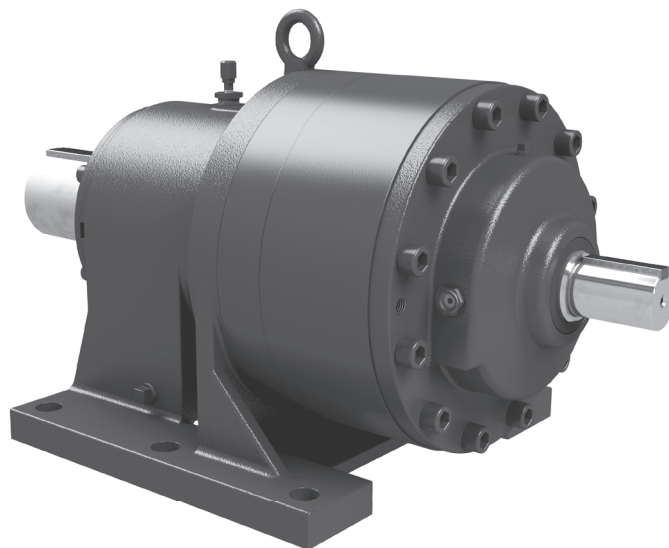


## **COMPOWER<sup>®</sup>**

### Planetary Gear Drive DP1000 Series



#### 《CAUTION》

- These Products should be handled, installed and maintained by trained technicians. Carefully read the maintenance manual before use.
- Oil is removed from these products before shipment. Supply oil according to the maintenance manual before operation.
- This maintenance manual should be sent to the actual user.
- This maintenance manual should be kept by the user for future reference.



# Introduction: Safety Precautions

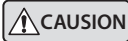
- Carefully read this maintenance manual and all accompanying documents before use (installation, operation, maintenance, inspection, etc.). Thoroughly understand the machine, information about safety, and all precautions for correct operation. After reading, retain this manual for future reference.
- Pay close attention to the “DANGER” and “CAUTION” warnings regarding safety and proper use.



Improper handling may result in physical damage, serious personal injury and / or death.



Improper handling may result in physical damage and/ or personal injury.

Matters described in  may lead to serious danger depending on the situation. Be sure to observe important matters described herein.

## DANGER

- Transport, installation, plumbing, wiring, operation, maintenance, and inspections should be performed by trained technicians; otherwise, electric shock, injury, fire, or damage to the equipment may result.
- When using the equipment in conjunction with explosion proof motor, a technician with electrical expertise should supervise the transport, installation, plumbing, wiring, operation, maintenance and inspection of the equipment, so as to avoid a potentially hazardous situation that may result in electrical shock, fire, explosion, personal injury and/or damage to the equipment.
- When the unit is to be used in a system for human transport, a protecting device for human safety should be installed to prevent accidents resulting in personal injury, death, or damage to the equipment due to running out of control or falling.
- When the unit is to be used for an elevator or lifter, install a safety protecting device on the elevator side to prevent falling; otherwise, personal injury, death, or damage to the equipment may result.
- Do not disassemble the product while operating. And do not disassemble the parts except the oil-level stick, drain port and inspection cover while the input/output shaft or the motor connecting to the machine, however it is not operating ; otherwise, personal injury, death or damage to the equipment due to falling or running out of control originating from coming off gear engagement may result.




## CAUTION

Please install loss prevention device such as oil pan to the machine which is vulnerable to oil especially (machine for food processing and machine for clean room, and so on) in case oil or grease leaks; otherwise, the product may fail because of oil leakage.

# Introduction: Reading the Maintenance Manual, Table of Contents

This maintenance manual is for COMPOWER DP1000 Series. See the maintenance manual of Motor (No.MM1001E) for handling the motor-brake of Drive Unit.

The symbols shown below appear in the upper right or left corner of each page to indicate the classification. Please read the applicable pages. On Common pages, symbols identify distinctions between specific specifications.

Specifications	All specifications are common	Drive Unit	Reducer
Mark			

## Contents

Introduction: Safety Precautions .....	1
Introduction: Reading the Operation Manual, Table of Contents.....	2
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# 1. Inspection upon Delivery **Common**

## ⚠ CAUTION

- Unpack the unit after verifying that it is positioned right side up; otherwise, injury may result.
- Verify that the unit received is in fact the one you ordered. Installing the wrong unit may result in personal injury or equipment damage.
- Do not remove the nameplate.

Verify the items listed below upon receiving the product. If a nonconformity or problem is found, contact our nearest agent, distributor, or sales office.

- [1] Does the information on the nameplate conform to what you ordered?  
 [2] Was any part broken during transport?  
 [3] Are all bolts and nuts tightened firmly?

### 1-1 Reading the Nameplates

Representative examples of nameplates are shown below.  
 Please observe them by type.

When consulting us, provide [1]reducer or drive-unit nomenclature, [2]reduction ratio, and [3]Serial number.

#### (1) For reducer or drive-unit

[1] Nomenclature of reducer or drive-unit (See P.4 or P.5)

[2] Reduction ratio

Input power

[3] Serial number (Manufacturing number)

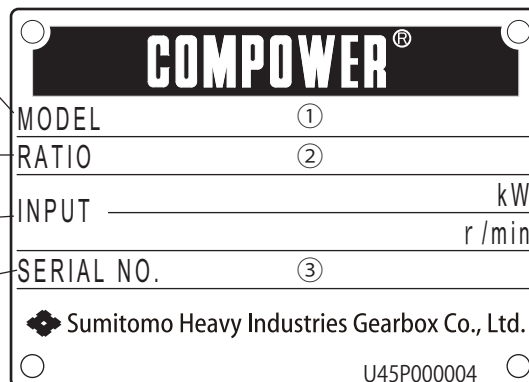


Fig1-1 Nameplate of gear part

#### (2) For drive-unit

Motor capacity

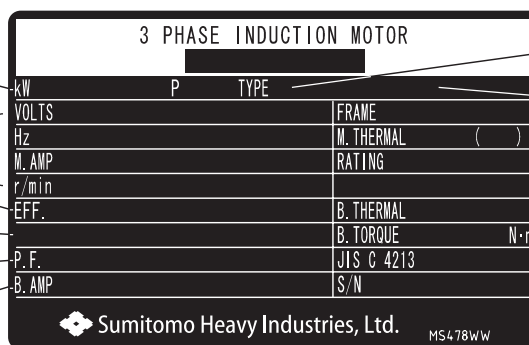
Motor characteristics

Motor efficiency

IE code

Power factor

Brake current value (for the motor with a brake)



Motor nomenclature

Type of brake (for the motor with brake)

Brake torque (for the motor with brake)

Serial number (Manufacturing number)

Fig1-2 Nameplate of motor

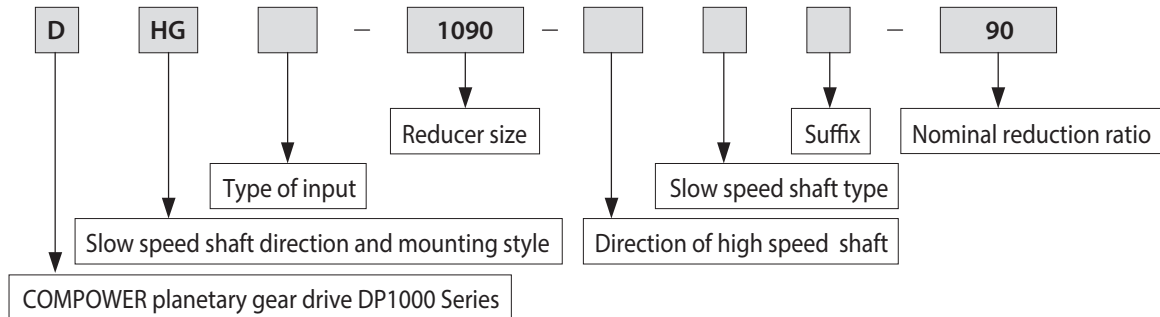


# 1. Inspection upon Delivery

## 1-2 Nomenclature

Symbol meanings are shown below. Please confirm that the nomenclature matches the order. In the case of special model, there may not be nomenclature in the following.

### (1) Nomenclature of Reducer



#### Slow speed shaft direction and mounting style

Horizontal and Foot mount	Horizontal and Flange mount	Vertical and Flange mount	Horizontal and Shaft mount

#### Type of input

Blank free solid shaft	J With motor adapter	JM With motor adapter and motor

#### Direction of high speed shaft

Blank In-line	G Rightangle	L/R/U/D Direction of rightangle

#### Slow speed shaft type

Blank Solid shaft with key	P Spline shaft	T Hollow shaft with Shrink disc

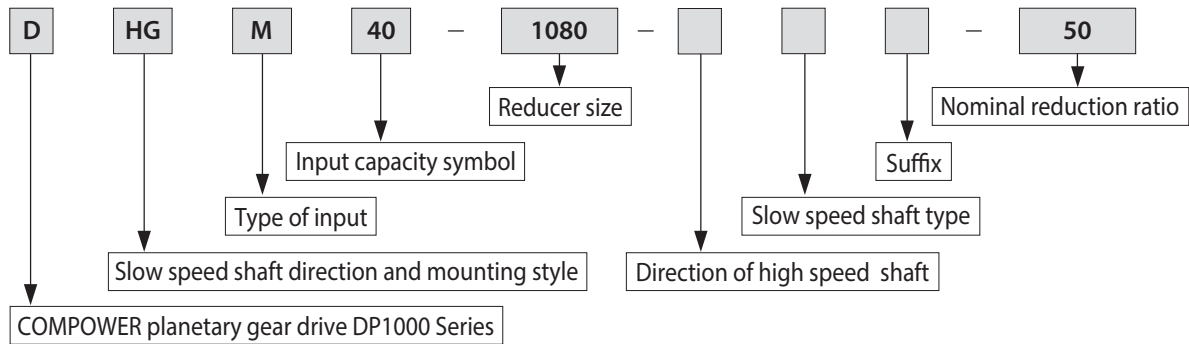
#### Suffix

Blank Standard type	F With cooling fan	R Radial base mount
-		

# 1. Inspection upon Delivery



## (2) Nomenclature of Drive-unit



Slow speed shaft direction and mounting style

Horizontal and Foot mount	Horizontal and Flange mount	Vertical and Flange mount	Horizontal and Shaft mount

