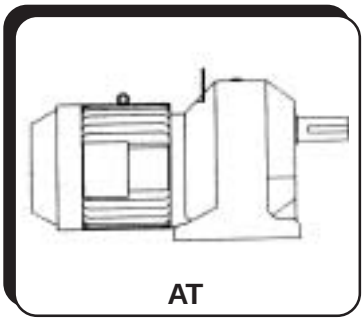
POWER BUILD LIMITED

INSTRUCTION MANUAL

SKK JAPANESE TECHNOLOGY FOR GEAR MOTOR & REDUCERS

(AVAILABLE FOR SALE IN INDIA, BANGLADESH, BHUTAN, NEPAL, PAKISTAN AND SRI LANKA)

FOOT MOUNTED



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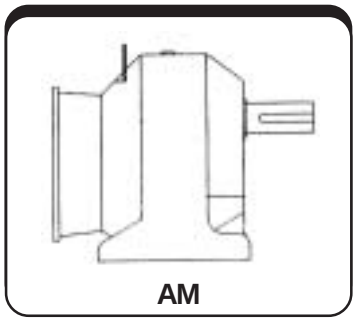

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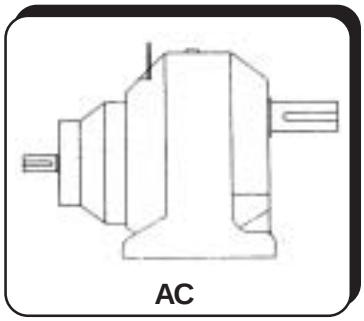
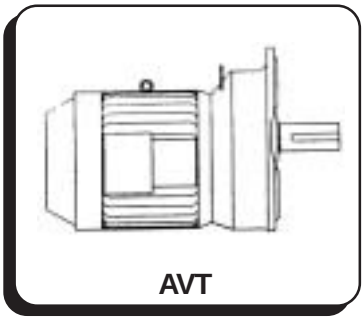
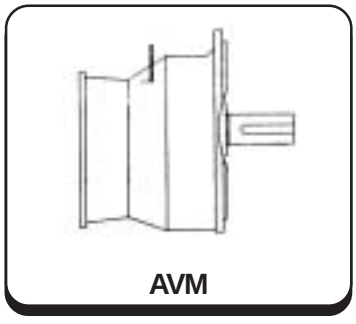


