

FLK



产品说明书

PRODUCT SPECIFICATION

上海费洛卡重工机械有限公司

Shanghai Ferrocar Heavy Industry Co., Ltd.



K系列斜齿轮—伞齿轮减速电机
K SERIES HELICAL-BEVEL GEARED MOTOR



F系列斜齿轮减速机
F SERIES PARALLEL SHAFT HELICAL GEARED MOTOR



R系列斜齿轮减速电机
R SERIES HELICAL GEARED MOTOR



S系列斜齿轮—蜗轮蜗杆减速电机
S SERIES HELICAL-WORM GEARED MOTOR

公司简介

作为减速机行业的专业制造商，费洛卡重工始终坚持科技与品质同行，敢于创新、追求卓越。

一直以来，费洛卡重工始终以强大的生产实力为发展基石，以完善的研发实力为品质保障，以卓越的服务体系为品牌延伸，倾力打造齿轮减速机、行星减速机，通用减速机领域具有竞争力、有价值的品牌。

秉持“自主创新”的研发宗旨，自主研发并在2012年开始使用ERP管理系统，完善优化产品研发、设计、生产的每个细节。实现了方案制定的精准、可靠与完美性，实现了公司在企业内部将科研、技术服务、市场营销、生产一体化。

费洛卡重工拥有自营进出口权，公司国际贸易市场已经在亚、非、拉美等发展中国家和地区稳固发展，并已经成功打开欧、美、澳等发达国家和地区市场。

费洛卡人坚信品牌的价值，不仅仅源于过硬的产品和优秀的解决方案设计，还必须拥有周到完善的售前、售后技术服务。因此，我们建设了专业技术团队，解决从减速机选型、现场应用、安装调试、指导维护设备动力系统过程中的系列问题，确保各个环节与客户对接到位，及时解决客户所需。

Company profile

As a leader in the reducer industry, Feiluoka heavy industry always adhere to scientific and technological innovation, and the quality of company, the pursuit of excellence.

Since Feiluoka heavy industry has always been to strong production strength as the cornerstone of the development, to To improve the quality of R & D for quality assurance, excellent service system for the brand extension, efforts to build gear reducer, planetary reducer, the field of General Motors is extremely competitive, the most valuable brand.

Adhere to the "independent innovation" R & D purposes, independent research and development and in 2012 began to use ERP management system, improve the optimization of product development, design, production of every detail. The accuracy, reliability and perfection of the scheme are realized, and the integration of scientific research, technical service, marketing and production is realized.

Feiluoka company has import and export rights, the international trade market has stable development in developing countries in Asia, Africa and Latin America and other regions, and has successfully opened the market in Europe, America, Australia and other developed countries and regions.

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1. 产品说明 / PRODUCT DESCRIPTION

1.1 性能特点 / Performance Characteristics

- ① 采用了系列化、模块化的设计, 传动比覆盖范围广、分级精细;
 - ② 传动效率高, 耗能低、性能优越;
 - ③ 齿轮经高精度磨齿机磨削加工, 传动平稳、噪音低, 承载能力大、寿命长;
设计精巧: 体积小, 安装简便, 用途广泛;
 - ⑤ 安装方式多样, 适合全方位的万能安装配置;
 - ⑥ 可实现 K 系列与 R F 系列减速器的联体组合, 适用于特殊低速的应用。
- ① Systematic and modular design; Transmission ratio with fine stage covers a wide range.
 - ② High efficiency; Low energy consumption; Superior performance.
 - ③ High Precision gear with teeth grinding; Stable transmission; Low noise; Strong bearing capacity; Long Service life.
 - ④ Deft design: Small volume; Simple Installation; Wide usage.
 - ⑤ Suitable for all kinds of mounting positions.
 - ⑥ KT.. and RTF.. conjoined combination for special low speed.

1.2 主要材料 / Material

- ① 箱体: HT250 高强度铸铁。射型内腔, 有效减少零件磨损;
 - ② 齿轮: 20CrMnTi 优质合金钢, 碳氮共渗处理 (精磨后保持齿面硬度 HRC60);
 - ③ 平键: 45 钢, 表面硬度 HB230-270.
- ① Housing: High strength cast iron HT250, die casting lumen, reduce the abrasion of parts. .
 - ② Gears: 20 CrMnTi, Carbonitriding, Teeth hardness: HRC 60 after grinding.
 - ③ Flat keys: C45, Surface hardness: HB230-270.