Type of input

Motor directly connected

Input capacity symbol

Symbol	kW (HP)	Symbol	kW (HP)	Symbol	kW (HP)
02	0.2 (1/4)	5	3.7 (5)	30	22 (30)
05	0.4 (1/2)	8	5.5 (7.5)	40	30 (40)
1	0.75 (1)	10	7.5 (1.0)	50	37 (50)
2	1.5 (2)	15	11 (15)	60	45 (60)
3	2.2 (3)	20	15 (20)	75	55 (75)
4	3.0 (4)	25	18.5 (25)		

Direction of high speed shaft

Blank In-line

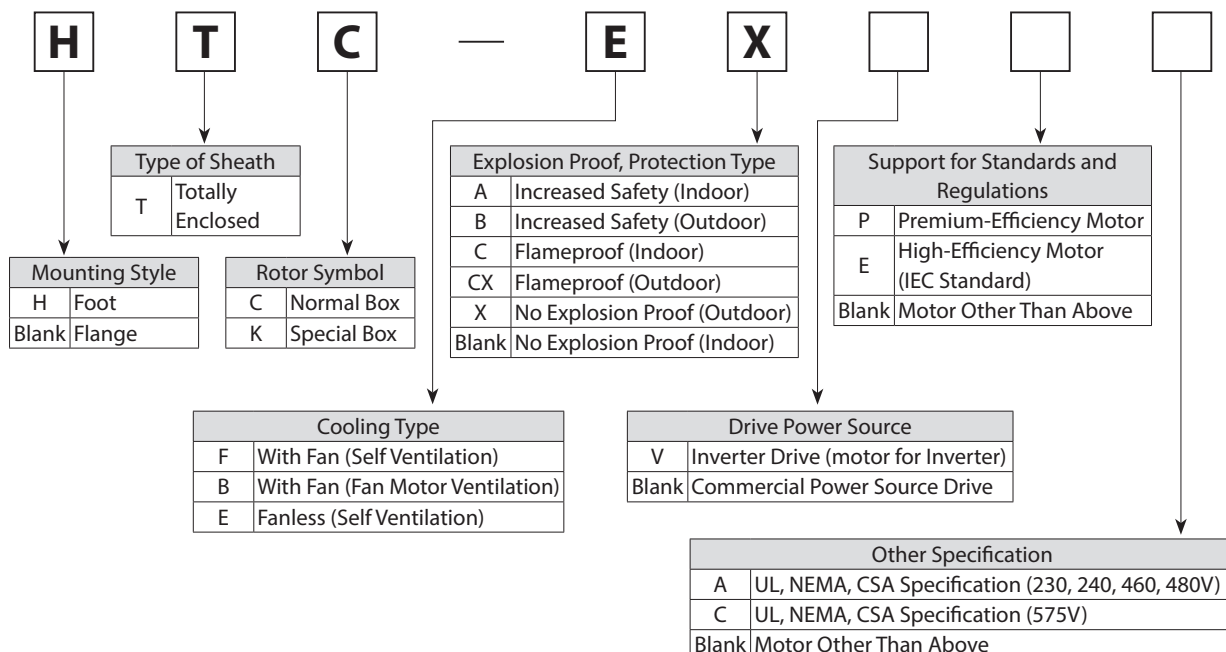
Slow speed shaft type

Blank Solid shaft with key	P Spline shaft	T Hollow shaft with Shrink disc

Suffix

Blank Standard type
-

## (3) Nomenclature of motor



# Common 2. Storage

If this product is not for immediate use, note the following points when storing it.

## 2-1 Storage Location

Store the product indoors in a clean, dry location.

Do not store outdoors. Store in a location that is free of moisture, dust, extreme temperature changes, corrosive gases, etc.

## 2-2 Storage Time

- The storage time should be within the rust prevention time shown below.
- If the storage time exceeds the rust prevention time shown below, adherence to special rust prevention specifications is required.  
Please consult with us.
- If for export, adherence to export rust prevention specifications is required. Please consult with us.
- Standard rust prevention specifications
  - External rust prevention      Rust prevention oil is applied when shipping from the factory. Check rust conditions every six months after shipment. Reapply the rust prevention process, if necessary.

## 2-3 Using after Storage

- Oil seals are affected by temperature, ultraviolet light and other ambient conditions and can easily degrade. After long storage periods, inspect before operation, and replace any degraded seals with new seals.
- At startup, check that there are no unusual noises, vibrations, temperature rises, or other symptoms. For models with brakes, check that brakes work properly.  
If any abnormalities are found, immediately contact the nearest authorized service station.

# Common 3. Transport

### DANGER

- Do not stand directly under a unit suspended by a crane or other lifting mechanism; otherwise, injury, or death may result.

### CAUTION

- Be careful not to drop the unit. When a hanging bolt or hole is provided, be sure to use it. After mounting a unit on a machine, do not hoist the entire machine by using the hanging bolt or hole; otherwise, personal injury or damage to the equipment and/ or lifting device may result.
- Before hoisting, refer to the nameplate, crate, outline drawing, catalog, etc. for the weight of the unit. Never hoist a unit that exceeds the load capacity of the crane or other mechanism being used to lift it; otherwise, personal injury or damage to the equipment and/ or lifting device may result.
- When the products are lifted, use suitable lifting parts, and confirm that eye-bolts and nuts are not loose.



## **DANGER**

- Do not use a standard unit in an explosive atmosphere (which is likely to be filled with explosive gas or steam). Under such conditions, an explosion proof motor should be used; otherwise, electric shock, personal injury, explosion fire, or damage to the equipment may result.
- In the case of an **explosion proof motor**, use a motor that has specifications that are appropriate for a dangerous location (a location where gas or volatile vapor is present); otherwise explosion, ignition, electric shock, injury, fire, or equipment damage may result.
- When a **flameproof motor is driven by an inverter**, install an inverter in a place free from explosive gas since the inverter itself is not explosion proof. Otherwise, electric shock, personal injury, explosion fire, or damage to the equipment may result.

## **CAUTION**

- Do not use the products for purposes other than those shown on the nameplate or in the manufacturing specifications; otherwise, electric shock, personal injury, or damage to the equipment may result.
- Do not place flammable objects around the gearmotor; otherwise, fire may result.
- Do not place any object around the gearmotor or reducer that will hinder ventilation. Insufficient ventilation can cause excessive heat that may result in burns or fire.
- Do not step on or hang from the gearmotor or reducer; otherwise injury may result.
- Do not touch the shaft end of the gearmotor or reducer, inside keyways, or the edge of the motor cooling fan with bare hands; otherwise, injury may result.
- Please install loss prevention device such as oil pan to the machine which is vulnerable to oil especially (machine for food processing and machine for clean room, and so on) in case oil; otherwise, the product may fail because of oil leakage.

### **4-1 Installation Location**

Ambient temperature:	-10 to +40°C
Ambient humidity:	85%RH or less with no condensation
Altitude:	Maximum 1,000 m
Atmosphere:	No corrosive or volatile gases, no steam Dust-free, well-ventilated area.
Installation location:	Indoors (area with minimal dust, no contact with water)

- Mounting in conditions other than the above requires adherence to optional specifications. Please consult with us.
- Drives built according to special specifications, such as outdoor type, explosion proofing, etc. can be used in the specified mounting environments. However, concerning the connector to the machine used, implement measures based on the mounting environment.
- Mount in a location that enables easy operation, such as inspection and maintenance.
- Mount on a sufficiently rigid base.

### **4-2 Mounting angle**

Mount the product on the horizontal base. (In the case of mounting with any angle, consult us.)  
And for products manufactured with specified mounting angle, only use the specified mounting angle.

### **4-3 Mounting method**

- Mount the product surely on the base with enough stiffness to use the steel bolts at least class 10.9 (JIS B 1051) strength.
- Construct knock pins on the product in the case of operating with heavy vibration and shock.
- In the case of the reducer-unit with motor mounted the base, however their shaft are centered enough before sipping, they may have gap between each shafts of motor and reducer while transportation or due to the condition of concrete base. Center each shafts of motor and reducer again at installation of the unit.
- Rust proof oil is applied on the face of high/slow speed shaft, key and mounting face. Remove it before installation, but do not use special solvent or sandpaper.

# Common 5. Coupling with Other Machines

## ⚠ CAUTION

- Confirm the rotation direction before coupling the unit with the driven machine. Incorrect rotation direction may cause personal injury or damage to the equipment.
- When operating the product alone (uncoupled), remove the key that is temporarily attached to the low speed shaft; otherwise the key could fly off, and injury may result.
- Cover rotating parts; otherwise, injury may result.
- When coupling the product with a load, check that the centering, the belt tension and parallelism of the pulleys are within the specified limits. When the unit is directly coupled with another machine, check that the direct coupling accuracy is within the specified limits. When a belt is used for coupling the unit with another machine, check the belt tension. Correctly tighten bolts on the pulley and coupling before operation; otherwise, there is a risk of injury due to scattering the broken pieces or of damage to the products.

## 5-1 Mounting Connected Equipment

- When mounting connected equipment, do not apply impact or excessive axial load to the shaft. The bearing could be damaged, or the collar could come off.
- Shrinkage fit is recommend.

### (1) When using a coupling

The alignment accuracy (A, B, X) in figure 5-2 should be no greater than that shown in Table 5-1.

