

# **BONENG**



**PK系列专  
用行星齿轮  
马达使用说  
明书**

**Operation  
manual of PK  
series special  
planetary  
gear motor**

08/2023

中文

EN

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## 重要提示

在安装操作过程中，  
请注意本说明书中的安全提示和警告提示！



使用建议和有用的信息



有害情况：  
可能产生的后果：损坏传动装置和环境



遵守本手册的规定可以让装置无故障运行，同时也满足质量缺陷索赔的要求，因此在使用传动装置进行工作之前，请您先阅读本说明书。

本说明书包含重要的安装维护提示，请将说明书保管在靠近设备的位置，以便安装维护参阅。

## 1 安全说明

安全说明主要涉及齿轮箱的使用。当使用齿轮箱时，请注意说明书中的相关安全提示！

- ◆使用说明书为本公司所供齿轮箱的有机组成部分。
  - ◆齿轮箱的安装、操作、维护和修理人员均需认真阅读本说明书并遵守其中的规定。
  - ◆严格遵循说明书中的规定是实现产品无故障运行和履行任何质量保证要求的必要条件。
  - ◆在遵循说明书规定的前提下还要注意：
    - 相关安全和事故防范的国家（地区）规定；
    - 相关设备的特别规定和要求；
    - 设备装置上的安全警告和安全标志牌。
  - ◆下列情况会导致人身伤害和财产损失：
    - 使用不当；
    - 安装或操作失误；
    - 违反规定拆除必要的防护罩或机壳。
  - ◆若因违反本说明书的规定而造成的任何损伤或停机，本公司概不负责。
- 为不断追求技术进步，我们保留对其进行修改的权力。通过不断改进，将在保持基本特性的基础上，有利于进一步提高其使用性能和工作安全性。

## 2 技术说明

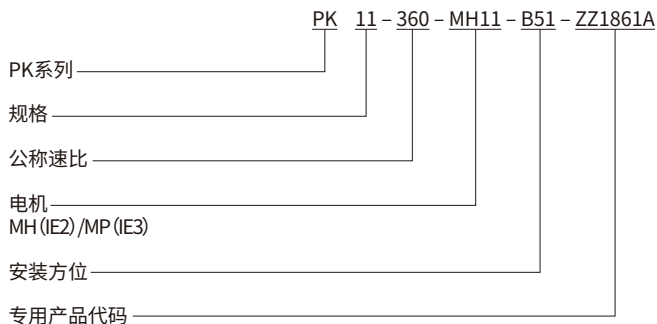
### 2.1 铭牌说明

<b>BONENG</b>			
Type			
n2		RPM	
P1	kW	T2	N · m
n1	RPM	i	
Oil		Wt.	kg
NO.		Date	

- ① 产品型号
- ② 输出转速(直联电机时才有)
- ③ 额定输入功率 kW(直联电机时指电机功率)
- ④ 额定输出扭矩 N · m
- ⑤ 额定输入转速 RPM(直联电机时是指电机转速)
- ⑥ 公称减速比
- ⑦ 润滑油粘度
- ⑧ 重量
- ⑨ 产品编号
- ⑩ 出厂日期

◆铭牌上的数据十分重要，请仔细阅读，并保持其整洁，当需要服务时，请提供铭牌上的产品编号、使用时间及故障类型。

### 2.2 型号说明



附件代号见选型样本

◆型号说明仅供用户参考使用，特殊供货类别敬请垂询。

## 2.3 注意事项 (下述注意事项与齿轮箱的使用有关)

- ◆在户外安装时应避免阳光直射，一定要避免热力集中影响齿轮箱的正常性能。
- ◆一定不能用高压清理设备清洁齿轮箱。
- ◆对齿轮箱所进行检修、保养、维护、安装都必须在齿轮箱不工作的情况下进行。
- ◆在齿轮箱上不得进行焊接工作，也不得用作焊接工作的接地点。焊接会造成精密齿轮和轴承不可修复的损坏。
- ◆如果在齿轮箱的运行过程中发现了任何异常现象（例如过热或者不正常的噪声等），应该立即关闭驱动装置。
- ◆凡是旋转的零部件必须配备合适的防护罩以防止人员的意外接触，例如联轴器、液力偶合器、齿轮、驱动皮带轮等。
- ◆一定要遵守齿轮箱上所附加的说明，例如铭牌、指示方向的箭头等。这些铭牌和标记上面不得有灰尘和油漆。
- ◆在组装或者拆卸工作中损坏了的螺栓一定要用同等强度和类型的新螺栓更换。
- ◆本公司对不合理使用联轴器、私自对齿轮箱进行修改，以及使用非本公司零部件的情况，所造成的不良后果不在‘三包’服务之内。
- ◆根据齿轮箱的操作条件，齿轮箱的表面、润滑油和零部件可能会达到相当高的温度，小心烫伤！
- ◆当更换润滑油的时候，要谨慎小心，不要被热油烫伤。
- ◆齿轮箱应该放置在不振动的干燥木制基座上并遮盖好。当储存齿轮箱和任何单独零部件的时候一定要做好防锈措施，以免生锈，储存时不得将齿轮箱叠放在一起。
- ◆除订货合同中另外有所规定，否则齿轮箱不得储存或工作在强酸、强碱、低温、高温和重度的空气污染、潮湿以及具有化学物品的场所。
- ◆在搬运齿轮箱时，一定要特别小心，防止轴端被撞击，因为这样将有可能造成齿轮箱的损坏。在吊运齿轮箱时，不得将吊环螺钉安装在轴端处的螺纹上。
- ◆配件一定要从BONENG公司购买。

## 3 安装与拆卸

### 3.1 安装前的注意事项



- ◆确认齿轮箱完好无损（在运输或储存过程中未损坏）。
- ◆确认现场环境条件与铭牌内容相符。
- ◆标准齿轮箱使用环境温度为：-20°C~+50°C；无油、酸、有害气体、蒸汽、放射性物质等。
- ◆若齿轮箱储存时间在一年以上，轴承内润滑剂的使用寿命将缩短。



- ◆在户外安装时应该避免阳光直射，一定要避免热力集中影响齿轮箱的正常性能。
- ◆特殊形式齿轮箱：是根据环境条件配置的。
- ◆在进行规划阶段就应该预留足够的空间进行维护保养和修理工作。
- ◆配备了风扇的齿轮箱，应该有足够的空间以便能够吸入空气。

