

BONENG



CR/F/K/S Gearmotor Instruction

10/2021

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Important notes

During installation, please pay attention to the safety notes and warning in this book!



Suggestions and useful information



Harmful situations:

Possible result: damage transmission device and the environment



If you conform to the regulations in this manual, there won't be any fault, at the same time, it can satisfy the requirements of quality defect claim. So before the transmission device starts working, please read this instruction.

This instruction book contains important installation and maintenance notes, please keep this instruction book in a place near the device for reference;

1 Safety information

Safety information mainly involve the applications of gearmotor. When running gearmotor, please note the relevant notes.

This instruction is an integral part of the gearmotor supplied.

All persons involved in the installation, operation, maintenance and repair of the gearmotor must have read the instructions and comply with them.

Conforming to the instruction strictly is a necessity for realizing non-fault running and performing any quality assurance requirement.

Under the premise of conforming to instruction, please pay attention to:

National (Local) regulations for relevant safety and accident preventions;

Special regulations and requirements of relevant devices;

Warning and safety mark on device.

The following situations will cause human injury and property loss:

Incorrect running;

Wrong installation or operation;

Disassemble the protect cover or housing against the instructions.

Any damage or stop caused by disregarding this instruction book will not be responsible by the company.

To seek for technical advance, we reserve the rights to modify the instructions. With continuous improvements, we will further improve its performance and safety performances on the foundation of keeping the basic characteristics.

2 Technical information

2.1 The name plate information

BONENG			
Type			
n ₂		RPM	
P ₁	kW	T ₂	N · m
n ₁	RPM	i	
Oil		Wt.	kg
NO.		Date	

Product type

Output speed (only for directly connected motor)

Rated input power kW (it means motor power for directly connected motor)

Rated output torque N · m

Rated input speed RPM (it means motor speed for directly connected motor)

Nominal ratio

Lubrication oil viscosity

Weight

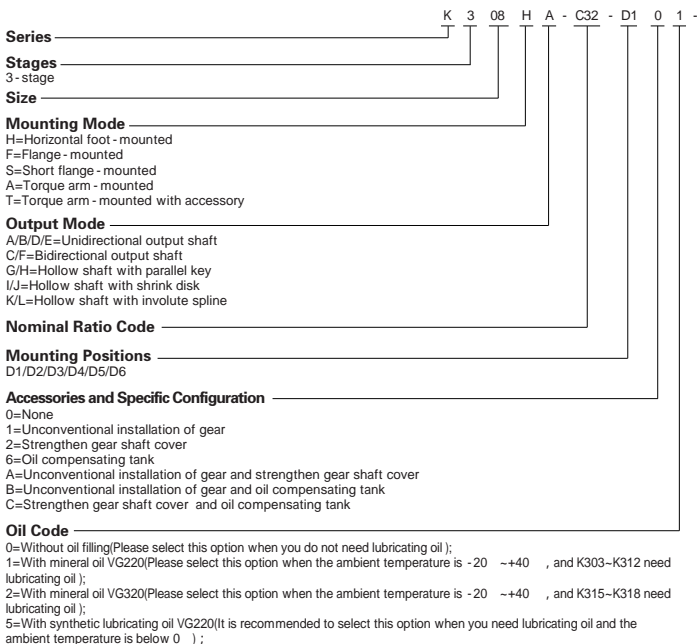
Product number

Production date

Data on nameplate are very important, please read them carefully and keep them clean. When services are needed, please provide the product number, used time and fault details.

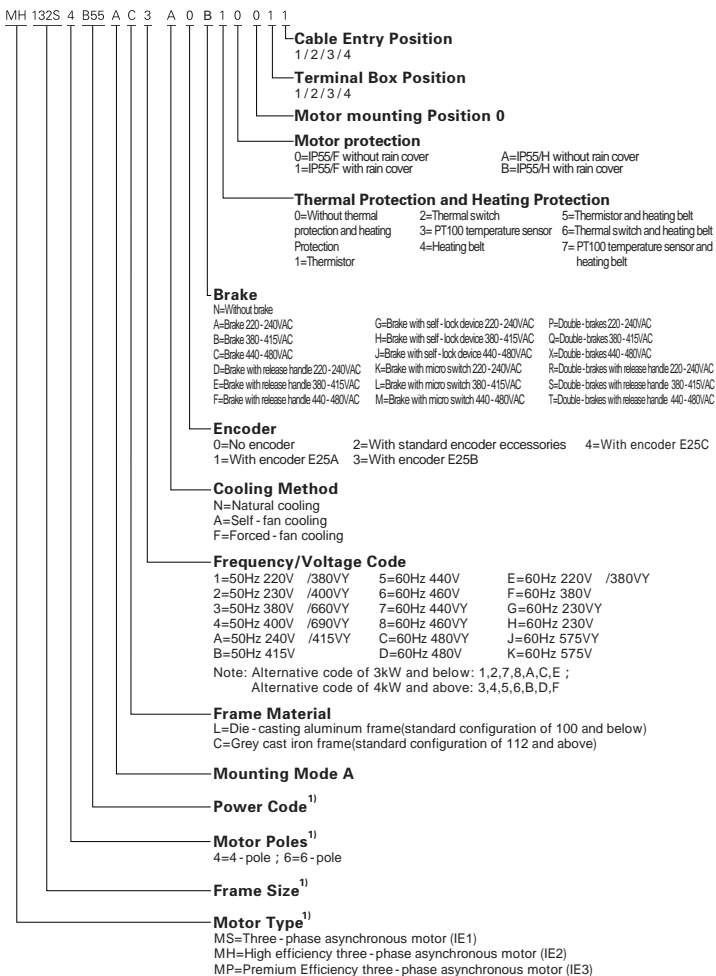
2.2 Type designation

For example : KA87A - 30.9 - M7.5+T31 - B51 - 90



Note¹ Motor Type/Frame Size/Poles/Power Code

Power kW	4-pole Type	6-pole Type	Power kW	4-pole Type	6-pole Type	Power kW	4-pole Type	6-pole Type	Power kW	4-pole Type	6-pole Type
0.09	MS056M4A09		1.1	MS090S4B11 MH090S4B11 MP090S4B11 MA090M4B11	MH090S6B11 MP090M6B11	11	MH160S4C11 MP160M4C11 MA160M4C11	MH160M6C11 MP160M6C11	55	MH250M4C55 MP250M4C55 MA250M4C55	MH280M6C55 MP280M6C55
0.12	MH063M4A12 MP063M4A12 MA063M4A12		1.5	MS090S4B15 MH090S4B15 MP090M4B15 MA090M4B15	MH100M6B15 MP100M6B15	15	MH160M4C15 MP160L4C15 MA160L4C15	MH180M6C15 MP180M6C15	75	MH280S4C75 MP280S4C75 MA280S4C75	MH315S6C75 MP315S6C75
0.18	MH063M4A18 MP063M4A18 MA063M4A18	MH071M6A18 MP071M6A18	2.2	MS100M4B22 MH100M4B22 MP100M4B22 MA100M4B22	MH112M6B22 MP112M6B22	18.5	MH180M4C18 MP180M4C18 MA180M4C18	MH200M6C18 MP200M6C18	90	MH280M4C90 MP280M4C90 MA280M4C90	MH315M6C90 MP315M6C90
0.25	MH071M4A25 MP071M4A25 MA071M4A25	MH071M6A25 MP071M6A25	3	MS100M4B30 MH100M4B30 MP100M4B30 MA100M4B30	MH132S6B30 MP132S6B30	22	MH180L4C22 MP180L4C22 MA180L4C22	MH200M6C22 MP200M6C22	110	MH315S4D11 MP315S4D11	MH315L6D11
0.37	MH071M4A37 MP071M4A37 MA071M4A37	MH080M6A37 MP080M6A37	4	MS112M4B40 MH112L4B40 MP112L4B40 MA112L4B40	MH132M6B40 MP132S6B40	30	MH200M4C30 MP200M4C30 MA200M4C30	MH225M6C30 MP225M6C30	132	MH315M4D13 MP315M4D13	MH315L6D13
0.55	MS080M4A55 MH080M4A55 MP080M4A55 MA080M4A55	MH080M6A55 MP080M6A55	5.5	MS132S4B55 MH132S4B55 MP132M6B55 MA132L4B55	MH132M6B55 MP132M6B55	37	MH225M4C37 MP225M4C37 MA225M4C37	MH250M6C37 MP250M6C37	160	MH315L4D16 MP315L4D16	
0.75	MS080M4A75 MH080M4A75 MP080M4A75 MA080M4A75	MH090S6A75 MP090S6A75	7.5	MS132M4B75 MH132M4B75 MP132L4B75 MA132L4B75	MH160S6B75 MP160S6B75	45	MH225M4C45 MP225M4C45 MA225M4C45	MH280S6C45 MP280S6C45	200	MH315L4D20 MP315L4D20	



