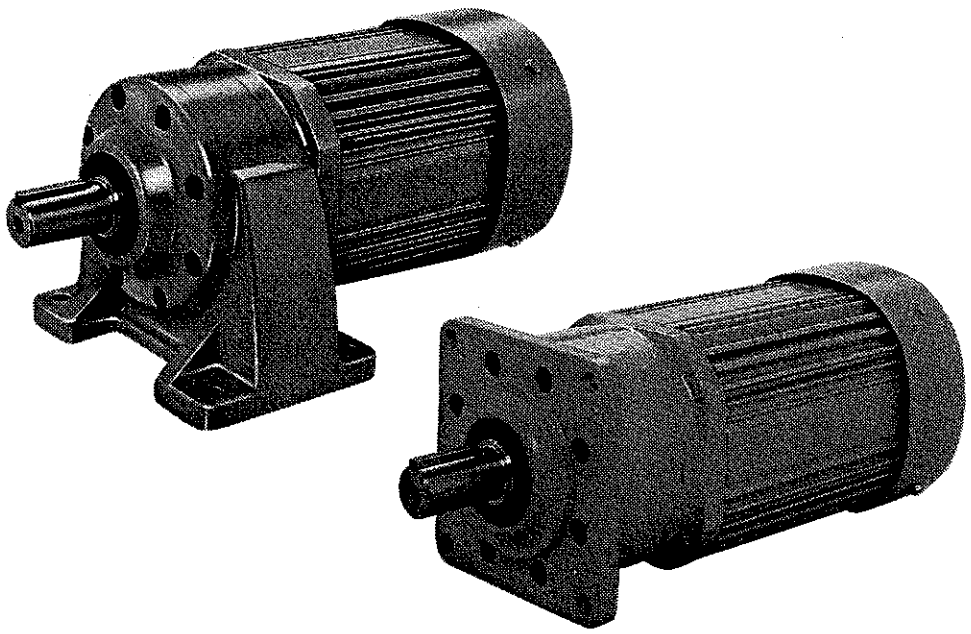
140 %

CYCLO® GEARMOTOR

Altax

OPERATING MANUAL



POWER TRANSMISSION & CONTROLS GROUP

Sumitomo Heavy Industries, Ltd.

Cat. No.
CM0105E-1

INTRODUCTION

We appreciate your selection of our CYCLO® geared motor "ALTAX". This manual presents you all prerequisites essential to your correct use of the CYCLO® geared motor "ALTAX". Please read this Manual carefully before you start operating "ALTAX".

Remarks:

1. Please make sure to deliver a copy of this manual to the operator.
2. Keep the Manual close to the operator's access.

– CONTENTS –

1. Inspection on Delivery

Check the following points upon delivery of the geared motor. If there are any deficiencies found or questions arising about the unit, please contact our agent, dealer or sales office in the nearest distance.

(1) There is no failure caused during the transportation.
(2) Descriptions on the rating plate are as specified in your order.
(3) Screws and nuts are tight enough.
(4) A condenser is enclosed, in case a single-phase unit (40 W ~90 W) is ordered.

2. Mounting

(1) Mounting conditions

Ambient temperature:	− 10 ~ +40 ℃
Ambient humidity	: 85 % or less
Altitude	: Lower than 1000 meters above sea level
Ambient air	: Free from corrosive gases, explosive gases or steam. It should also be free from dusts and well ventilated.
Place of mounting	: Indoor

(2) Mount the geared motor on a rigid table or plate.
(3) There is no restriction for mounting angle.Please enquire us, if the motor should be mounted outdoor and the axial direction cannot be kept horizontal.

3. Connection to the Machine to be Driven

(1) Set the connecting device such as coupling, chain, sprocket, gear or V-pulley on the shaft as close to the shaft collar as possible, unless specifically required, so that a loading point comes between the shaft center and the shaft collar (Fig.1).

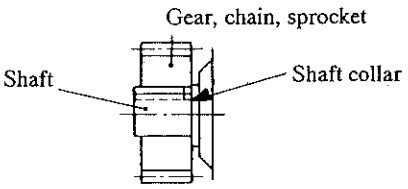


Fig. 1

(2) As the bearings may be damaged, if a heavy impact or thrust load is applied to the shaft when fitting the connecting device, use of end cap screws is recommended (Fig.2).

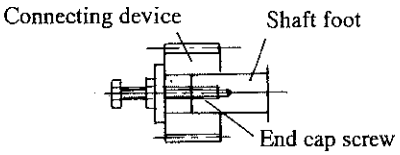


Fig. 2

(3) In connecting the geared motor to the machine to be driven, careful attention should be paid to align shafts of both units (connection by couplings) or to keep both shafts parallel to each other connection by chains, gears or V-belts).
(4) Excessively loosened chains would cause an impact in starting-up which may give bad influences to the geared motor and the machine.
(5) Excessive tension of V-belts may result in failure of the bearings.

4. Wirings

4 – 1) Wirings

(1) For wiring, use good wiring tools and follow the client's interoffice wiring criteria and power supply company's provisions.

(2) When very long wirings are required, considerations should be paid to avoid voltage drops.

(3) Standard specifications for wire connections and terminal marks are shown in Fig.3~6. The rotating direction of output shaft is when wiring is made as per Fig.3~6 is shown in Fig.7.

(4) Dismounting and mounting of terminal box cover (for 0.1 ~ 0.4 kW standard 3-phase motor without brake)

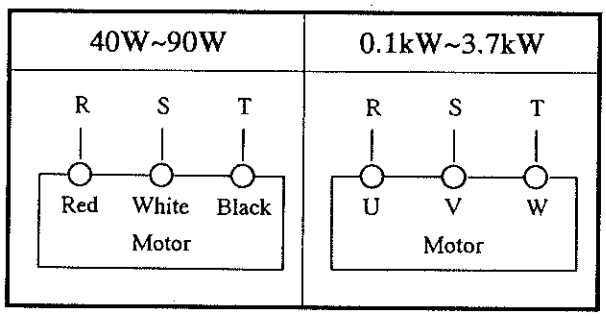
① Dismounting

Press the cover forward in the direction of the shaft and pull it to remove the cover.

② Mounting

Press the cover against the box from above.

Fig.3 In case of three-phase motor



For reverse rotation, exchange connections of any two out of three terminals.