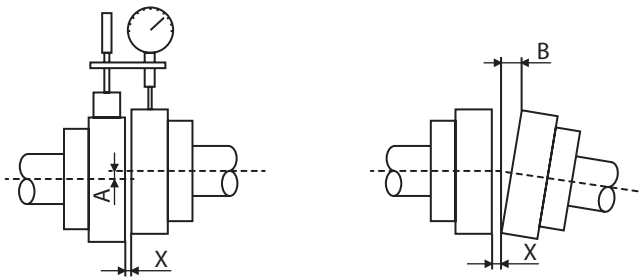


Fig. 5-2

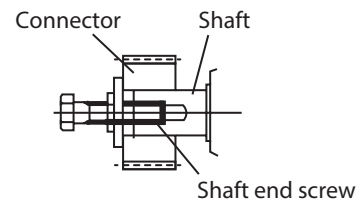


Fig. 5-1

Table 5-1 Alignment Precision for Flexible Coupling

Allowable tolerance A	0.05mm
Allowable tolerance B	0.05mm
X	manufacturer-specified X value

### (2) When using chains, sprockets, or gears

- When using a chain, attach so that the chain tension angle is perpendicular to the shaft.
- Refer to the chain catalog or other reference for chain tension.
- The pitch circle diameter of the sprocket and gear shall be three times or more of the shaft diameter.
- The working load point of the sprocket or gear should go from the center of the shaft to this product. (See figure 5-3)

### (3) When using a V-belt

- Over-tightening the V-belt will damage the shaft and bearing. - Refer to the V-belt catalog or other reference for V-belt tension.
- The parallelism, eccentricity  $\beta$  of the two pulleys should be within  $20'$ . (See figure 5-4)
- When using multiple V-belts, use a matched set having the same circumferential length.

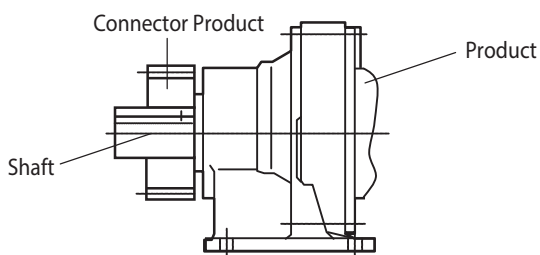


Fig. 5-3

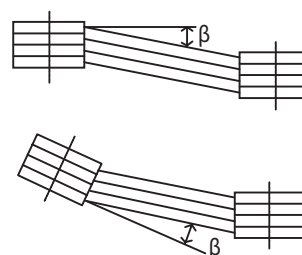


Fig. 5-4

# 5. Coupling with Other Machines **Common**

## 5-2 Hollow shaft type

### ■ Remarks for mounting and removal of shrink disk

New shrink disk can be mounted as it is since proper grease has been applied before shipment. When mounting used shrink disk, disassemble and clean it first. Smear sliding cone, locking bolt, and contact area of locking bolt with molybdenum disulfide like MOLYKOTE BR-2 and MolyLG grease. Prior test of tightening locking bolt is recommended.

### CAUTION

Clean oil content on the hole of boss and its contacting shaft sufficiently. Do not use solvent; corrosion by the solvent may occur. Locking bolt shall be tightened when the shaft is fully inserted in the boss.

It is recommended to smear the surface of boss and hole of sliding cone with grease before mounting shrink disk.

### Mounting procedure

- [1] If shrink disk can be easily lifted, mount it as assembly, If it is very heavy and crane cannot be used, disassemble first and assemble it on the hub.
- [2] Make sure that outer ring and inner ring are parallel when tightening bolts.(A short handle wrench is suitable.)
- [3] After confirming that the shrink disk is set correctly, tighten the bolts with a wrench of appropriate length. Uniformly and orderly, tighten bolts clockwise (not diagonally) while keeping outer ring and inner ring parallel. it is recommended to tighten respective bolts by 30 degree each time.
- [4] All locking bolts shall be tightened with a torque wrench in accordance with the torque strength shown in the table 2.
- [5] Finally, confirm gain that outer ring and inner ring are parallel.

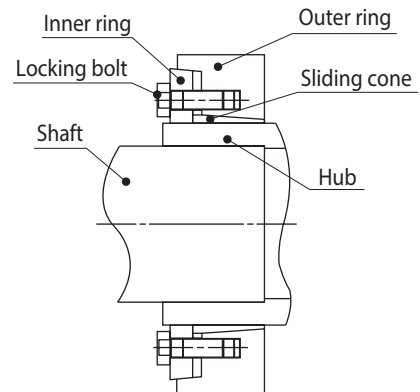


Fig. 5-5

### Removal procedure

Steps of removal procedure shall be done in a reverse order of mounting procedure. Keep reducer or shrink disk from falling off shaft during the process. Carefully loosen locking bolts for keeping outer ring from inclining on the sliding cone.

### CAUTION

Do not remove locking bolts unless you confirm that outer ring and inner ring are parallel; otherwise, injury by a sudden release of outer ring or inner ring from sliding cone.

Table 5-2 Standard torque of locking bolt for shrink disk.

Bolt (strength class 10.9)	M4	M5	M6	M8	M10	M12	M16	M20	M24	M27
Tightening torque N·m	2	4	12	30	59	100	250	490	840	1250



## 6. Wiring

This manual shows wiring for motors with Japanese standard specifications. Please consult with us for motors with overseas.

### DANGER

- Do not handle the unit when cables are live. Be sure to turn off the power; otherwise, electric shock may result.
- Connect a power cable to the unit according to the diagram shown inside the terminal box or in the maintenance manual; otherwise, electric shock or fire may result.
- Do not forcibly bend, pull, or clamp the power cable and lead wires; otherwise, electric shock or fire may result.
- Correctly ground the grounding bolt; otherwise, electric shock may result.
- The lead-in condition of an **explosion proof motor** shall conform to the facility's electrical codes, extension regulations and explosion-proofing guide, as well as the maintenance manual; otherwise, electric shock, personal injury, explosion, fire or damage to the equipment may result.

### CAUTION

- When wiring, follow the facility's electrical codes and extension regulations; otherwise, burning, electric shock, injury, or fire may result.
- The motor is not equipped with a protection device. However, it is compulsory to install an overload protector according to facility electrical codes. It is recommended to install other protective devices (earth leakage breaker, etc.), in addition to an overload protector, in order to prevent burning, electric shock, injury, and fire.
- Never touch the terminals when measuring insulation resistance; otherwise, electric shock may result.
- When using a **When using a star-delta starter** select one with an electromagnetic switch on the primary side (3-contact point type); otherwise, fire may result.
- Voltage PWM inverters that use IGBT generate high-voltage surges at the motor terminals, which may degrade the insulation on the motor windings. In particular, if for example using a 400V class with long cables, a surge in excess of 1300V could be generated. Because of the the following measures are required.
  - Install an LCR filter or and AC reactor between the inverter and the motor
  - Enhance motor winding insulation
- For units **When using a motor with brake** , do not turn on connection power to the brake coil when the motor is stopped. Otherwise coil burnout fire, may result. Also, mistaken wiring could damage the rectifier.
- **When a explosion proof motor is driven by an inverter** , use one inverter for one motor. Use the approved inverter for the motor.
- When measuring the insulation resistance of a **explosion proof motor** , confirm that there is no gas or explosive vapor in the vicinity, in order to prevent possible explosion or ignition.
- If ambient temperature exceeds 60°C , place the rectifier in a location where the temperature is 60°C or less. In this case, always protect the entire rectifier with a cover. However, standard ambient temperature conditions for units with and without brakes is -10 to 40°C . (Manufacture to special specification is required for operation in an environment where ambient temperature exceeds 40°C .)
- Long cables cause large voltage drops. Select cables with appropriate diameter so that the voltage drop will no greater than 2%.
- After wiring **outdoor types and explosion proof types** , check that terminal box mounting bolts are not loose, and correctly attach the terminal box cover.

## 6-1 Measuring Insulation Resistance

When measuring insulation resistance, always disconnect the control board and measure the motor alone.

Measure insulation resistance before wiring. Insulation resistance (R) is changed by a number of factors, including motor output, voltage, type of insulation, winding temperature, moisture, degree of fouling, time used, and amount of time test voltage is applied.

However, normally, it must be above the values in Table 6-1.

Table 6-1 Values for Insulation Resistance

Motor voltage	Megaohmmeter voltage	Insulation resistance (R)
Low-voltage electric motors of no more than 600V	500V	Minimum 1 MΩ

Reference: JEC -2100 contains the following equation.

$$R \geq \frac{\text{Rated Voltage (V)}}{\text{Rated output power (kW) + 1,000}} \quad (\text{M}\Omega)$$

$$R \geq \frac{\text{Rated Voltage (V) + (RPM/3)}}{\text{Rated output power (kW) + 2,000}} + 0.5 \quad (\text{M}\Omega)$$

Low insulation resistance is a sign that there is an insulation failure. Do not apply power. Consult an accredited service station.

## 6-2 Coordination of System Protection

- Use a wiring breaker for short circuit proofing.
- Use an overload protection device designed to handle currents that exceed the rated current on the nameplate.
- For **Increased safety, explosion proof motor**, use an overload protection device capable of protecting the locked rotor current on the nameplate within the allowable locking time.

## 6-3 Connecting the Power Cable

Connect the power cable and motor lead wire by clasp in a pressure connection terminal as shown in figure 6-2.