### 3.2 准备工作

- ◆彻底清除输出输入轴和法兰表面的防腐剂、污物等；注意不要让溶剂浸入并损坏油封。
- ◆若齿轮箱储存时间在一年以上，轴承内润滑剂的使用寿命将缩短。
- ◆工具/材料的准备：一组扳手、扭矩扳手、装配夹具、输入和输出紧固装置、润滑剂（防锈油）、密封螺栓的介质（螺纹锁固剂）。

### 3.3 齿轮箱的整机安装

#### 基础

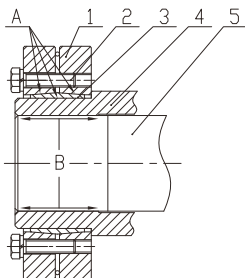
- ◆准备刚性好的基础或牢固的台架来安装传动设备，同时也需充分考虑即使加上最大载荷也不至于改变装配好后各部件的位置。
  - ◆齿轮箱的基础应该水平并平整。基础的设计应该保证不会产生谐振并且不会有临近的基础传递过来的振动。
- 安装齿轮箱的基础的刚性应该可靠，适合于齿轮箱的重量和扭矩，并且要考虑作用在齿轮箱上的力。
- ◆安装六角头螺栓和螺母应该紧固到规定的扭矩。我们推荐强度级别为8.8或者更高强度的螺栓。

### 3.4 锁紧盘的安装与拆卸

- ◆当齿轮箱空心轴配置锁紧盘时，应在空心轴上套上锁紧盘，再按上述方法完成被驱动设备的驱动轴的安装，在安装被驱动设备的驱动轴之前不要拧紧锁紧盘上的紧固螺栓。



- 所供货的锁紧盘是可直接安装的,在首次受力之前一定不能拆卸下来。
- 安装锁紧盘前，要确保空心轴孔和被驱动设备的驱动轴在锁紧盘区域不能有润滑油。



- 1外环
- 2紧固螺栓
- 3内环
- 4空心轴
- 5被驱动轴
- A有润滑脂的部位
- B绝对不能有润滑脂的部位

- ◆拧紧锁紧盘上的螺栓时，严禁按相邻顺序逐个拧紧，应按锁紧盘安装要求，按等边三角形顺序逐次拧紧紧固螺栓，每次循环拧紧过程中，每个螺栓只能拧紧螺丝的1/4圈。
- ◆安装螺栓强度等级不低于8.8级，如果有高温或者振动冲击等情况，请在螺纹连接处作好防松措施。各个紧固螺栓的拧紧扭矩见下表：

螺栓	每个螺栓的最大预紧力距 ( $\mu=0.1$ )		螺栓	每个螺栓的最大预紧力距 ( $\mu=0.1$ )	
	强度等级 10.9 N.m	强度等级 12.9 N.m		强度等级 10.9 N.m	强度等级 12.9 N.m
M6	12	14.5	M20	470	570
M8	29	35	M24	820	980
M10	58	70	M27	1210	1450
M12	100	121	M30	1640	1970
M14	160	193	M33	2210	2650
M16	240	295	M36	2850	3420

- ◆配置了锁紧盘的齿轮箱空心轴拆卸时，锁紧盘松开的过程与紧固的方向相反，拆掉锁紧盘后再按上述方法完成被驱动设备驱动轴的拆卸。

#### 拆卸锁紧盘时应注意：



- 拆卸时严禁按照相邻的顺序松开螺栓。
- 锁紧盘外环与内环不能分离时，可将几个螺栓拧入拆卸螺丝，将内环和外环分开。





## 4 安装方位

### 4.1 安装方位说明

◆ 齿轮箱的具体安装方位及选型可参见BONENG公司产品选型手册。

### 4.2 安装方位页面的说明

◆ 齿轮箱的安装方位页面中使用的图形符号及其含义：

图形符号		含义	
		通气帽	进油孔
		油 镜	
		放油孔	

## 5 润滑/冷却/加热

### 5.1 润滑

润滑油的选择：

◆ 在相同粘度等级和类型的前提下，您可以自由地选择国际知名品牌的润滑油。如需改变推荐的粘度等级敬请垂询。

◆ 下表列出了产品规格对应使用润滑油牌号及使用环境温度。

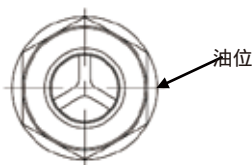
环境温度	-20℃~+40℃
粘度牌号	VG320



- ◎ 环境温度低于-10℃时必须使用合成油。
- ◎ 为确保产品的使用寿命，实际使用中推荐使用合成油。
- ◎ 使用环境温度超过上述范围时，请咨询BONENG公司技术部门。

润滑油的注油量

◆ 本注油量为建议值。根据齿轮箱级数和速比的不同，相应加油量也不同。请注意油尺刻度作为加油量多少的指示。



◆ 下表列出了对于安装方位相应的润滑油注油量建议值。



## 5.2 注油量

油量表 ( L )						
产品型号 /规格	PK09	PK10	PK11	PK12	PK13	PK14
P	3	4	6	8	10	16
K	8.5	8.5	11.5	11.5	22	22

备注：齿轮箱采用浸油润滑，产品系列P和K油路不通，用油封隔绝，需分别加油。

## 6 使用

### 6.1 润滑油添加

◆ 公司产品一般都未带润滑油出厂，在设备运行前请先按使用说明书加润滑油。



在标记有该符号的位置上将通气帽拧出，  
给齿轮箱加入润滑油。



### 6.2 设备检查

- ◆ 检查油面高度，润滑油冷却或者供油系统管路的密封性。
- ◆ 检查冷却装置，截止阀的开启状态。
- ◆ 配备了止回装置的齿轮箱，检查电机接线是否正确。
- ◆ 检查轴封是否有效。
- ◆ 检查旋转的零部件是否与其它零件接触。

### 6.3 起动

- ◆ 配置了电机油泵的齿轮箱应当保证在启动设备前首先开启油泵电机。
- ◆ 检查自由状态下转动方向是否正确（同时监听轴转动时是否有异常研磨噪声）。
- ◆ 运行检查时要保证轴上没有输出元件，同时开启相关的监测和保护设备。
- ◆ 无论什么时候，只要怀疑出现了不正常的运行现象（例如温升、噪声、振动等异常），应立即关掉电机，并查明原因。
- ◆ 必要时与BONENG公司联系。