AC

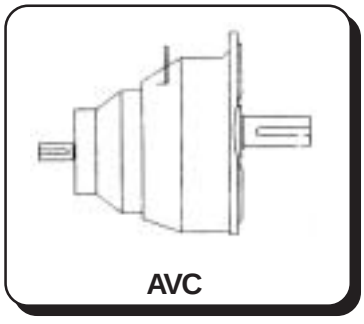
FLANGE MOUNTED



AVT



AVM



AVC

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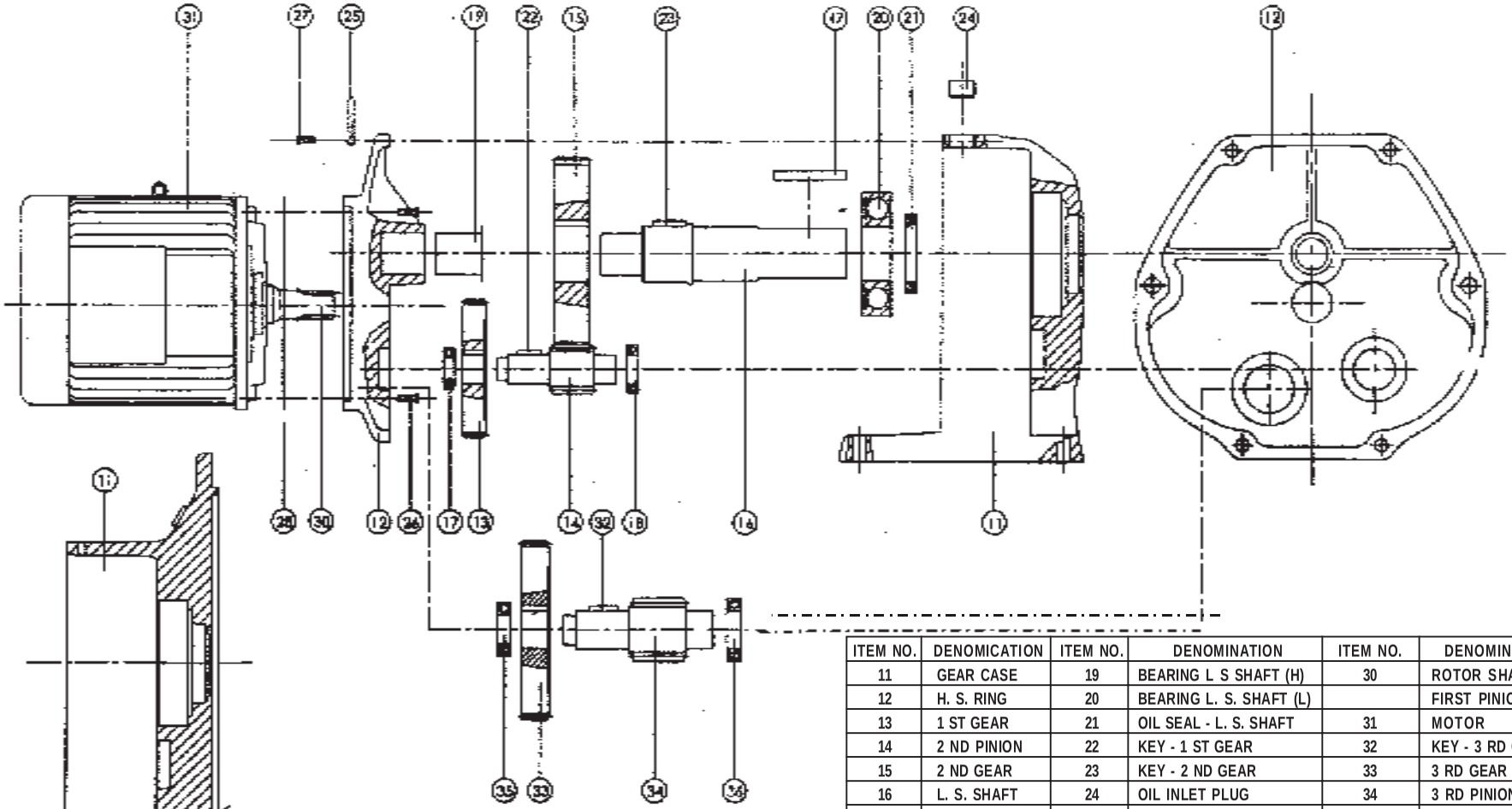

(AVT)

ITEM NO.	DENOMICATION	ITEM NO.	DENOMINATION	ITEM NO.	DENOMINATION
11	GEAR CASE	19	BEARING L S SHAFT (H)	30	ROTOR SHAFT WITH
12	H. S. RING	20	BEARING L. S. SHAFT (L)		FIRST PINION
13	1 ST GEAR	21	OIL SEAL - L. S. SHAFT	31	MOTOR
14	2 ND PINION	22	KEY - 1 ST GEAR	32	KEY - 3 RD GEAR
15	2 ND GEAR	23	KEY - 2 ND GEAR	33	3 RD GEAR
16	L. S. SHAFT	24	OIL INLET PLUG	34	3 RD PINION
17	BEARING 2 ND	25	EYE BOLT	35	BEARING 3 RD
	PINION (H)	26	BOLT - MOTOR		PINION (H)
18	BEARING 2 ND	27	BOLT - H. S. RING	36	BEARING 3 RD
	PINION (L)	28	GASKET - MOTOR		PINION (L)
				47	KEY - OUTPUT

