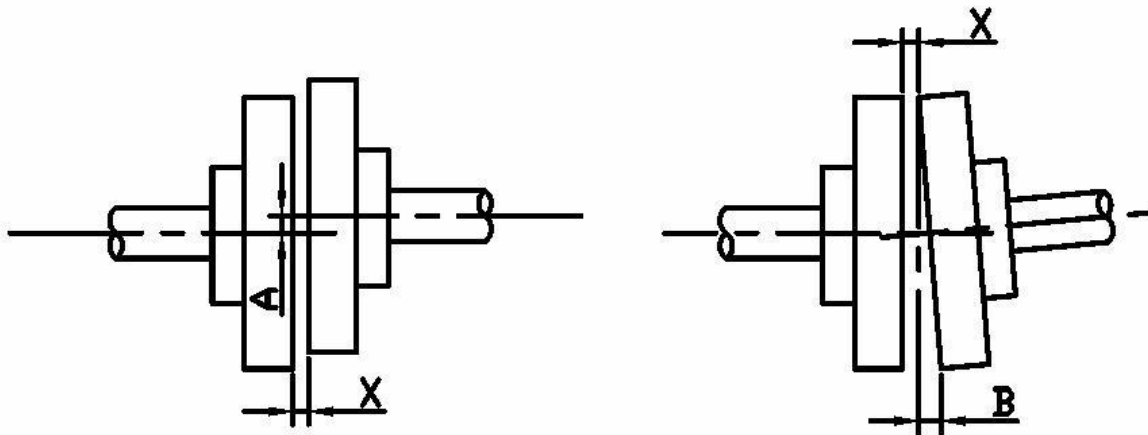
When installing a coupling device(coupling, sprocket, pulley, etc)on the gearmotor the fit should be in the neighborhood of H7.

5.1 Direct Connection

When the machine is used with its shaft coupled together directly, use "flexible coupling" and make sure that both ends are in alignment.

●An example of gear coupling

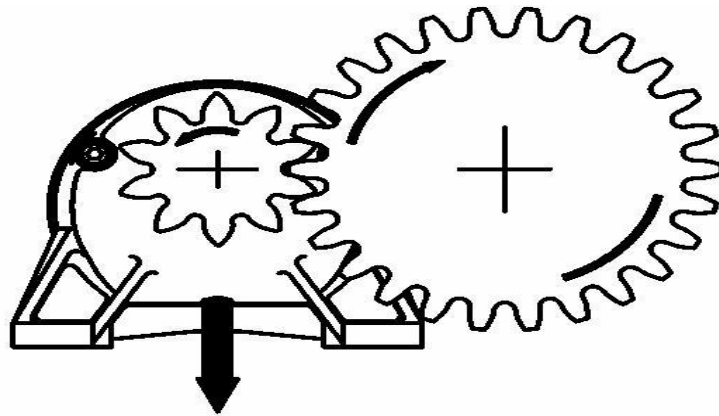
Allowance of Tolerance A	0.05 mm
Allowance of Tolerance B	0.04 mm
Tolerance X	Specified by coupling maker



5.2 Attaching Chains. V-Belts, Gears etc.

- ① In any connection center of the shaft of the reducer and that of the other equipment are parallel.
- ② The tension of the Chains/ V-Belts and the coupling of gear must be perpendicular to the center of shaft.
- ③ When the machine is driven by rearing, gearmotor or reducer should be installed setting up the center distance accurately and avoiding partial bearing of gear, and the output shaft is pushed downward (refer to figure)

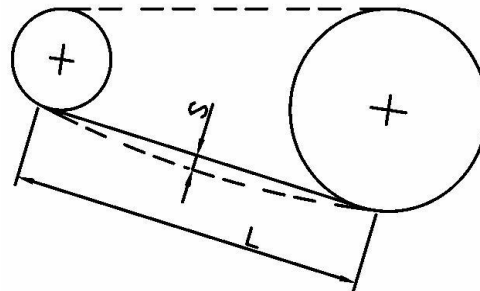
- Example for Gear Drive



④ Diameter of the chain sprocket wheel or gearing that is mounted on the output shaft; the diameter should be 3 times as large as output diameter.

⑤ Tension of V-Belt : Excessive tensioning may result in damage of the bearings of the shaft.

