

GEARED MOTOR

VX PARALLEL SPEED REDUCER
Series 0.1kW~7.5kW

INSTRUCTION MANUAL

⚠ FOR SAFE USE

The geared motor must be handled by the person who is practiced in the work.

Read and understand the contents explained in this instruction manual thoroughly before use of the product.

Hand over this manual to the person who actually operates the product.

Keep this manual carefully so that everyone can read it any time before use.



FUJII HENSOKUKI CO., LTD.

Head offices

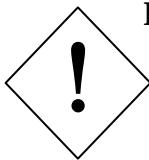
〒500-8448 Nakasu-cho 18, Gifu City, Gifu Pref, Japan

We thank you for your purchase of VX series geared motor.

This instruction manual explains the necessary items for making full use of the capability of the machine and for safe operation.

Before use, please read this instruction manual thoroughly for proper handling.

In this instruction manual, the degree of injury and damage to be estimated when the product is handled improperly are explained by classifying them basically into two ranks, which are [DANGER] and [CAUTION]. The definitions and contents are as follows.



DANGER

The case if handled improperly, dangerous situation may occur and as the result, death or heavy injury of a person is estimated.



CAUTION

The case if handled improperly, dangerous situation may occur and as the result, light injury and medium class breakage or only property breakage are estimated.

However, even items listed in “CAUTION” could cause serious results depending on the status. Anyway, all items listed here state important contents concerning safety. Ensure to observe these items.

C o n t e n t s

1 . GENERAL	P 3
2 . AT RECEPTION OF PRODUCT	P 4
3 . OPERATING ENVIRONMENT	P 5
4 . MOUNTING AND CONNECTION TO MATING MACHINE	P 6
5 . WIRING	P 9
6 . HANDLING OF BRAKE	P 1 4
7 . OPERATION	P 1 7
8 . IN CASE OF THE EXPLOSION - PROOF MOTOR	P 2 0
9 . MAINTENANCE , INSPECTION AND REPAIR	P 2 1
1 0 . CONSTRUCTION DRAWING	P 2 9
1 1 . TYPE NUMBER OF BEARING AND OIL SEAL	P 3 3
1 2 . REQUEST REGARDING INQUIRY	P 3 6

1 . G E N E R A L



DANGER

The works such as carrying, installation, piping, wiring, operation, handling, maintenance and inspection must be performed by the person having expertise and special technique.

If this is not observed, there is a possibility of explosion, ignition, fire, electric shock, injury and breakage of device.

Do not work while the line is hot. Ensure to turn OFF the power source.

There is a possibility of electric shock.



CAUTION

Do not use the geared motor on conditions other than that of written on the nameplate or the manufacturing specification.

If this is not observed, there is a possibility of electric shock, injury or breakage of device.

Do not insert your finger or a thing into the open section of the geared motor . There is a possibility of electric shock, injury, fire or breakage of device.

Do not use a broken geared motor. There is a possibility of injury and fire.

Do not remove the nameplate.

If the product is modified by the customer, the modified product is outside of our guarantee and we can not bear any responsibility of the product.

2 . AT RECEPTION OF PRODUCT



DANGER

**When hoisting the geared motor, Never enter under the device.
There is a possibility of personal injury due to fall.**



CAUTION

Confirm the top and bottom of package before opening it. If this is not observed, there is a possibility of injury.

When opening the wooden packing, pay attention to the nails. There is possibility of injury.

Confirm that the actual product is in accord with what you ordered. If wrong product is installed, there is a possibility of injury and breakage of device.

Fall or overturn during carrying is dangerous. Pay sufficient attention. There is a possibility of injury and breakage of device due to fall or overturn.

When carrying the geared motor equipped with the lifting lugs, ensure to use them.

However, avoid lifting the whole machine with the lifting lugs after the geared motor has been mounted on the machine. There is a possibility of injury due to dropping or topping and breakage of equipment caused by breakage of lifting lugs.

Before hosting, confirm the mass of the geared motor by the nameplate, packing box, exterior drawing or catalogue. Prepare the hoisting crane that has sufficient hosting capacity for the mass of the geared motor. There is a possibility of bolt breakage, injury due to fall or overturn and breakage of device.

Confirm whether there is any breakage on the product due to accident during transportation.

Confirm whether there are any loose bolts and nuts.

***If there is any deficiency or question, please contact the dealer or our company.**

3 . OPERATING ENVIRONMENT



DANGER

Do not use the geared motor in the explosive atmosphere. There is a possibility of explosion, ignition, fire, electric shock, injury and breakage of device.

Take care so that oil and the like do not stick on the brake. There is a possibility of fall due to reduction of braking force and runaway accident.



CAUTION

Never put inflammables around the geared motor. There is a possibility of fire.

Do not put obstacles that impede ventilation. Cooling is impeded and there is a possibility of burn and fire due to abnormal heating.

(1) Conditions of installing location

- **The ambient temperature shall be within the range of -15 to +40 .**
- **The ambient humidity shall be 85% and less (No dew condensation is allowed.)**
- **The atmosphere shall be free from corrosive and explosive gases and vapor.**
- **Install at the interior of the house and at the location to allow easy inspection.**

(2) Storage of products

- **When the product is not used immediately but store it temporarily, store it at the location where dust is few, humidity is dry and the ventilation is good.**
- **For storage of longer term, store the product at the location where humidity is dry, dust is few and ventilation is good. In addition, periodically check for abnormality.**
- **Apply preservation oil on the output shaft to prevent rust during storage. When using the stored products, measure the insulation resistance of motor, at the same time, check the operation at no load. Use the product after confirming that there is no abnormality.**

For confirmation work, refer to [9. MAINTENANCE, INSPECTION AND REPAIR], [7. OPERATION] and other relating articles.

4 . MOUNTING AND CONNECTION TO MATING MACHINE



DANGER

In the case that this geared motor is used for the personnel transportation equipment, provide a protection device for safety at the equipment side. If this is not observed, there is a possibility of personal injury and breakage of device due to the runaway and the fall.

In the case that this device is used for lifting equipment, provide a protection device at the equipment side for safety.

If this is not obeyed, there is a possibility of personal injury and the breakage of device due to fall of lifting equipment.



CAUTION

When connecting the geared motor with the load, pay attention to the centering, tension of belt or chain, parallelism of pulley or sprocket.

In the case of direct connection, pay attention to the accuracy of direct connection. In the case of belt or chain drive, adjust the belt tension or sprocket correctly. Before operation, tighten the fixing bolts of pulley and coupling securely. There is a possibility of injury breakage of device due to the scattering of fragments.

Provide the cover, etc. to prevent touching to the rotating part. There is a possibility of injury.

Before connection with the mating machine, confirm the rotating direction. If the rotating direction is wrong, there is a possibility of injury or breakage of device.

When running the geared motor alone, remove the key attached on the output shaft temporarily. There is a possibility of injury.

Never ride on or hand down from the geared motor. There is a possibility of injury.

Do not touch the shaft end and the key way at the inner diameter of the geared motor with bare hand. There is a possibility of injury.

When this geared motor is used for the machine such as the food machinery where oil is inhibited, provide the breakage protection device such as the oil receiver against oil leakage due to failure or deterioration of oil seal. If this is not observed, food products may be spoiled due to leaked oil.

(1) Since this geared motor is grease lubricated, you can adopt any installation posture you like. However, consider the following points at installation.

- When the brake specification geared motor is installed with the output shaft directing upward or downward, rubbing sound of the brake lining may be heard.
- When the single-phase motor specification geared motor is installed with the output shaft directing downward, large impact sound may be heard at starting due to the setting of the preloading spring on the motor.

(2) Input shaft and output shaft

- Rust-preventive agent is applied on the input and output shafts. Wipe it off using solvent before connection.

When applying the solvent, soak cloth with solvent to wipe off the agent so that solvent does not wet the oil seal.

- The output shaft and input shaft is manufactured with tolerance of h6 (JIS B0401) and the key is manufactured according to the standard of New JIS Normal class (JIS B1301) parallel key.
- Using the hole tolerance equivalent to H7 class is recommended for the coupling and sprocket to be mounted on the shaft. When the transition fit is adopted, before inserting them, warm the coupling and sprocket to 100 °C and less. When you drive them in forcibly, the internal parts may be damaged.

(3) Installation

- Install the geared motor on the stable foundation that is free from vibration.
- Use the mounting surface of good parallelism.
- To mount, use appropriate bolts that conform to the bolt hole diameter. (JIS B1001 Class 3)
- When mounting, tighten the fixing bolts evenly.
- Deficiencies on fixing surface and tightening force of bolts cause the breakage of the geared motor case.

(4) Connecting method with mating machine

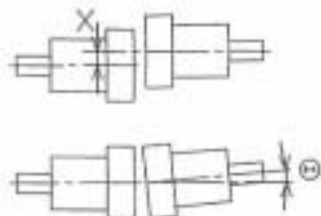
(a) In case of direct coupling

- When connecting the output shaft and input shaft directly with the shaft of mating machine, use the flexible coupling, etc. and center the both shaft so that the shaft centers become concentric.