◆ Example of product type with input flange or input shaft: K308HA-C32-D101-AE3

◆ Example of product type with input flange and motor type: K308HA-C32-D101-AP132-MH132S4B55FC3-A0N10-011

◆ Combi-type designation: K308HA/C205-D28-D100-MH080M4A75AL1-A0N00-011

Note: MA type(NEMA efficiency three-phase asynchronous motor) alternative pole code 4,frequency and voltage code 6,8,G,H,J,K, brake code A,D,G,K.

2.3 Noise level of gearmotor

Noise level conforms to relevant national standard, industrial standard and enterprise standard.

Inspection of noise is done according to sound density theory, it is inspected in a distance of 1 meter (the surface noise region).

Noise level is tested when gearmotor is under good working situation with regulated rated input speed n_1 and rated input power p_1 stated on the name plate. If several figures are given, the highest speed and power values apply.

If the repeated measurement can't get the final result, you should apply the inspection result obtained from the test platform of our company.

A class noise power of gearmotor should not exceed 80dB(A).

2.4 Temperature rising

When the ambient temperature is 40℃, the running gearmotor oil temperature is not exceeded 85℃.

The allowable working temperature range of lubricating oil for gearmotor is roughly as follows:

Mineral oil is about -10℃ ~ +90℃ (Up to +100℃ at moment); Synthetic oil is about -20℃ ~ +100℃ (Up to +110℃ at moment)

2.5 Notes (Following notes is related to the use of gearmotor):

When installed outdoor, direct sunlight should be avoided, otherwise concentrated heat will affect the gearmotor performance.

The gearmotor must not be cleaned using high-pressure cleaning equipment.

All work such as inspection, maintenance and installation on gearmotor should be done when gearmotor is not in operation.

No welding work should be done on gearmotor, the gearmotor must not be used as an earthing point for welding work. Welding will cause irreparable damage to fine gear wheel and bearings.

If any changes are found during operation (for example, over heating or abnormal noise, etc), you should switch off driving device immediately.

All the rotating components should be equipped with protective cover to prevent accidental contact of staffs, such as couplings, hydraulic coupler, gear wheel, driving belt wheel, etc.

You should conform to the instructions on gearmotor, for example, nameplate, arrow of the direction, etc. These nameplates and marks must be kept free from dirt and paint out all times.

During assembly or disassembly work, the damaged bolts should be changed with new bolts with the same strength and category.

The bad results caused by unreasonable application of couplings, self-modification to gearmotor and application of the components of other companies are not included in "three-guarantee" services.

Depending on operation conditions of gearmotor, the surface, lubrication oil and components of gearmotor may reach high temperature, avoid being burnt.

When changing lubrication oil, take care to prevent scalding by hot oil.

Gearmotor should be laid on dry wooden foundation with no vibration and be covered well. When storing the gearmotor and any independent components, you should take anti-rust measures, avoid rusting, the gearmotor should not be piled together when stored.

Unless there are other regulations in ordering contract, gearmotor should not be stored or work in sites with strong acid, alkali, low temperature, high temperature and heavy polluted air, damp and the places with chemical articles.

When shifting the gearmotor, take care to avoid the shaft ends knocked, otherwise the gearmotor may be damaged. When lifting, don't use the front threads at the shaft ends to attach eyebolts for transport.

Spare parts must be purchased from BONENG.

3 Installation and dismantlement

3.1 Notes before installation



Confirm the gearmotor in good condition (no damage during transporting or storing).
Confirm site environment conforms to the name plate data.
Standard working ambient temperature of gearmotor is -20 - +40 , no oil, no acid, no harmful gas, no steam and radioactive substance etc.
When gearmotor is stored over 1 year, the lubrication life on bearings will be short.



Installing outdoor should avoid direct sunshine. In case of concentrated heat to influence smooth running of gearunit;
Special gearmotor: allocated according to ambient condition;
During planning period, you should reserve enough space to maintain or repair.

3.2 Preparations

Completely clean the preservative and pollutants, etc on the surface of input/output shaft and flange; be sure not to damage the oil sealing by solvents immersion;
Preparation of tools/materials: one group of spanner, torque spanner, assembly clamp tools, input and output fastening device, lubricant(anti-rust oil), medium of sealing bolts (thread locking adhesives).

3.3 Installation of gearmotor

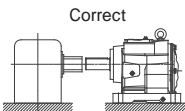
The gearmotor foundation must be horizontal and level, no resonance vibrations, good rigid and anti-torque forces. When installing the drive transmission on position the rigid base frame, make adequately on consideration that the individual components cannot be changed even if putting the max load on.
Lift the gearmotor through the fasten bolt on the gearbox.



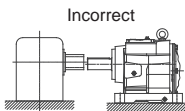
Note. Shaft end screw bolt is prohibited for the lifting fasten bolt.

Central height should be correctly aligned during foot-mounted ; coaxiality should be calibrated when coupling connect; run-out should keep within permissible values when flexible coupling while rigid coupling; contour and position tolerance should be guaranteed. And when long coupling, rigidity of shaft should be enough.

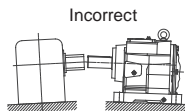
Gearmotor central height should be aligned when it is foot mounted :



Correct
Gearmotor central height is on the same level with driven machine central height



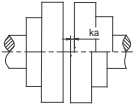
Incorrect
Gearmotor central height isn't on the same level with driven machine central height



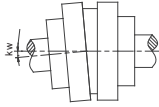
Incorrect
Mounting surface is not on the same level between the driven machine and gearmotor.

When installing the coupling, make absolutely certain that the following points are accurately aligned :

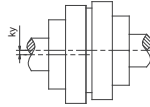
a) Axial misalignment



b) Angular misalignment

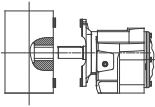


c) Radial misalignment



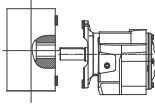
Flange - mount installation. Protruding (or concave) steps should inosculate with the housing:

Correct



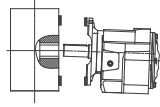
Connection parts should be coaxial.

Incorrect



coupling is not coaxial with flange

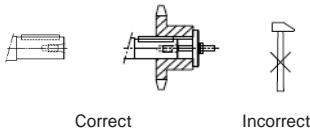
Incorrect



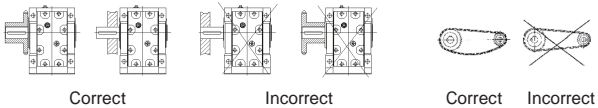
Flange mounting surface is not vertical with the connect shaft.