## 7 检查与维护

### 7.1 定期检查与维护

◆用户要定期对齿轮箱进行维护和保养，要定期检查润滑油的使用状态，定期清理通气帽、风扇、冷却盘管和齿轮箱表面的灰尘和异物，保持齿轮箱清洁，保证齿轮箱的正常运行。

### 7.2 检查与维护的周期

检查油温	每日
检查齿轮箱的不正常的噪声	每日
检查油面高度	每月
检查齿轮箱的漏油	每月
检验油中的水分	在400工作小时后, 至少每年一次
在起动之后的首次换油	在400工作小时后
其后的换油	每5000工作小时
清理滤油器	每3个月
清理通气帽	每3个月
清理风扇、风扇罩和齿轮箱箱体	和换油同时进行
检查润滑油空气冷却器	和换油同时进行
检查润滑油水冷却器	和换油同时进行
检查紧固螺栓的紧固程度	第一次换油后, 其后每隔一次换油
对于齿轮箱的全面检查	大约每2年和换油同时进行
清理通气螺丝	每3个月



所列出的期限是取决于齿轮箱的工作条件的。这些期限是在如下条件下的平均值：

- 每日的工作时间24小时
- 负载系数100%
- 输入装置的转速1500 RPM
- 最高温度90°C（仅仅限于矿物油）
- 100°C（仅仅限于合成油）

### 7.3 检查与维护的注意事项

- ◆切断电源，防止触电，等待齿轮箱冷却。
- ◆油位的检查：油位必须在油镜的中间位置。
- ◆油的检查：移去油塞，取油样，检查油的粘度指数；如果油明显浑浊，建议尽快更换。
- ◆油的更换：
  - 不同的润滑剂禁止相互混合使用。
  - 冷却后油的粘度会增大，放油困难，换油时齿轮箱应保持温热。
  - 在油塞下面放一个接油盘，拆下油塞/通气帽，将油全部排除后装上油塞。
  - 注入同牌号的新油，油量应与安装方位一致（见铭牌）；若牌号不同则向我司售后服务咨询。
  - 在油镜处检查油位，装上通气帽。

## 8 故障处理

### 8.1 K系列的故障、原因和措施

维修工作一定要由经过培训后素质合格的人员谨慎地进行

故障现象	造成故障的可能原因	处理方法
(1)不能起动	a. 定子绕组有一相开路	检查定子绕组，查出断路处，加以修复
	b. 定子绕组匝间及相间短路	测量定子绕组每相电阻和各相空载电流是否平衡，查出所在处，加包绝缘
	c. 定子接线错误	按铭牌上规定的接法和接线图，查出定子绕组的接线，纠正错误联接
	d. 负载或传动机械有故障	把马达和负载分开，如马达能正常起动，应检查被拖动机械，消除障碍
	e. 变频器参数设置不当	检查变频器参数，进行调整（变频马达）
	f. 制动器未动作	检查制动器及其电器（制动马达）
(2)变频马达起动后转速低于额定转速	a. 变频器的输出频率与输出电压设定不当	按使用要求重新设定
	b. 负载过重	检查负载传动装置是否正常
(3)马达有异常噪声或振动过大	a. 机械摩擦（包括定转子相擦）	检查转动部分与静止部分间隙，找出相擦原因，进行校正
	b. 缺相运行	断电，再合闸，如不能起动，则可能有一相断电，检查电源或马达并加以修复
	c. 轴承缺油或损坏	清洗轴承，加新油。或更换新轴承
	d. 马达接线错误	查明原因，加以更正
	e. 修理后转子平衡被破坏	重新校动平衡
	f. 轴伸弯曲、变形	校直，必要时须更换转轴
	g. 联轴器俩连接松动	查清松动处，把螺栓拧紧
	h. 安装基础不平衡或有缺陷	检查基础固定情况，加以纠正
(4)马达温升高	a. 过载	用电磁式电流表测量定子电流或检查变频器面板上的电流显示值（变频马达），发现过载时，应减轻负载
	b. 缺相运行	检查马达定子接线或变频器接线（变频马达），并加以修复
	c. 马达接法错误	$\Delta$ 接法马达误接成Y接工作或相反，必须立即断电改接
	d. 定子绕组接地或匝间或相间短路	检查找出短路和通地的部分，进行修复

故障现象	造成故障的可能原因	处理方法
(4)马达温升过高	e. 定、转子相擦	检查轴承装配有无松动，定子和转子装配有无不良情况，加以修复
	f. 通风不畅	检查风机和风叶有否损坏，风道有否阻塞。风机或风叶损坏应予以修复或更换。风道阻塞应移开妨碍通风的物件，清除风道污垢、灰尘及杂物，使空气流通
	g. 变频器的V、f参数设置不当，使马达低速轻载时出现过激励，电流大于额定值	调整V/f的参数设置（变频马达）
	h. 利用变频器的直流制动功能对马达进行制动时，制动电流太大	调整直流制动电流的设置，根据制动频繁程度，一般设置在额定电流的100%~150%。（变频马达）
	i. 制动器动作迟缓	检查制动器气隙和直流励磁电压（制动马达）
(5)轴承过热	a. 轴承损坏	更换轴承
	b. 轴承润滑脂过多、过少或有杂质	调整或更换润滑脂
	c. 轴承与轴、轴承与端盖配合过松或过紧	修整到合适的配合
	d. 马达两侧端盖或轴承盖没有装配好（不平行）	将两侧端盖或轴承盖止口装平，旋转螺栓
	e. 轴伸端油封安装不良	调整到合适的安装状态
(6)马达外壳带电	a. 接地不良	检查接地螺栓，接地线同机壳接触是否紧密
	b. 绕组受潮，绝缘电阻过低	绕组干燥处理
	c. 绝缘损坏，定子线圈碰铁芯	予以修复
	d. 接线板有污垢	清理接线板
	e. 引出线绝缘磨破	破损处用绝缘材料包扎
(7)马达在负载时不能起动	a. 定子绕组有匝间短路	检查各相电阻和各相电流
	b. 过载	检查马达负载电流
(8)三相电流不平衡	a. 匝间短路	修理绕组
	b. 接线错误	改正接线
	c. 三相电源电压不平	改善供电质量
(9)保险丝熔断	a. 两相间短路	修理绕组
	b. 负载过大	减小负载
	c. 电压过低	升高电压

故障现象	造成故障的可能原因	处理方法
(0) 绝缘电阻低或击穿	a. 绝缘老化或损伤	检修绝缘
	b. 不清洁	用干燥的压缩空气吹净内部
	c. 绕组或接线板受潮	拆开烘干或处理后再用
	d. 马达过热	拆开检修防止继续过热
(1) 制动马达制动失灵	a. 摩擦片磨损较大	调整气隙
	b. 弹簧失效	调换弹簧
	c. 动作迟缓	调整气隙，检查励磁电压
	d. 整流器损坏	调换整流器
	e. 制动线路故障	正确排除制动线路故障