Tension of the chain : Excessive tensioning may result in damage of the bearings of the shaft. If the chain is installed loosely, shock load will occur when the drive shaft starts rotation, and this can result in damage to the reducer and the other equipment. therefore, adjust the tension of the chain properly. (refer to figure)



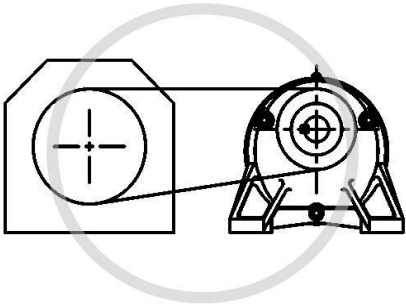
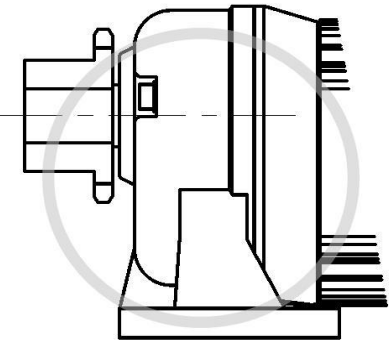
Amount of slack for chains $S=0.02L$

$L = \text{SPAN}$

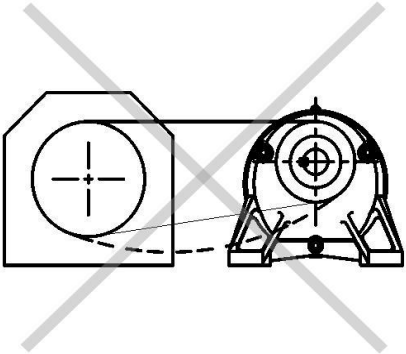
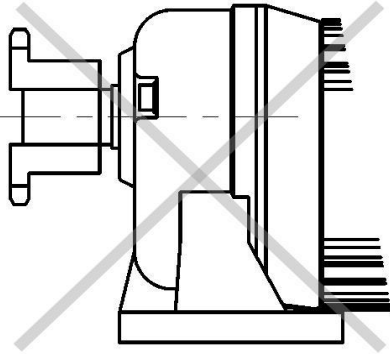
⑥ Point of load application on the output shaft

The gearing or chain sprocket wheel must be mounted so the point of load application is as near as possible to the face of the unit to minimize overhung load.

● **Proper Way of Use.**

	
<p>The tension of the Chains/ V-Belts are properly set.</p>	<p>Pulley and sprocket are properly positioned.</p>

● **Bed Example**

	
<p>The chain is too loose.</p>	<p>The point of load is not near to the gearmotor.</p>

⑦ When load is applied on the output shaft(over hung load), please make sure that it is within the limit of allowable value.(Refer to Catalogue)

6. Direction of Rotation

Caution

Before coupling with other machine, be sure to check the direction of rotation.
Operation in wrong direction may cause serious injury and/or damage to the equipment.

The relation between the input shaft and the output shaft are shown below:

0.2 ~ 7.5 kW Capacity

Reduction Ratio 1/5 ~ 1/20(2 Reduction stage) same direction

Reduction Ratio 1/25 ~ 1/200(3 Reduction stage) counter direction

7. Wiring

Danger

●When connecting the machine to the power cable, be sure to follow the Instruction Manual.

Failure to observe this warning may cause electric shock or fire.

(In case of no terminal box, be sure to insulate a wire at the terminal area)

●Do not bend, pull, or tuck down power cables or motor lead wires forcibly.

Failure to observe this warning may cause electric shock.

●Be sure to ground the terminal of the earth wire.

Failure to observe this warning may cause electric shock.

●Be sure to use the electric current source specified in the name plate.

Failure to observe this warning may cause burnout of the motor and/or fire.

Caution

- Do not touch terminals when inspecting the insulation resistants.

Failure to observe this warning may cause electric shock.

- Wiring should be properly made under the specified electrical equipment engineering standard or the safe code.

Failure to observe this warning may cause electric shock, fire or physical injury.

- Our motor is not equipped with protective devices. The electrical equipment engineering standards provide that an overload protection device should be installed in a unit. Other protection devices such as circuit breaker are also recommended to be installed.

Failure to observe this warning may cause damage to the equipment, electric shock, fire or physical injury.

- When rotating gearmotor alone, take off the key attached temporarily to the output shaft.

Failure to observe this warning may cause physical injury.

- Check the direction of the rotation before connecting with the other machine.

Failure to observe this warning may cause damage to the equipment and/or physical injury.

- If drive motor with inverter make be sure to attach a control filter or a reactor to the inverter.

- Voltage drop in the wiring should be kept within 2%.

Excessive length or wiring may cause steep voltage drop and makes the motor disable to start up.

- When reversing a gearmotor be sure to stop rotating and then start reversing.

Failure to observe this warning may cause damage to the equipment.

- For a gearmotor with brake, do not energize continuously to the brake unit during the rest of motor.


The continuous supply may cause burning of brake coil and fire.

- If a gearmotor with brake used for the application such as lift, safety device for falling accident should be employed.

To avoid accidental falling.