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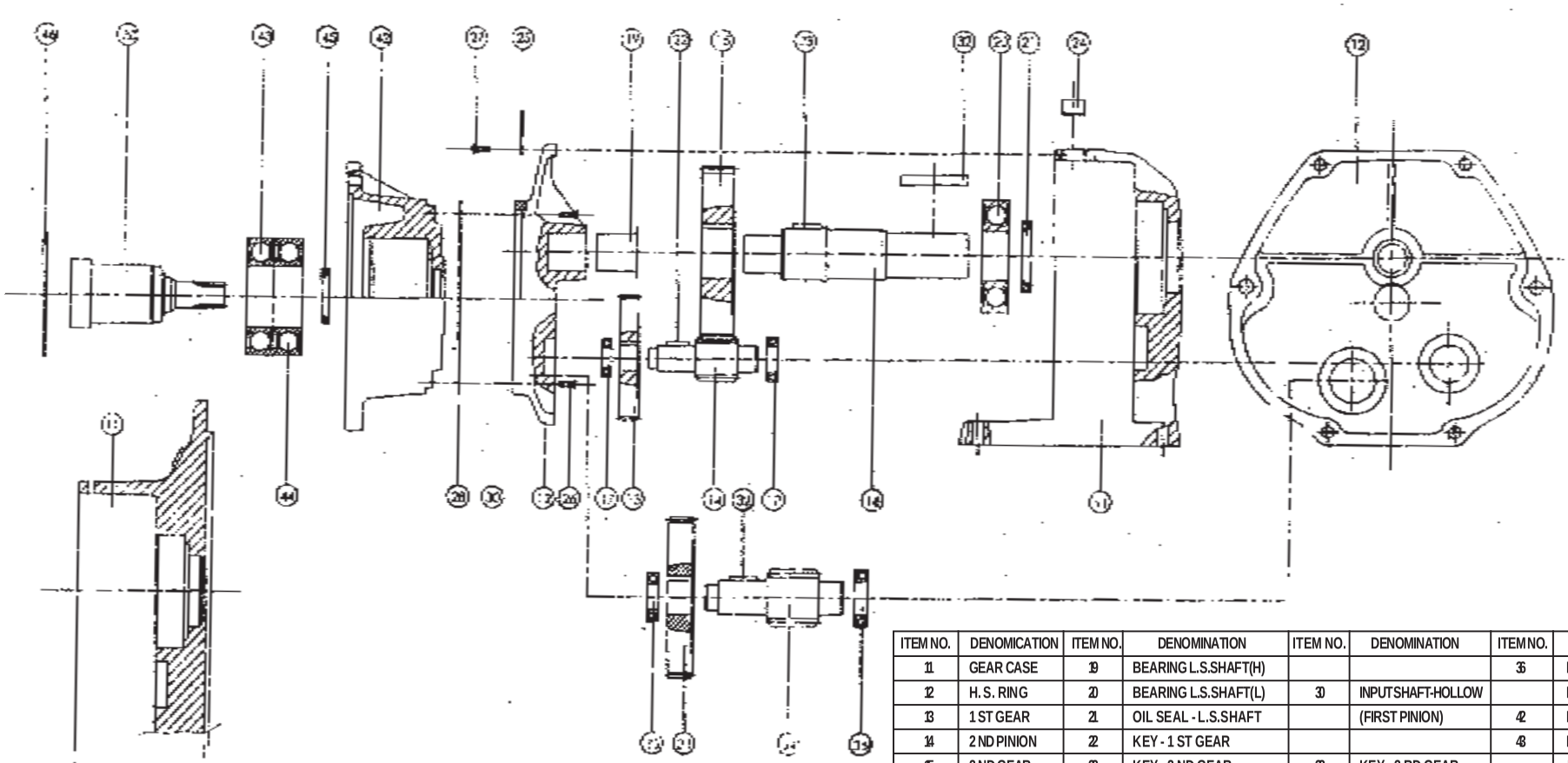
ARRANGEMENT DRAWING - MOTOR MOUNT REDUCER (AM)