注：1.用户想获得更详细的资料，请与本公司联系；  
2.无需通知，本公司保留对马达使用维护说明书的修改权。

## 8.2 P系列的故障、原因和措施

维修工作一定要由经过培训后素质合格的人员谨慎地进行

故障	原因	措施
在齿轮箱的紧固件处有大的噪声	紧固件松动了	将螺栓/螺母拧紧到规定的扭矩。 更换损坏了的螺栓/螺母。
齿轮箱的噪声变化	齿轮箱的齿轮发生了损坏	和客户服务部联系。 →检查所有的齿轮，更换损坏了的零件。
	轴承间隙过大	和客户服务部联系。 →调整轴承的间隙。
	轴承损坏	和客户服务部联系。 →更换损坏的轴承。
工作温度过高	箱体里面的油面过高	检查油面的高度，如果有必要的话，调整。
	油过于陈旧	和客户服务部联系。 检查上一次换油的时间，如果有必要的话就更换。
	油受到严重污染	和客户服务部联系。 →换油
	在配备了润滑油冷却系统的齿轮箱上： 冷却剂的流量过低或者过高	全面调节进口和出口管道的阀门。检查水冷装置的自由流量。
	冷却剂温度过高	检查温度并按需调节。
	通过水冷装置的油流过低，其原因：滤油器严重堵塞	清理滤油器
	油泵的机械故障	和客户服务部联系。 →检查油泵的功能是否正常 →休息或者换新。
	在配备了风扇的齿轮箱上： 风扇盖的空气入口和/或箱体严重污染	清理风扇盖和箱体。

故障	原因	措施
轴承处的温度过高	齿轮箱箱体里面的油面过高或者过低	在室温下检查油面的高度并按需加油。
	油过于陈旧	和客户服务部联系。 → 检查上次换油的时间。
	油泵的机械故障	和客户服务部联系。 → 检查油泵的工作是否正常。 修理或者换新油泵
	轴承损坏	和客户服务部联系。 → 查阅操作人员在振动测量中所获得的数据。 → 检查并按需更换轴承。
轴承处的振幅升高	轴承损坏	和客户服务部联系。 → 检查并按需更换轴承。
	齿轮损坏	和客户服务部联系。 → 检查并按需更换齿轮。
止回装置的温度过高 止回功能失效	止回装置损坏	和客户服务部联系。 → 检查并按需更换止回装置。
齿轮箱漏油	箱体盖或者连接处的密封不良	检查密封和连接处，如果必要的话，更换新的。将连接处密封好。
	径向轴封环失效	和客户服务部联系。 → 换新的径向密封。
油中有水	油中有杂物	用试管检查油的状态是否有水分存在。 实验室分析油。
	润滑油冷却器或者冷却盘管失效	和客户服务部联系。 → 找出并修理泄漏之处。 → 更换冷却器或者冷却盘管。
	齿轮箱受到机器间的通风过来的凉空气而产生凝霜	用合适的保温材料将齿轮箱保护起来。关闭空气的出口或者在结构上改变其方向。
压力监测装置报警（配备了压力润滑、润滑油水冷却装置和空气冷却装置的齿轮箱）	油压 < 0.5巴	在室温下检查油面高度，按需加油。 检查滤油器，按需更换。和客户服务部联系。 → 检查油泵的功能是否正常。 → 修理或者更换油泵。
双切换式滤器的指标器发出警报	双切换式滤器堵塞	按照说明将切换滤器进行切换，将堵塞了的滤芯取下来并清理。
供油系统的故障		看使用说明书中关于供油系统的说明。

对于客户自己无法排除的故障请和我公司售后服务部联系。

## 9 马达概述

### 9.1 说明

◆本说明书为我公司马达的随机文件。其中介绍了马达起动、储运、安装的要求和注意事项，以及使用、维护马达的要求、方法和注意事项，使用维护人员必须认真阅读此说明书。认真审阅马达上的铭牌、标牌、警示牌等。使用单位应对操作人员进行专业培训后，方能上岗作业。



注意:

为保证设备安全和正确的安装、操作和维护，请务必遵守本说明书的相关条款。负责安装操作或维护设备的人员应注意相关说明，忽视说明将会使质保失效。

### 9.2 产品适用范围

◆本说明书适用于博能各标准系列及其所派生的各种系列马达（防爆系列马达除外）。机座中心高：56-280。（对一些特殊应用场合或有特殊设计考虑的型号马达还需参阅其它特别的指导说明）。



## 10 一般要求

### 10.1 起动

#### 10.1.1 收货检验

- ◆收货后，立即检验马达有无外部损伤，检验所有的铭牌数据，尤其是电压的连接方式(Y或 $\Delta$ )。
- ◆用手旋转转轴，检测马达空转情况，如果马达装有锁定装置，注意将其打开。
- ◆带制动器马达，应通电看其制动器能否动作，带手柄制动器，应扳动手柄，检查手动释放性能。

#### 10.1.2 绝缘性能检测

- ◆马达初次使用之前，绕组有可能受潮，都要测量其绝缘阻值；对双绕组多速马达要分别测量两套绕组的绝缘电阻。



注意:测量后绕组要立即放电，避免电击。

- ◆绕组被海水浸泡后一般要重绕。

#### 10.1.3 直接起动、Y/ $\Delta$ 起动及变频起动

- ◆标准单速马达的接线盒一般有6个接线螺栓和至少1个接地螺栓。
- ◆马达通电之前，必须按规定要求可靠接地，不能接零代替接地。
- ◆电压连接方式在铭牌上有标注。

##### ◎直接起动

绕组可以采用Y或 $\Delta$ 接法，例如660VY，380V $\Delta$ 分别表示660V为Y接法，380V为 $\Delta$ 接法。

##### ◎Y/ $\Delta$ 起动

- 电源电压必须等于 $\Delta$ 接法马达的额定电压。
- 拆下接线板上所有的接线片，按Y/ $\Delta$ 起动装置接线，妥善连接到马达六个接线柱上，并能从起动初期的Y连接跳到启动完成的 $\Delta$ 接。
- 双速马达和其他特种马达的电源接法必须依照接线盒内的接线图说明。