When gearmotor input or output is coupled with the couplings, belt pulleys, gear wheels and sprocket, must meet following requirement.

Press the drive components into the outer screw of output shaft, knock should be avoided.

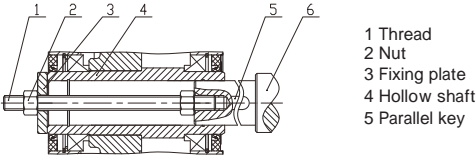


When using belt pulley, sprocket and pug mill, make consider the radial force. See the figure.



3.4 Assembly of hollow shaft of gearmotor

When hollow shaft is connected with solid shaft, clean and put anti-rust oil (hollow shaft must be exactly aligned with the machine shaft). Instead of the nut and threaded spindle shown in the diagram, other types of equipment such as a hydraulic lifting equipment can be used.

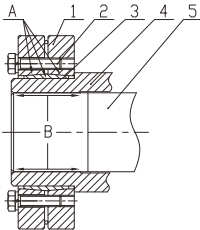


- 1 Thread
- 2 Nut
- 3 Fixing plate
- 4 Hollow shaft
- 5 Parallel key

When hollow shaft of gearmotor is equipped with locking plate, you should first cover locking plate on hollow shaft, then finish the installation of driving shaft of driven device, you should not screw the fastening bolts on locking plate before installing the driving shaft of driven device.



- The locking plate being supplied can be directly installed, you can't tear it down before the first stress.
- Before installing locking plate, ensure the bore of hollow shaft and the machine shaft must be absolutely free of grease in the area of the shrink disk seat.



- 1 Outer ring
- 2 Fastening bolt
- 3 Inner ring
- 4 Hollow shaft
- 5 Driven shaft
- A Greased
- B Absolutely grease-free

When screwing the bolts on locking plate, it is forbidden to screw it according to adjacent order, you should screw fastening bolts along with equilateral triangle order according to installation requirements of locking plate. During each circulated screwing process, each bolt can only screw 1/4 circle.

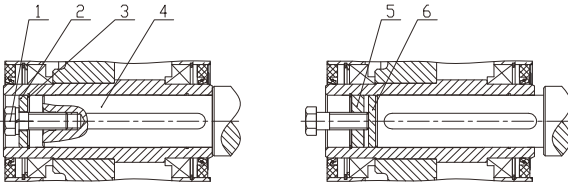
Generally fixing bolts adopt 8.8 level, in case of high temperature or vibration impact, please take anti-loosening measures on screw joints. The screw torque of each fastening bolt as follows.

Bolt size (mm)	Tighten torque (N·m)	Bolt size (mm)	Tighten torque (N·m)
M6	15	M30	2000
M8	36	M36	3560
M10	72	M42	5720
M12	123	M48	8640
M16	295	M56	13850
M20	580	M64	14300
M24	1000	M72	20800

3.5 Disassembly of hollow shaft of gearmotor

Disassembly of hollow shaft

Depending on the facilities available on site, the gearunit can be forced off the machine shaft using forcing screws in and end plate, a central threaded spindle or preferably a hydraulic lifting unit. Each end face of hollow shaft are equipped with 2 screw holes to screw in bolts used to fixing end plate.



- | | | |
|-------------------|-----------------|--------------------|
| 1. Bolt | 3. Circlip | 5. Nut |
| 2. Pressure plate | 4. Driven shaft | 6. Assistant plate |



Note:

The pressure plate and auxiliary plate are not in the range of delivery. (Arrangement and dimension of screw hole of hollow shaft end can refer to technical diagram of BONENG)



When disassembling the hollow shaft of gearmotor equipped with locking plate, the loosening of locking plate is reversed to fastening direction. Finish disassembly of driving shaft of driven device according to the above method after tearing down locking plate.

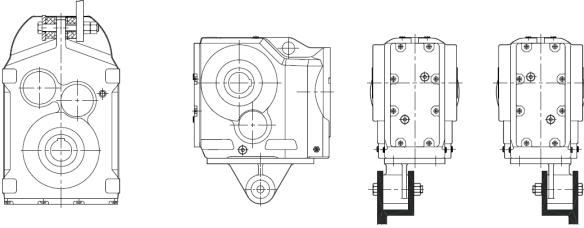
When disassembling locking plate, you should pay attention :

It is forbidden to loose bolts according to the adjacent order.

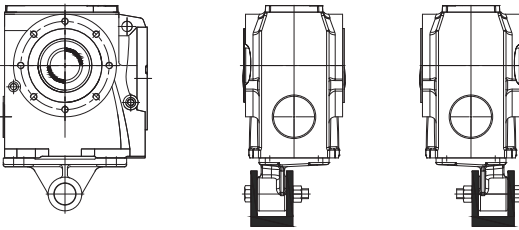
When outer ring of locking plate can't separate from inner ring, you can screw a few bolts into disassembly screw, separate inner ring from outer ring.

3.6 Torque arm assembly

Torque arm assembly , The hollow shaft must be exactly aligned with the machine shaft. Machine shaft swiveling and the gearmotor vibration shouldn't exceed the flexible range. Torque arm should be fixed and tightened.



Torque arm B direction Torque arm A direction

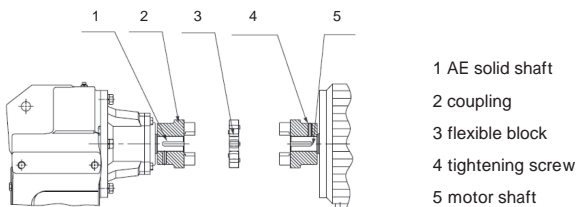


Torque arm B direction Torque arm A direction

3.7 Gearmotor input shaft connection with motor

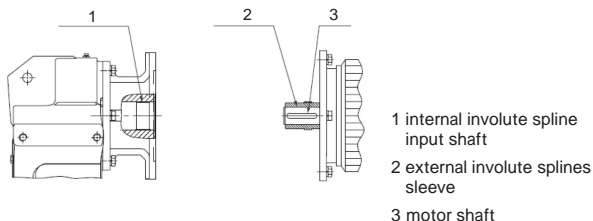
3.7.1 AE solid shaft connection with motor

Clean the motor shaft, motor flange and coupling, remove the key on the motor shaft and change the new one. Heat the half of coupling to 100 °C, put it on motor shaft or AE solid shaft step position, fix the key and half of coupling with the tightening screw on motor shaft and AE shaft, connect the motor shaft with coupling device and make sure the two half of coupling is meshed well (see following figures). Flexible block can't be heated.



3.7.2 AG flange connection with motor

Clean the motor shaft and motor flange, remove the key on the motor shaft and change the new one. Put the external involute splines sleeve to the motor shaft stage position and assemble the motor with AG flange, make sure the involute splines are meshed well.



3.8 Dismantlement of gearmotor

Depending on the facilities available on site, the gearmotor can be forced off the machine shaft and please pay attention to protect the output shaft.





4 Mounting position

4.1 General description of mounting position

The mounting position details and type selection, please refer BONENG selection manual.