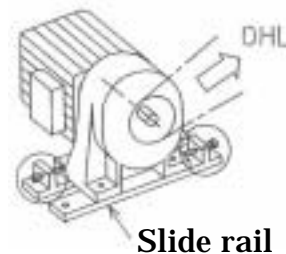
- Keep the mounting accuracy of the coupling so that it satisfies the recommended value of the coupling manufacturer to be used.

(b) In case of chain, belt or gear coupling

- Pay attention so that the output shaft and input shaft are parallel to the shaft of the mating machine. The chain, belt or gear must be rectangular with the shaft. If this is not observed, there is a possibility of damage due to uneven loading.
- If the tension of the chain or belt is too strong or too weak, it exerts a bad influence to the geared motor and the mating machine. Correct the tension according to the installation procedure of the manufacturer.



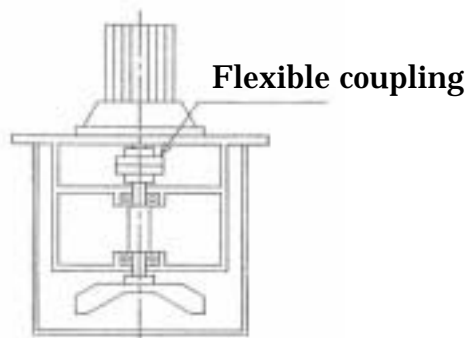
- X : Misalignment error of shaft center
- ⊗ : Angular error of shaft center



When the slide rail is used, mount the push bolts at front and rear alternately so that they cancel the moment generated by O.H.L.

(c) In case of using for agitator

The output shaft of the geared motor cannot support the radial and thrust loads of the agitation bar. Support the agitation bar with bearings installed at two points. Connect this agitation bar and the output shaft of geared motor with the flexible coupling.



(5) In case of attachment type

Since the mounting dimension of the motor is in conform to the International Standard (IEC Standards), all motors that meet this standard can be installed without problem.

5 . W I R I N G



DANGER

Connect the power source cable according to the wiring diagram printed in the terminal box or the instruction manual.

If wiring is not proper, there is a possibility of electric shock and fire. Do not forcibly bend, pull or squeeze the power cable and the lead wire of motor. There is a possibility of electric shock.

Ensure to connect the power source having the rating written on the nameplate. If this is not observed, there is a possibility of burning of the motor and fire.

Ground the earth terminal securely. If this is not observed, there is possibility of electric shock.

(1) Earth terminal of motor

- With terminal box : The earth terminal (⊕ mark) is provided in the terminal box.
- Less terminal box : Use the terminal box mounting hole, etc. as a substitute for the earth terminal.

(2) Grounding work standard

Ground the earth terminal as shown in the table below according to the nm“Electric Work Regulation”.

Rated voltage	King of grounding work	Value of grounding resistance
300V and less	Class 3 Grounding Work	100 and less
Above 300V	Special Class 3 Grounding Work	10 and less



CAUTION

When measuring the insulation resistance, do not touch the terminals. There is a possibility of electric shock.

Execute the wiring work in compliance with the “Electric Installation Technical Standards” and the “Interior Wiring Regulation”. If this is not observed, there is a possibility of burning, electric shock, fire and injury.

The protection device is not attached on the motor. The overload protection device is obliged to install by the “Electric Installation Technical Standards”. We also recommend the installation of the protective device (earth leakage breaker) in addition to the overload protection device.

If this is not observed, there is a possibility of breakage, electric shock, fire and injury.

Before connecting the mating machine, confirm the rotating direction. There is a possibility of injury, breakage of device due to wrong rotation direction.

Keep the voltage drop on the wiring to 2% and less. When the wiring distance is long, there is a possibility that the geared motor cannot be started due to voltage drop.

In case of starting by the star-delta connection, use a star-delta starter with the electromagnetic switch (three-contactor type) at the primary side. If this is not observed, there is a possibility of fire.

In case of driving the 400V class motor by the inverter, provide the suppression filter and the reactor at the inverter side to suppress the surging voltage. There is a possibility of damage and fire due to insulation breakage.



CAUTION

In case of single-phase motor

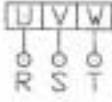
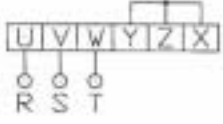
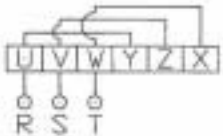

Do not mistake in using the starting condenser and the running condenser. If the starting condenser is used for running motor, the condenser will be damaged.

Be careful not to damage the vinyl coating of the starting condenser. There is a possibility of electric shock.

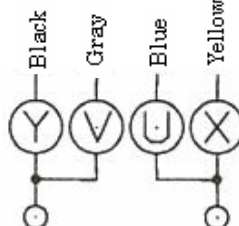
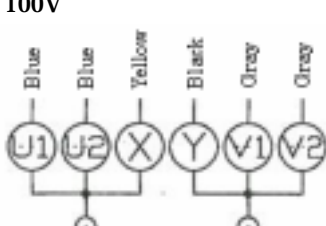
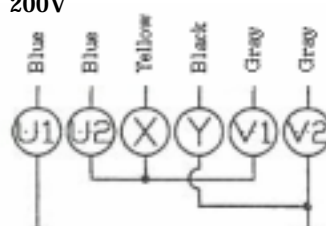
Wiring of motor

Connect the wiring correctly according to the connection diagram.

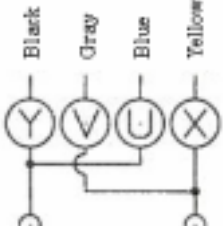
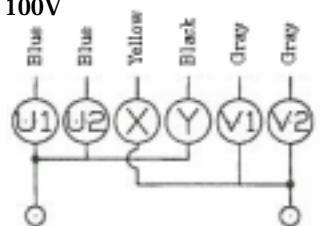
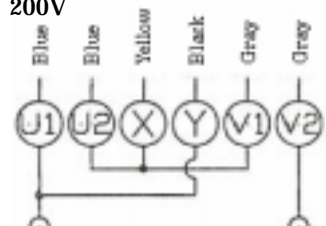
Since the direction of rotation can be altered by exchanging the connection, connect wiring according to the specification.

Connection diagram	Rotation direction of output shaft		
<p>• 3-phase 0.1kW ~ 3.7kW</p>  <p>• 3-phase 5.5kW ~ 7.5kW Starting (star connection)</p>  <p>Running (delta connection)</p> 	0.1 kW	1/5-1/60, 1/300-1/1200	1/80-1/240
	0.2 kW	1/5-1/50, 1/300-1/1200	1/60-1/240
	0.4 kW	1/5-1/30, 1/240-1/1200	1/40-1/200
	0.75 kW	1/5-1/40, 1/240-1/500	1/45-1/200
	1.5 kW	1/5-1/30, 1/240-1/300	1/40-1/200
	2.2 kW	1/5-1/30, 1/240-1/300	1/40-1/200
	3.7kW	1/5-1/30	1/40-1/120
	5.5kW	1/5-1/30	1/40-1/120
	7.5kW	1/5-1/30	1/40-1/80
			

Looking from the output side

• single-phase 0.1kW ~ 0.2kW	• single-phase 0.4kW ~ 0.75kW	
	<p>100V</p> 	<p>200V</p> 

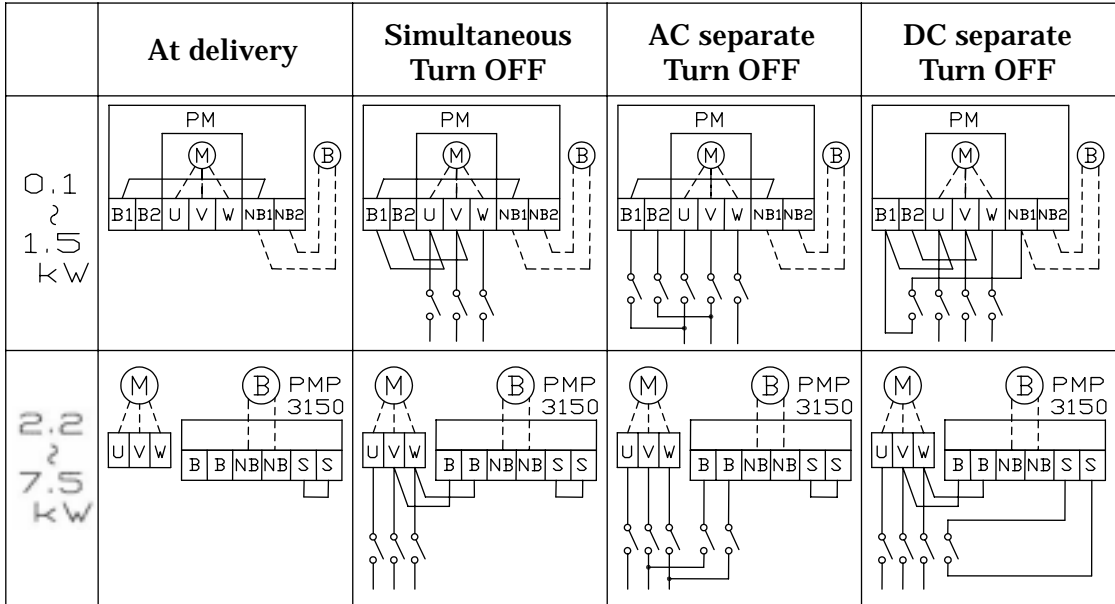
- The rotation direction of a three phase-motor can be reversed by exchange the connection of any two wires between R-S-T and U-V-W.
- The rotation direction of a single phase-motor can be reversed by exchange the connection diagram shown below.