##### ◎变频起动

- 按照变频器的使用说明书，对变频器正确地实施接线并进行通电前的检查。检查无误后，先不接马达，对变频器的各项参数逐一设定、调整。在确认变频器运转无问题后，再联接马达。
- 给出“接通”指令后，若马达不转，请先检查一下变频器，设置参数是否正确，若马达还不转，请再检查马达的接线和负载情况。
- 对IC416冷却方式的变频马达，强冷风机启动正常运行后，再启动马达，并注意观察马达、传动装置、生产机械及变频器面板的显示数据，若有异常现象应立即停机，查明故障并排除之后，方可重新启动。

#### 10.1.4 接线柱和旋转方向

- ◆从马达的驱动端观察转轴，其旋转方向为顺时针。
- ◆换接电源线中的任意两相就可以改变马达的旋转方向。

## 11 使用说明

### 11.1 运行环境

- ◆ 马达用于工业生产。
- ◆ 正常的环境温度在-15°C到+40°C之间，海拔不高于1000m。

### 11.2 安全要素

- ◆ 马达应由熟悉相关安全要求的专业人员安装和接线。
- ◆ 安装时必须有安全装置以防止事故发生，安装的位置也必须符合规定。

### 11.3 遵守规则

- ◆ 马达不能用于加速和超载运行。
- ◆ 一些有特殊设计考虑的马达需要特别的指导说明。

## 12 管理

### 12.1 储存

- ◆ 所有马达都应保存在室内，要求干燥，防震，防尘的环境。
- ◆ 无保护层的马达表面(轴伸端部和法兰)应该采取防锈措施。
- ◆ 建议定期检查马达，用手转动转轴，防止润滑脂流失或其它问题。
- ◆ 如果装有抗凝露加热器，最好使用。

### 12.2 运输

- ◆ 马达在运输时需要安装锁紧装置。

## 13 电气联接

### 13.1 概述:

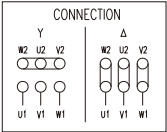
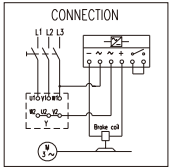
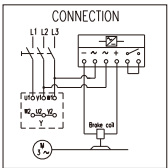
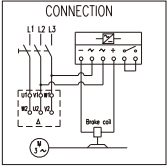
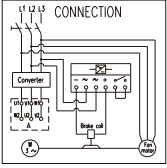
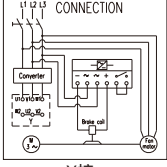
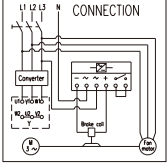
- ◆ 马达顶部的接线盒允许旋转，可按要求选择出线方向。
- ◆ 没有电缆进入的进线口必须封闭。
- ◆ 除了主绕组和接地端的接线，接线盒内还可包括热敏电阻，加热带，热敏开关或PT100电阻元件及制动器的接线部件。
- ◆ 对于装有电磁制动器的马达用户自供电源时应保证马达电源与制动器电源同步切换。
- ◆ 冷却方式为IC416的变频马达需安装轴流风机。轴流风机配有专用的接线盒。风机马达应与相应的电源电压相接，注意风机马达须用工频电源，其接线应接在变频器的输入端。风机叶轮的正确旋转方向必须与风机机壳上的旋转方向箭头相一致。



注意:

- 1、防护等级比较高的马达（如户外使用），接线盒电缆与接头部分需用户做好防护，由于此处导致的马达接线盒进水，责任由客户自行承担。
- 2、马达停转时，在接线盒内仍可能带电，不要立即触摸接线柱。

### 13.2 接线指示图(标配):

型号	接线指示图	适用范围
M MH MP YZ	 <p>CONNECTION</p> <p>Y      Δ</p> <p>W2 U2 V2      W2 U2 V2</p> <p>U1 V1 W1      U1 V1 W1</p>	适用于所有电压范围。
M+Brake MH+Brake MP+Brake YZ+Brake	 <p>CONNECTION</p> <p>Y接</p>	制动器外接交流电压220~240V。
M+Brake MH+Brake MP+Brake YZ+Brake	 <p>CONNECTION</p> <p>Y接</p>	制动器外接交流电压380~420V。
M+Brake MH+Brake MP+Brake YZ+Brake	 <p>CONNECTION</p> <p>接</p>	制动器外接交流电压220~240V或380~420V。
M+Brake+ Fan MH+Brake+ Fan MP+Brake+ Fan YZ+Brake+ Fan	 <p>CONNECTION</p> <p>接</p>	制动器外接交流电压220~240V或380~420V。
M+Brake+ Fan MH+Brake+ Fan MP+Brake+ Fan YZ+Brake+ Fan	 <p>CONNECTION</p> <p>Y接</p>	制动器外接交流电压380~420V。
M+Brake+ Fan MH+Brake+ Fan MP+Brake+ Fan YZ+Brake+ Fan	 <p>CONNECTION</p> <p>Y接</p>	制动器外接交流电压220~240V。



- 注: a、以上所列风机均为三相风机,且风机电压频率跟马达一致。  
 b、上表所列制动器接线均为较慢速制动控制方式,较快速制动,见下图例。  
 c、上述接线图为我司标配,如有其它特殊需求,请另咨询。  
 d、制动器的制动频次不应超过马达对应工作制及负载率允许的起停频次。

图例(快速制动):

型号	接线指示图	适用范围
M+Brake MH+Brake MP+Brake YZ+Brake	<p>Y接</p>	制动器外接交流电压220~240V.

## 14 维护

### 14.1 概论

- ◆定期检修马达。
- ◆保持马达清洁,空气流通。
- ◆检查轴伸的密封圈,如有必要应及时更换。
- ◆检查安装连接状况和安装螺钉。
- ◆通过监听异常噪声,温度检测等来检查轴承运行情况。
- ◆如有异常发生,应立即停机,检查原因并及时排除。

### 14.2 轴承润滑

马达标配装有封闭式轴承,免维护。

### 14.3 制动器的维护

#### ◆制动器气隙的调整

◎制动器的摩擦面经过长期使用后，将受到磨损，引起电磁铁与衔铁间的气隙增大和弹簧工作长度的增加，从而降低了弹簧压力，减少了制动力矩，同时由于气隙的增大，使衔铁吸合时电流值上升，严重时将使衔铁不能吸合，因此需经常检查气隙，进行调整或更换摩擦片。

◎气隙调整步骤如下：(参考图1)

- 取下风罩(7)。
- 取下防尘罩(5)。
- 调节气隙。
- 调整在下表所列范围内。

机座中心高	71	80	90	100	112	132	160	180	200	225	250	280
正常工作气隙(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
最大工作气隙(mm)	0.5	0.5	0.5	0.75	0.75	0.75	1	1	1	1.2	1.2	1.2