7.1 Wiring of Gearmotor

For standard gearmotors, wiring described below are recommended.

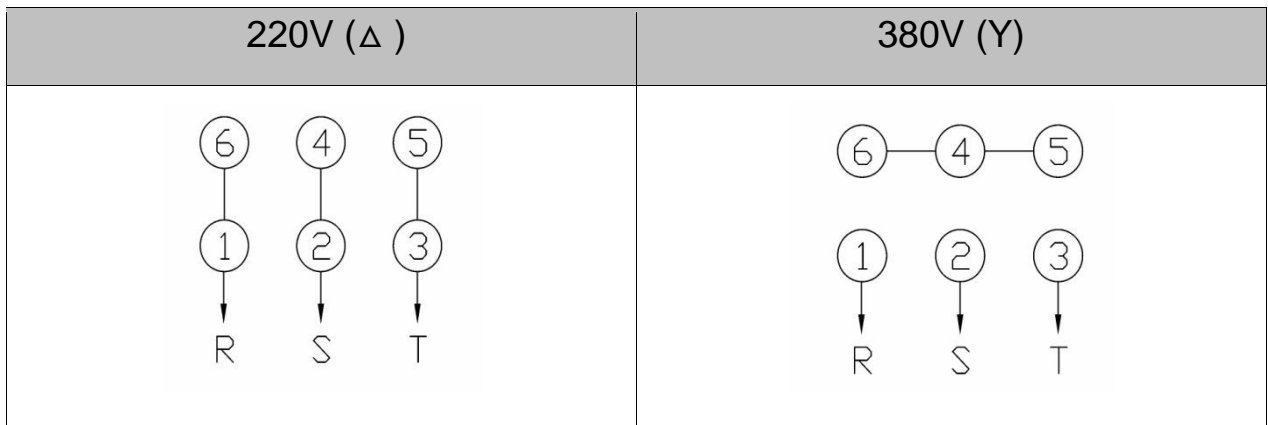
 Wiring of instruction manual is only for our standard product.

If the wiring indicates on the product is different from our instruction manual please contact to nearest sales office or agent.