Fig.4 In case of single-phase motor

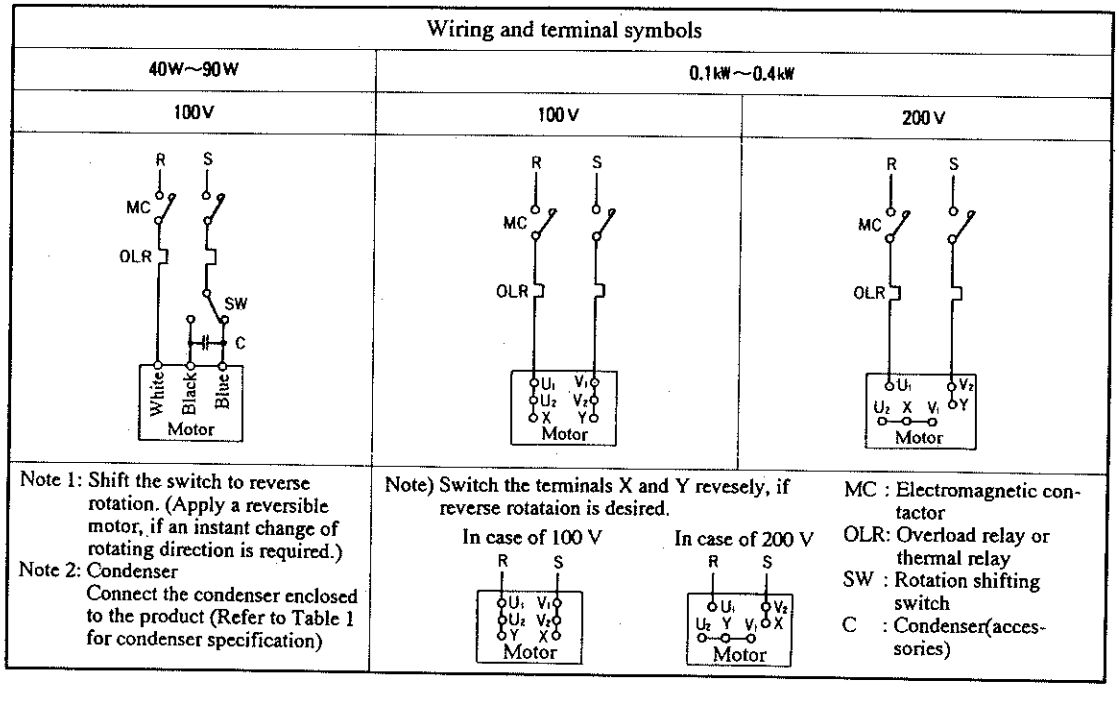


Table 1 Condenser specification

Motor voltage	Voltage resistance of condenser	Motor type	Motor capacity	Condenser capacity	Condenser size(mm)				
					W	H	T	D	E
100V	220V	Induction motor	40	14	58.0	31.0	21.0	31.0	4.5
			60	18	58.0	31.0	21.0	31.0	4.5
			90	25	58.0	37.0	23.5	38.5	7
		Reversible motor	40	16	58.0	31.0	21.0	31.0	4.5
			60	22	58.0	37.0	23.5	38.5	7
			90	32	58.0	41.0	29.0	44.0	7

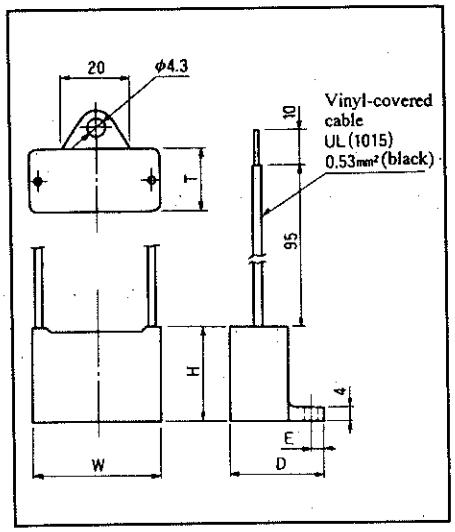
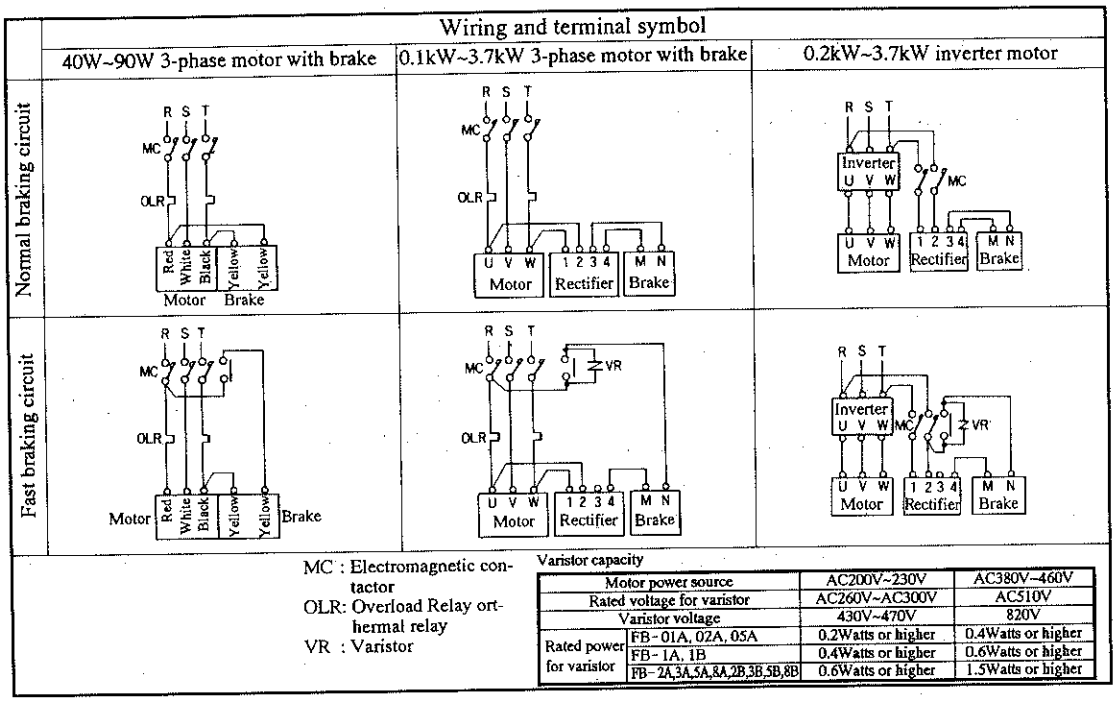


Fig.5 In case of 3-phase brake-motor and inverter brake-motor

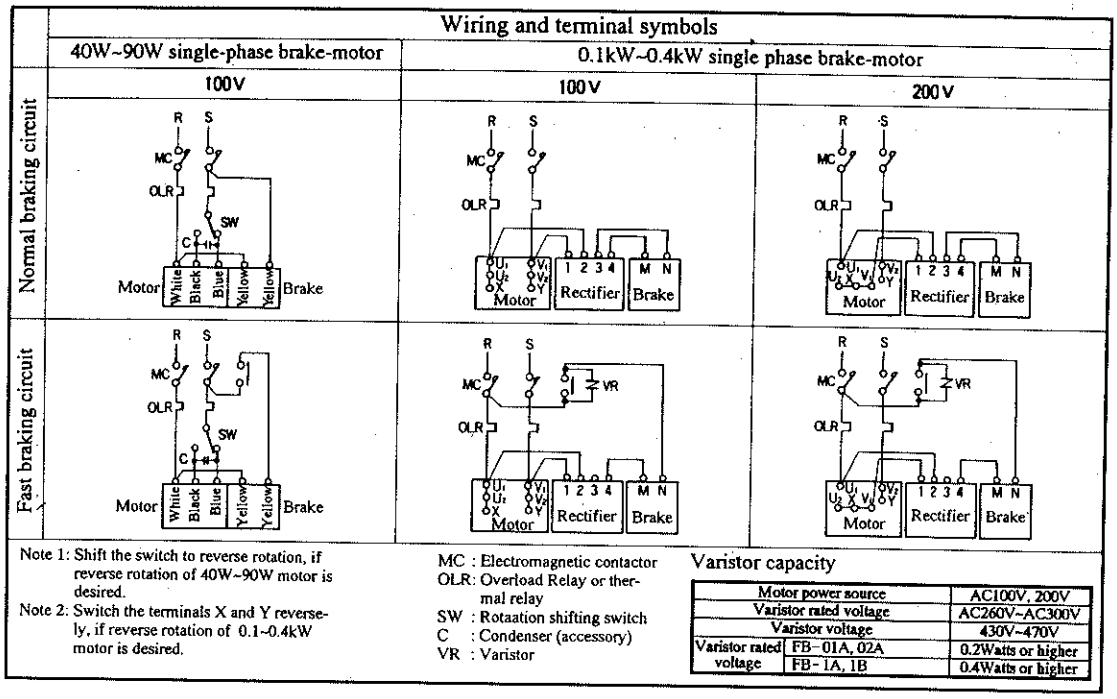


Varistor capacity

Motor power source		AC200V~230V	AC380V~460V
Rated voltage for varistor		AC260V~AC300V	AC510V
Varistor voltage		430V~470V	820V
Rated power for varistor	FB-01A, 02A, 05A	0.2Watts or higher	0.4Watts or higher
	FB-1A, 1B	0.4Watts or higher	0.6Watts or higher
	FB-2A,3A,5A,8A,2B,3B,5B,8B	0.6Watts or higher	1.5Watts or higher

When the standard electric motor is driven by an inverter, the dielectric withstand voltage of the electric motor may have to be taken into account if the inverter has a high carrier frequency (typical in IGBT) with high input voltage (400V or more), or if it has a long wiring distance. Consult with us in such a case.