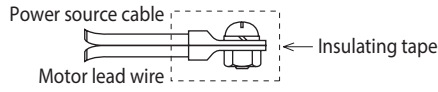


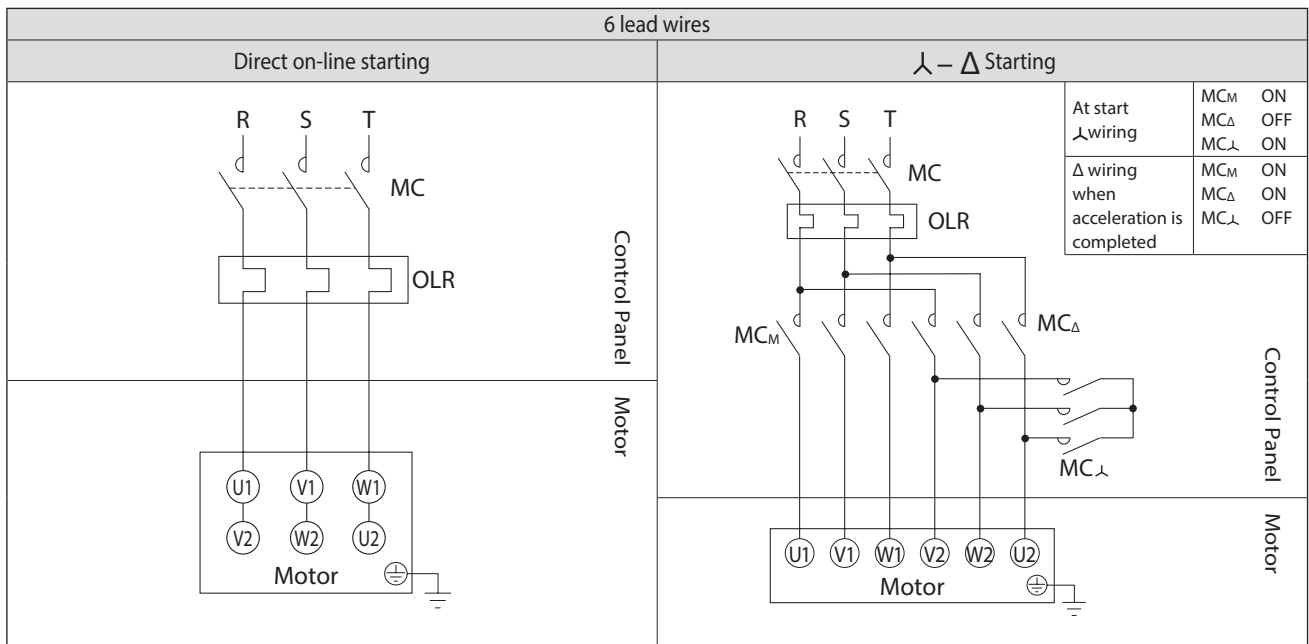
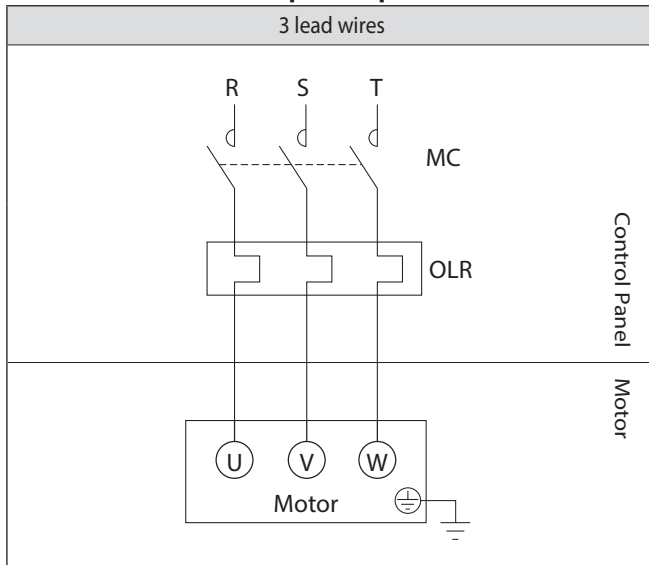
Fig. 6-1



# 6. Wiring

shows motor wiring and standard specification for terminals and lead wires that are indicated by symbols.

## ■ Without brake 3-phase power source



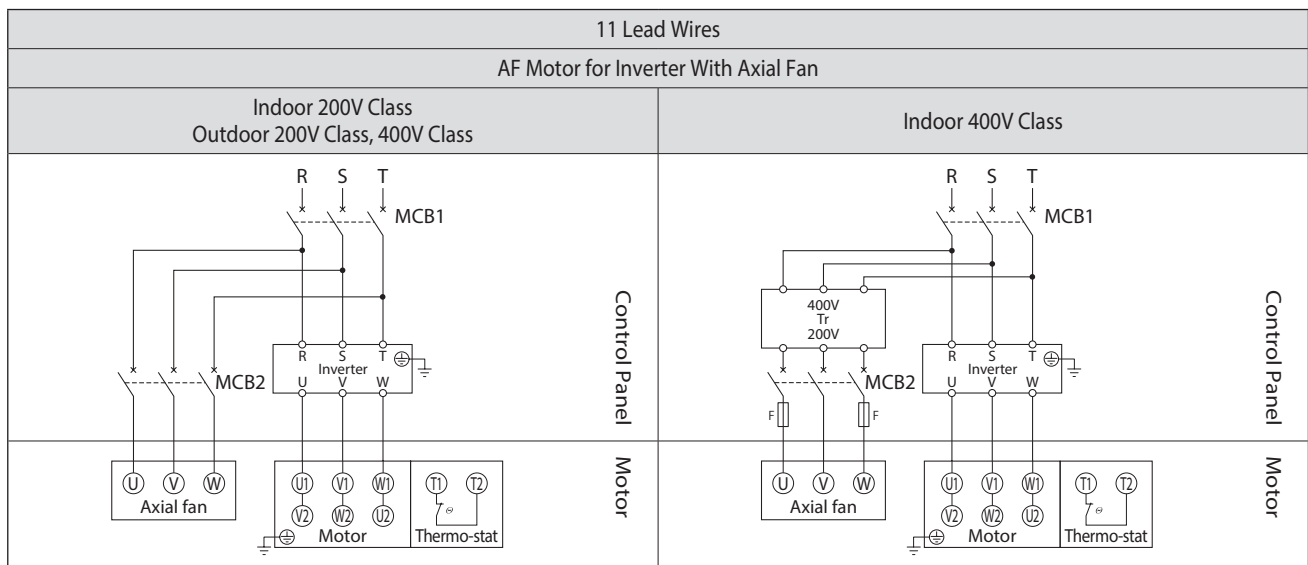
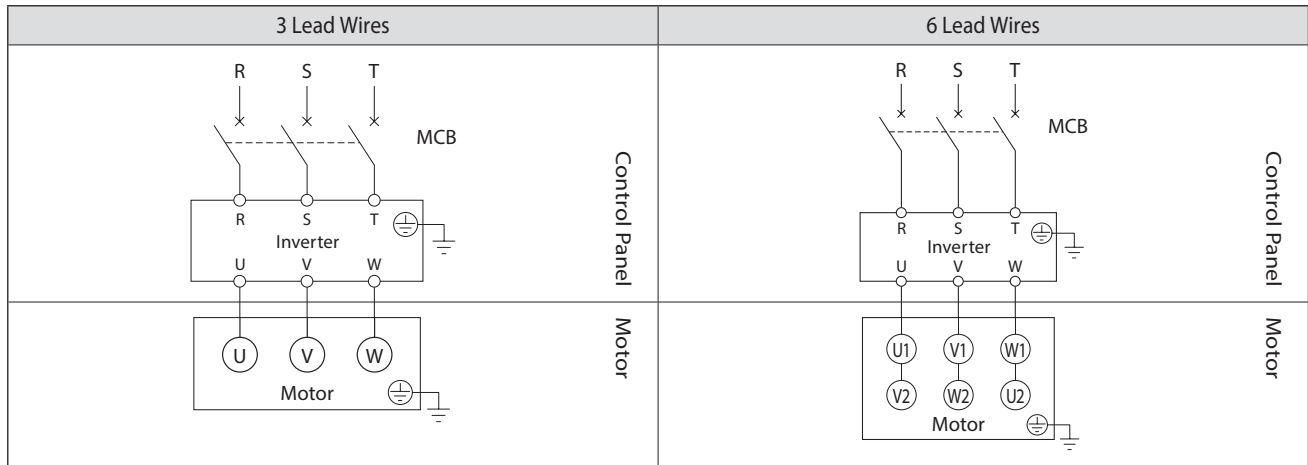
MC: Electromagnetic contactor

OLR: Overload protection device or electronic thermal relay

— Customer to prepare.

- This diagram shows cases for motors with standard Japanese domestic specifications. Please consult with us for motors with overseas specifications.

## Without brake, Inverter drive



MCB: Breaker for wiring

Tr: Transformer capacity 250–300VA, Secondary voltage 200–220V

F: Fuse 3–5A

} Customer to prepare.

- This diagram shows cases for motors with standard Japanese domestic specifications. Please consult with us for motors with overseas specifications.
- When using inverter for 400V class 3-phase motor / high-efficiency 3-phase motor, the motor must be insulated.

In the case of **With axial fan (totally enclosed, ventilated types)**

- Also connect a power source to the axial fan.
- For an indoor 400V class, the axial fan power source voltage will be 200V class. For the motor with special specifications, specifications may differ from the above. Check the manufacturing specifications.
- Connect the fan so that it rotates in the same direction as that shown on the nameplate for direction of rotation.  
(Normally, the air from the fan will blow in a direction from the anti-load side to the load side.)
- When the motor is shut down for a long period, also shut down the axial fan motor.
- Wire the mounted thermostat.
- Thermostat specification: Terminal symbols: T1, T2 and P1, P2      Operating function: Normal close (b contact point)  
Operating temperature: 135°C (for thermal class 155 (F))      Maximum current: DC 24V, 18A; AC 230V, 13A

# Common 7. Operation

## DANGER

Do not approach or touch rotating parts (low speed shaft, etc.) during operation; otherwise loose clothing may become caught in these rotating parts and cause serious injury or death.

## CAUTION

- Do not put fingers or foreign objects into the opening of the product; otherwise, electric shock, injury, fire, or damage to the equipment may result.
- The product becomes very hot during operation. Touching the unit may result in burns.
- Do not loosen the oil filler plug, or do not open the cover for maintenance during operation; otherwise, hot, splashing lubricant may cause burns.
- In the case of drive opposite rotation, do stop the product at once before starting; damage to the equipment may result.
- If any abnormality occurs during operation, stop operation immediately; otherwise, electric shock, personal injury, or fire may result.
- Do not operate the unit in excess of the load rating; otherwise, personal injury, or damage to the equipment may result.

- These products are shipped with oil removed. Before operating, they must be supplied the recommended lubricating oil.
- The type of long-term rustproof, rustproof for export or lubrication-oil enclosure are shipped to be sealed up by the plug on the port for air breather.  
Before the product mounting, do change the plug to the air breather attached.
- The special piping type is shipped with attaching pipes due to be afraid to be damaged at the shipping.  
After the product mounting, do lay a pipe to it.

After installation and wiring are completed, check the following items before operating.

- Is the wiring correct?
- Is the unit properly coupled with the driven machine?
- Are mounting bolts tightened firmly?
- Is the direction of rotation as required?
- Does the oil level in an oil-lubricated model reach the top red line of the oil gauge when the unit is at rest?

After confirming these items, operate without a load and gradually apply a load. Check the items shown in Table 7-1.