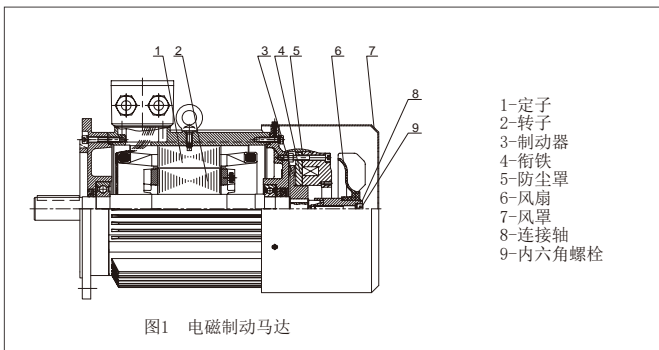
#### ◆更换摩擦片

◎摩擦片属易损件，当摩擦片磨损超过下表数值时，就需要更换新的摩擦片：

机座中心高	71	80	90	100	112	132	160	180	200	225	250	280
最大磨损量(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

◎更换摩擦片步骤如下：

- 取下风罩(7)。
- 取下风扇(6)。
- 旋下螺栓(9)。
- 取下连接轴(8)。
- 取下防尘罩(5)。
- 将制动器线圈拆下。
- 取下制动盘，便可更换摩擦片。



## 售后服务

售后服务请按以下步骤提交售后流程。

- 登录“www.boneng.com”
- 点击“服务”和“售后服务”



- 登录系统

邮箱登录

[新用户注册](#)

请输入合法邮箱

请输入密码

请输入6位验证码

0 5 8 9

登录

## 博能传动（沈阳）有限公司

控制器/驱动器：024-31271571

马达/齿轮马达/齿轮箱：024-31292571

## 博能传动（天津）有限公司

控制器/驱动器：022-86928559

马达/齿轮马达/齿轮箱：022-26929558

## 博能传动（开封）有限公司

控制器/驱动器：0371-23335230

马达/齿轮马达/齿轮箱：0371-23277771

## 博能传动（潍坊）有限公司

控制器/驱动器：0536-4699687

马达/齿轮马达/齿轮箱：0536-4699667

## 博能传动（长沙）有限公司

控制器/驱动器：0731-88386958

马达/齿轮马达/齿轮箱：0731-88380725

## 博能传动设备（成都）有限公司

控制器/驱动器：028-87740066

马达/齿轮马达/齿轮箱：028-87740066

## 博能传动（苏州）有限公司

控制器/驱动器 苏南区：0512-66182005

马达/齿轮马达/齿轮箱 苏南区：0512-66189918

控制器/驱动器 浙沪区：0512-66182005

马达/齿轮马达/齿轮箱 浙沪区：0512-66189918

控制器/驱动器 苏皖区：0512-66182005

马达/齿轮马达/齿轮箱 苏皖区：025-52171612

## 博能传动（美国）有限公司

技术支持/调试/售后服务：

1250 E 222nd Euclid, OH 44117, United States

Email: America@boneng.com

Tel: 1-216-618-3099 / 1-216-618-0138

## 博能传动（印度）有限公司

技术支持/调试/售后服务：

Plot No. E-10/3, MIDC sinner (Malegaon) Industrial Area,  
Nashik, 422123, Maharashtra, India.

Email: india@boneng.com

Tel: +91-11-4507 6293 / +91-22-2781 3385

## 其他地区

控制器/驱动器：0512-66182005

马达/齿轮马达/齿轮箱：0512-66189918

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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 gearbox. When running gearbox, please note the relevant notes.

- ◆ This instruction is an integral part of the gearbox supplied.
- ◆ All persons involved in the installation, operation, maintenance and repair of the gearbox 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;
  - Dismatle 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

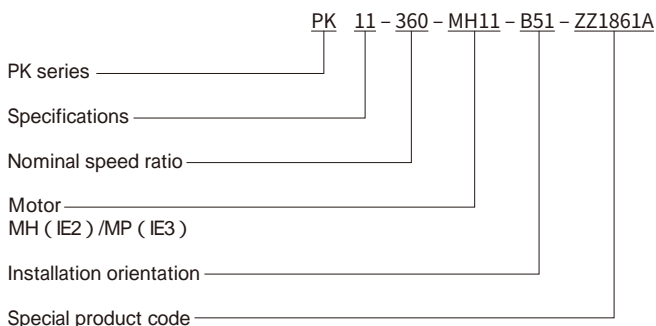
### 2.1 The name plate information

⊕ <b>BONENG</b> ⊕	
Type	
n2	RPM
P1 kW	T2 N · m
n1 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 description



Accessories code recommended on the catalog.

- ◆ Type designation is only for reference, special type, please consult.

## 2.3 Notes

### (Following notes is related to the use of gear motor):

- ◆ When installed outdoor, direct sunlight should be avoided, otherwise concentrated heat will affect the gearbox performance.
- ◆ The gearbox must not be cleaned using high-pressure cleaning equipment.
- ◆ All work such as inspection, maintenance and installation on gearbox should be done when gearbox is not in operation.
- ◆ No welding work should be done on gearbox, the gearbox 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 gearbox, 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 gear unit and application of the components of other companies are not included in “three-guarantee” services.
- ◆ Depending on operation conditions of gearbox, the surface, lubrication oil and components of gearbox may reach high temperature, avoid being burnt.
- ◆ When changing lubrication oil, take care to prevent scalding by hot oil.  
Gearbox should be laid on dry wooden foundation with no vibration and be covered well. When storing the gearbox and any independent components, you should take anti-rust measures, avoid rusting, the gearbox should not be piled together when stored.
- ◆ Unless there are other regulations in ordering contract, gearbox 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 gearbox, take care to avoid the shaft ends knocked, otherwise the gearbox 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 gearbox in good condition (no damage during transporting or storing).
- ◆ Confirm site environment conforms to nameplate content.
- ◆ Standard ambient temperature of gearbox:  
-20°C~+50°C; no oil, acid, harmful gas, steam, radioactive substances. etc.
- ◆ If the storage time of gear unit is more than one year, the life of lubricant within the bearings will be shortened.



- ◆ Installing outdoor should avoid direct sunshine. In case of concentrated heat to influence smooth running of gear unit.
- ◆ Special gearbox: allocated according to ambient condition.
- ◆ During planning period, you should reserve enough space to maintain or repair.
- ◆ If the gearbox is fitted with a fan, there should be sufficient space for air intake.