Fig.6 Single phase brake-motor



In case a better is desired, use of the fast braking circuit is recommended.
The D.C. cut-off capacity (for D.C. coil loading) of 5 times as much as brake current shown in Tables 5, 6 and 7 is recommended for contact points in the fast braking circuit.

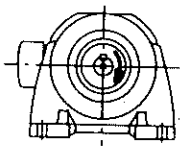
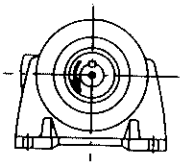
Note)3 phase-400V class standard motors are applicable to the following special voltages.

Standard motor	400V, 50/60Hz			440V, 60Hz	
Voltage(V)	380	400	415	400	440
Frequency(Hz)	50/60			60	

※ These special voltages are not showed on name plate(standard voltages are showed on name plate.)

Fig.7 Direction of rotation of the output shaft

The motor shaft will rotate clockwise seen from the fan cover side, when wiring is made according to Figs. 3 ~ 6. In these occasions, the direction of rotation of the output shaft will be as indicated by arrow marks in the following sketches.

Frame number	5065, 5075, 5085, 5090, 5095, 5100, 5105, 5115, 5115, 5125	5095DA, 5105DA, 5115DA, 5125DA
Direction of rotation		

4 – 2) Precautions for motor operations

(1) Earthing

Earthen the motor terminal box or the frame without fail.

(2) Insulation resistance

Determine the insulation resistance (For determination, separate the motor and the control board). The insulation resistance value will vary depending on the temperature, humidity, extent of contamination, the servicing period, test running time as well as the motor output, voltage and type of insulation. Therefore, the insulation resistance (R) cannot uniformly be expressed, but it should normally be the value shown in Table 2 or higher.

Table 2 Insulation resistance

Motor voltage	Mega voltage	Insulation resistance (R)
Low voltage motor(Lower than 600 V)	500V	Higher than 1 M Ω

JEC-146 provides the following formulas (For reference only)

$$R \geqq \frac{\text{Rated voltage (V)}}{\text{Rated output (KW)} + 1{,}000} \qquad (\text{M}\,\Omega)$$

$$R \geqq \frac{(\text{Rated voltage (V)} + (\text{Rotation speed per minute} / 3)}{\text{Rated output (KW)} + 2{,}000) + 0.5\ (\text{M}\,\Omega)} \qquad (\text{M}\,\Omega)$$

When the insulation resistance is lowered, the coil must be dried.There are several different drying methods such as hot air drying, hot wind drying and electrical current drying, and selection of drying method should be made according to the actual situations.

The drying temperature shall be lower than 90 ℃ , and local heating must be avoided. When the insulation resistance cannot be recovered by drying, defective insulation resistance for a certain reason can be doubted. Therefore, please contact our agent, dealer or our sales office in the nearest distance, before electric power is supplied.

(3) Condenser (In single-phase motor of 0.1 kW or more)

Be careful not to damage the insulation vinyl coating on the starting condenser.

Do not use the wrong condenser for start-up or for operation, as the wrong use of condenser will cause breakage of the condenser.

5. Lubrication

(1) All of the CYCLO geared motor "ALTAX" adopt grease lubrication and enclose grease before they are shipped from the factory. Therefore, you can run the motor as they are.

6. Operation

Upon completion of mounting and wiring, confirm the following points before starting operation.

(1) Wirings are correctly and surely made.

(2) Connection to the corresponding machine is correctly made.

(3) Direction of rotation is correctly made according to the plan.

After completion of the above – mentioned checks, start the test running without loading, and increase the load gradually. Further, check the following points.

Table 3

Precautions for trial run	
Any abnormal noises or vibrations are observed.	(1) The casing is distorted due to non-flat bed surface. (2) The motor is resonant due to insufficient rigidity of the bed. (3) The shafts to be connected are not in alignment. (4) Vibrations of the machine are conveyed to the motor.
The abnormally high temperature of the surface of gear casing or motor frame .	(1) The electric current is exceeding the rated value specified in the name plate. (2) The rise and drop of the electric current are intensive. (3) The ambient temperature of the geared motor in use is too high.

In case there any abnormalities observed, stop running the motor and contact our agent, dealer or sales office immediately.

7. Daily Inspection and Maintenance

Inspect the motor daily basing on the following table.

Table 4

Inspecting items	Detailes
Electric current	Is the electric current lower than the value as indicated in the name plate?.
Noise	Are there any noises or sudden changes in noise?
Vibration	Are there any vibrations of the gear case, or motor frame, or sudden changes in vibration?
Surface temperature	Is the surface temperature of gear case, or motor frame not too high or rising suddenly? (The temperature rise during operation varies depending on the type of motor. However, there is no problem, if the fluctuation is not frequent, in spite of the difference between the designated temperature and the ambient temperature being in the magnitude of 40℃.)
Grease leakage	There is no leakage of grease from gear assembly.
Mounting bolts	No mounting bolts are loose.
Chains and V-belts	No chain and V-belt are loose.
Brake	The brake lining is not worn out.(Check brake gaps from time to time according to descriptions in Figure 8 – "Inspection, adjustment and maintenance of FB brake assembly", as the brake lining will be worn out after long hours of use.)

① If any abnormalities are found in daily inspections, take necessary measures according to descriptions given in Fig 19, 20 "Trouble-shooting". If such measures cannot recover the geared motor from troubles, contact our agent, dealer or sales office in the nearest distance.

② As the CYCLO geared motor encloses grease of long life, it can be operated for long hours without supply of grease. But, overhauling after operation of 10,000 hours or 2 ~ 3 years will extend its life.

(Note) We request you to have the CYCLO geared motor "ALTAX" overhauled at our specialized workshop, as it requires skilled workmanship.

8. Inspection, Adjustment and Maintenance of FB Brake Assembly

When you use a geared motor with brake, inspections, adjustments and maintenances of the brake assembly are necessary. When it is used for a long period, inspections of the brake gap G (Figs. 9, 10, 11, 14 and 15) become necessary, as the brake lining will be abraded. If the gap G is expanded, the excited electromagnetic coil will no more pull the movable core closer and consequently the brake will be kept working. The mechanical life of the brake is more than 2,000,000 times, but inspections of the brake gap should be made from time to time.