Table 7-1 Items to Check During Operation

Is abnormal sound or vibration generated?	<ul style="list-style-type: none"> <li>• Is the housing deformed because the installation surface is not flat?</li> <li>• Is insufficient rigidity of the installation base generating resonance?</li> <li>• Is the shaft center aligned with the driven machine?</li> <li>• Is the vibration of the driven machine transmitted to the gearmotor or reducer?</li> </ul>
Is the surface temperature abnormally high?	<ul style="list-style-type: none"> <li>• Is the voltage rise or drop substantial?</li> <li>• Is the ambient temperature too high?</li> <li>• Does the current flowing to the gearmotor exceed the rated current shown on the nameplate?</li> </ul>

If any abnormalities are found, immediately stop operation and contact the nearest authorized service station.



# 8. Daily Inspection and Maintenance **Common**

## DANGER

Do not approach or touch any rotating parts (output shaft, etc.) during run-time maintenance or inspection of the unit; loose clothing may become caught in these rotating parts and cause serious injury or death.

## CAUTION

- Do not put fingers or foreign objects into the opening of the gearmotor or reducer; otherwise, electric shock, injury, fire, or damage to the equipment may result.
- The gearmotor or reducer becomes very hot during operation. Touching the unit with bare hands may result in serious burns.
- Promptly identify and correct, according to instructions in this maintenance manual, any abnormalities observed during operation. Do not operate until the cause for the abnormality is understood, and the abnormality is corrected.
- Change lubricant according to the maintenance manual instructions. Be sure to use factory recommended lubricant.
- Do not change lubricant during operation or immediately after stopping operation; otherwise, burns may result.
- Do not operate damaged gearmotors or reducers; otherwise, injury, fire, or damage to the equipment may result.
- We cannot assume any responsibility for damage or injury resulting from an unauthorized modification by a customer, as it is outside the scope of the warranty.
- Dispose of gearmotor or reducer lubricant as general industrial waste.

## 8-1 Daily Inspection

Make certain to carry out daily inspections in accordance with Table 8-1. Neglecting inspections is a source of trouble.

Table 8-1 Daily inspection

Inspection item		Inspection detail
Noise		Are there unusual noises, or are there extreme changes in the noises?
Vibration		Is there abnormally large vibration? Are there extreme changes?
Surface temperature		Is surface temperature unusually high? Has there been a sudden rise? (Temperature rises during operation will differ according to model and type. However the gear unit surface temperature should be approximately 85°C, In this case, there is no particular problem if fluctuation is slight.)
Oil level		Is the oil level lower? (Check with oil check stick or oil gauge during operation is stopping.)
lubricant condition	force-feed lubrication	Are the oil signal and flow gauge working properly? Their no working properly is a sign of improper reducer lubrication, due to factors including insufficient oil, pump damage and plugged pipes. Immediately stop the machine and inspect.
Oil, grease leaks		Are oil or grease leaking from the gear unit? Are the oil seal sliding surfaces corroded?
Mounting bolts		Are the mounting bolts loose?
Chain, V-belt		Are the chain or V-belt loose?

If any abnormality is discovered during the daily inspection, take measures in accordance with "10. Troubleshooting" (P21-22).  
If these actions do not remedy the issue, immediately contact the nearest authorized service station.

# Common 8. Daily Inspection and Maintenance

## 8-2 Confirmation of Lubrication Method

Standard lubrication method

- All model of The lubrication method are oil bath type.
- In the case of vertical mount type, it may have a part of grease lubrication on the bearing part of the upper shaft.
- Check the manufacture sheet or outline drawing about the detail of specification.

### CAUTION

For equipment with moor oil pump, run the pump prior to operation of the product. Start motor of the product after lubricating oil has circulated through the bearing; otherwise, damage to the equipment may occur.

Provide flow switch or flow sight to check the circulation of the lubricating oil. Stop the motor of reducer or drive unit when abnormality occurs.

## 8-3 Oil Supply and Oil Change for part of gears

### (1) Oil change interval

Table 8-2 Oil change interval

Oil feeding	Interval		Using conditions
	At purchasing		—
Oil Change	1st time	Whichever comes first, after 500 hours or 6 months of operation	—
	2nd time	Whichever comes first, after 2,500 hours or 6 months of operation	—
	3rd time or later	Whichever comes first, every 5,000 hours or every year	When oil temperature is lower than 70°C
Whichever comes first, every 2,500 hours or every half a year		When oil temperature is 70°C or higher	

Please consult lubrication supplier when ambient temperature changes dramatically or atmosphere contains corrosive gas.

### (2) Grease filling interval

Table 8-3 Grease filling interval

Filling interval	Input speed
Every 1,500 hours	750r/min or slower
Every 1,000 hours	Over 750 to 1,800r/min

- The grease lubrication types are shipped with filled grease. After their arrival, do check pieces of their grease-nipple and their fix points.
- Check whether grease lubrication type or not, and the fix points of grease-nipple, by the specifications or outline-drawing.

### (3) Recommended lubricants

Only following lubricants in table8-4 shall be applied for lubrication.

Table 8-4 Recommended lubricants

Ambient temperature	ISO AGMA	BP	Castrol			Chevron	TEXACO	Mobil		Shell		Total	
Gear oil	-10°C~+25°C	VG150 4EP	Energol GR-XP 150	Alpha SP 150	Optigear BM 150	Tribol 1100/150	Gear Compounds EP 150	Meropa WM 150	Spartan EP 150	Mobilgear 600XP 150	Shell Omala S2 G 150	Shell Omala S2 GX 150	CARTER EP 150
	10°C~40°C	VG220 5EP	Energol GR-XP 220	Alpha SP 220	Optigear BM 220	Tribol 1100/220	Gear Compounds EP 220	Meropa WM 220	Spartan EP 220	Mobilgear 600XP 220	Shell Omala S2 G 220	Shell Omala S2 GX 220	CARTER EP 220
	30°C~50°C	VG320 6EP	Energol GR-XP 320	Alpha SP 320	Optigear BM 320	Tribol 1100/320	Gear Compounds EP 320	Meropa WM 320	Spartan EP 320	Mobilgear 600XP 320	Shell Omala S2 G 320	Shell Omala S2 GX 320	CARTER EP 320
Bearing grease		Energol LS-EP2	Spheerol AP 3	Olista Longtime 3 EP	Tribol 3020/1000-2	Duralith Grease 68	Multifak EP 2	Beacon EP2	Mobilux EP 2	Shell Alvania EP Grease 2		MULTIS EP2	

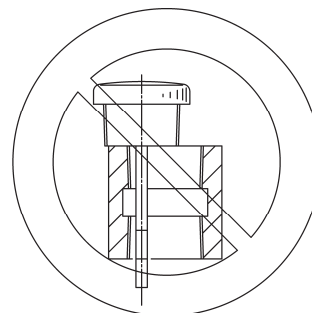
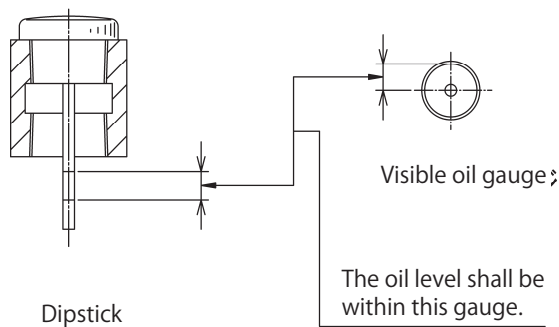
## (4) Oil fill quantity

An estimated quantity of oil for standard specifications is shown Oil quantity table on page 24. (As to oil quantity for special specifications, refer to specifications sheet and outline drawing.) The oil quantity shown in the catalog, etc., is not exact quantity. Use a dipstick or visible oil gauge to check the oil level when filling.

## (5) Oil supply and draining

Supply oil through the oil inlet on top of the main unit. Check the oil level with a dipstick or visible oil gauge. (Fig.8-1)

Screw the dipstick to its deepest position to check the oil level; otherwise, the measured oil level may be wrong. (Fig.8-2)



Make sure during the oil-filling process that any foreign materials, dust, and water will not enter the unit. If the oil level is less than the range, the unit will not be lubricated well, and if higher, deterioration of the oil is accelerated due to oil temperature rise.

Please remove drain plug located under the unit for oil draining when lubricating oil is still warm. Removing the air breather makes draining and supplying oil easier.

## (6) Grease supply and draining

- ① Confirm the position of grease fitting and relief fitting by specifications sheet and outline drawing.
- ② Supply of grease by grease gun from grease fitting. Amount of grease is shown in outline drawing.  
No need to supply grease until grease is drained from relief fitting.
- ③ To supply grease smoothly, supply grease during operation. Speed of grease supply shall be slow.

Note: During the first operation, there is possibility that grease (which was supplied before shipment) will be drained from the relief fitting. In that case, please wipe up such grease.

## 8-4 Parts Maintenance

To extend operational life, replace the following parts every 3 to 5 years.

COMPOWER Planetary Gear Drive shall be basically returned to the factory to exchange the parts.

Please inform the serial number, model name, quantity, operation period, and so on.

COMPOWER Planetary Gear Drive shall be returned to the factory or authorized shop for repairing/maintenance with disassembly.

Please inform the service center of the serial number, model name, number of unit and operation period.

Replacement parts

- Bearing, oil seal, seal sleeve, oil gauge, and air breather.
- Check and replace shafts and gears if there is any damage.
- On a case-by-case basis for other parts including special applications.



# 9. Disassembly / Reassembly

## ⚠ CAUTION

- Disassembly and reassembly shall be handled by proper technicians; otherwise, personal injury or damage to the equipment may occur.
- If any abnormal condition occurs, immediately contact the nearest authorized service station.

- Make sure not to be injured by keyway or other sharp edges of parts.
- Disassemble the unit at a clean and dry location.
- Keep accessory parts like screws in the box to prevent loss.
- Carefully handle all parts to prevent damage. Keep them from water and dust.