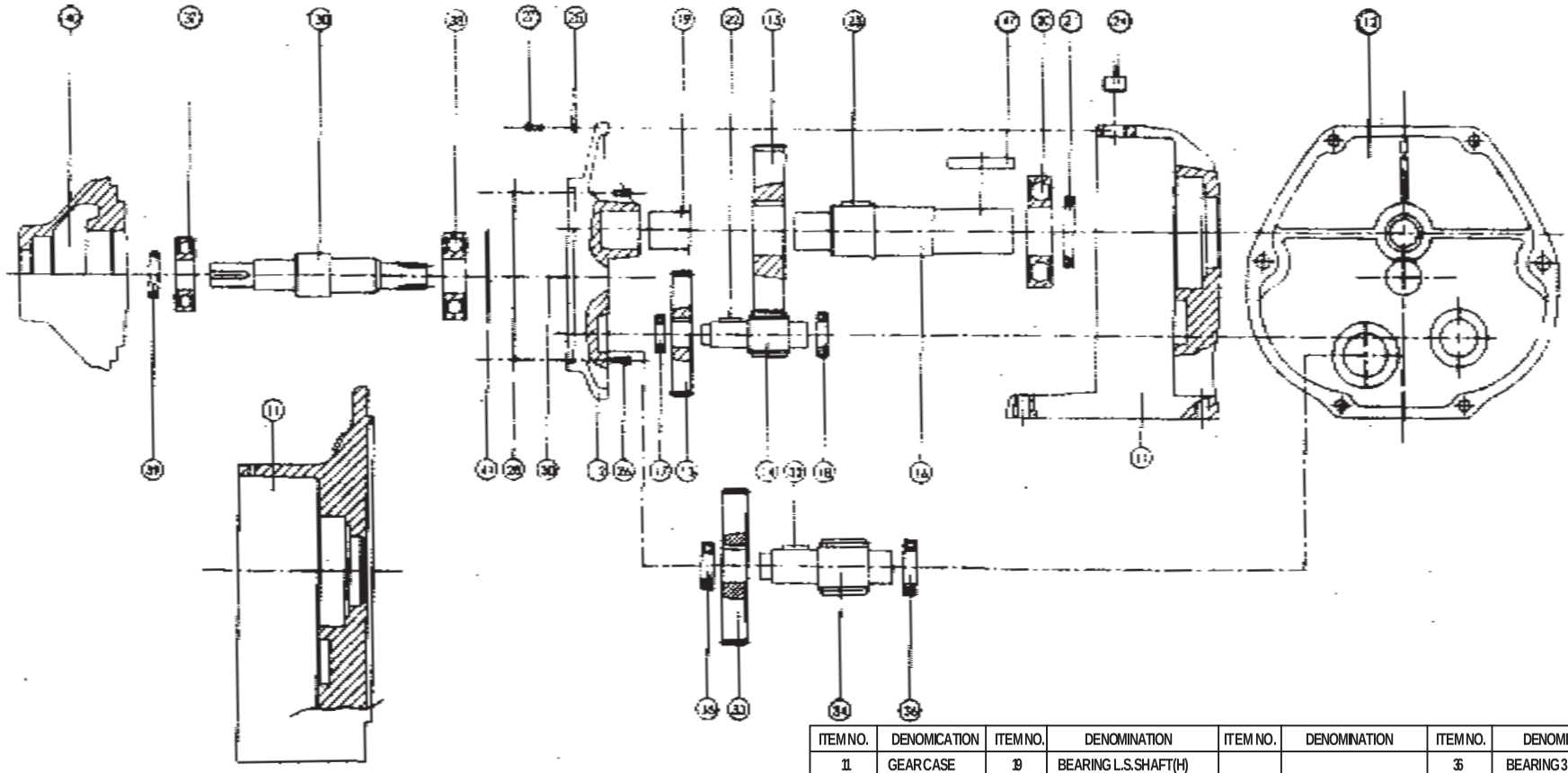


(AVM)