8 – 1) Specification of electromagnetic brakes

Table 5 Specifications of electromagnetic brakes for three-phase motor

Brake type	Motor output	Standard braking torque (kgf•m)	Brake delay(sec)		Electric current for brake(A)				Braking electro-magnet	Struc-tural sketch	Re-marks
			Normal braking circuit	Fast braking circuit	200V 50/60Hz	220V 60Hz	400V 60/60Hz	440V 60Hz			
FB-003	40W	0.035	0.1~0.12	0.05 ~ 0.06	0.04	0.04	–	–	D.C.-operated (Rectifier built in the brake)	Fig.8	Spring actuated type (non-excited braking method)
FB-005	60W	0.05									
FB-005	90W										
FB-01A	0.1kW	0.1	0.15~0.2	0.015~0.02	0.07	0.08	0.04	0.04	D.C.-operated (Rectifier built in the terminal box)	Fig.9	
FB-02A	0.2kW	0.2			0.1	0.1	0.05	0.06			
FB-05A	0.4kW	0.4	0.1~0.15	0.01~0.015	0.1	0.1	0.05	0.06			
FB-1B	0.75kW	0.8	0.2~0.3	0.01 ~ 0.02	0.1	0.1	0.1	0.1		Fig.10	
FB-2B	1.5kW	1.5			0.3	0.3	0.1	0.2			
FB-3B	2.2kW	2.2	0.3~0.4		0.3	0.3	0.1	0.2			
FB-5B	3.7kW	3.7	0.4~0.5	0.01~0.02	0.5	0.6	0.3	0.3		Fig.14	
FB-1A	0.75kW	0.8	0.2~0.3	0.01~0.02	0.1	0.1	0.1	0.1		Fig.11	
FB-2A	1.5kW	1.5			0.3	0.4	0.2	0.2		Fig.14	
FB-3A	2.2kW	2.2	0.3~0.4	0.02~0.03	0.4	0.4	0.2	0.2			
FB-5A	3.7kW	3.7	0.4~0.5		0.6	0.6	0.2	0.2		Fig.15	

Table 6 Specifications of electromagnetic brakes for single-phase motor

Brake type	Motor output	Standard braking torque (kgf•m)	Brake delay(sec)		Electric current for brake(A)		Braking electro-magnet	Struc-tural sketch	Re-marks
			Normal braking circuit	Fast braking circuit	100V 50/60Hz	200V 50/60Hz			
FB-003	40W	0.035	0.1~0.12	0.05 ~ 0.06	0.07	–	D.C.-operated (Rectifier built in the brake)	Fig.8	Spring actuated type (non-excited braking method)
FB-005	60W	0.05							
FB-005	90W								
FB-01A	0.1kW	0.1	0.15~0.2	0.015~0.02	0.1	0.1	D.C.-operated (Rectifier built in the terminal box)	Fig.9	
FB-02A	0.2kW	0.2			0.1	0.1			
FB-1B	0.4kW	0.4	0.3~0.4	0.01~0.02	0.2	0.2		Fig.10	
FB-1A								Fig.11	

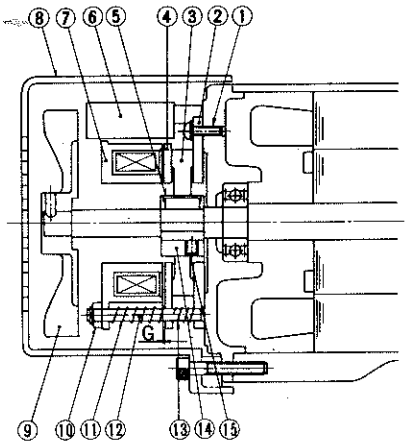
Table 7 Specifications of electromagnetic brakes for AF motor (three-phase inverter motor)

Brake type	Motor output	Standard braking torque (kgf•m)	Brake delay(sec)		Electric current for brake(A)		Braking electro-magnet	Struc-tural sketch	Re-marks
			Normal braking circuit	Fast braking circuit	200V 50/60Hz	220V 50/60Hz			
FB-05A	0.2kW	0.4	0.03~0.07	0.01~0.015	0.1	0.1	D.C.-operated (Rectifier built in the terminal box)	Fig.9	Spring actuated type (non-excited braking method)
FB-1B	0.4kW	0.8	0.1~0.15	0.01 ~ 0.02	0.1	0.1		Fig.10	
FB-2B	0.75kW	1.5			0.3	0.3			
FB-3B	1.5kW	2.2	0.15~0.2		0.3	0.3			
FB-5B	2.2kW	3.7	0.2~0.25	0.01~0.02	0.5	0.6		Fig.15	
FB-8B	3.7kW	5.5	0.15~0.2		0.5	0.6			
FB-1A	0.4kW	0.8	0.1~0.15	0.01~0.02	0.1	0.1		Fig.11	
FB-2A	0.75kW	1.5			0.3	0.4		Fig.14	
FB-3A	1.5kW	2.2	0.15~0.2	0.02 ~ 0.03	0.4	0.4			
FB-5A	2.2kW	3.7	0.2~0.25		0.6	0.6		Fig.15	
FB-8A	3.7kW	5.5	0.15~0.2		0.6	0.6			

8 – 2) Brake models FB – 003, FB – 005

8 – 2 – 1) Construction and actions

The construction of the brake is shown in Fig.8. The brake action is controlled by the spring(Unexcited Starting type).



Part No.	Part Name
1	Brake fixing bolt
2	Fixed plate
3	Brake lining
4	Armature plate
5	Leaf spring
6	Rectifier
7	Stationary core
8	Cover
9	Fan(provided for single-phase 60, 90W)
10	Gap adjusting nut
11	Torgue spring
12	Stud bolt
13	Sub spring
14	Boss
15	Boss setting Bolt

Fig.8 Brake models FB – 003, FB – 005

8 – 2 – 2) Checking, adjustment and maintenance

Gap checking procedures

(1) Remove the cover ⑧.

(2) Insert a gap gauge into the gap between stationary core ⑦ and Armature plate ④ to measure the gap. When the gap has approached to the limit value shown in Table 8, adjustment is necessary. Measurement shall be made at three points on the circumference.

Table 8 Brake gap value

Brake type	Gap value G (mm)	
	Normalized Value	Limit value
FB – 003 FB – 005	0.15~0.25	0.4

Table 9 Brake lining size

Brake type	Brake lining dimension	Initial thickness	Allowable thickness limit
		t_o(mm)	t_o(mm)
FB – 003 FB – 005		7.0	6.2

Gap adjustment

(1) Remove the cover ⑧.

(2) Insert a gap gauge into the gap between stationary core ⑦ and Armature plate ④ and turn three gap adjusting nuts ⑩ clockwise which are mounted on the tip of stud bolt ⑫. Turn the nuts alternatively, so that the gap can be uniform on the circumference.

(3) Check the brake performance by turning the power switch on and off.

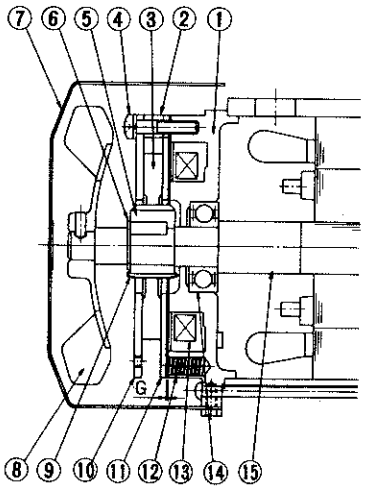
If there is no abnormality in the brake performance, paint the gap adjusting nuts ⑩ with anti-loosening paint.

(4) Mount the cover ⑧ on the brake.

8 – 3) Brake models FB – 01A, FB – 02A and FB – 05A

8 – 3 – 1) Construction and actions

The construction of the brake is shown in Fig.9. The brake action is controlled by the spring(Unexcited starting type).



Part No.	Part Name
1	Stationary core
2	Spacer
3	Brake lining
4	Stud bolt
5	Boss
6	Shaft retaining C ring
7	Cover
8	Fan (except for three-phase motor of 0.1 kW)
9	Leaf spring
10	Fixed plate
11	Armature plate
12	Spring
13	Electromagnetic coil
14	Ball bearing
15	Motor shaft

Fig.9 Brake models FB – 01A, FB – 02A and FB – 05A

8 – 3 – 2) Checking, adjustment and maintenance

Gap Checking procedures

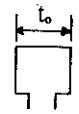
(1) Remove the cover ⑦.

(2) Insert a gap gauge into the gap between stationary core ① and armature plate ⑪ to measure the gap. When the gap has approached to the limit value shown in Table 10, adjustment is necessary. Measurement shall be made at three points on the circumference.