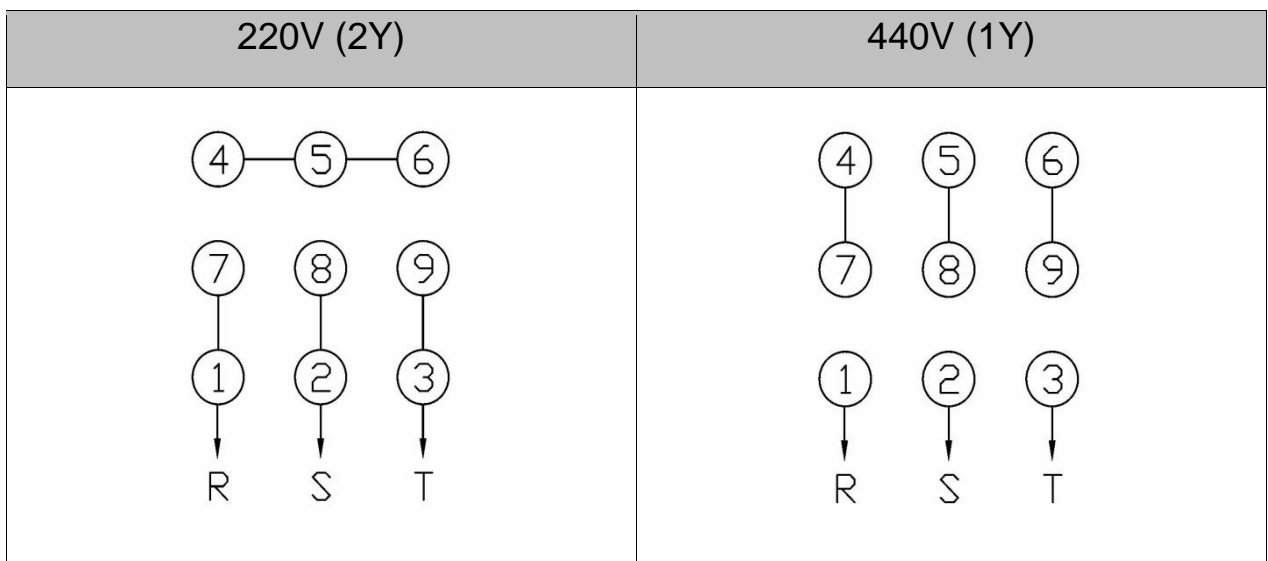
■ 3-phase motor

■ Double Voltage

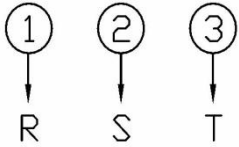
▪ 220V / 380V Wiring



▪ 220V / 440V Wiring



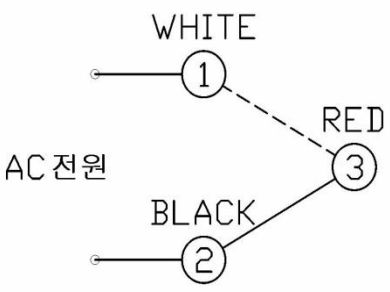
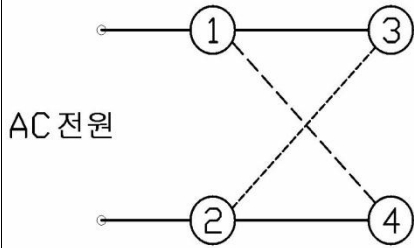
■ Single Voltage

Single Voltage	
	

To reverse rotation, exchange any two of R, S, T connection.

■ Single-phase motor

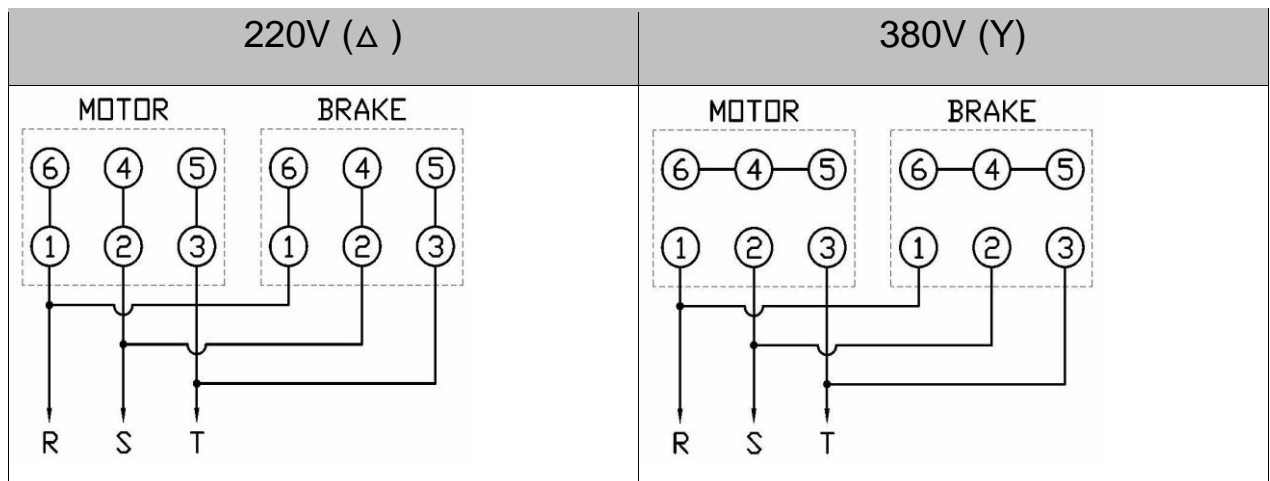
■ Single Voltage

3 Lines	4 Lines
	
<p>To reverse rotation, separate ② from ③ and connect ① with ③ as shown with dotted line.</p>	<p>To reverse rotation, exchange ③ and ④ as shown with dotted line.</p>