• single-phase 0.1kW ~ 0.2kW	• single-phase 0.4kW ~ 0.75kW	
	<p>100V</p> 	<p>200V</p> 

Brake wire connection

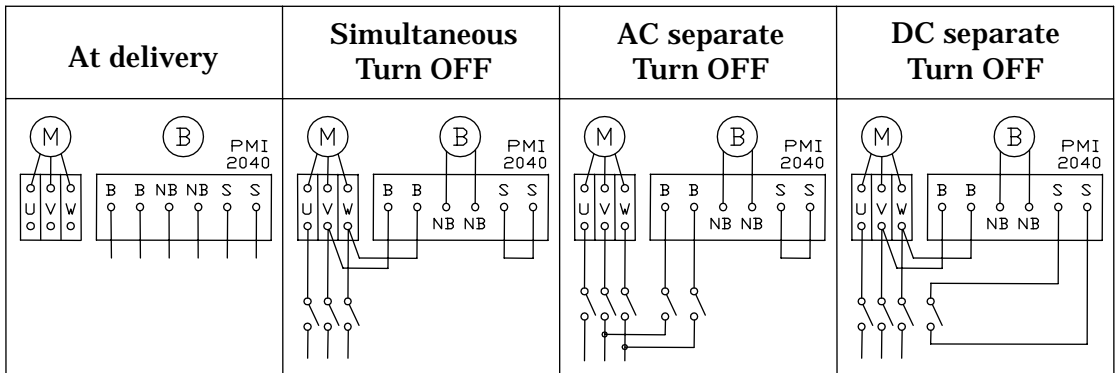
Connect correctly according to the connection diagram shown below.

<Standard terminal box>



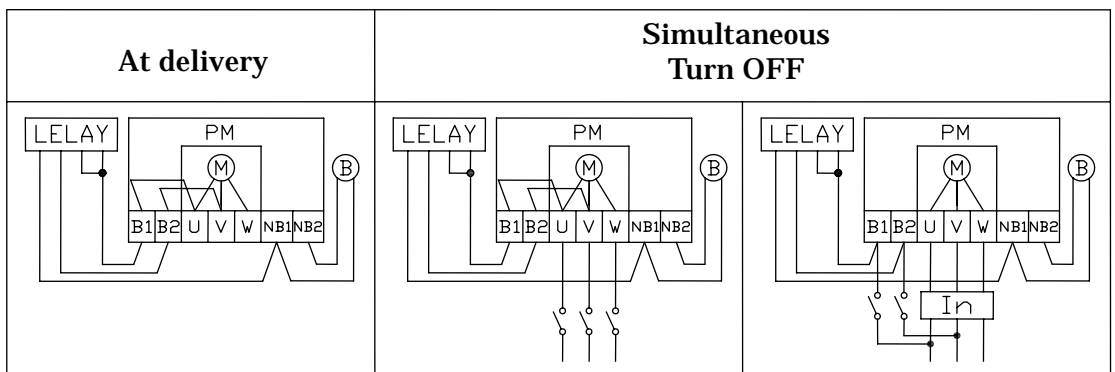
<Special terminal box>

• 3-phase motor 0.1kW ~ 1.5kW



<Relay-installed terminal box>

• 3-phase motor 0.1kW ~ 1.5kW



In : Inverter

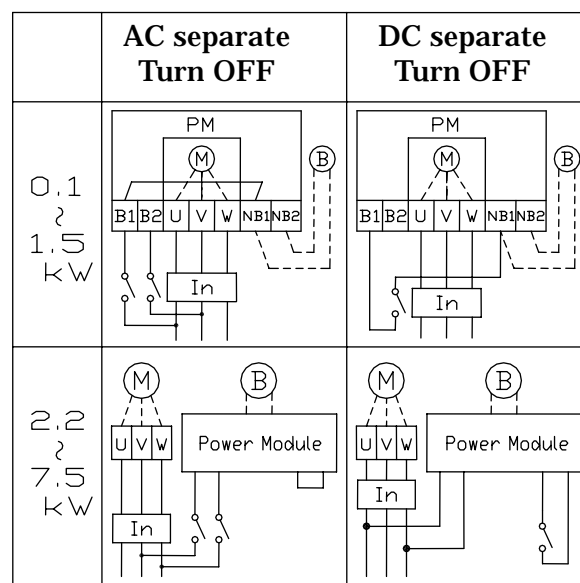
[CAUTION ITEMS]

1. When using the geared motor for lifting purpose or the stop position accuracy is required, adopt the separate turn-off circuit.
2. In case of inverter drive, connect the brake power source to the primary side of the inverter.
3. Select the contact for the direct current separate turn-off circuit according to the rated current for DC100V, DC11 class (coil loading).
4. Adopt the separate turn-off circuit in case of the star-delta start or reduced voltage start. If the simultaneous turn-off circuit is used, there is a possibility that the brake is not completely released and the motor continues rotation while rubbing the brake lining.
5. When using the power factor improvement condenser, adopt the separate turn-off circuit.
6. To deal with the 400V class of geared motor with brake configuration, provide a transformer at the primary side of the power module.
The required capacity of the transformer is as follows.

Motor-Transformer specification

Motor	Trans specification
3-phase 0.1kW to 0.75kW	Autotransformer 100VA and over
3-phase 1.5kW to 7.5kW	Autotransformer 200VA and over

Brake connection diagram for inverter drive



In : Inverter

6 . H A N D L I N G O F B R A K E



DANGER

At the maintenance and inspection during operation, never touch the rotator (shaft, etc.). There is a possibility of injury due to being caught. When checking the gear teeth condition at the geared motor stoppage, ensure to apply the rotation detention of driver and the driven. If this is not observed, there is a possibility of personal accident due to being caught.

When the safety cover was removed for inspection, never forget to restore it on the device before next run.

If this is not observed, there is a possibility of injury due to being caught. Take care so that oil and the like do not stick on the brake. There is a possibility of fall due to reduction of braking force and runaway accident. Do not operate the geared motor while releasing the brake by the manual release device. There is a possibility of drop or runaway.



CAUTION

In the case that the geared motor with brake is used for the lifting purpose, adopt the quick acting separate turn OFF connection.

Motion

(1)Basic motion

This device brakes and releases the brake lining that is turning in restriction to the motor shaft. The braking action is executed by the pressing force of the braking spring and the releasing action is executed by compressing the braking spring using the attracting force of the electromagnet.

At the brake power source OFF status, the armature is pushed by the force of braking spring and the brake lining is squeezed in between the armature and the braking plate to brake the motor.

When the power is supplied to the motor, the brake coil is excited and the armature is attracted to the coil side by the electromagnetic attracting force to release the brake.


This device is so-called no-excitation actuating type, a safe construction that the braking force is maintained even during power supply stoppage.

(2) Manual brake release device

To operate, remove the release handle from the handle catcher and turn it as shown in the illustration on the previous page.

The brake becomes normally open status.

This device is convenient when moving the machine manually for inspection.

	DANGER	Return the handle to the original position after the job is finished without fall. If this is forgotten, there is a possibility of runaway or drop accident.
---	---------------	--

Brake specification

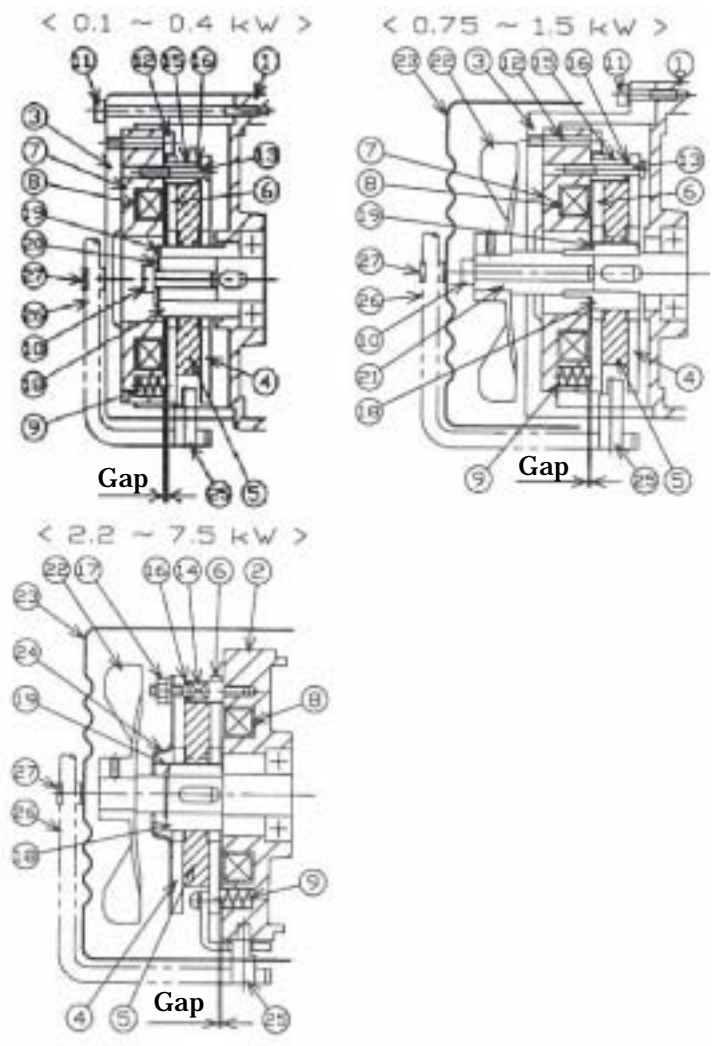
- No-excitation actuating type.
- With power supply.
- With manual release device.
- Non-asbestos material is used for brake lining.