Table 10 Brake gap value

Brake type	Gap value G (mm)	
	Normalized Value	Limit value
FB – 01A FB – 02A FB – 05A	0.15~0.25	0.5

Table 11 Brake lining size

Brake type	Brake lining dimension	Initial thickness t_0(mm)
FB – 01A FB – 02A FB – 05A		7.0

Gap adjustment

(1) Remove the cover ⑦ .

(2) Loosen the stud bolt ④ slightly and turn the fixed plate ⑩ anticlockwise in full. Then, tighten the fixed plate again. After completion of tightening, measure the gap G and confirm that the gap value is between normalized value and limit value. The gap will be reduced by 0.3 mm with this adjustment.

(3) Confirm by turning the power switch on and off that the adjustment is well made and there is no abnormality in braking action.

(4) Mount the cover ⑦ on the brake.

Replacement of brake lining

When the brake lining has reached the limit thickness by repeated gap adjustments, replace the lining with a new one.

(1) Remove the cover ⑦ .

(2) Remove the fan ⑧ (The three-phase motor of 0.1 kW is not equipped with a fan).

(3) Loosen the stud bolt ④ slightly and remove the fixed plate ⑩ and spacer ② in a combined form. Do not separate the spacer from the fixed plate.

(4) Remove the brake lining ③. Handle carefully so that the leaf spring ⑨ will not come off.

(5) Place a new brake lining onto the boss ⑤ and confirm if it travels smoothly on the boss.

(6) After setting the parts ②, ④ and ⑩ in position, tighten the stud bolt ④, keeping the fixed plate ⑩ fully turned clockwise. After completion of tightening the stud bolt, measure the gap G and confirm that the gap value is equal to the normalized value.

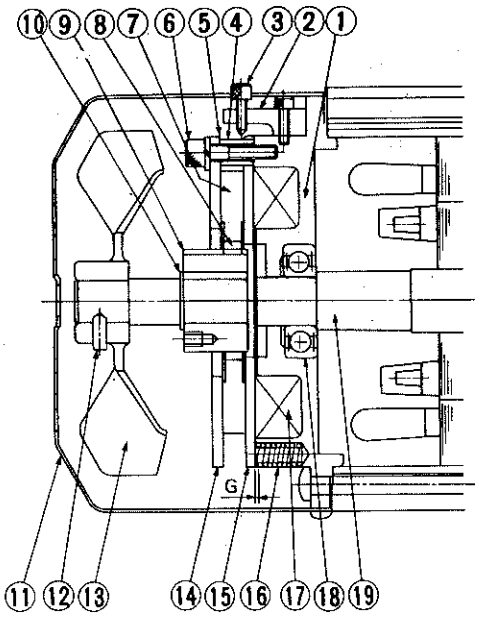
(7) Confirm that the adjustment was made satisfactory by turning the power switch on and off and checking the brake action. After confirmation, paint the fan setting bolt with anti-loosening paint.

(8) Mount the cover ⑦ on the brake.

8 – 4) Model FB – 1A, 1B, 2B, 3B

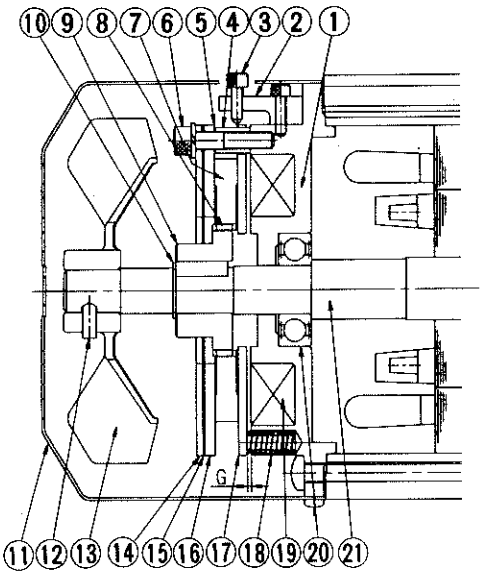
8 – 4 – 1) Construction and action

The construction of the brake is shown in Fig.10, 11. The brake action is controlled by the spring (Unexcited starting type).



Part No.	Part Name
1	Stationary core
2	Releasfitting
3	Brake release bolt
4	Spacer
5	Gap adjusting shim
6	Assembling bolt
7	Brake lining
8	Leaf spring
9	Boss
10	Shaft retaining C-ring
11	Cover
12	Fan setting bolt
13	Fan
14	Fixed plate
15	Armature plate
16	Spring
17	Electromagnetic coil
18	Ball bearing
19	Motor shaft

Fig.10 Model FB – 1B, 2B, 3B



Part No.	Part Name
1	Stationary core
2	Releasfitting
3	Brake release bolt
4	Spacer
5	Gap adjusting shim
6	Stud bolt
7	Brake lining
8	Leaf spring
9	Boss
10	Shaft retaining C-ring
11	Cover
12	Fan setting bolt
13	Fan
14	Fixed plate
15	Noise absorbing plate
16	Braking plate
17	Armature plate
18	Spring
19	Electromagnetic coil
20	Ball bearing
21	Motor shaft

Fig.11 Model FB – 1A

8 – 4 – 2) Checking, adjustment and maintenance

Manual brake releasing (Applicable to Models FB – 2A ~ 8A, 5B, 8B)

When manual brake releasing is desired, operate the manual brake releasing device according to the following procedures.

(1) Turn two of the brake releasing bolts ③ diagonally positioned three to four times clockwise using a (hexagonal bar) spanner for M5, then the brake will be released. As the releasing bolts are tight because they are painted with anti-loosening paint, turn them uniformly and do not turn too much.

(2) To recover the brake to the original state after releasing, turn the releasing bolts 3 or 4 times anti-clockwise. Start regular driving, after having confirmed that the braking action works satisfactory, by turning the power switch on and off.

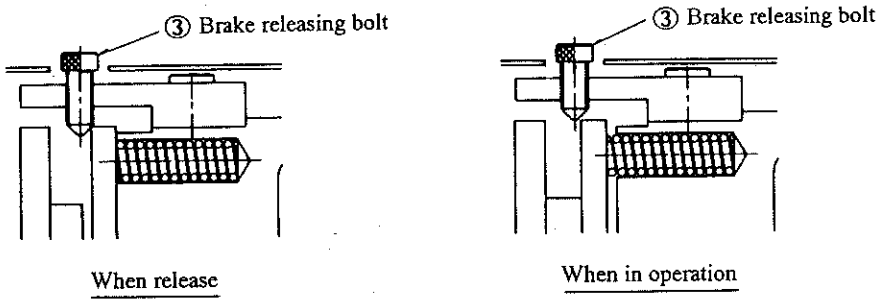


Fig.12

Gap checking Procedures

(1) Remove the cover ⑪.

(2) Insert a gap gauge into the gap between stationary core ① and armature plate ⑮ (in Fig.10), ⑰ (in Fig.11) to measure the gap. When the gap has approached to the limit value shown in Table 12, adjustment is necessary. Measurement shall be made at three points on the circumference.

Table 12 Brake gap value

Brake type	Gap value G (mm)	
	Normalized Value	Allowable limit value
FB – 1A	0.15~0.25	0.5
FB – 1B	0.2~0.3	
FB – 2B		
FB – 3B		0.7

Gap adjustment

(1) Remove the cover ⑪ and measure the gap to confirm a difference from the normalized value. A gap smaller than 0.2 mm is not adjustable.

(2) Pull out the fan setting bolt ⑫ and remove the fan ⑬.

(3) Untighten the stud bolt ⑥ and remove the spacer ④, gap adjusting shim ⑤, stud bolt ⑥ and fixed plate ⑭, in Fig.10, or the spacer ④, gap adjusting shim ⑤, stud bolt ⑥, fixed plate ⑭, noise absorbing plate ⑮ and braking plate ⑯, in Fig.11, all in a single set. Handle carefully not to remove the stud bolt ⑥ independently which may result in coming off of the gap adjusting shim ⑤.