### 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.
- ◆ If the gearbox is stored for more than one year, the life of lubricant in bearing will be shortened.
- ◆ 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 gearbox

#### Foundation

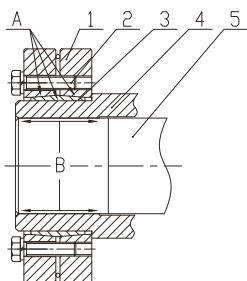
- ◆ Prepare rigid foundation or stable platform to install transmission device, at the same time, you should consider that the position of all parts will not change even if maximum torque is loaded on units.
- ◆ The foundation of gearbox should be horizontal and leveled. It must be designed in such a way that no resonance vibrations are set up and no vibration are transmitted from adjacent foundations steel structures on which the unit is to be mounted must be rigid. It must be designed according to the mass and torque taking into account the forces acting on the gearbox.
- ◆ Fastening bolts or nuts must be tightened to the prescribed torque. For the correct torque, we recommend customer to use the bolts of the minimum strength class 8.8.

### 3.4 The installation and teardoun of locking plate

- ◆ When hollow shaft of gearbox 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.
- ◆ The installation bolt strength grade is not less than 8.8, In case of high temperature or vibration impact, please take anti-loosing measures on screw joints. The screw torque of each fastening bolt as follows:

Bolt	The max. Pretighting torque for each bolt ( $\mu=0.1$ )		Bolt	The max. Pretighting torque for each bolt ( $\mu=0.1$ )	
	Strength Grade 10.9 N.m	Strength Grade 12.9 N.m		Strength Grade 10.9 N.m	Strength Grade 12.9 N.m
M6	12	14.5	M20	470	570
M8	29	35	M24	820	980
M10	58	70	M27	1210	1450
M12	100	121	M30	1640	1970
M14	160	193	M33	2210	2650
M16	240	295	M36	2850	3420

- ◆ When disassembling the hollow shaft of gearbox 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.





## 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 filler
		Oil glass	
		Oil drain	

## 5 Lubrication/Cooling/Heating

### 5.1 Lubrication

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. The following table lists the lubrication oil brand and ambient temperature corresponding to product specification.

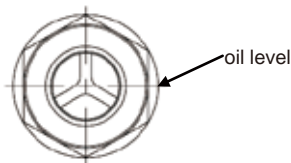
Ambient temperature	-20 ~ +40
Viscosity brand number	VG320



- ◎When ambient temperature is lower than -10°C, 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.

Quantity of lubrication oil fill:

- ◆ This quantity is a recommended value. According to the difference of gear unit level and ratio, the oil filling quantity is different. Please pay attention to oil ruler scale as the indication of oil filling.



- ◆ Following table lists the suggested oil value according to the gearbox mounting position.

## 5.2 Quantity of lubrication oil fill

Product model/Specifications	Oil gauge (L)					
	PK09	PK10	PK11	PK12	PK13	PK14
P	3	4	6	8	10	16
K	8.5	8.5	11.5	11.5	22	22

Remarks: The gearbox is lubricated by oil immersion. The oil circuits of product series P and K are blocked and isolated by oil seal, which needs to be filled separately.

## 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 gearbox.



### 6.2 Check the device

- ◆ Check oil level, cooling of lubrication oil or the sealingness of oil supply system.
- ◆ Inspect the status of cooling device and check the shut-off valve.
- ◆ For the gearbox 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

- ◆ For the gearbox equipped with motor oil pump, make sure open oil pump motor before starting the device.
- ◆ 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 gearbox . Check the status of lubrication oil regularly, clean vent cap, fan, cooling coil and the surface of gear unit, keep the gearbox clean, ensure normal running of gearbox.

## 7.2 Periods of checks and maintenance

Check oil temperature	Daily
Check abnormal noise of gearbox	Daily
Check oil level	Monthly
Check for leaks gearbox	Monthly
Check oil for water content	After working 400 hours, at least once a year
First oil chang after starting	After working 400 hours
Subsequent oil changes	After every 5000 hours
Clean oil filter	Every 3 months
Clean ventilation cap	Every 3 months
Clean fan, fan cowl and gearbox cabinet	Do with oil changing
Check lubrication oil air cooler	Do with oil changing
Check lubrication oil water cooler	Do with oil changing
Check tightness of fastening bolts	The first time after changing oil, then change oil every two times
Full-aspect inspection to gearbox	About every 2 year, do with oil changing
Clean ventilation screw	Every 3 months



The listed periods are determined on working condition of gearbox. These periods are average values under the following conditions:

- Daily working hour: 24 hours
- Loading factor: 100%
- Speed of input device 1500 RPM
- Maximum temperature 90°C (only mineral oil)
- 100°C (only synthetic oil)

## 7.3 Notes for checks and maintenance:

- ◆ Cut off power source, prevent electric shock, wait for cooling of gearbox.
- ◆ 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

### 8.1 Fault causes and measures of K series

Maintenance work should be done by qualified staff.

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
( 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.

## 8.2 Fault causes and measures of P series

Maintenance work should be done by qualified staff.

Fault	Reason	Measure
Big noise at the fastener of gear box	Fastner looses	Tighten bolt/nut to regulated torque. Replace the damaged bolt/nut.
Noise change of gear box	Teeth of gear is damaged	<b>Contact with customer service department</b> Check all the gears, change the damaged components.
	Bearing interval is too large	<b>Contact with customer service department</b> Adjust bearing interval.
	Bearing is damaged	<b>Contact with customer service department</b> Change the damaged bearings.
Operating temperature is too high	Oil level in cabinet is too high.	Check oil level, if necessary, adjust it.
	Oil is too old.	<b>Contact with customer service department</b> Check the last time of oil changing, if necessary, change it.
	Oil is badly contaminated.	<b>Contact with customer service department</b> Change oil
	On gear box equipped with lubrication oil cooling system: Flow of coolant is too low or too high	Adjust the valve of inflow and outflow pipelines. Check free flow of water cooling device.
	Temperature of coolant is too high	Check the temperature and adjust according to requirements
	Oil flows through water cooling device is too low, reason: Oil filter is seriously clogged	Clean oil filter
	Mechanical fault of oil pump	<b>Contact with customer service department</b> Check whether the function of oil pump is normal. Repair or change into a new one.
	On gear box equipped with fan: Air inlet and/or cabinet of fan cover are badly contaminated	Clean fan cover and cabinet