3phase Motor		0.1kW	0.2kW	0.4kW	0.75kW	1.5kW	2.2kW	3.7kW	5.5kW	7.5kW
Brake type		PNB 2001K	PNB 2002K	PNB 2004K	PNB 2008K	PNB 2015K	PNB 3022	PNB 3040	PNB 3055	PMB 3080
Rated torque [Nm]		0.98	2.0	3.6	7.8	15	22	39	54	78
DC power Supply type		Combined with terminal box PMI3040					PMP3150			
Power source voltage		AC 200V (Brake coil voltage DC 90V 1)								
At 20	Current [A]	0.13		0.33	0.30	0.40	0.45	0.35	0.5	
	Capacity [W]	12		30	27	36	40	31	45	
Specified gap [mm]		0.15		0.25		0.3				
Limit gap [mm]		0.4		0.8		1.3				
Release time [sec]	Simultaneous turn-off	0.15	0.25	0.3	0.4	0.45	0.55	0.7		
	AC separate turn-off	0.08	0.12	0.1	0.2	0.18	0.22	0.28		
	DC separate turn-off	0.015	0.03	0.02	0.03		0.04			
	Simultaneous turn-off with relay 2	0.06		0.08						

<Remarks>

- 1) For 2.2 to 7.5kW type, voltage becomes DC 180V instantaneously at attraction.
- 2) This is case of relay-installed terminal box type.
Refer to P. 12 for the Connection diagram.

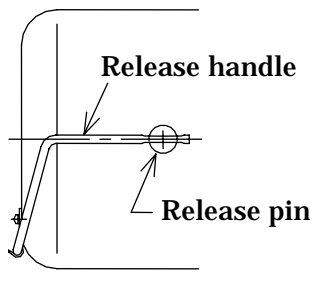
Brake construction



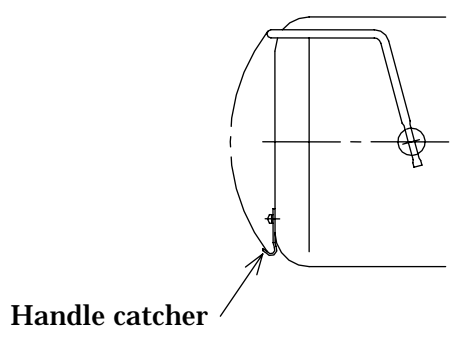
- Motor frame
- B-sealed
- Brake cover
- Braking plate
- Brake lining
- Armature
- Field
- Brake coil
- Braking spring
- Bolt
- Bolt
- Bolt
- Bolt
- Stud bolt
- Collar
- Adjusting liner
- Nut
- Hub
- Steady rest
- Presser
- 21 Extension shaft
- 22 Fan
- 23 Fan cover
- 24 Protection cover
- 25 Release pin
- 26 Release handle
- 27 Handle support

<Manual brake release device>

At normal operation



At manual brake release



Inspection and adjustment of brake gap

After the geared motor has been used for prolonged time, the brake lining wears and the electromagnet gap exceeds the limit value, as the result the attraction of armature becomes impossible.

In that case, inspect and adjust the brake gap.

<Procedures>

(1) Before inspection, release the load at the output side and turn off the motor power source.

(2) When the manual release device is provided, remove releasing handle 26 and releasing pin 25.

(3) Remove fan cover 23 and fan 22 if installed.

(4) In case of 0.1 to 1.5kW products, disassemble further as explained below.

- . Remove bolt 11 and take out the brake section together with the brake unit.

- . Remove bolt 12 and take out the unit locating inside from the brake cover 3.

(5) Check the gap using a feeler gauge.

When the gap exceeds the limit value, remove bolt 13 or nut 17 and draw out suitable amount of adjusting liners 16 to adjust the to the specified value. At this time, pay attention so that the equal gap is kept around the periphery.

(6) After adjustment is finished, assemble the brake unit with the reverse order of disassemble.

(7) After completion of adjustment, confirm whether the braking action is normal.

7 . O P E R A T I O N



DANGER

Do not operate the geared motor with the terminal cover removed. After completion of work, attach the terminal box cover to the original position every time. If this is not observed, there is a possibility of electric shock.

Never approach or touch the rotator (shaft, etc.) during operation. There is a possibility of injury due to being caught.

When the electric supply was stopped, be sure to turn OFF the power source switch. If this is not observed, there is a possibility that the geared motor begins running suddenly when the power supply is restored again, which causes injury of person or breakage of device.



CAUTION

When reversing the direction of rotation, stop the motor once then start the reverse rotation. If this is not observed, there is a possibility of breakage of device due to normal/reverse rotation plugging.

The surface temperature of geared motor becomes considerably high during operation. Pay attention so that your hand or body does not touch the motor. There is a possibility of burn.

If abnormality occurred, stop operation immediately. There is a possibility of electric shock, injury and fire. Do not use the geared motor in excess of the rated capacity. There is a possibility of injury and breakage of device.

Do not loosen the filler cap during operation. There is a possibility that lubrication oil spouts out and gets scalded.



CAUTION

In case of single-phase motor

Do not touch the charged section of the single-phase motor starting condenser until the charge is completely discharged. There is a possibility of electric shock.

When reversing the rotating direction of the single-phase motor except The reversible motor, be sure to stop the motor completely then begin starting action to reverse direction. If this is not observed, direction of rotation may not change and may cause running out of control.

Confirm the following items in operation of the geared motor.

(1) Before turning on the switch

- Are the installation of geared motor and connection with the mating machine correct?
- Is the wiring between the power source and the motor perfect?
- Is the grounding correct?

(2) Test run

- Operate with light load.
- Turn ON the switch for 1 to 2 seconds to check whether the rotation direction of the output shaft is correct.
- Check whether the rotating status is normal.

(3) Operation

- When no abnormality was found at test run, execute the load run.
- Is not there any abnormal sound or vibration?
- Is the motor current value within the indicated value on the nameplate at full load operation?

Motor rotating direction does not change but the motor will runaway.

- Use the geared motor within its allowable limit value in transmission torque, O.H.L. and starting frequency.

Exceeding the allowable limit value will cause the damage of product.

For the allowable limit value, refer to the VX series catalogue.

8 . I N C A S E O F T H E E X P L O S I O N - P R O O F M O T O R



DANGER

In case of the explosion-proof motor, use the explosion-proof electric devices suitable to the danger spot (spot where the existence of explosion atmosphere of gas or vapor is suspected). If this is not observed, there is a possibility of explosion, ignition, fire, electric shock, injury and damage of equipment.

In case of the explosion-proof motor, the works such as carrying, installation, piping, wiring, operation, handling, maintenance, inspection, repair and disassembly must be executed by the person who is familiar with the knowledge of principles and functions such as explosion-proof construction, execution of electric facility, related regulations and has necessary technique. If this is not observed, there is a possibility of explosion, ignition, fire, electric shock, injury and damage of equipment.

In case of the explosion-proof motor, lead-in the external wire in accordance with the instruction manual in addition to the “Electric Installation Technical Standards”, “Interior Wiring Regulations” and “Explosion-proof Guidance”. If this is not observed, there is a possibility of explosion, ignition, fire, injury and damage of equipment.

In case of the explosion-proof motor, absolutely avoid the modification of the product by the customer. There is a possibility of explosion, ignition fire, electric shock, injury and damage of equipment.

Regarding the control device and transformer of the pressure withstanding explosion-proof construction and increased safety construction, never open the door or cover during excitation. There is a possibility of explosion ignition, fire, injury and damage of equipment.

In case that the pressure withstanding explosion-proof motor is driven by the inverter, since the inverter itself is not of explosion-proof construction, be sure to install the inverter at the place where explosion gas does not exist. If this is not observed, there is a possibility of explosion, ignition, fire, injury and damage of equipment.



CAUTION

When driving the explosion-proof motor by the inverter, since the motor and the inverter is approved in one to one combination. Be sure to operate the geared motor together with the specified special inverter.