ITEM NO.	DENOMICATION	ITEM NO.	DENOMINATION	ITEM NO.	DENOMINATION	ITEM NO.	DENOMINATION
11	GEAR CASE	19	BEARING L.S.SHAFT(H)			35	BEARING 3 RD
12	H. S. RING	20	BEARING L.S.SHAFT(L)	30	INPUT SHAFT-HOLLOW		PINION (L)
13	1 ST GEAR	21	OIL SEAL - L.S.SHAFT		(FIRST PINION)	42	H. S. COVER
14	2 ND PINION	22	KEY - 1 ST GEAR			43	BEARING
15	2 ND GEAR	23	KEY - 2 ND GEAR	32	KEY - 3 RD GEAR		H. S. COVER (H)
16	L. S. SHAFT	24	OIL INLET PLUG	33	3 RD GEAR	44	BEARING
17	BEARING 2 ND	25	EYE BOLT	34	3 RD PINION		H. S. COVER (L)
	PINION (H)	26	BOLT - H. S. COVER	35	BEARING 3 RD	45	OIL SEAL-H.S.COVER
18	BEARING 2 ND	27	BOLT - H. S. RING		PINION (H)	46	INTERNAL CIRCLIP
	PINION (L)	28	GASKET - H. S. COVER			47	KEY - OUTPUT

PBL - SKK

ARRANGEMENT DRAWING - IN LINE REDUCER (AC)



ITEM NO.	DENOMICATION	ITEM NO.	DENOMINATION	ITEM NO.	DENOMINATION	ITEM NO.	DENOMINATION
11	GEAR CASE	19	BEARING L.S.SHAFT(H)			35	BEARING 3RD
12	H. S. RING	20	BEARING L.S.SHAFT(L)	30	INPUT SHAFT-HOLLOW		PINION (L)
13	1ST GEAR	21	OIL SEAL - L.S.SHAFT		(FIRST PINION)	37	BEARING
14	2ND PINION	22	KEY - 1 ST GEAR				H. S. COVER (H)
15	2ND GEAR	23	KEY - 2 ND GEAR	32	KEY - 3 RD GEAR	38	BEARING
16	L. S. SHAFT	24	OIL INLET PLUG	33	3 RD GEAR		H. S. COVER (L)
17	BEARING 2 ND	25	LIFTING HOOK	34	3 RD PINION	39	OIL SEAL-H.S.COVER
	PINION (H)	26	BOLT - H. S. COVER	35	BEARING 3RD	40	H. S. COVER
18	BEARING 2 ND	27	BOLT - H. S. RING		PINION (H)	41	INTERNAL CIRCLIP
	PINION (L)	28	GASKET - H. S. COVER			47	KEY - OUTPUT

(AVC)

Notes To Users :-

We are pleased to enter your name in our Customers List and greatly appreciate your decision in choosing PBL Geared Motor / Gear Reducers.

Your Model :_____
Model Serial Number :_____

This instruction manual covers some essential procedures for installation, operation and maintenance. Before operating the unit, please thoroughly read this manual.

1. To start with, check the following points to see,

- The items indicated on the nameplates are in confirmance with your requirements.
- There is no damage with the units due to humidity or dirt accumulated in transit.
- Operating conditions of driven machine (load, frequency of start/stops and degree of shock) please do not differ from the ones indicated at the time of the order.
- Please contact PBL if required.

2. Transportation

- For the type of geared motor / reducer whose weight is more than 20 kg, an eyebolt or a lifting hook is fixed. Please use it for removing from the packing. Please note that an eye bolt or a hanging hook is only for lifting a geared motor / reducer, therefore, do not use it when the unit is assembled with the driven machine, etc.