(4) The gap adjusting shim ⑤ is 0.2 mm thick. Adjust the number of shims dependent on the extent of abrasion to reassemble the set of the spacer ④, gap adjusting shim ⑤, stud bolt ⑥ and fixed plate ⑭, in Fig.10, or the set of spacer ④, gap adjusting shim ⑤, stud bolt ⑥, fixed plate ⑭, noise absorbing plate ⑮ and braking plate ⑩, in Fig.11.

(5) Check the gap G. If the difference of the gap from the normalized is large, readjust the gap by adjusting the number of shims.

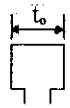
(6) Confirm that the adjustment was well made and the brake performance is satisfactory by turning the power switch on and off.

(7) Mount the fan ⑬ fan setting bolts ⑫ and the cover ⑪. Paint the fan setting bolts with anti-loosening paint.

Replacement of brake lining

Replace the brake lining with a new one, when its thickness reached the limit thickness as shown in Table 13 or when gap adjustment by using the gap adjusting shims has become impossible.

Table 13 Brake lining size

Brake type	Brake lining dimension	Initial thickness t_o(mm)	Allowable thickness limit t_o(mm)
FB − 1A		8.3	7.3
FB − 1B		7.0	6.0
FB − 2B		8.2	7.2
FB − 3B		9.0	8.0

(1) Remove the cover ⑪ and measure the gap G. Then, remove the fan setting bolt ⑫ and the fan ⑬.

(2) Untighten the stud bolt ⑥ slightly and remove the spacer ④, gap adjusting shim ⑤, stud bolt ⑥ and fixed plate ⑭, in Fig.10, or the spacer ④, gap adjusting shim ⑤, stud bolt ⑥, fixed plate ⑭, noise absorbing plate ⑮ and braking plate ⑯, in Fig.11, all in a single set.

(3) Remove the brake lining ⑦ and measure its thickness. Handle carefully so that the leaf spring ⑧ (Figs.10 , 11 and 13) will not come off.

(4) Replace the brake lining with a new one and confirm that it travels smoothly on the boss. Handle the lining carefully in mounting, so that the leaf spring ⑧ will not be damaged or come off.

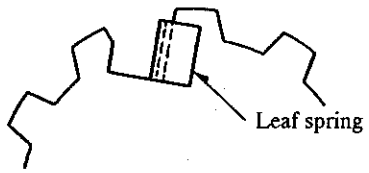


Fig.13

(5) Add the gap adjusting shim ⑤ which was taken away in adjusting the abraded gap, and assemble the spacer ④, gap adjusting shim ⑤, stud bolt ⑥ and fixed plate ⑭, in Fig.10, or the spacer ④, gap adjusting shim ⑤, stud bolt ⑥, fixed plate ⑭, noise absorbing plate ⑮ and braking plate ⑯, in Fig.11, all in a single set.

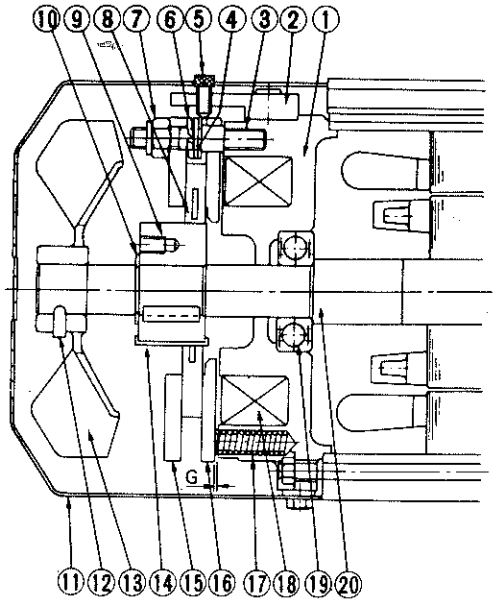
(6) Check the gap G. If the difference of the gap from the normalized is large, adjust the gap again.

(7) Confirm that the adjustment was well made and the brake performance is satisfactory, by turning the power switch on and off. If there is no abnormality found, mount the fan ⑬, fan setting bolts ⑫ and the cover ⑪. Paint the fan setting bolts with anti-loosening paint.

8 – 5) Model FB – 2A, 3A, 5A, 8A, 5B, 8B

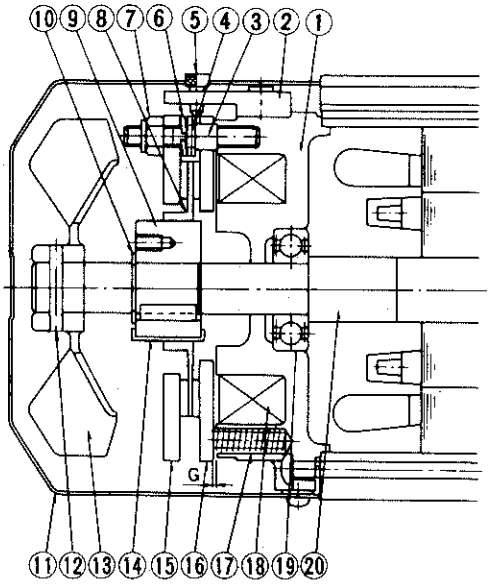
8 – 5 – 1) Construction and action

The construction of the brake is shown in Fig.14., 15. The brake action is controlled by the spring (Unexcited starting type).



Part No.	Part Name
1	Stationary core
2	Brake release fitting
3	Stud bolt
4	Adjusting washer
5	Brake releasing bolt
6	Spring washer
7	Gap adjusting nut
8	Brake lining
9	Boss
10	Shaft retaining C-ring
11	Cover
12	Fan set bolt
13	Fan
14	Leaf spring
15	Fixed plate
16	Armature core
17	Spring
18	Magnetic coil
19	Ball bearing
20	Motor shaft

Fig.14 Model FB – 2A, 3A



Part No.	Part Name
1	Stationary core
2	Brake release fitting
3	Stud bolt
4	Adjusting washer
5	Brake releasing bolt
6	Spring washer
7	Gap adjusting nut
8	Brake lining
9	Boss
10	Shaft retaining C-ring
11	Cover
12	Spring pin
13	Fan
14	Leaf spring
15	Fixed plate
16	Armature core
17	Spring
18	Magnetic coil
19	Ball bearing
20	Motor shaft

Fig.15 Model FB – 5A, 8A, 5B, 8B

8 – 5 – 2) Checking, adjustment and maintenance

Manual brake releasing

Procedures for manual brake releasing are the same as those for Model FB – 1A, please refer to the descriptions in Paragraph 8 – 4 – 2).

Gap checking Procedures

(1) Remove the cover ⑪.

(2) Insert a gap gauge into the gap between stationary core ① and armature plate ⑯ to measure the gap. When the gap has approached to the limit value shown in Table 14, adjustment is necessary. Measure the gap at three points on the circumference.

Table 14 Brake gap value

Brake type	Gap value G (mm)	
	Normalized value	Allowable limit value
FB – 2A, 3A	0.45~0.55	0.9
FB – 5A, 8A	0.6~0.7	1.1
FB – 5B, 8B	0.4~0.5	1.0

Gap adjustment

(1) Remove the cover ⑪.

(2) Insert a gap gauge into the gap between stationary core ① and armature plate ⑯, and turn the gap adjusting nut ⑦ provided at the top of the stud bolt ③ clockwise. If the gap is too small and unable to readjust, reduce the number of gap adjusting shim ④. Adjust three nuts alternatively, so that the gap can be evenly adjusted to the prescribed value in Table 14 at three points.

(3) Confirm that the adjustment was made satisfactory, by turning the power switch on and off.