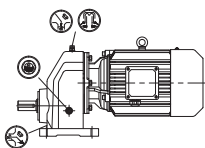
4.2 Specified description of mounting position

The symbol of mounting position and its meaning:

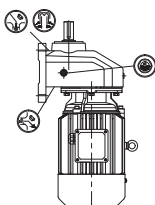
symbol		Meaning	
		Breather	Oil inlet
		Oil glass	
		Oil drain plug	

C Helical Gearmotor Mounting Positions C103H ~ C110H

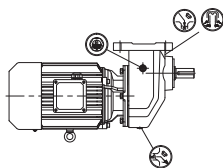
D1



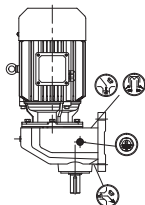
D2



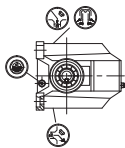
D3



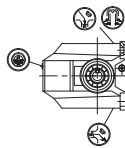
D4



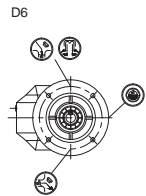
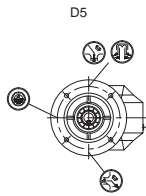
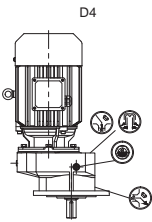
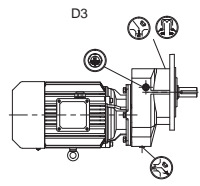
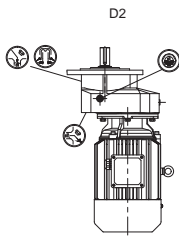
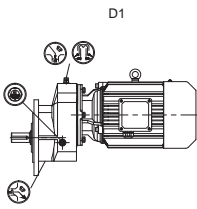
D5



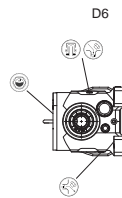
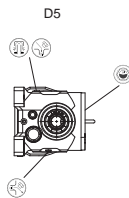
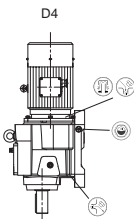
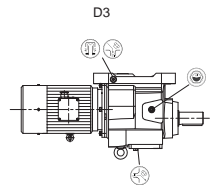
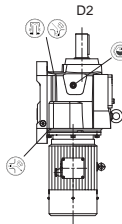
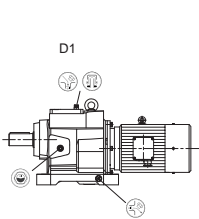
D6



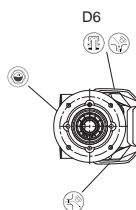
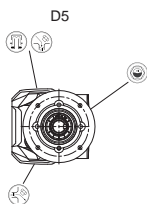
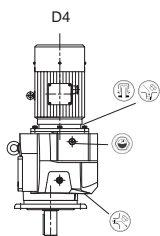
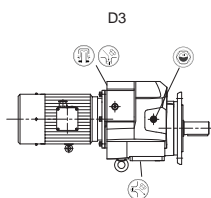
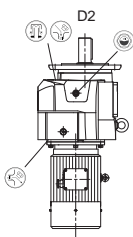
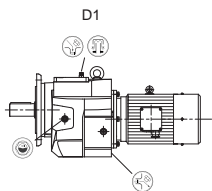
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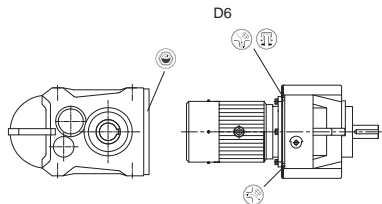
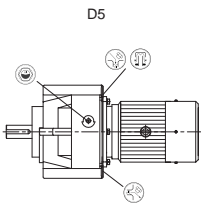
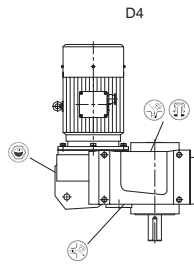
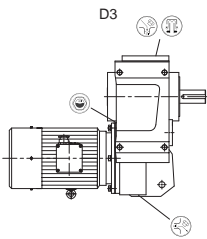
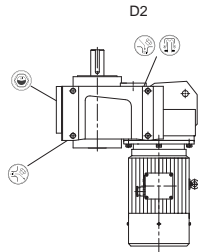
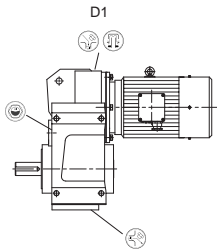
C203H ~ C216H
C303H ~ C316H



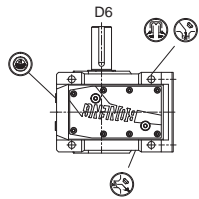
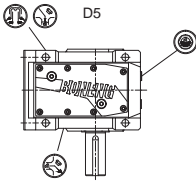
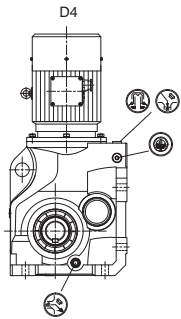
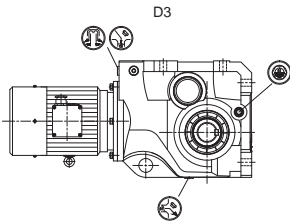
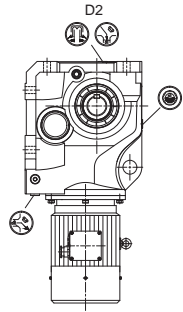
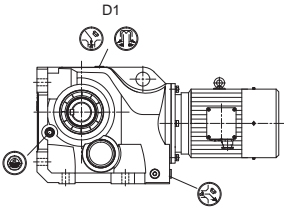
C203F/S ~ C216F/S
C303F/S ~ C316F/S



F202H/F/S/A/T ~ F215H/F/S/A/T
F302H/F/S/A/T ~ F315H/F/S/A/T

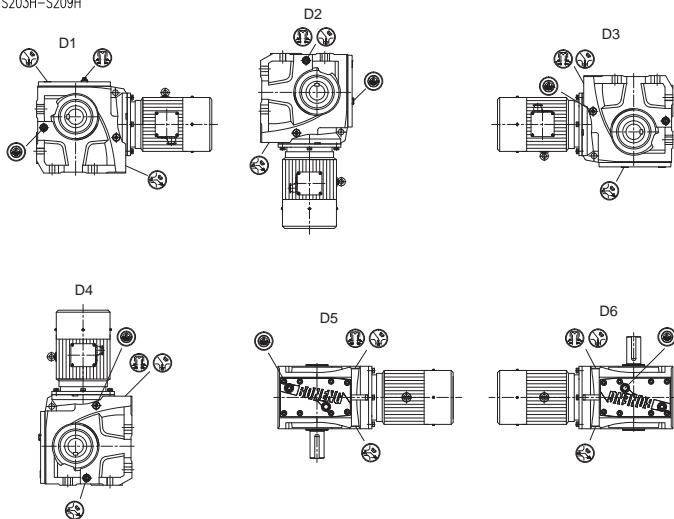


K Helical-Bevel Gearmotor Mounting Positions
K303H/F/S/A - K315H/F/S/A , K316H/F - K318H/F

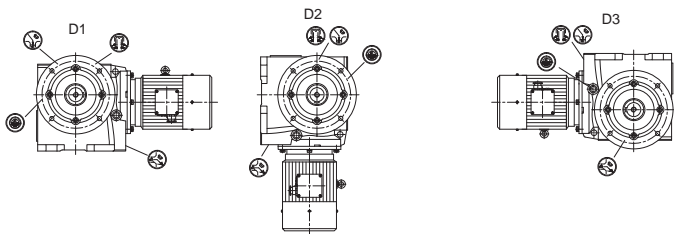


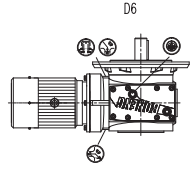
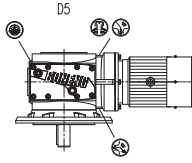
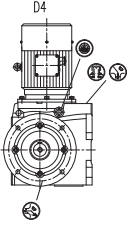
S helical - worm gearmotor mounting position