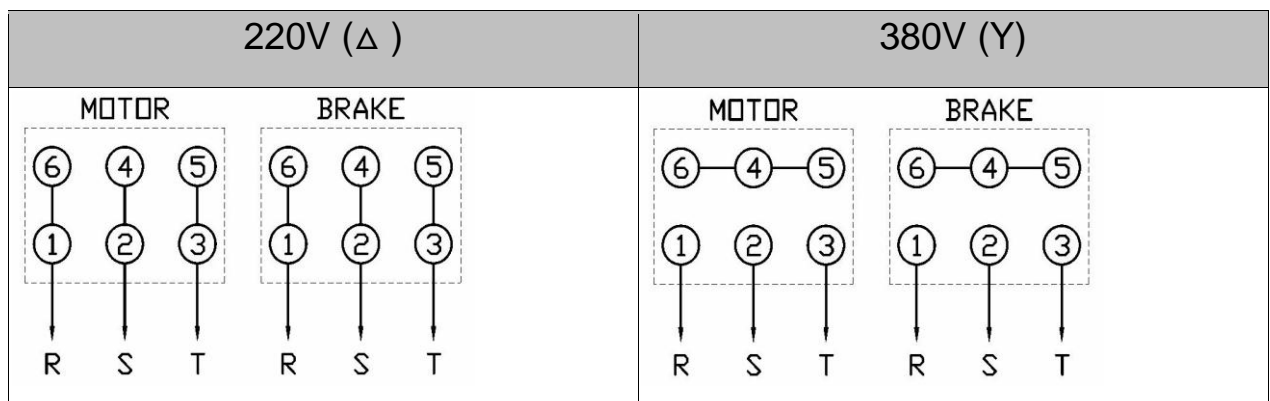
7.2 Wiring for the gearmotor with brake

■3-phase motor

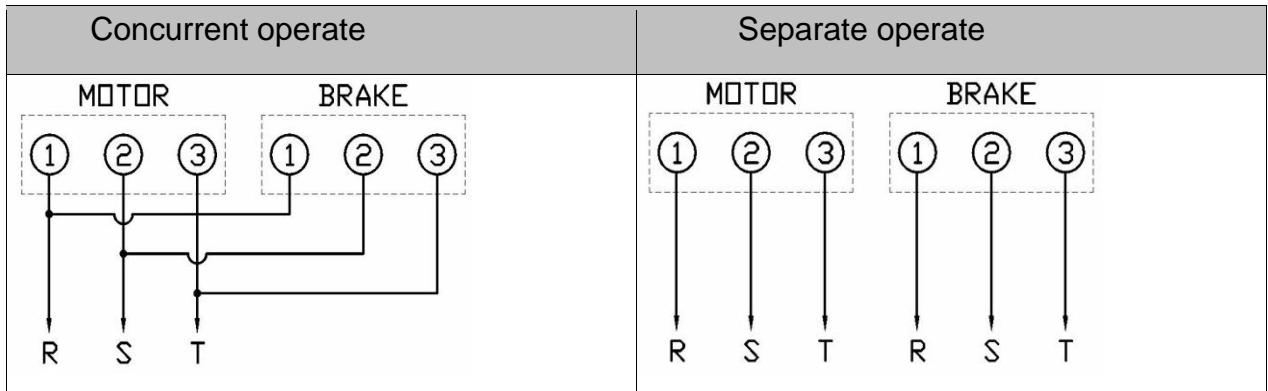
- AC BRAKE motor(B Type)
- 220V / 380V Wiring(Concurrent operate system)



- 220V / 380V Wiring(Separate operate system)

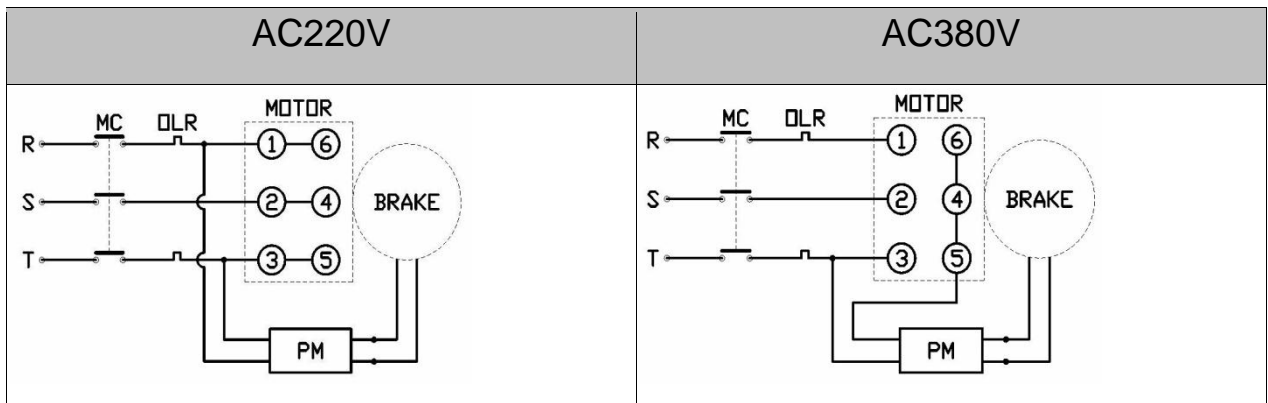


- Single Voltage

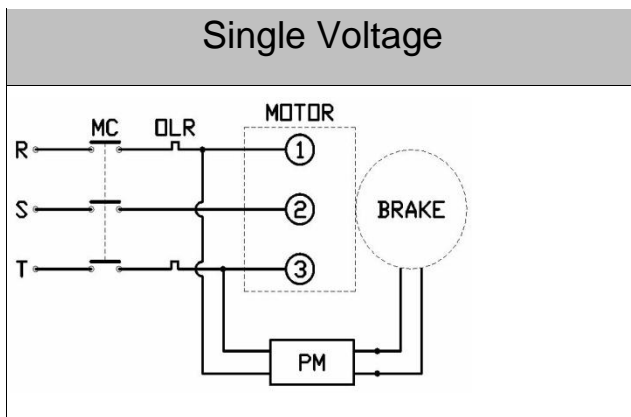


- DC Brake Motor (B Type)