In case of the explosion-proof motor, when measuring the insulation resistance, confirm that explosive atmosphere of explosive gas or vapor does not exist around. There is a possibility of explosion and ignition.

9 . MAINTENANCE , INSPECTION AND REPAIR

When executing daily check, periodical check and repair, pay attention to the following items.



DANGER

At the maintenance and inspection during operation, never touch the rotator (shaft, etc.) There is a possibility of injury due to being caught. When checking the gear teeth condition at the geared motor stoppage, ensure to apply the rotating detention of driver and the driven. If this is not observed, there is a possibility of personal accident due to being caught.

When the safety cover was remove for inspection, never forget to restore it on the device before next run.

If this is not observed, there is a possibility of injury due to being caught. Do not remove the cover for inside inspection during operation. There is a possibility that hot oil will spout out and get scalded.



CAUTION

Be sure to execute the repair, disassemble and assemble work by a specialist. If this is not observed, there is a possibility of electric shock, injury, fire and breakage of device.

When measuring the insulation resistance, do not touch the terminals. There is a possibility of electric shock.

Change the lubrication oil according to the instruction manual. Be sure to use the recommended oil by the manufacturer. If this is not observed, there is a possibility of breakage of device.

Since the surface temperature of the geared motor becomes high during operation, do not touch with bare hands. There is a possibility of burn.

Do not change the lubrication oil during operation or just after operation stop. There is a possibility of burn.

If abnormality occurred, make diagnosis according to the instruction manual. Never restore operation until the cause of abnormality is cleared and the countermeasure is established.

(1) Daily inspection

The following list shows items to be inspected daily or once a week.

Item	Method	Content
Load current	Ammeter	Shall be equal and less than the rated current shown on the nameplate.
Sound hearing	Listening rod	Abnormal sound shall not be heard.
Vibration	Vibration meter	No abnormal vibration shall be found on the motor and the speed reducer.
Temperature rise	Thermometer	The temperature difference from the atmosphere shall be 50 and less for the motor surface and 30 and less for the speed reducer surface.
Grease leakage	Visual check	No grease leakage shall be found at the connecting portion between the motor and the speed reducer and the output shaft of the geared motor.
Sticking of dust	Visual check	No sticking of dust shall be found at the ventilation port and outer surface of the motor.
Chain tension	Visual check	The chain tension shall be normal.
Thermal relay	Visual check	The set value of the thermal relay shall agree with the rated current value.

(2) Periodical inspection

The interval differs depending on the circumference and condition where the geared motor is used. Execute inspection and maintenance referring to the table shown below as a standard.

Item	Method	Content
*Grease replacement	Ever 3 to 5 years	Replace once 20,000 hours or 3 to 5 years.
*Oil seal replacement	Ever 6 months	Replace once 10,000 hours or 1 to 2 years.
Chain tension	Ever 6 months	Adjust the tension when looseness of chain is found.
*Bearing replacement	Ever 2 years	Replace if abnormal sound is heard.
Foundation bolt	Ever 6 months	Retighten the foundation bolts if looseness is found.
Insulation resistance of motor	Ever 6 months	Measure resistance whether it is 1M and more. If the value is less than 1M , dry up the motor.
Thermal relay	Ever 6 months	Confirm whether the set value agrees with the rated current value.
Brake Gap adjustment	Ever 3 months	Adjust the gap to the specified value by the shim adjustment method.
Lining thickness	Ever one year	Replace the lining if the gap exceeds the limit value even if gap is adjusted by shim.

Consult us for the items marked with asterisk (*).

(3) Grease replacement

- Basically grease replacement is not required. However, when the geared motor is used for a long period of time under light load, grease replacement is necessary for every 20,000 hours or every 3 to 5 years.
- Grease replacement must be executed by a person who is practiced in the work. Read this manual before beginning work. Our company will accept the order for grease replacement work.
- We cannot guarantee the quality of product after grease replacement.

- When replacing grease, extract old grease as much as possible and replace with new one completely. At this time avoid mixing of different brand grease.
- Do not waste old grease to the draining floor but dispose it as waste oil.
- The quantity of grease to be filled is shown in the table below. Pay attention to the filling quantity. Insufficient quantity of grease causes gear wear. On the contrary, surplus grease causes heating, efficiency reduction and grease leakage.

Grease filling quantity (kg)

	1/5	1/10	1/15	1/20	1/25	1/30	1/40	1/45	1/50	1/60	1/80	1/100	1/120	1/160	1/200
0.1kW	0.2										0.4				
0.2kW	0.2						0.4						0.6		
0.4kW	0.2	0.4						0.6			1.5				
0.75kW	0.6						1.5						2.4		
1.5kW	0.6	1.1				1.5			2.4			3.6			
2.2kW	1.1				2.0		2.4			3.6					
3.7kW	2.4						3.6			4.5					
5.5kW	2.4	3.0				4.5			7.0						
7.5kW	3.0				4.5		7.0								

	1/240	1/300	1/400	1/500	1/600	1/800	1/1000	1/1200
0.1kW	Fr 0.25							
	Re 0.6				Re 1.5			
0.2kW	Fr 0.5							
	Re 1.5				Re 2.4			
0.4kW	Fr 0.7							
	Re 2.4				Re 3.6			
0.75kW	Fr 1.0							
	Re 3.6							
1.5kW	Fr 1.0							
	Re 3.6							
2.2kW	Fr 1.7							
	Re 4.5							

Fr: Front stage

Re: Rear stage

(4) If failure occurred, dispose properly referring to the table shown below.
Failure and its countermeasures of geared motor

Status failure		Cause	Disposition
<ul style="list-style-type: none"> • Does not start 	Sound is not heard	Power stoppage	Check power source.
		Open circuit of connecting wire	Check wiring.
		Open circuit of stator winding.	Repair at special factory.
	Buzzing Sound is heard	Crunch at speed reducer.	Repair at special factory.
		Contact between stator and armature Breakage of bearing.	Repair at special factory.
		Phase interruption on power source.	Check terminal voltage.
		Overload	Lower load to appropriate level.
	Status failure		Cause
<ul style="list-style-type: none"> • Circuit breaker tripped • Fuse blew 	Short circuit of stator winding.	Repair at special factory.	
	Contact of terminal.	Insulate.	
	Insufficient fuse capacity.	Replace with appropriate fuse.	
	Overload	Lower load to appropriate level.	
<ul style="list-style-type: none"> • Temperature becomes high. 	Abnormal voltage	Rectify to appropriate voltage.	
	Wear of gear	Repair at special factory.	
	Overload	Lower load to appropriate level.	
	Frequent start/stop	Lower frequency.	

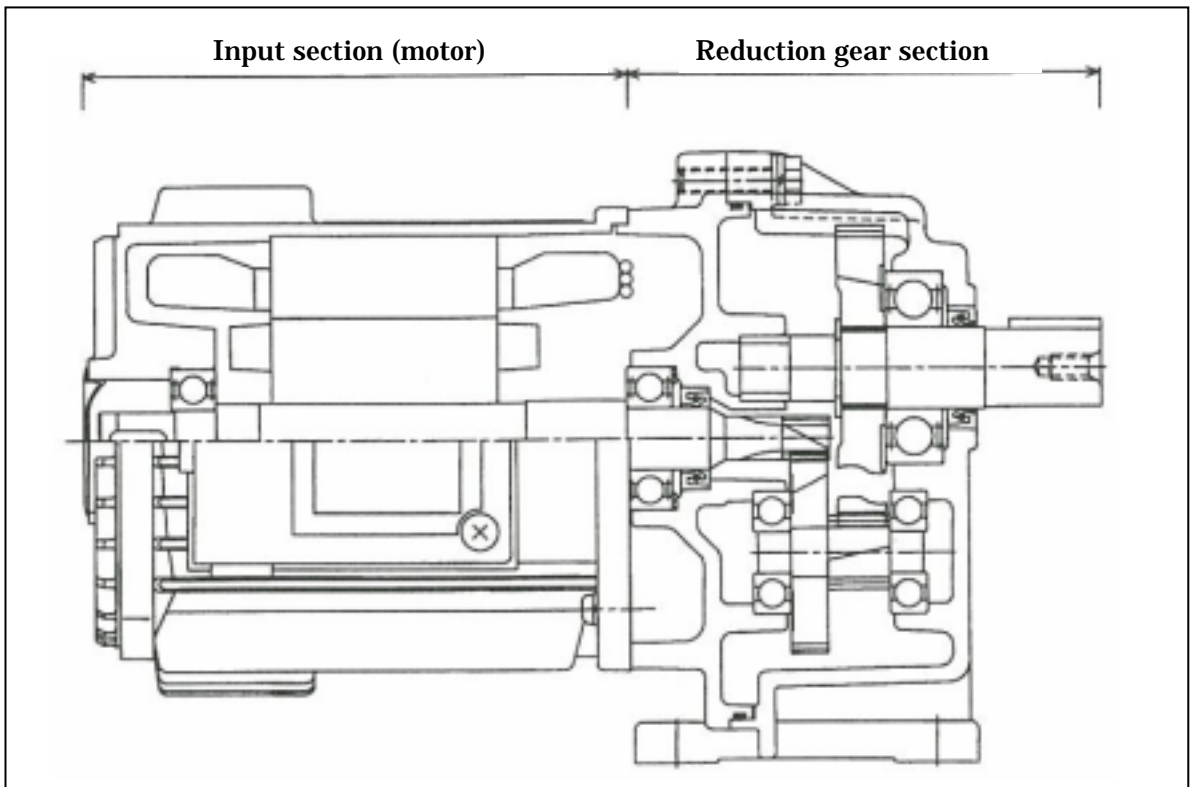
• Vibration large		Abnormality of gear or bearing	Repair at special factory.
		Improper installation	Check installation. Retighten bolts.
		Overload	Lower load to appropriate level.
		Improper rotation of stator and armature	Repair at special factory.
		Unbalance at connecting section	Replace with appropriate one.
• Sound is large.	Continuous sound	Abnormality on bearing Wear of gears, Insufficient grease	Repair at special factory.
	Intermittent sound	Dent on gears Mixing or crunch of foreign matter	Repair at special factory.
	Buzzing sound	Abnormality on motor. Insufficient grease	Repair at special factory.
• Grease leaks		Loose bolt	Retighten.
		Wear of oil seal Abnormality on packing	Replace oil seal. Replace packing.
		Overfill of grease	Reduce to normal quantity.
• Grease leaks into motor.		Damage of oil seal	Replace oil seal.