3. Storage

If geared motors / reducers have to be stored or is not in operation for more than 3 months, please follow the procedures given below.

1. In case geared motors / reducers are to be stored in packing for a long period of time,
   a) Geared motors / reducers have to be stored in indoor, clean and dry place where there is no vibration and much change in temperature.
   b) Rotate shaft by hand every 3 months to prevent bearing from rusting and confirm that shaft rotates smoothly and there is no abnormality.

2. In case geared motors / reducers are stored after installation with machine for a long period of time (over 6 monts in general condition, over 3 months in hot and humid place.)
   a) If geared motors / reducers are exposed to high humidity or if there is possibility to enter water or foreign articles in the units, cover geared motors / reducers with poly ethylene sheet, put desiccant inside and seal. Please replace desiccant with new one periodically.
   b) Please run geared motors / reducers for about 5 minutes for every 3 months to prevent bearing from rusting.
   c) Before operation, check the insulation resistance and carry out the inspection of bearing and the connection to power supply source, etc. to see that there is no abnormality.

4. Tips on Installation

1. Conditions for installation

a)	Ambient Temperature	:	-20^0C to 60^0C
b)	Ambient Humidity	:	Below 100% (For the units with single-phase motor or brake motor: under 85%)
c)	Altitude	:	Below 1000m
d)	Atmosphere	:	Avoid corrosive gas, explosive gas and vapour. Dustless and well ventilated.

e) Installation angle : No limit. (Can be installed at any position).

f) Installation place : Indoor.

Note :

- In case geared motors with brake is installed vertically, the allowable frequency of braking and the life of lining will be reduced.

g) Cautions for installation of foot mount type

a) Care must be exercised to ensure that installation is always performed on a reliable machined foundation.

b) Avoid uneven clamping when you lock the unit on the bed.

h) Cautions for installation of flange mount type.

a) Care must be excercised to ensure that installation is always performed on a reliable machined face.

b) After the geared motor has been positioned by means of the spigot joint of the bracket, tight it firmly.

c) Connect the low-speed shaft (output shaft) and the driven shaft by means of a “flexible coupling” or any such similar means.

d) When radial load and thrust load are applied to geared motor, install driven shaft block on the machine in which bearings are fixed to absorb the load adequately.

i) Cautions fro installation of motor on motor mount reducers :

a) Clean the motor face and rotor shaft thoroughly.

b) Apply lubricant on the diameter of rotor shaft to ensure free insertion.

5. Connection with the driven machine

Since low-speed shaft (output shaft) and high-speed shaft (input shaft) are protected with rust preventing coating, remove it with thinner or a similar solvent.

i. Direct connection

a) When installing the coupling, etc. on the low-speed shaft (output shaft), the fit should be in the neighbourhood of h6M6~h6P6. In this case slightly heat the coupling, etc. before connecting.

b) When the input shaft of the driven machine and the low-speed shaft (output shaft) of the geared motor are coupled directly, use a “flexible coupling“ and make sure that both ends are in alignment. (Refer to Fig. 1)

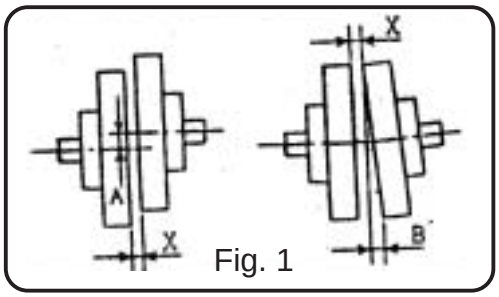


Fig. 1

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

ii. When the machine is driven by V-belt, chain or gearing

Make arrangement to ensure that the Shaft of driven machine and that of geared reducer are positioned parallel. When the machine is driven by V-belt or chain, ensure that the center distance is not too long. When the machine is driven by gearing, geared motor / reducer should be installed setting up the accurate center distance.