S203H-S209H

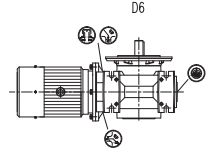
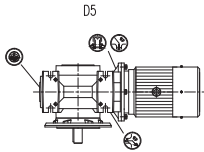
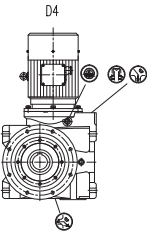
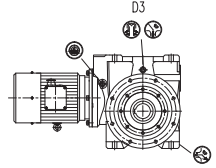
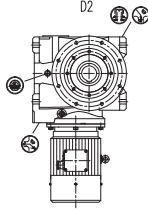
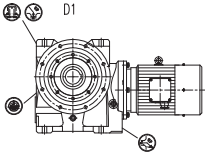


S203F/S/A-S209F/S/A





S210F/S/A-S212F/S/A



5 Lubrication/ Cooling/ Heating

5.1 Lubrication selection

Under the premise of the same viscosity level and category, you can choose internationally famous brand. If you need to change the recommended viscosity level, please consult.

Boneng lubrication oil selection are listed in following table

Type	Lubrication brand(adhesiveness of ISO)	Ambient temperature
C200/C201 C300/C301	000#	-20°C~+40°C
C103~C110	VG220	
C203~C216		
C303~C316		
F202~F215		
F302~F315		
K303~K312	VG320	
K315~K318		
S203~S212	VG680	



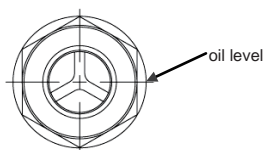
When ambient temperature is lower than -10 , you have to use synthetic oil.

To ensure lifespan of the products, we recommend synthetic oil.

When ambient temperature exceeds the above range, please consult technical department of BONENG.

5.2 Quantity of lubrication oil fill

This quantity is a recommended value. According to the difference of gearmotor level and ratio, the oil filling quantity is different. Please pay attention to oil ruler scale as the indication of oil filling. Please refer the oil glass level and fill the oil to the middle level of oil glass.



Following table lists the suggested oil value according to the gearmotor mounting position.

5.2.1 C series oil quantity (L)

Mounting position Size	D1	D2	D3	D4	D5	D6
C103	0.52	0.36	0.45	0.6	0.36	0.36
C104	0.7	0.45	0.6	0.8	0.45	0.45
C106	0.8	0.5	0.7	0.9	0.5	0.5
C107	1.6	1	1.6	2	1	1
C108	2.5	1.8	2.7	3.1	1.6	1.6
C109	3.5	2.5	3.7	4.3	2.2	2.2
C110	6.2	4.1	7.7	8.5	4.1	4.1
C200 C300	0.2	0.2	0.2	0.3	0.2	0.2
C201 C301	0.4	0.4	0.4	0.5	0.4	0.4
C203 C303	0.4	1	1.1	1.2	0.9	1.1
C204 C304	1	1.1	1.1	1.1	1.8	1.7
C205 C305	1.5	1.7	1.8	1.8	2.6	2.5
C206 C306	2	2.3	2.4	2.5	3.3	3.2
C207 C307	2	2.9	2.8	3.1	3.6	3.5
C208 C308	3.9	6.4	5.5	6	7.8	7.5
C209 C309	7.8	9.7	9.5	10.1	13.1	12.8
C210 C310	11	16.8	14.8	16.1	20	18.8
C212 C312	14.8	21.7	20.7	21.8	27	26.4
C213 C313	18.6	26.6	26.6	27.4	34	33.9
C214 C314	28.7	39	35.5	38.9	52	48.5
C216 C316	49.5	64	62	69	89	88

5.2.2 F series oil quantity

mounting position type	D01	D02	D03	D04	D05	D06
F202 F302	0.7	0.9	1	1	0.9	0.8
F203 F303	1.2	1.4	1.3	1.5	1.3	1.1
F204 F304	1.8	2.1	2.2	2.3	2.2	1.9
F205 F305	2.1	2.8	2.5	2.9	2.4	2.3
F206 F306	3.1	3.9	4.1	4.2	3.9	3.3
F207 F307	5.8	7.8	7.6	8.6	7.2	6.8
F208 F308	10.9	14.8	13.7	14.7	13.2	11.3
F209 F309	20	28	27	26	24	21
F210 F310	25	37	35	36	32	27
F212 F312	43	65	58	66	56	59
F215 F315	75	125	101	116	97	84

5.2.3 K series oil quantity

Mounting position Size	D1	D2	D3	D4	D5	D6
K303	0.8	0.8	0.7	0.9	0.8	0.8
K304	1.2	1.1	1.2	1.6	1.3	1.3
K305	2.2	1.7	1.2	2.5	2.1	2.1
K306	2.2	1.6	1.6	2.6	1.9	1.9
K307	2.9	3.9	3.1	5.4	4.5	4.5
K308	5.2	6.6	8	10	8	8
K309	11	12	15	19	15	15
K310	17	21	25	33	25	24
K312	28	37	41	55	41	40
K315	50	61	68	90	72	71
K316	77	84	109	143	114	110
K318	103	113	155	202	158	158

5.2.4 S series oil quantity

Oil quantity table (L)						
mounting position Size	D01	D02	D03	D04	D05	D06
S203	0.3	0.5	0.6	0.7	0.5	0.5
S204	0.5	1.1	1.1	1.4	1.2	1.2
S205	0.6	1.4	1.2	1.9	1.7	1.7
S206	1.2	2.6	3.7	3.8	3.2	3.2
S207	2.3	5.0	7.0	7.8	5.9	5.9
S208	4.6	9.7	12.5	14.4	10.9	10.9
S209	8.9	18.0	22.6	28.3	21.6	21.6
S210	12.5	45.6	37.8	45.6	25.4	25.4
S212	22.0	80.4	63.6	80.4	42.8	42.8

Note: When ambient temperature is $-10 \sim +40$, for S series Products, lubricant brand is VG680 (Isoviscosity class).

5.3 Lubrication oil change

Change oil with the same type and manufactured in the same factory. Before filling the new oil, please clean the sediments, metal particles and remained oil in the housing off.

5.4 Heating

For standard gearmotor, the working ambient temperature is -20 $- +40$, when the temperature is under -10 , it needs to be preheated or running without load. When the gearmotor temperature is over -10 , gearmotor can be operated with lod.

5.5 Backstop

Gearmotor with shrink disc. Before assembly or running, please check the transmission machine running direction. To avoid wrong direction running, if necessary, please consult technical person. Backstop do not need maintenance.

6 Application

6.1 Fill the lubrication oil

Our products are not filled with lubrication oil when delivered. You should fill lubrication oil according to instruction book before running.

On the position marked with this symbol, fill lubrication oil into gearmotor.

6.2 Check the device

Check oil level.

For the gearmotor equipped with backstop device, inspect whether wiring of motor is correct.

Inspect whether shaft sealing is effective.

Check whether the rotating components contact with other components.

6.3 Start

Check whether the running direction under free status is correct (supervise whether there is abnormal grinding noise when the shaft is running).

During running inspection, you should ensure no output component on shaft, open relevant supervision and protection device at the same time.

If there is abnormal running phenomenon (for example, temperature rise, noise, vibration, etc), you should turn off the motor and check out the reason.

Contact with BONENG when necessary.