(4) Place the cover ⑪ on the brake.

Replacement of Brake lining

Repeat the gap adjustment until thickness of the brake lining reaches the allowable limit for use. Then, replace it with a new one.

Table 15 Brake lining size

Brake type	Brake lining dimension	Initial thickness t_o(mm)	Allowable thickness limit t_o(mm)
FB − 2A, 3A		8	6
FB − 5A, 8A		11	7
FB − 5B, 8B		10	6

(1) Remove the cover ⑪.

(2) For Models FB − 5A, 8A, 5B, 8B, remove the fan ⑬ by pulling out the spring pin ⑫ using a pin of 3.5 mm in diameter. For Models FB − 2A, 3A, remove the fan ⑬ by untightening the fan setting bolt ⑫.

(3) Remove three gap adjusting nuts ⑦.

(4) Remove the fixed plate ⑮ and take the brake lining ⑧ out.

(5) Fix the leaf spring ⑭ for FB − 5A, 8A, 5B, 8B, as shown in Fig.13.

(6) Apply a little amount of grease around the brake lining for FB − 5A, 8A, 5B, 8B.

(7) For FB − 5A, 8A, 5B, 8B, put the brake lining on the boss ⑨ and confirm if the brake lining slides smoothly around the boss. Remove surplus grease from the surface.

(8) When the gap G has not reached the specified value after the brake assembly was mounted, adjust the gap to become the specified value by turning the gap adjusting nuts ⑦.

(9) Confirm the braking performance by turning the power switch on and off. If no abnormality is observed, mount the fan ⑬, the spring pin or fan setting bolt ⑫ and the cover ⑪. Coat the fan setting bolt ⑫ for FB − 2A, 3A with anti-loosening agent.

9. Trouble Shooting

When any abnormalities are observed with CYCLO geared motor ALTAX, take appropriate actions without delay by refering to the following instructions.

Table 16

Type of trouble			Cause	Remedy
The motor does not run in the unloaded condition			Power failure	Contact the power supply company.
			Defective electric circuit	Check the defective portion of electric circuit.
			Fusing	Replace the fuse.
			Safety device at work	Eliminate a cause of wrong actuation of the safety device.
			Locking of the load	Check and investigate the load and the safety device
			Poor contact of switch	Adjust the contact.
			Disconnection of motor stator wiring	Repair at a specialized workshop.
			Broken bearing	Repair at a specialized workshop.
			Defective governor switch (0.1~0.4 kW single-phase motor)	Repair at a specialized workshop.
			Broken condenser (single-phase motor)	Replace the condenser.
			Three-phase motor acting as single-phase motor (3-phase motor)	Check the power sorce using a voltmeter. Repair or replace the motor, transformer coils,contactors and fuses.
			Frictional surface of the brake is stained.	Clean the brake lining.
			Poor gap adjustment of the brake	Readjust the brake gap.(Refer to Page 9~18).
The motor works but the output shaft does not work.			Defective gear drives due to overloading etc.	Repair at a specializewd workshop
The output shaft rotate without loading, but	When loaded	Switch is overheated.	Insufficient capacity of switch	Replace the switch with one having a specified capacity.
			Overloading	Reduce the load to a specified level.
		Fuse is cut.	Insufficient fuse capacity	Replace the fuse with one having a specified capacity.
			Overloading	Reduce the load to a specified level.
			Defective governor switch (in 0.1~0.4 kW motor)	Repair the governor at a specialized workshop.
		Rotating speed does not increase and overheated.	Voltage drop	Consult with the power supply company.
			Overloading	Reduce the load to a specified level.
			Deteriorated condenser capacity (in single-phase motor)	Replace the condenser.
			Short circuit of motor stator winding	Repair the stator at a specialized workshop.
		Motor stops.	The key is not set on the shaft	Set the key.
			Burnt bearing	Repair at a specialized workshop.
			Defective adjustment of the safety device	Adjust the safety device.
	The motor rotates re-vesely.		Wrong connection	Connect correctly.
	Disconnected fuse		Short-circuit of the lead wire	Replace the fuuse.
			Poor connection of the motor with the starter	Connect firmly.

Type of trouble		Cause	Remedy
Excessive rise of the temperature		Overloading	Reduce the load to a specified level.
		Increased or decreased voltage	Consult with the power supply company.
		Defective governor switch (Single-phase motor)	Repair at a specialized workshop.
		Deteriorated condenser capacity (single-phase motor)	Replace the condenser.
		Ambient temperature is too high.	Improve the ventilation method.
		Failure due to overloading to shaft and gear	
Grease leakage	Grease leakage from the output section	Damaged oil seal	Replace the oil seal.
	Grease leakage from the casing seam	Slacked bolts	Tighten the bolts.
	Grease leakage into the inside of motor	Damaged oil seal	Repair at a specialized shop.
Abnormal noise or heavy vibration		Damaged gear	
		Distortion of the housing due to rough bed surface	Flatten the bed surface or adjust the bed with the liner.
		Resonance resulting from insufficient rigidity of the bed	Improve rigidity of the bed by reinforcement.
		Misalignment of connecting shafts	Realignment or use of flexibble coupling
		Vibration transferred from the connected machine	Detect vibration sources by running the gear motor independently.
Abnormal noise in the motor		Foreign substances enclosed in the motor	Eliminate the foreign substances.
		Damaged bearing	Repair at a specialized workshop.
		Improper brake gap adjustment	Adjust the brake gap.(Refer to Page 9~18)
		Worn brake lining	Replace the brake lining(Refer to Page 9~18)
		Burnt magnetic coil in the brake assembly	Replace the magnetic coil
		Failure of the rectifier	Replace the rectifier.
		Disengagement or failure of leaf spring in the brake boss	Replace the leaf spring.
		Defective governor switch (0.1~0.4 kW single-phase motor)	Repair at a specialized workshop.
Ineffective braking function	Brake does not work.	Releasing bolt not returned to the original position.	Return the bolt to the original position and readjust the gap.
		Improper adjustment after disassembling.	Readjust the gap.
	The brake slips. A braking response is slow.	A fast braking circuit is not working.	Shift to the fast braking action (Refer to Page 4~5)
		Foreign substances or oil are adhered to the brake lining.	Remove foreign substances and clean the lining surface with a dry cloth.
		Worn brake lining	Adjust the brake gap. Replace the brake lining.
		Uneven brake gap	Adjust the brake gap.
		Overloading	Reduce the load or apply a brake frame of larger number.
		Insufficient recovery of the releasing bolt	Set back the releasing bolt to the original position and readjust the gap.