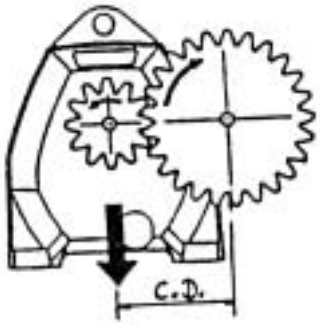


Fig. 2

a) Diameter of the chain sprocket wheel or the gearing that is mounted on the output shaft:

The Pitch circle diameter should be at least 3 times larger than the output shaft diameter.

b) Point of load application on the output shaft :

When load (overhung load) is applied at the end of the shaft, it may cause damage to the shaft. The gearing or chain sprocket wheel must be mounted so that the point of load application is as possible to the face of the unit minimize overhead load.

c) Tension of chain :

When using chain, it is necessary to give suitable slack to chain. If the tension of chain is too loose, excessive shock will be generated at starting of load fluctuations, which may damage both the geared motor and the driven machine. Generally, the recommended amount of slack is 2 % of span distance. (Refer Fig. 3)

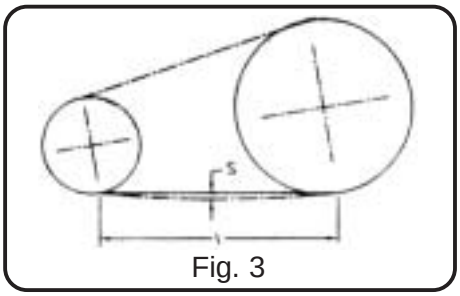


Fig. 3

$S = 0.02\ l$

S = amount of slack for chain
l = span

d) Layout of chain driving :

When using chain horizontally for connection with the drive and the driven machine, arrange shafts so as to give tension to the upper side of the chain. Shaft arrangement of vertical transmission is not recommended, however, if necessary, the large wheel should be positioned at lower and as illustrated in Fig. 4.

Correct layout

Incorrect layout

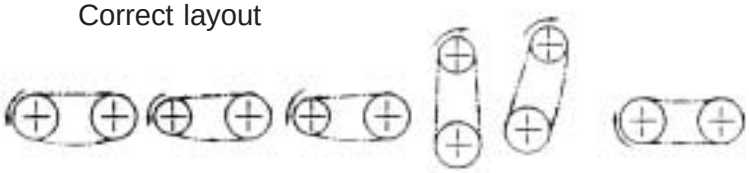


Fig. 4

e) Installation of slide rails :

When slide rails are used (Optional supply) in V-belt and chain driving, install the push bolts front and back alternately so that they will be set in an opposite direction to external forces, as shown in Fig. 5.

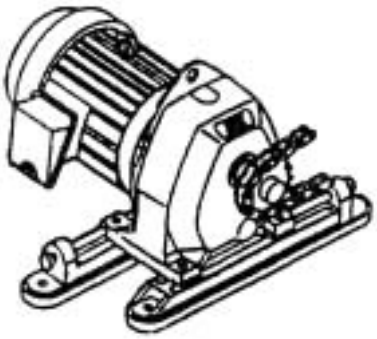


Fig. 5

6. Operation :

- "A-SERIES" geared motors and reducers are grease lubricated and already filled with grease at the time of delivery. Therefore, there is no need to fill grease before operation.
- After inspection of installation and wiring, carry out no-load running of the machine alone and then proceed to load running.

- Abrupt reversing during operation will damage the geared motor / reducer as well as the driven machine. It is requested to stop by braking before it is operated in reverse.

  In case the equipment is used for frequent reversals, please refer to PBL.

7. Lubrication

- "A-SERIES" geared motors and reducers are grease lubricated and filled with grease be fore delivery. For the general condition of use, it is not necessary to replace grease. However, it is recommended to replace with new one after 20,000 hours of operation (about 4-5 year) as it will extend the life of the unit.