Failure and disposition of geared motor with brake (Brake section).

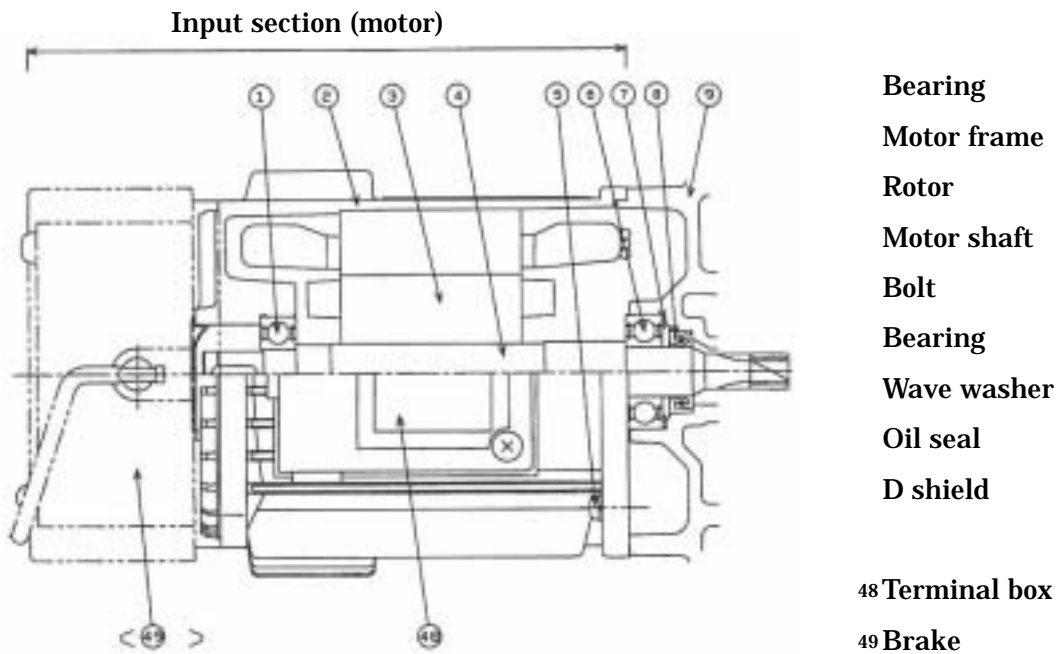
Status of failure	Cause	Disposition
• Brake is not released	Wrong connection	Check wiring.
	Open circuit	Check circuit.
	Abnormality on brake power source equipment	Replace.
	Abnormal voltage	Rectify to appropriate voltage.
	Brake gap is excessively large	Adjust gap.
• Braking action is weak • Braking time is long	Oil and foreign matter are sticking on inner disc	Disassemble and clean.
	Brake gap is excessively large.	Adjust gap.
	GD ² of load is excessively large	Review GD ² of load.
	Life of inner disc has exhausted.	Replace.
• Abnormal heating	Start/stop is frequent	Lower frequency.
	Load torque is large GD ² of load is excessively large	Lower load to appropriate level.
• Buzzing sound	Wrong connection	Check wiring.
	Brake gap is excessively large	Adjust gap.
	Incorrect connection of switch	Replace.
	Open circuit	Check circuit.

10 . CONSTRUCTION DRAWING

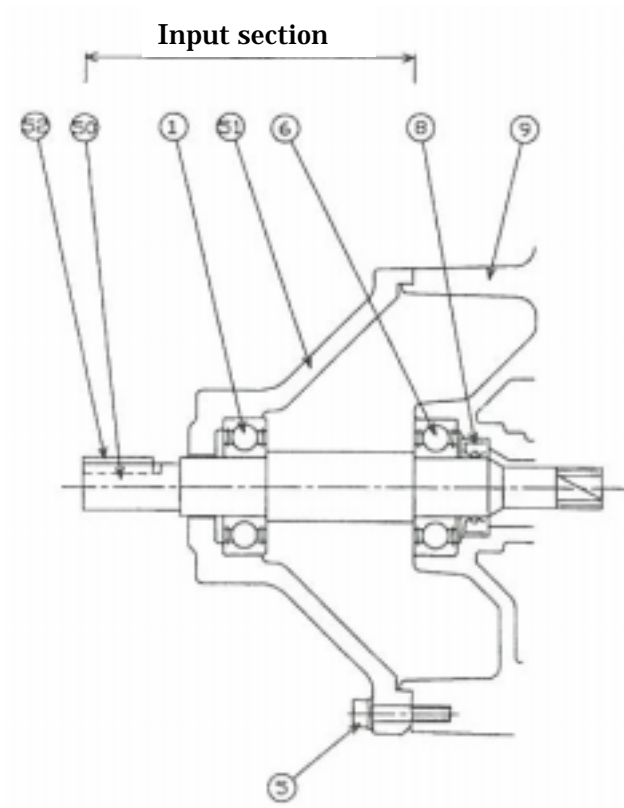
General view



A Geared motor (Input section)