### 9-1 Disassembly / reassembly of gear and motor [CONSTRUCTION 1]

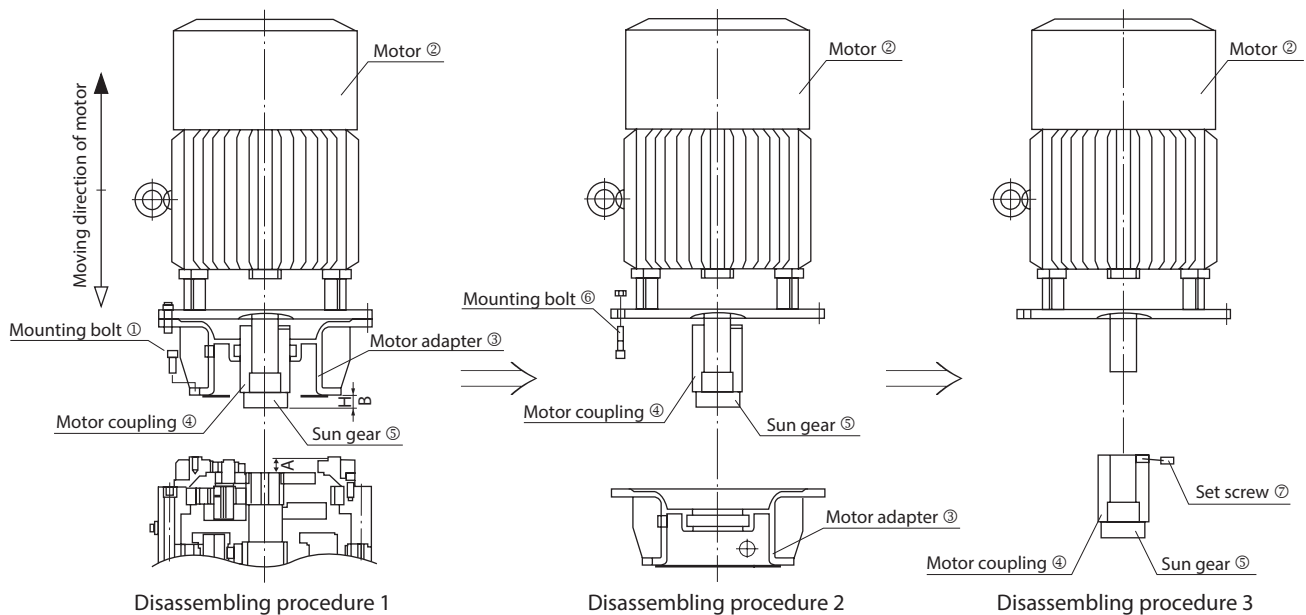


Fig. 9-1 Disassembling procedure of Construction 1

#### Disassembling procedure 1

- (1) Verify that the drive unit is the right model for Construction1 according to table 9-2 "Selection Table" on page 20.
- (2) Set the drive unit stably on rigid base with the motor upper side.
- (3) Remove mounting bolt ①.
- (4) Move motor ②, motor adapter ③, motor coupling ④, and sun gear ⑤ integrally towards →, and disassemble.

#### Disassembling procedure 2

- (1) Remove mounting bolt ⑥.
- (2) Remove motor ②, motor coupling ④, and sun gear ⑤ integrally from motor adapter ③.

#### Disassembling procedure 3

- (3) Remove set screw ⑦ and demount motor coupling ④ and sun gear ⑤ integrally from motor shaft.



## 9-2 Disassembly / reassembly of gear and motor [CONSTRUCTION 2]

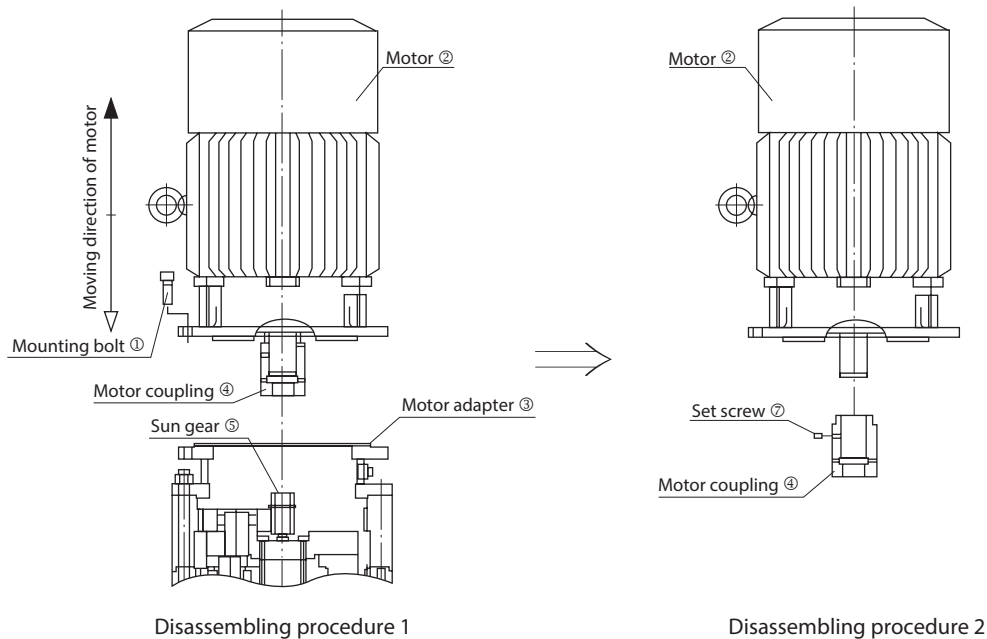


Fig. 9-2 Disassembling procedure of Construction 2

### Disassembling procedure 1

- (1) Verify that the drive unit is the right model for Construction2 according to table 9-2 "Selection Table" on page 20.
- (2) Set the drive unit stably on rigid base with the motor upper side.
- (3) Remove mounting bolt ①.
- (4) Move motor ②, motor coupling ④ integrally towards →, and disassemble.

### Disassembling procedure 2

- (1) Remove set screw ⑦ and demount motor coupling ④ integrally from motor shaft.

## 9-3 Reassembling procedure

Steps of reassembling procedure shall be done in a reverse order of disassembling procedure carefully with followings.

- (1) Keep gear part from dirt and dust, and reassemble each part to be fully cleaned with wash oil.
- (2) Assemble oil seals with attention to the direction of lip after applying grease to lip part.
- (3) For Construction1, adjust the position of sun gear within 0.5-1.5mm for A-B.
- (4) Remove old liquid packing attached to the contact area and apply new one. Assemble completely by sliding slowly towards →.
- (5) All bolts shall be tightened by a torque wrench in accordance with the standard torque shown in the table 9-1, standard torque of bolts.

Table. 9-1 Standard torque of bolts

Unit: N·m

Strength	Bolt size									
	M6	M8	M10	M12	M14	M16	M18	M20	M24	M30
4.6	3.3~4.1	8.1~9.9	16.5~20.2	28.5~34.8	45.5~55.6	70.5~86.2	95.4~117	137~167	236~289	480~586
10.9	12.8~14.2	31.0~34.8	61.3~69.0	107~120	170~191	265~298	365~411	518~583	896~1010	1370~1540



# 9. Disassembly / Reassembly

Table 9-2 Selection Table : Drive Unit

		Size of Reducer																											
		1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1185	1190		1195	1200	1205	1210	1215	1220	
Reduction ratio	5	●	●	●	●	●	●																						5
	9	●	●	●	●	●	●																						9
	16	●	●	●	●	●	●	●	●	○	○	○	○	○															16
	18				●	●	●	●	●	○	○	○	○	○															18
	20				●	●	●	●	●	○	○	○	○	○															20
	22.4	●	●	●	●	●	●	●	●	○	○	○	○	○															22.4
	25						●	●	●	○	○	○	○	○															25
	28						●	●	●	○	○	○	○	○															28
	31.5	●	●	●	●	●	●	●	●	○	○	○	○	○															31.5
	35.5				●	●	●	●	●	○	○	○	○	○															35.5
	40	●	●	●	●	●	●	●	●	○	○	○	○	○															40
	45						●	●	●	○	○	○	○	○															45
	50	●	●	●	●	●	●	●	●																				50
	56					●	●	●	●																				56
	63					●	●	●	●																				63
	71	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○													71
	80					●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	80
	90	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	90
	100					●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	100
	112					●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	112
	125	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	125
	140					●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	140
	160					●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	160
	180	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	180
	200					●	●	●	●	●		●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	200
	224	●	●	●	●	●	●	●	●										○	○					○	○	○	○	224
	250						●		●		●	●	●																250
	280										●	●	●	●															280
	315	●	●	●	●	●	●	●	●	●	●	●	●																315
	355								●	●	●	●	●		●	●	●						○						355
400	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	400	
450								●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	450	
500								●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	500	
560	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	560	
630								●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	630	
710								●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	710	
800	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	800	
900								●	●	●	●	●	●	●	●	●	●	●	○		○		○		○	○	○	900	
1000								●	●	●	●	●	●	●	●	●	●	●	○	○								1000	
1120	●	●	●	●	●	●	●	●	●	●	●	●	●					○	○				○	○			1120		
1250								●	●																			1250	
1400	●	●	●	●	●	●	●	●																				1400	

● Applicable range of Construction 1  
 ○ Applicable range of Construction 2  
 Blank : Not covered by DP1000-Series

# 10. Troubleshooting **Common**

## ⚠ CAUTION

Identify and provide appropriate corrective actions for any abnormality according to the maintenance manual. Do not operate the unit until corrective action has been taken.

When any abnormality happens on reducer or drive unit, take appropriate measures immediately referring to the following table. If they are not repairable, contact our nearest agency, distributor, or sales office.