10. Construction

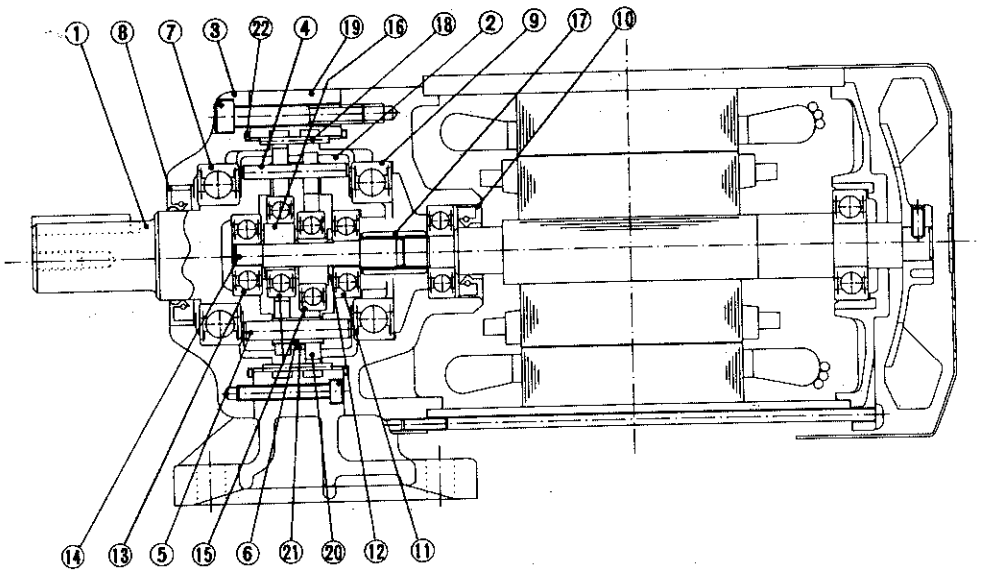


Fig.16 CNHM05 – 5085 – 17

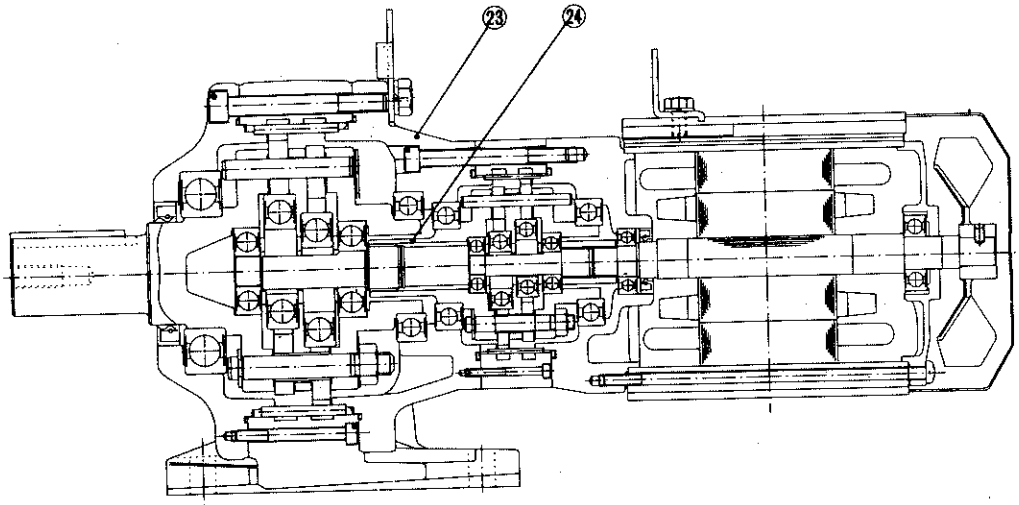


Fig.17 CNHM1 – 5125DA – 121

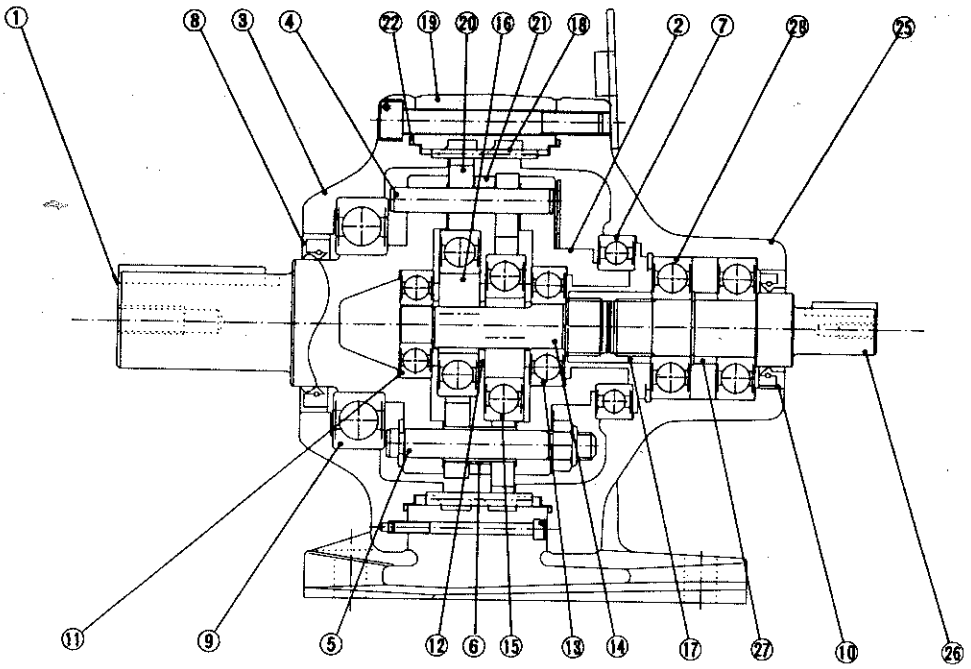


Fig.18 CNH – 5125

Part No.	Part name	Part No.	Part name	Part No.	Part name
1	Slow speed shaft	11	Bearing	21	Spacer ring
2	Carrier	12	Spacer	22	O-ring
3	Cover	13	Bearing	23	Intermediate cover
4	Slow speed shaft pin	14	Center shaft	24	Intermediate shaft
5	Carrier pin	15	Bearing for the eccentric	25	High speed end shield
6	Carrier pin pipe	16	Eccentric	26	High speed shaft
7	Bearing	17	Joint spline	27	Spacer
8	Oil seal	18	Ring gear pin	28	Bearing
9	Beraring	19	Ring gear housing with feet		
10	Oil seal	20	Cycloid disc		

11. Combinations for Double Reduction

ALTAX geared motor with high reduction ratio consists of double reduction system as shown in the following table.

Table 17

Frame size	Frame size of second stage	Frame size of first stage
5095DA	5095	5075
5105DA	5105	5085
5115DA	5115	5085
5125DA	5125	5095

12. Oil Seals

Table18

Frame size	ALTAX geared motor		ALTAX Reducer	
	For slow speed shaft	For motor shaft	For slow speed shaft	For high speed shaft
5065	D20357	S14287	——	——
5075	D28458	S15307	D28458	S16267
5085	D28458	S15307	D28458	S16267
5090, 5095	D355511	S20357	D355511	S25408
5100, 5105	D385811	S20357	D385811	S25408
5115	D507212	S325211	D507212	S325211
5125	D557812	S32511	D557812	S325211
5095DA	D355511	S15307	D355511	S16267
5105DA	D385811	S15307	D385811	S16267
5115DA	D507212	S15307	D507212	S16267
5125DA	D557812	S20357	D557812	S25408

13. Guarantee

Guarantee period

The guarantee terms are valid for new products only for a period of 18 months after the date of shipment from the manufacturer's factory or 12 months from commencement of work, which ever it may be shorter.

Guaranteed items

1. Our ALTAX geared motors are guaranteed for their normal performance, if they are installed, connected and maintained properly in accordance with our operating instructions and correctly operated under conditions specified in the corresponding catalogue or specifically agreed upon between the manufacturer and the the purchaser.
2. We guarantee that components of our products neither use defective materials nor have processing defects. We also guarantee that our ALTAX geared motors have deficiencies in painting, packing and transportation.
3. We guarantee that our ALTAX geared motors delivered to you are manufactured in accordance with our appearance sketch and specification.
4. The scope of our guarantee is limited to the scope of our manufacture.
5. The following items shall be excluded from our guarantee.
   ① Deficiencies connected with installation and connection to other machine.
   ② When our products are not given proper maintenance or correctly handled.

③ When operated under other conditions than specified.
④ When remodelling or structural changes have been made by the user.
⑤ When the secondary troubles of our drive have been caused by deficiencies attributable to the user's machine connected to our drive by the user.
⑥ When the secondary troubles of our drive have been caused by deficiencies attributable to the user's supplies or designated parts.
⑦ When troubles have been caused by force majeure such as earthquakes, fires, floods, lightenings and others.
⑧ When troubles have been caused by reasons not attributable to us.

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