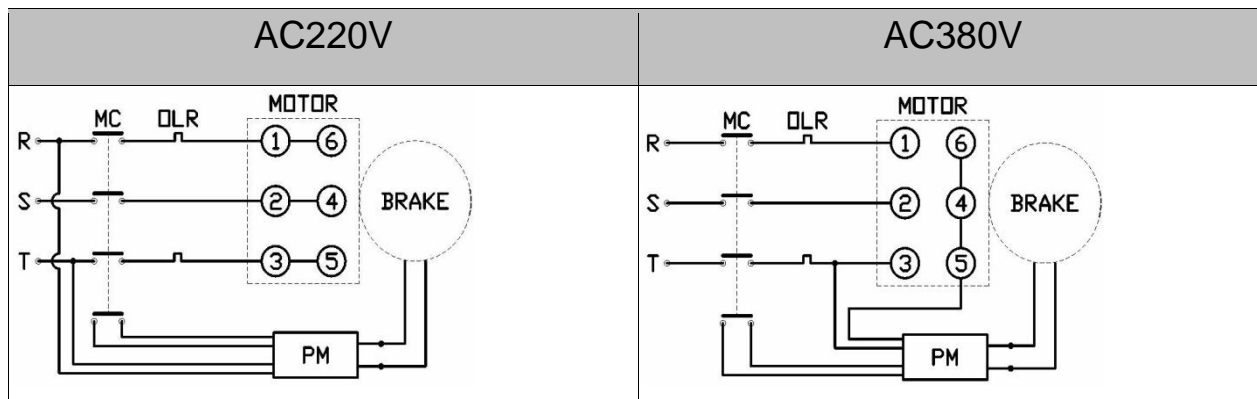
- 220V / 380V Wiring(Concurrent changing system)



- Single Voltage Wiring(Concurrent changing system)



▪220V / 380V Wiring(Separate changing system)



MC : Magnetic Contactor , PM : DC Power Supply, OLR : Over Load Relay

7.3 Cautions in operation with inverter

① Higher temperature rise, noise and vibration than that from the general power source will be observed. Especially, low speed rotation which naturally reduce the fan effect, may cause abnormal rise of temperature.

(More than 80°C at the surface of the motor.)

② In the gearmotor with brake or with clutch/brake, malfunction of the brake may be observed due to the voltage drop. In order to avoid this disadvantage, be sure to bypass the inverter when wiring the brake clutch.

③ It is feasible to use inverter in the single-phase motor.

④ When using inverter in the 400V class motor, consult with Inverter manufacturer concerning the micro surge voltage.

8. Operation

Danger

- Do not operate gearmotor with the terminal box cover opened.
Failure to observe this warning may cause electric shock
- Do not approach or touch rotating parts such as a shaft while the machine is running.
Failure to observe this warning may cause physical injury.
- If power cut occurs, be sure to switch off the power supply of a machine.
Unexpected recovery of electric power service may cause physical injury and/or damage to the equipment.

Caution

- The gearmotor becomes hot during operation, so do not touch.
Failure to observe this warning may cause burn injury.
- When gearmotor is found abnormal, stop running immediately.
Failure to observe this warning may cause electric shock, physical injury and/or fire.
- Do not overload a gearmotor.
Failure to observe this warning may cause damage to the equipment and/or physical injury.
- Do not touch the current applying part of condenser till the current be completely discharged.
Failure to observe this warning may cause electric shock.

Caution

- When a single-phase motor is to be reversed, be sure to start reversing after complete rest of motor.
Direction of rotation may not change and may cause running out of control.

8.1 Check up matter before turning the power switch on:

- 1 Wiring and connection are done properly
- 2 Fuses and thermal relays of proper capacities are used.
- 3 Installations and the connections with other machines are properly done.
- 4 Earth terminal is properly grounded

8.2 Check up matters at test running:

- ① Confirm the direction of rotation for 1~2 seconds after starting the motor with unloaded condition.

When you find the rotation in the opposite direction, change the wiring.

- ② Practice, running-in of the motor unload condition. When no defects is observed, add load gradually and eventually start operation with full load.

8.3 Check up matters during operation:

- ① Confirm that there is no abnormal noise or vibration at all. When such defect are observed, stop operation immediately. Failure to observe this warning may cause damage to the equipment and/or physical injury.
- ② Confirm that the surface temperature of a gear case or motor frame does not exceed 80°C. Do not touch the surface with bare hands. Failure to observe this warning may cause burn injury

9. Inspection and Adjustment

Danger

- When inspecting and/or adjusting the machine while it is in operation, do not touch rotating parts such as shaft.