Table 10-1 Troubleshooting

Problem		Cause	Correction	
	The motor will not operate under no load	Power failure	Contact the electric power company.	
		Defective electric circuit	Check the circuit.	
		Blown fuse	Replace the fuse.	
		Protective device is engaged	Fix the problem and recover.	
		Load locking	Check the load and safety device.	
		Poor switch contact	Adjust the contact unit.	
		Motor stator coil disconnect	Confer with authorized service station.	
		Bearing damage	Confer with authorized service station.	
	3-phase is functioning as single-phase	Check the power supply with a voltmeter. Check the motor, transformer coil, contactor, fuse, etc. and repair or replace them.		
	The motor rotates without a load but the slow speed shaft does not rotate	Damage to gear unit due to overloading of gears, etc.	Confer with authorized service station.	
The slow speed shaft turns without a load	The switch overheats	Insufficient switch capacity	Replace with specified switch.	
		Overload	Decrease the load to the specified value.	
	Fuse tripping	Insufficient fuse capacity	Replace with specified fuse.	
		Overload	Decrease the load to the specified value.	
	The speed will not increase and the motor is overheating	Voltage drop	Contact the electric power company.	
		Overload	Decrease the load to the specified value.	
		Short-circuited motor stator coil	Confer with authorized service station.	
	It stops	The key is not inserted	Insert key.	
		Bearing burnout	Confer with authorized service station.	
		Poor adjustment of protection device	Adjust the protection device.	
		The motor runs in the reverse direction	Wiring error	Change the connection.
	Fuse tripping	The lead wire is short circuited.	Confer with authorized service station.	
Poor contact between motor and starter		Make good connection.		
Excessive temperature rise	Overload	Decrease the load to the specified value.		
	Voltage drop or rise	Contact the electric power company.		
	The ambient temperature is high	Improve the ventilation method.		
	Damaged bearing	Confer with authorized service station.		
	Abnormal wear of gears and bearings due to overload, etc.	Confer with authorized service station.		
Oil leakage	Blot or drip of a small amount of oil at seal section of input speed or output speed shaft	Grease applied to the oil seal seeps out at first	Wipe off around the oil seal, and observe.	
	Leakage of oil from input speed or output speed shaft section	Damaged oil seal or maybe damaged shaft (or collar)	Confer with authorized service station.	
	Leakage of oil/grease from the contact surfaces of ring gear housing and casing, etc.	Loose fastener bolts	Tighten fastener bolts correctly.	
	Leakage of oil into motor	Damage to oil seals, or slinger collar	Confer with authorized service station.	
Excessive oil supply		Remove oil.		

# Common 10. Troubleshooting

Table 10-2 Troubleshooting

Problem		Cause	Correction
Abnormal sound Excessive vibration		Dust and foreign matter in bearings, or damaged bearings	Confer with authorized service station.
		Reducer parts grinding on foreign matter	Confer with authorized service station.
		Reducer parts are damaged	Confer with authorized service station.
		Warping of housing because the installation surface is not flat	Make the installation base flat or make adjustment using liners, etc.
		Resonance due to insufficient rigidity of installation base	Reinforce the installation base to increase rigidity.
		Nonalignment of shaft with driven machine	Align the shaft centers.
		Transmission of vibration from the driven machine	Individually operate the products to check the source of the sound.
Abnormal motor sounds		Foreign objects have entered	Confer with authorized service station.
		Bearing damage	Confer with authorized service station.
<div style="display: inline-block; transform: rotate(-90deg); transform-origin: left top; white-space: nowrap;">                     Tripping Inverter                 </div>	Overcurrent shut-off	Sudden speed changes	Increase the time for speed changes.
		Extreme load fluctuation	Decrease load fluctuation.
	Overcurrent due to ground fault	Ground fault on out side	Take measures to prevent ground fault.
	Direct current overcurrent	Short on output side	Take measures to prevent short. Inspect wiring.
	Regenerative overvoltage shut-off	Sudden speed reduction	Increase the time for speed reduction. Decrease brake frequency.
Thermal operation	Overload	Decrease the load to the specified value.	



## 11-1 Construction of Reducer

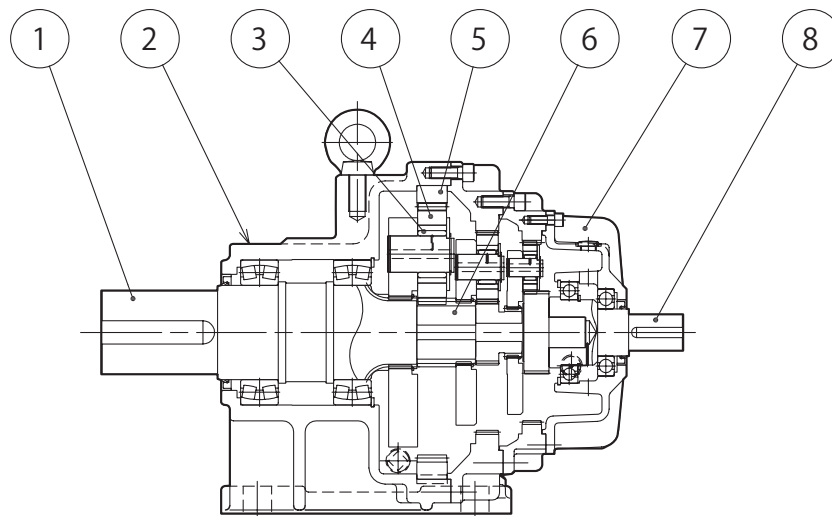


Fig.11-1 DHG Type (Foot mount tye)

No.	Part Name	No.	Part Name
1	Low-Speed Shaft	5	Internal Gear
2	Housing	6	Sun Gear
3	Bearing	7	High-Speed side Cover
4	Planetary Gear	8	High-Speed Shaft

## 11-2 Construction of Drive Unit

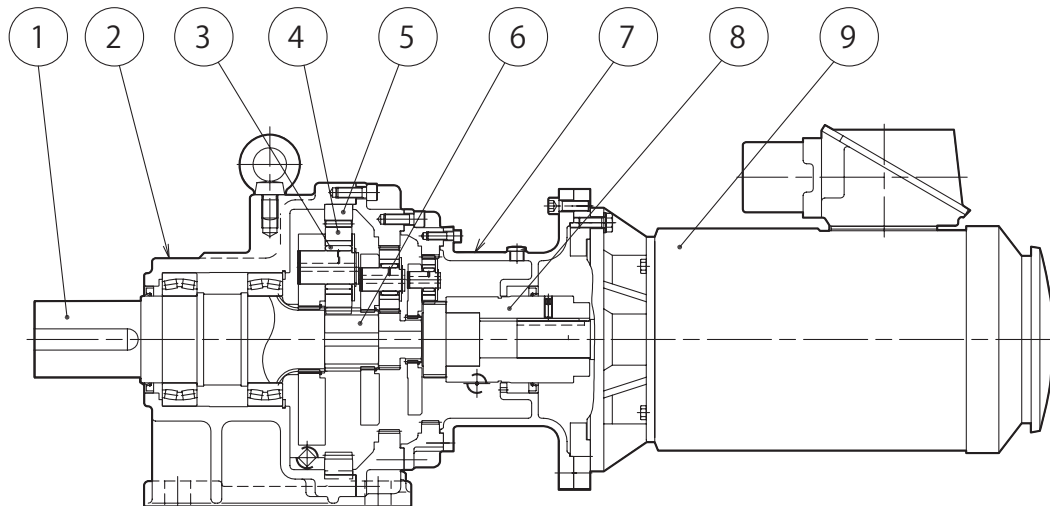


Fig.11-2 DHGM Type (Foot mount tye)

No.	Part Name	No.	Part Name
1	Low-Speed Shaft	6	Sun Gear
2	Housing	7	Motor Adapter
3	Bearing	8	Motor Coupling
4	Planetary Gear	9	Motor
5	Internal Gear		

# Common 12. Oil Quantity

The oil quantity shown below is not exact quantity. Use a dipstick or visible oil gauge to check the oil level when filling.  
(As to oil quantity for special specifications, refer to specifications sheet and outline drawing.)

Table 12-1 Oil quantity for Reducer

Unit: Liter

Size	Reducer							
	DHG Type				DHF Type			
	Nominal Reduction Ratio				Nominal Reduction Ratio			
	5·9	16~45	50~224	250~1400	5·9	16~45	50~224	250~1400
1010	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4
1020	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.5
1030	0.5	0.6	0.6	0.7	0.5	0.6	0.6	0.7
1040	0.7	0.8	0.8	0.9	0.7	0.8	0.8	0.9
1050	0.9	1.1	1.3	1.4	0.9	1.1	1.3	1.4
1060	2.0	2.2	2.5	2.7	2.0	2.2	2.5	2.7
1070	3.5	3.8	4.5	4.9	3.5	3.8	4.5	4.9
1080	-	4.8	5.7	6.8	-	4.8	5.7	6.8
1090	-	5.9	7.0	8.0	-	5.9	7.0	8.0
1100	-	11	12	13	-	8.3	9.0	10.5
1110	-	14	13	14	-	10	9.5	11
1120	-	20	16	17	-	15	11	12.5
1130	-	21	22	23	-	15	16	15.5
1140	-	33	34	34.5	-	22	15	16
1150	-	-	-	-	-	-	18	17
1160	-	-	-	-	-	-	22	20.5
1170	-	-	-	-	-	-	25	24
1180	-	-	-	-	-	-	28	26
1185	-	-	-	-	-	-	35	31
1190	-	-	-	-	-	-	40	36
1195	-	-	-	-	-	-	46	43
1200	-	-	-	-	-	-	52	47
1205	-	-	-	-	-	-	58	53
1210	-	-	-	-	-	-	63	57
1215	-	-	-	-	-	-	70	66
1220	-	-	-	-	-	-	77	70

Table 12-2 Oil quantity for Drive Unit

Unit: Liter

Size	Drive Unit											
	DHGM Type				DHFM Type				DVFM Type			
	Nominal Reduction Ratio				Nominal Reduction Ratio				Nominal Reduction Ratio			
	5·9	16~45	50~224	250~1400	5·9	16~45	50~224	250~1400	5·9	16~45	50~224	250~1400
1010	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.6	0.9	1.1
1020	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.5	0.6	0.7	1.0	1.2
1030	0.5	0.6	0.6	0.7	0.5	0.6	0.6	0.7	0.7	1.0	1.2	1.4
1040	0.7	0.8	0.8	0.9	0.7	0.8	0.8	0.9	1.1	1.4	1.7	1.9
1050	0.9	1.1	1.3	1.4	0.9	1.1	1.3	1.4	2.2	2.6	2.9	3.1
1060	2.0	2.2	2.5	2.7	2.0	2.2	2.5	2.7	4.1	4.8	5.2	5.4
1070	3.5	3.8	4.5	4.9	3.5	3.8	4.5	4.9	5.2	6.7	7.2	7.5
1080	-	4.8	5.7	6.8	-	4.8	5.7	6.8	-	8.3	9.0	9.5
1090	-	5.9	7.0	8.0	-	5.9	7.0	8.0	-	9.0	9.9	10.5
1100	-	11	12	12	-	8.3	9.0	9.3	-	15	16	17
1110	-	14	13.5	14	-	10	9.5	9.7	-	18	20	20
1120	-	20	-	16.5	-	15	-	11.5	-	28	-	31
1130	-	21	-	22.5	-	15	-	16.2	-	28	-	33
1140	-	-	-	35	-	-	-	17	-	-	-	34
1150	-	-	-	-	-	-	-	-	-	-	-	-
1160	-	-	-	-	-	-	-	-	-	-	-	-

# 13. Warranty **Common**

The scope of warranty of our delivered products is limited only to what we manufactured.