7 Checks and maintenance

7.1 Check and maintenance regularly

Users should make regular maintenance to gearmotor.

Check the status of lubrication oil regularly, clean ventilation cap, fan, cooling coil and the surface of gearmotor, keep the gearmotor clean, ensure normal running of gearmotor.

7.2 Periods of checks and maintenance

Check oil temperature	Daily
Check abnormal noise of gearmotor	Daily
Check oil level	Monthly
Check gearmotor for leaks	Monthly
Check oil for water content	After working 400 hours, at least once a year
First oil change after starting	After working 400 hours
Subsequent oil changes	After every 5000 hours
Clean the breather	Every 3 months
Clean gearmotor housing	Do with oil changing
Check tightness of fastening bolts	The first time after changing oil, then change oil every two times
Carry out complete inspection of gearmotor	About every 2 years, do with oil changing

7.3 Notes for checks and maintenance:

Cut off power source, prevent electric shock, wait for cooling of gearmotor.

Inspection of oil level: Please refer the oil glass level and fill the oil to the middle level of oil glass .

Oil inspection: remove oil drain plug, take some samples, inspect oil viscosity index; if the oil is not clean, change it.

Oil changing:

It is forbidden to mix different lubricants.

After cooling, oil viscosity will increase, it is harder to drain off oil. change before cooling.

Put an oil picking plate under oil plug, tear down oil plugventilation cap, install oil plug after removing oil.

Inject new oil of the same brand, oil quantity should be the same with installation direction (see nameplate); if the brand number is different, consult after-sales department.

Inspect oil level at oil glass,install vent cap.


8 Fault treatment

Fault	Reason	Measure
Noise change of gearmotor	Fastening is loose	Tighten bolts/nuts to prescribed torque Replace damaged bolts/nuts
	Damage to gearmotor	Contact customer service →Check all teeth and replace any damaged parts
	Excessive bearing play	Contact customer service →Adjust bearing play
	Bearing defective	Contact customer service →Replace defective bearings
Operating temperature too high	Oil level in gearmotor housing too high or too low	Check oil level and, if necessary, adjust
	Oil too old	Contact customer service Check date of last oil change if necessary, change
	Oil badly contaminated	Contact customer service →Change oil
Increased vibration amplitudes at the bearing points	Bearing defective	Contact customer service →Check and , if necessary, replace bearings
	Gear defective	Contact customer service →Check gears and, if necessary replace
Oil leakage from gearmotor	Inadequate sealing of housing covers or joints	Check and, if necessary, replace seals, seal joints
	Radial shaft sealing rings defective	Contact customer service →Replace radial shaft sealing rings
Water in the oil	Oil foams in sump	Check state of oil by the test-tube method for water contamination. Have oil analysed by laboratory
	Gearmotor expose to cold air from machine-room ventilator	Protect gearmotor with suitable heat insulation. Close air outlet or alter its direction by structural measures

Overview

9. Instruction

This instruction book is a document provided with motor. It introduces starting, storage and installation requirements of motor and the notes, requirements, methods and notes for application and maintenance of motor. Maintainers should carefully read this instruction manual. Read nameplate, label, alarm signs on motor. Operators should pass relevant trainings before going to work.

 **Note:**
To ensure safe and correct installation, operation and maintenance of device, please conform to relevant clauses in this instruction manual. Staffs responsible for installation or maintenance should pay attention to relevant instructions, the neglect of instruction will make quality assurance lose effect.

10. Applicable scope of products

This instruction book is appropriate for standard series and the derived series motors of Boneng (except anti-explosion motors).
Frame size central height: 56-280. (For the motors of special application sites or with special design, refer to other special instructions).

Common requirements

11. Starting

11.1 Reception inspection


After reception, check whether the motor has external damage, inspect all the nameplate data, especially the connection method of voltage and windings(Y or).

Spin running shaft with hand, check empty running situation of motor. If the motor is installed with locking device, open it.

For brake motor, connect power source, check whether the brake can be released, for brake with handle, pull the handle, check manual release performance.

11.2 Insulation performance inspection

Before first use of motor, windings may be affected with damp, measure the insulation resistance; for double winding various speed motor, measure insulation resistance of the two groups of windings.

 **Note:** After measurements, winding should discharge electricity immediately, avoiding electric shock.

Winding should be remade when immersed in seawater.

11.3 Direct start, Y/ Δ start and various frequency start

Wiring box of standard single speed motor usually has 6 wiring bolts and at least 1 grounding bolt.

Before the motor is connected with power, it should be reliably grounded according to regulations, zero connecting can't replace grounding.

Connection method of voltage and winding are marked on nameplate.

Direct start

Winding can apply Y or Δ connection method, for example, 660VY, 380V Δ express 660V, Y connection method and 380V, Δ connection method.

Y/ Δ start

- Power source voltage should be equal to rated voltage of wiring motor.
- Tear down all the wiring pieces on wiring plate, install wiring according to Y/ Δ starting, connect it to six wiring columns of motor, it can trip from Y connection of initial period of starting to connection with completed starting.
- The power source connection of double speed motor and other special motors should be done according to the wiring diagram in wiring box.

Various frequency start

- Make correct wiring to frequency changer according to instruction manual of frequency changer, make inspection before charging. After inspection, first not connect motor, set and adjust parameters of frequency changer. After confirming that there is no problem for frequency changer running, connect motor.
- After giving out "connection" order, if the motor doesn't rotate, please first check the frequency changer, whether output frequency has been set; If the motor doesn't run, please check wiring and loading situation of motor.
- Before the motor (cooling method to IC416) starts, start fan and ensure it runs well, pay attention to motor, transmission device, production machinery and displayed data of frequency changer panel. If there is any abnormal situation, stop the machine immediately, check out the fault and remove the fault, then restart.

11.4 Wiring column and rotation direction

Observing rotation shaft from motor driving terminals, the rotation is in clockwise direction.

Switching any two phases of power cable can change running direction of motors.

12. Instructions

12.1 Running environment

Motor is used for industrial production.

Normal ambient temperature is between -15°C and 40°C , the altitude is not higher than 1000m.

12.2 Safety factors

The motor should be installed and wired by specialists who are familiar with relevant safety requirements.

During installation, there should be safety device to prevent accidents, the position should conform to regulations.

12.3 Conform to rules

The motor can't be used for acceleration and overloading running. Motors with special design considerations should be indicated.

13. Management

13.1 Storage

All the motors should be stored indoor, the environment should be dry, with no vibration and dust.

Motor surface (shaft extension end and flange) with no protective layer should take anti-rust measures.

It is suggested to check motor regularly, turn running shaft with hand, prevent lubrication grease loss or other problems.

If it is installed with anti-condensation heater, better apply.

13.2 Transportation

The motor needs to install the lock device in transportation.

14. Electrical connection

14.1 Overview:

The wiring box at the top of motor can be rotated, select outlet direction according to requirements. You can also select wiring box installation method of side outlet wire.

The inlet port with no cable should be sealed.

Except the wiring of main winding and grounding end, the wiring box has thermistor, heating zone, thermoswitch or PT100 resistive element and wiring parts of brake in wiring box.