Fault	Reason	Measure
Temperature of bearing is too high	Oil level in gearbox cabinet is too high or too low	Check oil level under room temperature and topup oil according to requirements.
	Oil is too old	<b>Contact with customer service department</b> Check the last time of oil changing.
	Mechanical fault of oil pump	<b>Contact with customer service department</b> Check whether oil pump works normally. Repair or change a new oil pump
	Bearing is damaged	<b>Contact with customer service department</b> Check the data obtained from vibration measurement by operators Check and change bearing according to requirements
Amplitude of bearing rises	Bearing is damaged	<b>Contact with customer service department</b> Check and change bearing according to requirements.
	Gear is damaged	<b>Contact with customer service department</b> Check and change gear according to requirements.
Temperature of backstop device is too high Backstop is ineffective.	Backstop device is damaged.	<b>Contact with customer service department</b> Check and change backstop device according to requirements.
Gear box leaks oil	Sealing at cabinet cover or joint is not good	Check sealing part and the joint, if necessary, change into a new one. Seal the joint part.
	Radial shaft sealing ring is ineffective.	<b>Contact with customer service department</b> Change into a new radial sealing.
There is water in oil	Oil fams in pump	Check water contamination with test tube. Analyze oil in lab.
	Lubrication oil cooler or cooling coil is ineffective	<b>Contact with customer service department</b> Find out and repair the leaking part. Change cooler or cooling coil.
	Gearbox occurs the cold air from ventilation, thus forming frost.	Protect the gearbox with appropriate thermal insulation material. Close air outlet or change its direction on structure.
Pressure supervision device alarms (gear - box equipped with pressure lubrication, lubrication oil water cooling device and aircooling device)	Oil pressure is less than 0.5bar	Check oil height under room temperature, fill in oil according to requirements. Check oil filter, change according to requirements. <b>Contact with customer service department</b> Check whether oil pump function is normal. Repair or change oil pump.
Indicator of double changing filter sends alarms	Double changing filter clogged	Change the filter according to instructions, remove clogged filter element and clean it.
Fault of oil supply system		Check the instructions of oil supply system in instruction book.

For the faults can't be removed by customers, please contact with after - sales department of the company.

## 9 Motor Overview

### 9.1 Explain

- ◆ 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.

### 9.2 Product scope of application

- ◆ 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).

## 10 Common requirements

### 10.1 Starting

#### 10.1.1 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.

#### 10.1.2 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.

### 10.1.3 Direct start, Y/ $\Delta$ 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  $\Delta$  connection method, for example, 660VY, 380V  $\Delta$  express 660V, Y connection method and 380V,  $\Delta$  connection method.
- ◎ Y/ $\Delta$  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/ $\Delta$  starting, connect it to six wiring columns of motor, it can trip from Y connection of initial period of starting to  $\Delta$  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.

### 10.1.4 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.

# 11 Instructions

## 11.1 Running environment

- ◆ Motor is used for industrial production.
- ◆ Normal ambient temperature is between -15 and 40 , the altitude is not higher than 1000m.

## 11.2 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.

## 11.3 Conform to rules

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

# 12 Management

## 12.1 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.

## 12.2 Transportation

- ◆ The motor needs to install the lock device in transportation.

# 13 Electrical connection

## 13.1 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.



### 13.2 Wiring diagram (standard configuration):

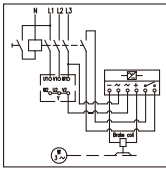
Type	Wiring diagram	Applicable scope
M MH MP YZ	<p>CONNECTION</p> <p>Y Δ</p> <p>W2 U2 V2 W2 U2 V2</p> <p>U1 V1 W1 U1 V1 W1</p>	Applicable to all voltage range
M+Brake MH+Brake MP+Brake YZ+Brake	<p>CONNECTION</p> <p>Y connection</p>	Brake with external AC voltage 220~240V
M+Brake MH+Brake MP+Brake YZ+Brake	<p>CONNECTION</p> <p>Y connection</p>	Brake with external AC voltage 380~420V
M+Brake MH+Brake MP+Brake YZ+Brake	<p>CONNECTION</p> <p>Δ connection</p>	Brake with external AC voltage 220~240V
M+Brake+ Fan MH+Brake +Fan MP+Brake +Fan YZ+Brake+ Fan	<p>CONNECTION</p> <p>Δ connection</p>	Brake with external AC voltage 380~420V
M+Brake+ Fan MH+Brake +Fan MP+Brake +Fan YZ+Brake+ Fan	<p>CONNECTION</p> <p>Y connection</p>	Brake with external AC voltage 380~420V
M+Brake+ Fan MH+Brake +Fan MP+Brake +Fan YZ+Brake+ Fan	<p>CONNECTION</p> <p>Y connection</p>	Brake with external AC voltage 380~420V



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

Legend (quick braking):

Type	Wiring diagram	Applicable scope
M+Brake MH+Brake MP+Brake YZ+Brake	 <p>Y connection</p>	Brake with external AC voltage 220~240V

## 14 Maintenance

### 14.1 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.

### 14.2 Bearing lubrication

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

## 14.3 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.

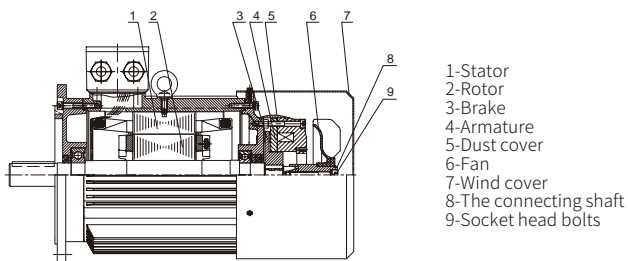


Fig. 1 Electromagnetic brake motor

## After-sale service

After-sales Service Please follow the steps below to submit the after-sales process.

- Login “www.boneng.com”
- Click “Service” and “After-sale Service”



- Login system

[Email sign](#)

[New user registration](#)

Please enter email address

Please enter your password

Please enter a 6-digit verification



Sign in

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Motor/Gear motor/Gearbox : 024 - 31292571

**BONENG TRANSMISSION(TIAN JIN)CO.,LTD**

Controller/Drive : 022 - 86928559

Motor/Gear motor/Gearbox : 022 - 26929558

**BONENG TRANSMISSION(KAIFENG)CO.,LTD**

Controller/Drive : 0371 - 23335230

Motor/Gear motor/Gearbox : 0371 - 23277771

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**BONENG TRANSMISSION(USA/Canada)CO.,LTD**

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Office Tel: 1 - 216 - 618 - 3099 / 1 - 216 - 618 - 0138

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