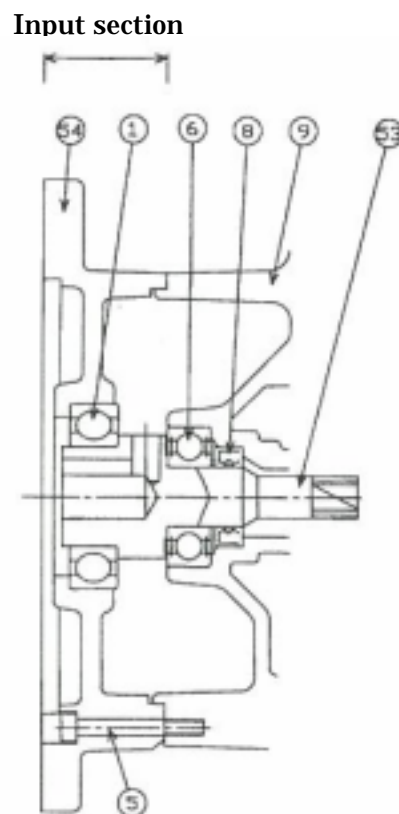
B Input shaft type



Bearing
 Bearing
 Oil seal
 D shield

50 Input shaft
 51 Input cover
 52 Key

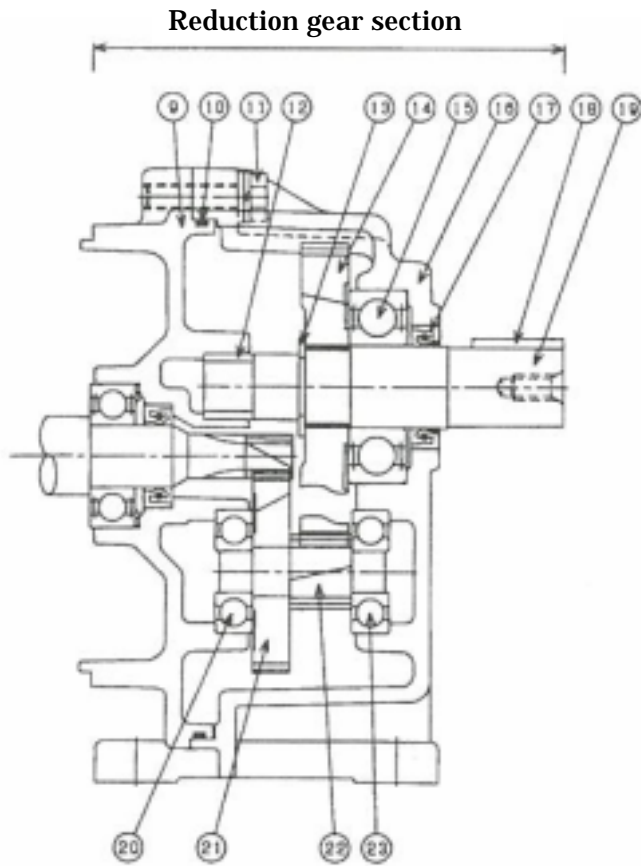
C Attachment type



Bearing
 Bearing
 Oil seal
 D shield

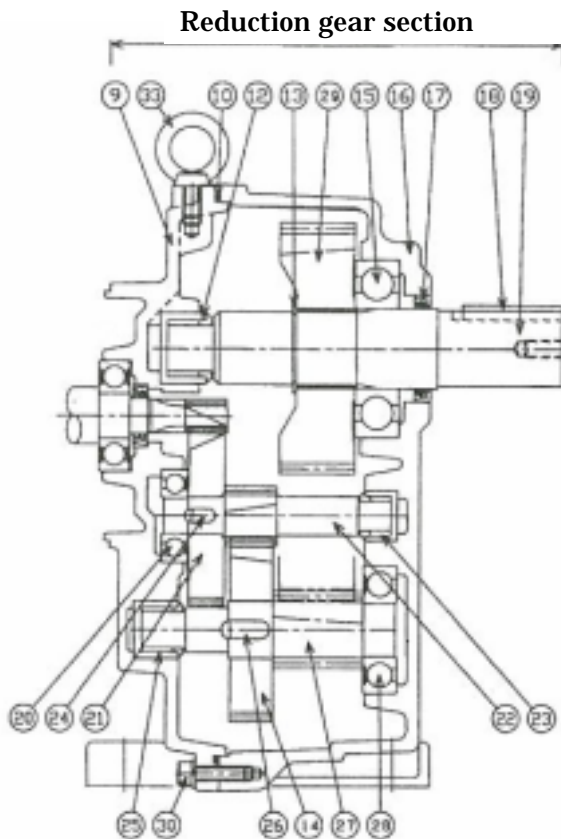
53 Input shaft
 54 Attachment flange

D Leg mounting type / Double reduction



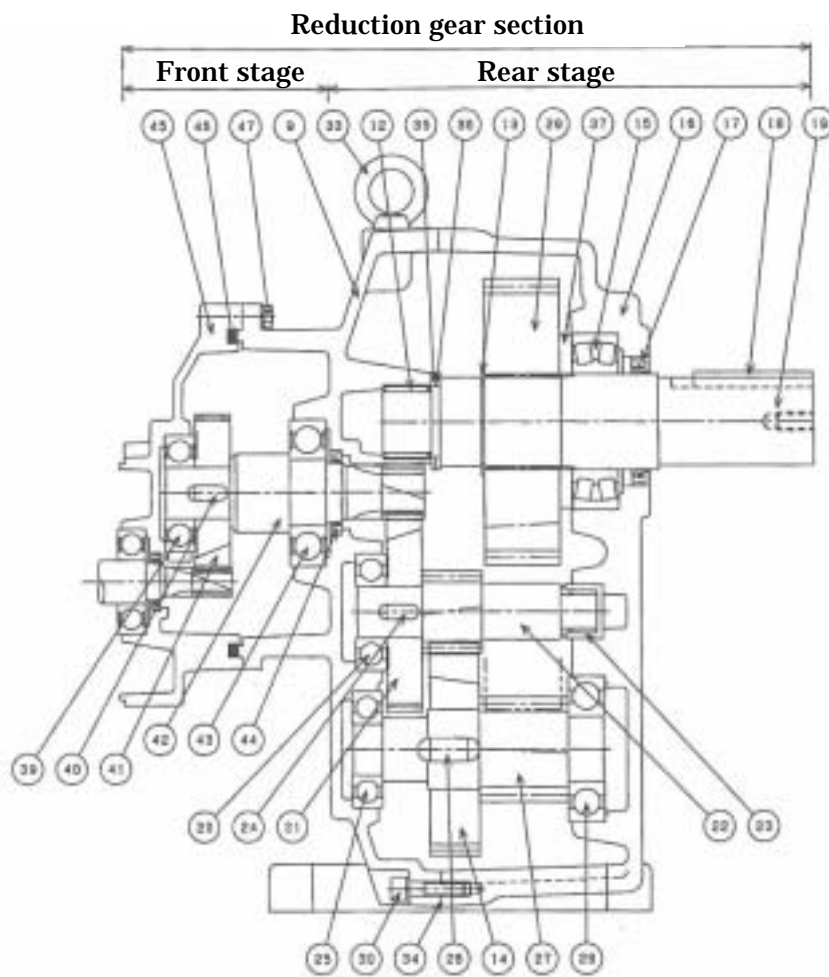
- D shield
- O-ring
- Bolt
- Bearing
- Stop ring
- Gear "B"
- Bearing
- Case
- Oil seal
- Key
- Output shaft
- Bearing
- 21 Gear "A"
- 22 Pinion "B"
- 23 Bearing
- 24 Key
- 25 Bearing

E Leg mounting type / Triple reduction




- 26 Key
- 27 Pinion "C"
- 28 Bearing
- 29 Gear "C"
- 30 Bolt
- 33 Eye-bolt

F Leg mounting type / High reduction ratio type



- D shield
- Bearing
- Stop ring
- Gear "B"
- Bearing
- Case
- Oil seal
- Key
- Output shaft
- Bearing
- 21 Gear "A"
- 22 Pinion "B"
- 23 Bearing
- 24 Key
- 25 Bearing
- 26 Key
- 27 Pinion "C"
- 28 Bearing
- 29 Gear "C"
- 30 Bolt
- 33 Eye-bolt
- 34 Packing
- 35 Thrust collar
- 36 Thrust collar
- 37 Slinger
- 39 Bearing
- 40 Key
- 41 Gear "X"
- 42 Pinion "A"
- 43 Bearing
- 44 Oil seal
- 45 Cover
- 46 O-ring
- 47 Bolt

1 1 . TYPE NUMBER OF BEARING AND OIL SEAL

- The type numbers listed here are those of the manufacturers products that we adopted in the geared motor. When you use other manufacturer's product, use the product of equivalent type number.
- The parts shown in  cannot be purchased commercially. When you need these parts, consult the dealer or our company.

Motor section

Motor output	Bearing				Oil seal
	Motor output (3-phase) Drawing A		Motor output (single-phase) Drawing A		
	Input side	Output side	Input side	Output side	
0.1kW	6202ZZ	6202ZZ	6201ZZ	6202ZZ	Y15257
0.2 kW	6202ZZ	6202ZZ	6201ZZ	6202ZZ	Y15257
0.4 kW	6202ZZ	6203ZZ	6201ZZ	6203ZZ	Y15257
0.75 kW	6203ZZ	6304ZZ	6202ZZ	6304ZZ	Y20358
1.5 kW	6303ZZ	6305ZZ	-	-	Y20358
2.2 kW	6205ZZ	6306ZZ	-	-	Y25408
3.7kW	6206ZZ	6307ZZ	-	-	Y35508
5.5kW	6207ZZ	6309ZZ	-	-	Y40588
7.5kW	6207ZZ	6309ZZ	-	-	Y40588

Input section

Motor output	Bearing				Oil seal
	Input shaft type Drawing B		Attachment type Drawing C		
	Input side	Output side	Input side	Output side	
0.1kW	6202ZZ	6202ZZ	6005ZZ	6202ZZ	Y15257
0.2 kW	6202ZZ	6202ZZ	6005ZZ	6202ZZ	Y15257
0.4 kW	6203ZZ	6203ZZ	6205ZZ	6203ZZ	Y15257
0.75 kW	6205ZZ	6304ZZ	6206ZZ	TMB205ZZ	Y20358
1.5 kW	6206ZZ	TMB206ZZ	6207ZZ	TMB206ZZ	Y20358
2.2 kW	6305ZZ	TMB306ZZ	6208ZZ	TMB306ZZ	Y25408
3.7kW	6306ZZ	TMB307ZZ	6209ZZ	TMB307ZZ	Y35508
5.5kW	6308ZZ	6309ZZ	6211ZZ	6309ZZ	Y40588
7.5kW	6308ZZ	TMB309ZZ	6211ZZ	TMB309ZZ	Y40588

Speed reducer section

• Reduction gear section

2 ~ 3 step reduction type (Drawing D and E)