Failure to observe this warning may cause wind-in to the gear teeth and physical injury.

- When inspecting the gear touch surface, be sure to lock off the drive and driven unit beforehand.

Failure to observe this warning may cause wind-in to the gear teeth and physical injury.

Danger

- While inspecting, be sure staff supporting personnel is outside to watch safety conditions and keep in touch with inspector inside. It can be very slippery with lubricant inside the equipment, do especially pay attention should be needed.

Failure to observe this warning may cause physical injury.

- Do not remove the cover of inspection window while the machine is in operation.

Failure to observe this warning may cause physical injury

(Inspection and Adjustment of the Brake Part)

- Do not operate the equipment while releasing brake by manual releasing lever.

Failure to observe this warning may cause accident by falling down of the equipment or by running out of control.

- Before actual operation of the equipment, make sure the brake is functioning properly by turning the switch on and off.

Failure to observe this warning may cause accident by falling down of the equipment or by running out of control.

- Do not operate the equipment without fan cover after inspection and adjustment of brake gap.

Failure to observe this warning may cause wind-in to the gear teeth and physical injury.

- Do not release the brake while the equipment is being loaded in the application such as lift.

Failure to observe this warning may cause accidental falling.

 **Caution**

- When measuring the insulation resistance, do not touch the terminals.
Failure to observe this warning may cause electrical shock.
- Surface of a gearmotor becomes very hot. Therefore do not touch with bare hands.
Failure to observe this warning may cause burn injury.
- When measuring the insulation resistance of an explosion-proof type motor, confirm that there is no gas, steam, or other explosive substance around.
Failure to observe this warning may cause explosion or ignition.
- When operation is found abnormal, diagnose the fault according to the instruction manual. Do not operate the machine until the causes of fault are found and proper measures are taken.
- Repairing, disassembling and assembling of the equipment should be done by an experienced technician.
Failure to observe this warning may cause electric shock, physical injury, etc.

[Note]

In case of changing grease, oil seal or O-ring for the purpose of maintenance or inspection, be sure to ask nearest sales office or agent. Please be note that we will not be responsible for the defects caused by user's changing.

9.1 Daily Inspection : Items should be inspected every 2~3 days

Inspection Item	Method	Detail of inspection
Load current	Ammeter	Rate of current specified in the name plate?
Noise	Hearing	No abnormal sound?
Vibration	Touching	No abnormal vibration on gear case and motor frame?
Surface Temperature	Thermometer	Should be 80°C max.
Oilseal	Viual check	No lubricant leakage from the joint part such as case, oilseal, bracket, etc.?

9.2 Periodic Inspection (Operation 8 hours a day)

Inspection Item		Interval	Detail of inspection
Fixing Bolt		6months	Check the looseness of the bolt and retight.
Chain and V-Bolt		6months	Check the tension and adjust it to the proper tension.
Insulation resistance of the motor		6months	Should be more than 1MΩ when insulate 500V
Brake	GAP	6months	Check if the gap is within the allowable limited of proper gap. Repair it in the authorized factory.

When the abnormality is found during the daily inspection, take proper measure according to the 「Troubleshooting」 of the instruction manual.

9.3 Caution Label

DSK G/M contains a caution label stick. In the case this labels get slippery or can not be recognize by damage please contact our nearest sales office or agent immediately.

9.4 GREASE·OILSEAL·O-RING

- ① All series are employed with grease lubricant and they are sealed with determined quantity of lubricant when shipping from our factory.

Therefore, machines are available for immediate use.

- ② Replacement or refill of the lubricant is hardly necessary. However, replacing it once in 10.000 hours may help prolong the life of the reducer. For replacement of lubricant, be sure to authorized factory.

- ③ Our machines are protected from grease leakage by oil seal or O-Ring, however, it is recommended to protect the machine by an oil pan for safety sake.

Grease leakage may cause damage to the machine.

(Grease leakage may be observed when machine is in trouble or the machine is at the end of life.)

- ④ The life of an oil seal may vary according to the condition of use.

Therefore replacement may be needed even within 10000 hours use.

For replacement of oil seal, be sure to use authorized factory.