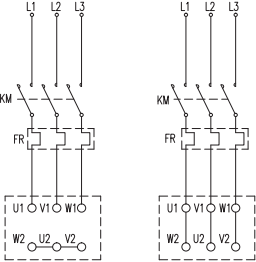
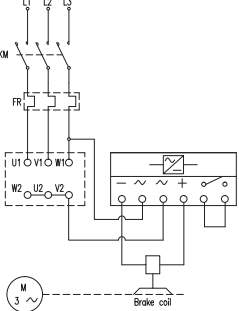
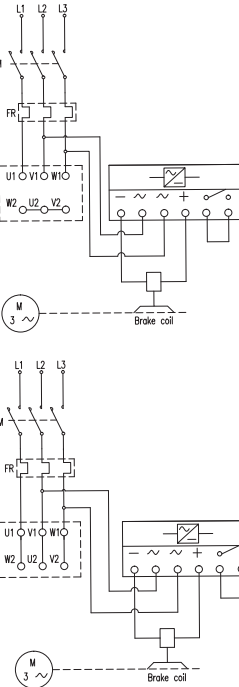
For motors with magnetic brake, when customers provide power source by themselves, ensure motor power by switched together with brake power source.

Frequency-changing motor with cooling method IC416 should be installed with axial flow fan. Axial flow fan is equipped with special wiring box. Fan motor should be connected with relevant power source voltage. Fan motor should apply non-reversible frequency power source, the wiring should be on input end of frequency changer. The correct running direction of fan blade should be the same with the running direction arrow on fan cover.

△ Note:

1. For motors (if used outdoor) with high protection level, wiring box cable and joint should make protections. If motor wiring box has water inside, the responsibility will be borne by customers.
2. When motor stops running, the wiring box may be with electricity, don't touch wiring column.

14.2 Wiring diagram (standard configuration)

Type	Wiring diagram	Applicable scope
MH MP YZ		Applicable to all voltage range.
		Brake with external AC voltage 220~240V.
MH+Brake MP+Brake YZ+Brake		Brake with external AC voltage 380~420V.

Type	Wiring diagram	Applicable scope
		<p>Brake with external AC voltage 220~240V.</p>
<p>MH+Brake MP+Brake YZ+Brake</p>		<p>Brake with external AC voltage 380~420V.</p>

⚠ Note:

- The above listed fans are three-phase fan, fan voltage frequency is the same with motor.
- The brake wiring applies slow speed wiring control method. More rapid braking, see illustration below.
- The wiring diagram above is standard configuration, any other special requirement should be referred to us.
- The brake frequency should not exceed the corresponding operation system of electric motor and the on and off frequency allowed by the load rate

Type	Wiring diagram	Applicable scope
MH+Brake MP+Brake YZ+Brake		Brake with external AC voltage 220~240V.

15. Maintenance

15.1 Overview

Check motor regularly.

Keep motor clean, air flow.

Check sealing ring of shaft extension, change in time when necessary.

Check installation and connection situation, mounting bolts.

Check bearing running situation by listening to abnormal noise, temperature detection, etc.

If there is abnormal situations, stop the machine immediately, check out the reason, remove the problem in time.

15.2 Bearing lubrication

Standard motor is fitted with seal type bearing and free maintenance.

15.3 Maintenance of brake

Adjustment of brake air gap

After long-term application of abrasion face of brake, it will be damaged, increasing air gap between electromagnetic iron and armature and the spring working length, thus reducing spring pressure and brake torque, at the same time, as the increasing of air gap, current rises when armature pulls in, when the situation is serious, armature will not be pulled in. So you should often check air gap, adjust it or change abrasion piece.

Air gap adjustment procedure is as follows: (reference Fig. 1)

Take wind cover down(7).

Remove the dust cover(5).

Adjust the air gap.

Adjust the range listed in table below.

Central height of frame size	71	80	90	100	112	132	160	180	200	225	250	280
Normal working air gap(mm)	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.6
Maximum working air gap (mm)	0.5	0.5	0.5	0.75	0.75	0.75	1	1	1	1.2	1.2	1.2

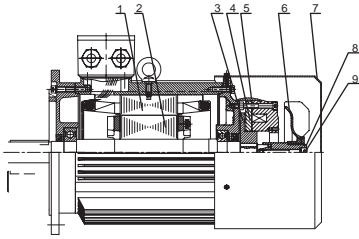
Change friction disc

Friction disc is easy to be damaged, when friction of the disc exceeds the following value, change a new one

Central height of frame size	71	80	90	100	112	132	160	180	200	225	250	280
Maximum friction quantity (mm)	1.5	1.5	1.5	2.5	2.5	3.5	3.0	4.0	4.5	4.5	5.0	5.0

The procedure of changing friction disc:

- Take down wind cover(7).
- Take down fan(6).
- Screw down bolt(9).
- Remove the connecting shaft(8).
- Remove the dust cover(5).
- Tear down lead wire of brake coil.
- Tear down brake disc, change friction disc.



- 1-Stator
- 2-Rotor
- 3-Brake
- 4-Armature
- 5-Dust cover
- 6-Fan
- 7-Wind cover
- 8-The connecting shaft
- 9-Socket head bolts

Fig. 1 Electromagnetic brake motor

15.4 Maintenance characteristics of various frequency motor

Maintenance during normal running

Adjust the speed of motor with frequency changer. As there is higher harmonic influence in frequency - changer output wave, motor noise and vibration are larger than the situation during mains supply, there is normal. When the change of running frequency, fundamental component, higher harmonic component change in a large scope, the resonance with each part of motor and mechanical loading are increasing, when adjusting to the point the same with system resonance frequency, mechanical system will has large vibration and noise. When there is such kind of phenomenon, you can apply the method of increasing system rigidity to avoid resonance, or you can make the output frequency equal to resonance point jump upward or downward by frequency jumping function of frequency changer, avoid resonance frequency, realize smooth running.

Application and maintenance of accessories

- ◎ Photoelectric encoder or speed - measuring machine brought with motor should not be torn down, avoid collision. When the motor is moved, this part should not be used as stressed part. Installation and application should strictly conform to regulations of encoder or speed - measurement machine.
- ◎ When motor with brake applies frequency - changer driving, pay attention to the following points:

Electro magnetic brake of motor is power - off type brake and released after power - on. the clearance of brake pads has been well adjusted before delivery and no changes should be made arbitrarily. Oil grease substance and other impurities should be prevented from entering into brake pads to ensure the reliability of brake in case of power - off.

Brake power source should not be connected on output side of frequency changer, it should be connected in input side of frequency changer.

As brake work is proportional to quadratic running speed, so high speed brake should not apply electromagnetic brake directly. Reduce motor speed under frequency speed with the regeneration brake function of frequency changer, then make electromagnetic brake.

If brake moves when frequency changer is outputting power, the current will be cut off. Brake should be done after main return circuit of frequency changer is cut off.

16.Common fault and maintenance method of motor

Fault	Possible reasons of fault	Treatment
(1)Can't start	One phase of stator windings is open -circuited	Check stator winding, check the shortcut part, repair
	Phase or interturn of stator windings is short - circuited	Measure whether stator winding resistance and no -load current of each phase are balanced, checkout the position, with insulation
	Stator wiring error	Check out stator winding wire according to the regulated connection method on nameplate and the wiring diagram, correct wrong connection
	Loading or transmission machinery have faults	Separate motor from loading, if the motor can start normally, check the machinery being pulled, remove faults.
	Frequency - changer parameter setting is not appropriate	Check frequency changer parameters, adjust (frequency changer motor)
	Brake doesn ' t work	Check brake and the machine (brake motor)
(2)After frequency changer motor starts, speed is lower than rated speed	Output frequency and output voltage setting of frequency changer are not appropriate	Reset according to application requirements
	Loading is too heavy	Check whether loading transmission device is normal
(3) Motor has abnormal noise or the vibration is too large	Mechanical friction (including stator and rotor phase friction)	Check the distance between transmission part and the static part, check out phase friction reason, correct
	Phase - lack running	Cut off electricity, switch on, if it can ' t start, maybe one phase cuts electricity, check the power source or motor to repair
	Bearing lacks oil or is damaged	Clean bearing, add new oil, or change new bearing
	Motor wiring is wrong	Check out the reason, correct
	Balancing of rotor after repair is damaged	Re - correct balancing
	Shaft extension bends,transforms	Correct, change running shaft when necessary
	Coupling connections loose	Check out the loosing part, screw down bolts
	Installation foundation is not balanced or has defects	Check foundation fixing situation, correct defects
(4) Motor temperature rise is too high	Overload	Measure stator current of electromagnetic current table or check the current display value on frequency changer panel (frequency - changer motor), if it is overloaded, reduce loading.
	Phase - lacking running	Check motor stator wiring or frequency changer wiring (frequency changer motor), and repair
	Motor wiring is wrong	- connection wiring of motor is connected incorrectly in Y or vice versa, cut off power source to change connection
	Stator winding grounding or interturn or phase - to - phase short circuit	Check out short circuit and grounding part, repair