Table 2. Quantity of grease

Type AT, AC and AM. - FOOT MOUNTED Double Reduction (1/5 ~ 1/30)									
Reducer Frame No.	A	B	C	D	E	F	G	H	K
Qty. of grease (kg)	0.14	0.23	0.28	0.42	0.85	1.1	1.9	2.6	3.8
Triple Reduction (1/45 ~ 1/200)									
Reducer Frame No.	-	B	C	D	E	F	G	H	K
Qty. of grease (kg)	-	0.28	0.32	0.51	0.95	1.4	2.3	3.2	4.6

Type AVT, AVC and AVM. - FLANGE MOUNTED Double Reduction (1/5 ~ 1/30)							
Reducer Frame No.	A	B	C	D	E	F	G
Qty. of grease (kg)	0.12	0.19	0.37	0.75	1.0	1.0	1.7
Triple Reduction (1/45 ~ 1/200)							
Reducer Frame No.	-	B	C	D	E	F	G
Qty. of grease (kg)	-	0.23	0.32	0.46	0.85	1.3	2.1

Type of grease : "OKS Make LONG LIFE NLGI 000" universal EP grease. In case of using grease made by other manufactures or equivalant, please refer to PBL.

8. Periodical Inspection / Repair

The frequency of inspection and repair will differ as per operating condition, however, please conduct inspection and repair with reference to the following table. (It is based on the operation of 10 hrs/day.)

Inspection / Repair items	**Frequency**	**How to determine the necessity of parts replacement**
Replacement of	4-5 years	Replace grease every 20,000 hours or every 5 years. In high temperature environment, or continuous operation under severe conditions, replace grease approximately every 15,000 hours.
Tightening of chain	6 months	If the tension of chain is loose, tighten property
Improper tightening of bolts	6 months	If tighteing of bolts is loose, tighten properly
Replacement of Oil seal	1-2 years	At every overhaul, or when leakage is found, replace oil seal.
Replacement of bearing	5 years	If abnormal noise occurs, replace bearing.
O-ring	1-2 years	At every overhaul, replace o-ring with a new one

9. Trouble Shooting

Trouble		Cause	How to correct
Unit does not Rotate even in no load condition		Interruption of service	Check motor terminal voltage or source voltage
		Breaking of wiring Bad contact of switch	1) Inspect circuits and repair defect. 2) Check motor terminal voltage or current, repair defect of connection.
		Open circuit exists	Replace fuse, reset overload relay, check tripping of breaker.
		Defect of gear	Replace gear
		Damaged key of shaft, sprocket or pulley	Replace key with a new one.
		Load is too heavy	Lower load to rated, or raise capacity by changing unit
		Bad contact of switch	Check motor terminal voltage or current, repair bad contact of circuit
Unit rotates in No load condition But cause trouble when rotated with load	Noisy continuous load	Inversion of foreign article	Remove foreign article
		Wear or damage of bearing	Replace bearing at PBL or at specified place
		Wear or damage of gear	Replace gear at PBL or at specified place
	Overload relay acts	Bad setting or improper selection of overload relay	Revise setting value, or replace with regular one
		Load is too heavy	Lower load to rated
	Breaking of fuse or breaker works Over heat	Insufficient capacity of fuse or breaker	Investigate and replace or change setting value
		Load is too heavy	Lower load to rated
		Voltage is too high or too low	Check voltage and repair.
		Imbalance of voltage	Check, source of circuit and wiring, and repair
		Short circuit of motor winging	Check winging and repair
		Shortage of lubricant and damage in bearings	Replace bearings and replace Lubricant
Grease Leakage		Improper tightening of each bolt	Tighten properly
		Defective oil seal	Replace oil seal
		Defect of gear case	Replace gear case
		Excessive quanititly of grease	Adjust to proper quantity

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