Warranty (period and description)

Warranty Period	The warranty period applies only to new products and represents 18 months after the shipment or 12 months after the actual operation, whichever is shorter.
Description	<p>If the product failed within the warranty period, during which despite a proper mounting, connection and maintenance &amp; administration are followed according to the maintenance manual, and the product is properly run based on the specification on the catalog or under conditions agreed separately, we will repair or provide an alternative product at our discretion for free of charge, except the exclusions below.</p> <p>However, as far as the product is connected with customers' other devices, we will not indemnify those expenses on dismounting from/mounting on the devices, etc. and other associated construction expenses, transportation expenses and opportunity loss and operation loss the customers suffered from, and other indirect damages.</p>
Exclusion from the warranty	<p>The following items will be excluded from the warranty:</p> <ol style="list-style-type: none"> <li>1. A breakdown resulting from defects in the installation of the product and coupling with other devices, etc.</li> <li>2. A breakdown resulting from insufficient maintenance &amp; administration and improper handling of the product, including a case that the product is not stored according to our defined storage manual.</li> <li>3. A breakdown resulting from operation which does not fall within our specification and other operation conditions and use status we hardly can know or a failure caused by the use of lubricant which we do not recommend.</li> <li>4. A breakdown resulting from defects, special specification, etc of device prepared and connected by customer.</li> <li>5. A breakdown resulting from disassembly, parts replacement, and modification conducted by the customer (excluding disassembly for inspection and adjustment of the brake gap, for manual release of the brake, and for other purposes guided in the maintenance manual).</li> <li>6. A breakdown resulting from defects in parts supplied or specified by customers.</li> <li>7. A breakdown caused by inevitable force including earthquake, fire, flood disaster, salt damage, gas damage, and lightning strike, etc.</li> <li>8. Natural wear and tear, abrasion, and deterioration of such relevant consumable parts as a bearing and oil seal, etc. under normal usage.</li> <li>9. A breakdown caused for reasons not attributable to each of the above item.</li> </ol>

# Worldwide Locations

## U.S.A

**Sumitomo Machinery Corporation of America (SMA)**  
1453 Cornwall Blvd. Chesapeake, VA 23323, U.S.A.  
TEL (1)757-485-3355 FAX (1)757-485-7490

## Canada

**SM Cyclo of Canada, Ltd. (SMC)**  
13331 Cornwell Road, Oakville, ON L6J 7T5, Canada  
TEL (1)905-469-1050 FAX (1)905-469-1055

## Mexico

**SM Cyclo de México, S.A. de C.V. (SMME)**  
Fresnos #201, Pocket Park Oriente, 67258 Juárez, N.L. México  
TEL (52)81-8144-5130 FAX (52)81-8144-5130

## Brazil

**Sumitomo Indústrias Pesadas do Brasil Ltda. (SHIB)**  
Av. Sumitomo, 500 – Itaim Mirim – Itu/SP – CEP: 13312-839 – Brazil  
TEL (55)11-4403-9292

## Chile

**SM-Cyclo de Chile Ltda. (SMCH)**  
Camino a Coronel Km.10 Modulo 3A, San Pedro de la Paz, Biobío, Chile  
TEL (56)41-246-9806 FAX (56)41-246-9808

## Argentina

**SM-Cyclo de Argentina S.A. (SMAR)**  
Ing Delpini 2230, B1615KGB Malvinas Argentinas, Grand Bourg, Buenos Aires, Argentina  
TEL (54)3327-45-4095

## Guatemala

**SM Cyclo de Guatemala Ensambladora, Ltda. (SMGT)**  
Parque Industrial Unisur, 0 Calle B 19-50 Zona 3, Bodega D-1 Delta Bárcenas, Villa Nueva, Guatemala  
TEL (502)6648-0500 FAX (502)6631-9171

## Colombia

**SM Cyclo Colombia, S.A.S. (SMCO)**  
Parque Industrial Celta, Km 7.0 Autopista Medellín, Costado Occidental, Funza, CUN, 250027, Colombia  
TEL (57)1-300-0673 FAX (57)1300-0673 ext. 105

## Peru

**SM Cyclo de Perú, S.A.C. (SMPE)**  
Jr. Monte Rosa 255, Oficina 702, Santiago de Surco-Lima 15038, Peru  
TEL (51)1-7130342 FAX (51)1-7150223

## Germany

**Sumitomo (SHI) Cyclo Drive Germany GmbH (SCG)**  
Cyclostraße 92, 85229 Markt Indersdorf, Germany  
TEL (49)8136-66-0

## Austria

**Sumitomo (SHI) Cyclo Drive Germany GmbH (SCG)**  
**Austria Branch Office**  
Gruntalerstraße 30A, 4020 Linz, Austria  
TEL (43)664-2840490

## Belgium

**Hansen Industrial Transmissions NV (HIT)**  
Leonardo da Vincilaan 1, Edegem, Belgium  
TEL (32)3-450-12-11

## France

**SM-Cyclo France SAS (SMFR)**  
8 Avenue Christian Doppler, 77700 Serris, France  
TEL (33)1-64-17-17-20

## Italy

**SM-Cyclo Italy Srl (SMIT)**  
Via dell' Artigianato 23, 20007 Comaredo MI, Italy  
TEL (39)293-481101

## Spain

**Sociedad Industrial de Transmisiones, S.A. (SIT)**  
Paseo de Ubarburu 67, 20014 San Sebastián Guipúzcoa, Spain  
TEL (34)9434-572-00

## United Kingdom

**SM-Cyclo UK Ltd. (SMUK)**  
29 Bergen Way, Hull, HU7 0YQ, United Kingdom  
TEL (44)1482-790340

## Turkey

**SM-Cyclo Turkey Güç Aktarım Sis. Tic. Ltd. Sti. (SMTR)**  
Barbaros Mh. Çiğdem Sk. Ağaoğlu, Office Mrk. No:1 Kat:4 D.18 34746, Ataşehir/İstanbul, Turkey  
TEL (90)216-250-60-69 FAX (90)216-250-55-56

## India

**Sumi-Cyclo Drive India Private Limited (SDI)**  
Gat No. 186, Global Raisonni Industrial Park Alandi Markal Road, Fulgaon, Pune 411 033, India  
TEL (91)96077-45353

## China

**Sumitomo (SHI) Cyclo Drive Shanghai, Ltd. (SCS)**  
Room 1101, SMEG Plaza, Office Building, No.1386 Hongqiao Road, Changning District, Shanghai, China 200336  
TEL (86)21-3462-7877 FAX (86)21-3462-7922

## Hong Kong

**SM-Cyclo of Hong Kong Co., Ltd. (SMHK)**  
Unit 19, 28/F, Metropole Square, 2 On Yiu Street, Sha Tin, New Territories, Hong Kong, China  
TEL (852)2460-1881 FAX (852)2460-1882

## Taiwan

**Tatung SM-Cyclo Co., Ltd. (TSC)**  
22, Chungshan N. Rd., 3rd Sec. Taipei, Taiwan, 104, R.O.C.  
TEL (886)2-2595-7275 FAX (886)2-2595-5594

## Korea

**Sumitomo (SHI) Cyclo Drive Korea, Ltd. (SCK)**  
913, 19 Saemunan-ro 5-gil, Jongno-gu, Seoul, Republic of Korea 03173  
TEL (82)2-730-0151 FAX (82)2-730-0156

## Singapore

**Sumitomo (SHI) Cyclo Drive Asia Pacific Pte. Ltd. (SCA)**  
83 Joo Koon Circle, Singapore 629109  
TEL (65)6591-7800 FAX (65)6863-4238

## Philippines

**Sumitomo (SHI) Cyclo Drive Asia Pacific Pte. Ltd. Philippines Branch Office (SMPH)**  
C4 & C5 Buildings Granville Industrial Complex, Governor's Drive, Bo. Bancal, Carmona, 4116 Cavite, Philippines  
TEL (63)2-8584-4921 FAX (63)2-8584-4922

## Vietnam

**SM-Cyclo (Vietnam) Co., Ltd. (SMVN)**  
Factory 2B, Lot K1-2-5, Road No. 2-3-5A, Le Minh Xuan Industrial Park, Binh Chanh Dist., Ho Chi Minh, Ho Chi Minh City, Vietnam  
TEL (84)28-3766-3709 FAX (84)28-3766-3710

## Malaysia

**SM-Cyclo (Malaysia) Sdn. Bhd. (SMMA)**  
No.7C, Jalan Anggerik Mokara 31/56, Kota Kemuning, Seksyen 31, 40460 Shah Alam, Selangor, Malaysia  
TEL (60)3-5121-0455 FAX (60)3-5121-0578

## Indonesia

**PT. SM-Cyclo Indonesia (SMID)**  
Cikarang Jalan Sungkai Blok F 25 No. 09K, Delta Silicon III, Lippo Cikarang, Bekasi, Jawa Barat, Indonesia  
TEL (62)21-29612100 FAX (62)21-29612211

## Thailand

**SM-Cyclo (Thailand) Co., Ltd. (SMTH)**  
1 Empire Tower, 21st Floor Unit 2103-4, South Sathorn Road, Yan Nawa, Bangkok 10120, Thailand  
TEL (66)2-670-0998 FAX (66)2-670-0999

## Australia

**Sumitomo (SHI) Hansen Australia Pty. Ltd. (SHAU)**  
181 Power Street Glendenning, NSW 2761, Australia  
TEL (61)1300-037-483

## Japan

**Sumitomo Heavy Industries, Ltd. (SHI)**  
ThinkPark Tower, 1-1 Osaki 2-chome, Shinagawa-ku, Tokyo 141-6025, Japan  
TEL (81)3-6737-2511 FAX (81)3-6866-5160

Specifications, dimensions, and other items are subject to change without prior notice.