10. Troubleshooting

10.1 Troubleshooting for gearmotor

Trouble		Cause	Troubleshooting
The motor does not rotate without load		Failure of power supply	Check the power source. Contact the power supply company.
		Disconnection of wire	Check the electric circuit and repair the defect.
		Bad contact of switch	Repair or barter
		Open circuit exist	Check the electric circuit and repair the defect.
		Disconnection of stator coil	Measure resistance of winding & insulation, distinguish defect of winding defects of winding. Repair at authorized factory.
		Damage of gear, shaft and bearing	Repair at authorized factory.
		Defect of key of shaft sprocket or pulley	Replace the key
		One of 3-phase circuit is opened and works as single-phase circuit	Check motor terminal voltage, current, breakage of fuse or winding, repair defect.
		Load is too heavy	Lower load to rotated or raise capacity.
		Capacitor connection forgotten (Single-phase motor)	Connect capacitor
		Malfunction of governor switch (Single-phase motor)	Repair at authorized factory.
Motor rotate in no load but trouble occurs on load	Abnormal noise	Inversion of foreign article	Removal of foreign article
		Damage of bearing wear of shaft	Repair at authorized factory
		Damage or wear gear	Repair at authorized factory
	Overload relay acts	Bad setting at improper selection of overload	Revise setting value, or replace to regular one

		relay	
		Overload operation	Reduce the load to rated
	Breakage of fuse or work breaker	Shortage of capacity of fuse or breaker	Investigate and replace or revise setting value
		Overload operation	Reduce the load to rated
	Overheat	Overload operation	Reduce the load to rated
		Overvoltage or lower voltage	Check the voltage and repair
		전압 불평형	Check the wiring of power supply and repair
		Cooling wind passage is blocked	Clean dust and foreign articles of cooling wind passage
		Short circuit of motor winding	Check wiring and repair at authorized factory
	Sudden drop of speed	Voltage drop	Check length of connection and capacity of source and amend them.
		Overload operation	Reduce the load to rated
		Worn of gear caused by leakage of lubricant	Repair at authorized factory
Big vibration		Bad installation	Tighten the bolts and check horizon
		Worn out gear or bearing	Repair at authorized factory
Grease leakage		Loosened bolts, screw, nuts	Tighten the bolts, screw, nuts
		Defect of oil seal	Repair at authorized factory
		Defect of gear case	Repair at authorized factory
		Excessive quantity of grease	Adjust to proper quantity

10.2 Troubleshooting for gearmotor with brake

Trouble	Cause	Troubleshooting
Break does not work	Wrong wiring	Check the wiring
Break function is not enough. Long brake time	Inversion of foreign article or oil are adhered to the friction disk	Remove the foreign article or oil and repair at authorized factory.
	Life of frictional disk	Replace frictional disk or repair at authorized factory.
	Excessive moment of load inertia	Reduce the load
	Capacity of fuse or circuit breaker	Revise setting value or replace to regular one
	AC switching (DC BRAKE)	Change DC switching
Motor does not run. Overheated motor. Thermal relay trips. Abnormal noise of brake.	Wrong brake wiring	Check the wiring
	Large brake gap	Adjust the brake gap
	Disconnection or short of circuit of brake coil	Replace the brake coil, or repair at authorized factory
	Poor contact of switch	Repair and replace the switch
Excessive rise in temperature	High frequency of braking	Reduce the frequency
	Excessive load torque or moment of load inertia	Reduce the load

10.3 Part for replacement

Contact our nearest office, agent or sales office for the replacement brake parts. Please note that we will not warrant any defect caused by improper replacement done by customer.

11. Disposal



For disposal of the gearmotor; lubricant should be disposed as general industrial waste; steel, aluminum and coil could be recycled.

12. Warranty

12.1 Warranty term

The warranty term for the product shall be 1 year after the date of delivery or 2000 hour from the product starting operation.

12.2 Scope of Warranty

- ① The scope of warranty is limited to our manufacture.
- ② In the case that any failures on the product which the product is properly operated under the condition that the product is properly treated, we will provide repair on the product free of charge.
- ③ Free of charge in general, but if the product repair is not possible we will change to new product.

12.3 Exception for Warranty

Warranty shall not be applied to the problems, troubles or damages on the product which are caused by :

- ① improper operation of the product not in conformity with the rated data specified in our catalogue.
- ② customer's improper operation of the product, product delivered which are rendered by customer.
- ③ product modified or repaired by the user himself.
- ④ trouble cause by customer by using not authenticity parts.
- ⑤ disaster (flood, earthquake, fire, etc.)

- ⑥ secondary failure caused by the damage of customers equipment.
- ⑦ losses caused by the parts, driving units which are supplied by customer.
(example : electric motor, servomotor, etc.)
- ⑧ improper storage and maintenance of product, or improper handling of the product.
- ⑨ we are not responsible for the compensation against the loss of shutdown and/or for the damage to the equipment which are not produced by us.

The items stipulated above are premised to apply to the transactions and use in domestic(South Korea). In case of the use in other country, all the conditions are settled by the prior discussion between customer and our Sales Department.

12.4 For unexpected trouble retain spare gearmotors.

12.5 Repair of the product after warranty term are in charge of customer.

And warranty shall not be applied to the problems, troubles or damages on the product cause by not scope of our warranty.

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