Fault	Possible reasons of fault	Treatment
(4) Motor temperature rise is too high	Stator, rotor frictions	Check whether bearing assembly loose, whether stator and rotor assembly are bad, repair
	Ventilation is not good	Check whether fan and blade are damaged, whether wind path is blocked. If fan or blade is damaged, repair or change. If the wind path blocks, remove the articles that obstructs ventilation, clean wind path dirt, dust and impurities, make air flow smoothly
	V,F parameter settings of frequency changer are not appropriate, there will be over excitation when motor is under low speed and light loading running, the current is larger than rated value	Adjust parameter setting of V/f (frequency changer motor)
	When braking the motor with DC brake function of frequency changer, brake current is too large	Adjust DC brake current setting, according to brake frequency, set it to be 100% - 150% of rated current.
	Brake action is slow	Check brake air gap and DC excitation voltage (brake motor)
(5) Bearing is overheat	The bearing is damaged	Change bearing
	Bearing has too much or too less lubrication grease, or with impurities	Adjust or change lubrication grease
	The mating of bearing with shaft, bearing or end cover is too loose or too tight	Repair to appropriate allocation
	Side end cover or bearing cover of motor are not assembled well (not paralleled)	Make side end cover or bearing cover seam horizontal, rotate bolts
	Shaft extension oil sealing is not installed well	Adjust to appropriate installation status
(6) Motor cover has electricity	Grounding is not good	Check grounding bolt, whether grounding wire has tight connection with machine cover
	Winding damps, insulation resistance is too low	Winding drying treatment
	Insulation is damaged, stator coil collides with iron core	Repair
	Wiring plate has dirt	Clean wiring plate
	Outlet insulation is damaged	Pack the damaged parts with insulation materials

Fault	Possible reasons of fault	Treatment
(7) Motor can't start with loading	Rotor winding has interturn shortcircuit	Check resistance and current of each phase
	Overload	Check motor loading current
(8) Three-phase current is not balanced	Interturn shortcircuit	Repair winding
	Wiring is wrong	Correct wiring
	Three-phase power source and voltage are not balanced	Improve electricity supply quality
(9) Fuse cuts	The two phase has shortcircuit	Repair winding
	Loading is too large	Reduce loading
	Voltage is too low	Rise voltage
(10) Insulation resistance is too low or be broken down	Insulation aging or damaged	Repair insulation
	Not clean	Blow the inner part with dry compressed air
	Winding or wiring plate damps	Tear down to dry or reuse after treatment
	Motor is overheat	Tear down inspection, prevent continuous heating
(11) Brake motor brake loses effect	Friction disc is seriously abraded	Adjust air gap
	Spring loses effect	Change spring
	Action is slow	Adjust air gap, check excitation voltage
	Rectifier is damaged	Adjust rectifier
	Brake wire path has fault	Remove brake wire fault correctly



Note:

1. Customers want to obtain detailed data, please contact with us.
2. We have the right to modify the maintenance manual without notice.

17 After-sale service

For the various kinds of transmission devices, if there is any quality problem, don't tear down components, you should illustrate the situation, then contact with after-sales department of the company, confirm about the problems, then apply ideal method to deal with them.

Type: _____

Production date: _____

Number: _____

Time being used: _____

Site or main machine name: _____

Manufacturer of main machine: _____

Quality problem description: _____

User company: _____

Address: _____

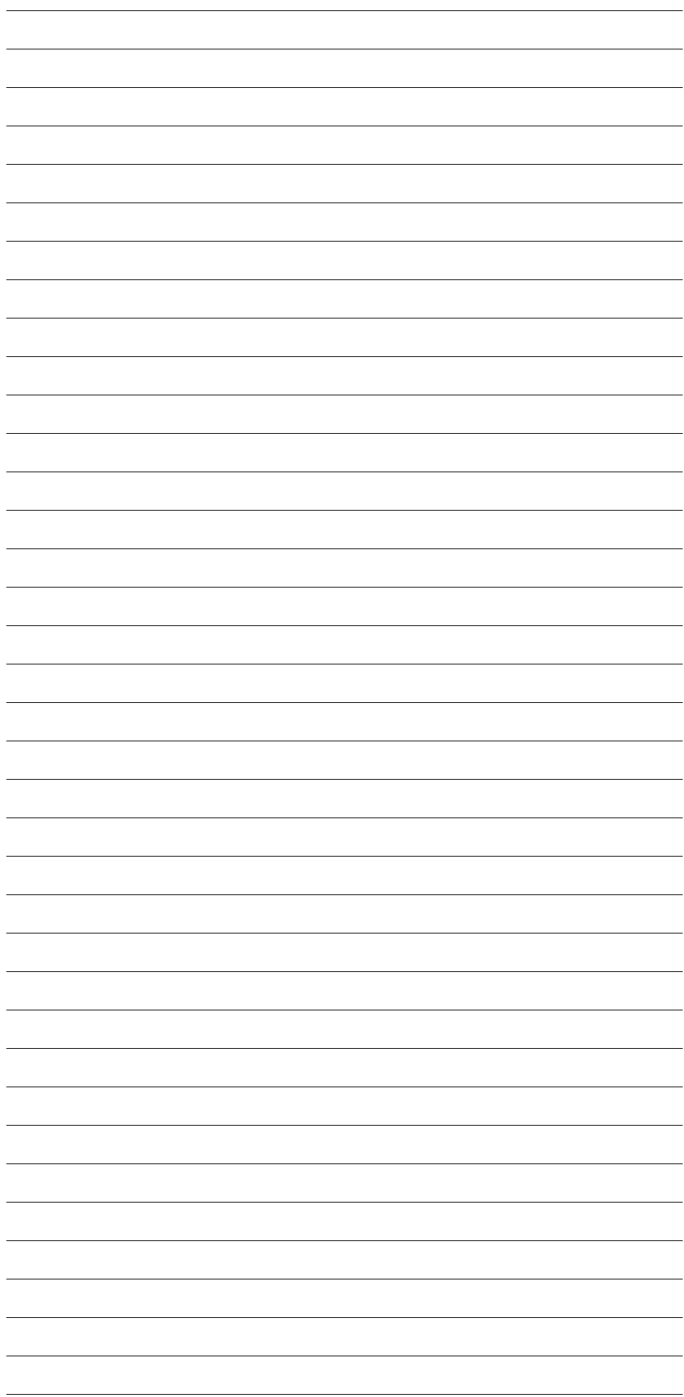
Telephone: _____ Fax: _____

Postcode: _____ Contact: _____

After-sales service telephone of Boneng: _____

Fax: _____

NOTE: _____



Lined writing area with 30 horizontal lines.