Output	Reduction ratio	Medium shaft bearing				Output shaft bearing		Output shaft oil seal
		Small shaft		Larger shaft		Input side	Output side	
		Input side	Output side	Input side	Output side			
0.1kW	1/5 ~ 1/50	-	-	6200ZZ	6200ZZ	12Metal	6204ZZ	TCY20307
	1/60	-	-	6200ZZ	6301ZZ	15Metal	6205ZZ	TCY25356
	1/80 ~ 1/200	6200ZZ	6200ZZ	6200ZZ	6301ZZ	15Metal	6205ZZ	TCY25356
0.2kW	1/5 ~ 1/30	-	-	6200ZZ	6200ZZ	12Metal	6204ZZ	TCY20307
	1/40 ~ 1/50	-	-	6200ZZ	6301ZZ	15Metal	6205ZZ	TCY25356
	1/60	6200ZZ	6200ZZ	6200ZZ	6301ZZ	15Metal	6205ZZ	TCY25356
	1/80 ~ 1/100	6200ZZ	6200ZZ	6200ZZ	6301ZZ	15Metal	6205ZZ	TCY30458
	1/120 ~ 1/200	UN-2564-2	6300ZZ	UN-2564-2	6303ZZ	UN-26571-2	6206ZZ	TCY30458
0.4kW	1/5 ~ 1/10	-	-	6200ZZ	6200ZZ	12Metal	6204ZZ	TCY20307
	1/15 ~ 1/30	-	-	6200ZZ	6301ZZ	15Metal	6205ZZ	TCY25356
	1/40 ~ 1/50	6200ZZ	6200ZZ	6200ZZ	6301ZZ	15Metal	TMB205ZZ	TCY30458
	1/60 ~ 1/100	UN-2564-2	6300ZZ	UN-2564-2	6303ZZ	UN-26571-2	6206ZZ	TCY30458
	1/120 ~ 1/200	UN-2564-2	UN-2564-2	UN-26571-2	UN-3293-2	UN-3293-2	6307ZZ	TCY35488
0.75kW	1/5 ~ 1/30	-	-	6201ZZ	6303ZZ	UN-26571-2	6206ZZ	TCY30458
	1/40	-	-	UN-2880-2	UN-3293-2	UN-3293-2	6307ZZ	TCY35488
	1/45 ~ 1/100	6303ZZ	UN-2564-2	UN-2880-2	UN-3293-2	UN-3293-2	6307ZZ	TCY35488
	1/120 ~ 1/200	6304ZZ	UN-2880-2	UN-3293-2	6306ZZ	UN-40112-2	6309ZZ	TCY45609
1.5kW	1/5 ~ 1/10	-	-	6201ZZ	6303ZZ	UN-26571-2	TMB206ZZ	TCY30458
	1/15 ~ 1/30	-	-	UN-26571-2	UN-3293-2	UN-3293-2	6307ZZ	TCY35488
	1/40 ~ 1/50	6303ZZ	UN-26571-2	UN-3293-2	UN-37104-2	UN-3293-2	TMB307ZZ	TCY35488
	1/60	6304ZZ	UN-2880-2	UN-3293-2	6306ZZ	UN-40112-2	6309ZZ	TCY45609
	1/80 ~ 1/100	6304ZZ	UN-2880-2	UN-3293-2	TMB306ZZ	UN-40112-2	6309ZZ	TCY45609
	1/120 ~ 1/200	6305ZZ	UN-3293-2	6306ZZ	6308ZZ	B-2416	6312ZZ	TCY60789
2.2kW	1/5 ~ 1/20	-	-	UN-26571-2	UN-3293-2	UN-3293-2	6307ZZ	TCY35488
	1/25 ~ 1/30	-	-	UN-3293-2	6306ZZ	UN-40112-2	6309ZZ	TCY45609
	1/40 ~ 1/50	6305ZZ	UN-3293-2	UN-3293-2	TMB306ZZ	UN-40112-2	6309ZZ	TCY45609
	1/60 ~ 1/100	UN-37104-2	UN-3293-2	6306ZZ	6308ZZ	B-2416	6312ZZ	TCY60789
	1/120 ~ 1/200	UN-37104-2	UN-3293-2	6306ZZ	TMB308ZZ	B-2416	6312ZZ	TCY60789
3.7kW	1/5 ~ 1/15	-	-	6305ZZ	6306ZZ	F-2826	6309ZZ	TCY45609
	1/20 ~ 1/30	-	-	6305ZZ	TMB306ZZ	F-2826	TMB309ZZ	TCY45609
	1/40 ~ 1/50	UN-37104-2	UN-3293-2	6306ZZ	6308ZZ	B-2416	6312ZZ	TCY60789
	1/60	UN-37104-2	UN-3293-2	6306ZZ	TMB308ZZ	B-2416	6312ZZ	TCY60789
	1/80 ~ 1/120	TMB306ZZ	UN-3293-2	TMB307ZZ	TMB309ZZ	B-2620	22213	TCY658812
5.5kW	1/5 ~ 1/10	-	-	6305ZZ	6306ZZ	F-2826	TMB309ZZ	TCY45609
	1/15 ~ 1/30	-	-	6306ZZ	6308ZZ	B-2416	6312ZZ	TCY60789
	1/40 ~ 1/50	6307ZZ	UN-37104-2	6307ZZ	6309ZZ	B-2620	22213	TCY658812
	1/60	TMB307ZZ	UN-37104-2	TMB307ZZ	TMB309ZZ	B-2620	22213	TCY658812
	1/80 ~ 1/120	6308ZZ	UN-37104-2	6309ZZ	NF310	TAFI-506835	22215	TCY7510013
7.5kW	1/5 ~ 1/20	-	-	6306ZZ	6308ZZ	B-2416	6312ZZ	TCY60789
	1/25 ~ 1/30	-	-	6207ZZ	6309ZZ	B-2620	22213	TCY658812
	1/40 ~ 1/45	TMB308ZZ	UN-37104-2	6309ZZ	6310ZZ	TAFI-506835	22215	TCY7510013
	1/50 ~ 1/80	TMB308ZZ	UN-37104-2	6309ZZ	NF310	TAFI-506835	22215	TCY7510013

• High ratio reduction type (Drawing F) – Front stage section

Output	Reduction ratio	Medium shaft bearing		Medium shaft oil seal
		Input side	Output side	
0.1kW	1/240 ~ 1/1200	6201ZZ	6203ZZ	Y15257
0.2kW	1/240 ~ 1/1200	6301ZZ	6304ZZ	MHS20358
0.4kW	1/240 ~ 1/1200	6303ZZ	6305ZZ	MHS20358
0.75kW	1/240 ~ 1/500	UN-37104-2	6307ZZ	MHS35508
1.5kW	1/240 ~ 1/300	UN-37104-2	TMB307ZZ	MHS35508
2.2kW	1/240 ~ 1/300	6307ZZ	6309ZZ	MHS40588

• High ratio reduction type (Drawing F) – Rear stage section

Output	Reduction ratio	Medium shaft bearing				Output shaft bearing		Output shaft oil seal
		Small shaft		Larger shaft		Input side	Output side	
		Input side	Output side	Input side	Output side			
0.1kW	1/240	UN-2564-2	6300ZZ	-	-	UN-26571-2	6206ZZ	TCY30458
	1/300 ~ 1/400	UN-2564-2	6300ZZ	UN-2564-2	6204ZZ	UN-26571-2	6206ZZ	TCY30458
	1/500 ~ 1/600	UN-2564-2	6300ZZ	UN-2564-2	6303ZZ	UN-26571-2	6206ZZ	TCY30458
	1/800 ~ 1/1200	UN-2564-2	UN-2564-2	UN-26571-2	UN-3293-2	UN-3293-2	6307ZZ	TCY35488
0.2kW	1/240	-	-	UN-2880-2	UN-3293-2	UN-3293-2	6307ZZ	TCY35488
	1/300 ~ 1/600	6303ZZ	UN-2564-2	UN-2880-2	UN-3293-2	UN-3293-2	6307ZZ	TCY35488
	1/800 ~ 1/1200	6304ZZ	UN-2880-2	UN-3293-2	6306ZZ	UN-40112-2	6309ZZ	TCY45609
0.4kW	1/240 ~ 1/600	6304ZZ	UN-2880-2	UN-3293-2	6306ZZ	UN-40112-2	6309ZZ	TCY45609
	1/800 ~ 1/1200	6305ZZ	UN-3293-2	6306ZZ	6308ZZ	B-2416	6312ZZ	TCY60789
0.75kW	1/240 ~ 1/500	UN-37104-2	UN-3293-2	6306ZZ	6308ZZ	B-2416	6312ZZ	TCY60789
1.5kW	1/240 ~ 1/300	UN-37104-2	UN-3293-2	6306ZZ	6308ZZ	B-2416	6312ZZ	TCY60789
2.2kW	1/240 ~ 1/300	6307ZZ	UN-37104-2	6307ZZ	6309ZZ	B-2620	22213	TCY658812

12 . REQUEST REGARDING INQUIRY

When you inquire the dealer or our company regarding the product, please inform the following items at that time.

Nameplate description
Type
Gear ratio
Serial No.
Output
Poles
Volt

Reference items
Status of failure
Kind of load
Connection method with mating machine
Working time
Other reference items

Guarantee

Our guarantee period under your normal installation and normal handling is 18 months after shipping from our factory or 12 months after delivery, whichever shorter one. The scope of guarantee is limited to the repair of delivered device (geared motor).

1. The guarantee is valid only in Japan.
2. For the following cases, the repair is onerous even during guarantee period.
 - (1) Failure or damage due to improper handling, modification or undue repair
 - (2) Failure or damage due to fall or transportation after purchase
 - (3) Failure or damage due to fire, earthquake, flood disaster, lightning, other act of God, pollution and abnormal voltage