1.3 减速器效率 / Gear Unit Efficiency

- ① 由于采用了高精度齿轮、油封、轴承, 有效降低了摩擦, 齿轮传动的级间效率可达 97%;
- ① High precision gear; seals; bearings; Effectively reduces friction; Stage efficiency of gear drive reaches 97%.

- ② 在某些安装方式时，输入级齿轮完全浸在润滑油中，对于大机座号和高输入转速的情况，须考虑搅油损失。

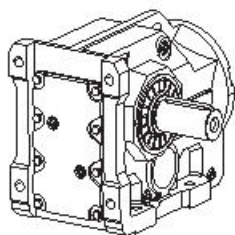
- ② For some ways of mounting, the input gear is completely immersed in the lubricant, please consider the churning loss when it comes to big frame size and high input speed.

1.4 使用条件/Working Condition

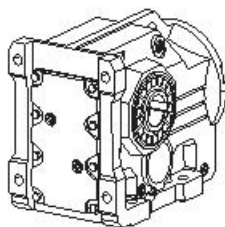
- ① 环境温度-40~50℃（0℃以下启动时润滑油需加热到0℃以上或采用防冻润滑油）；
② 输入转速不大于2800转/分；
③ 可用于正反转；
④ 无行业限制；

- ① Ambient temperature -40~50℃ (if lower than 0℃, need to heat the lubrication higher than 0℃ or use anti freezing lubricant).
② Input rotation speed ≤ 2800 r/min.
③ Both Rotation Direction.
④ No industry limit.

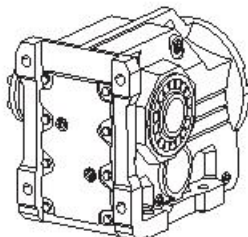
2. 机型版本 / VERSIONS



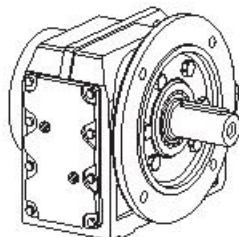
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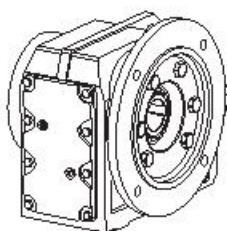
K A..B/K V..B



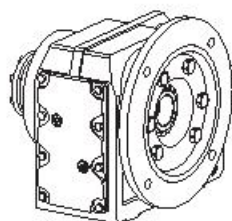
K H..B



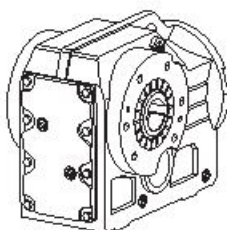
K F..



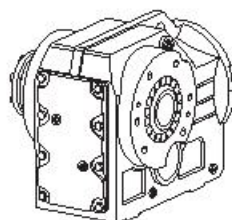
KAF./KVF..



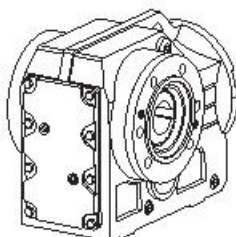
KHF..



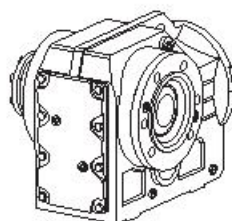
KA./KV..



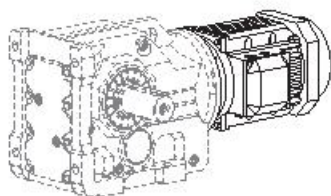
KH../KT..



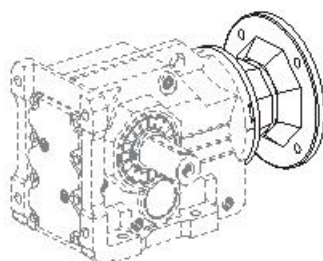
KAZ../KVZ..



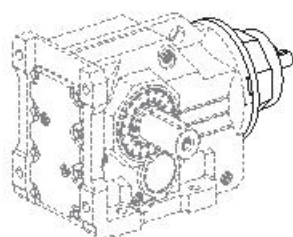
KHZ..



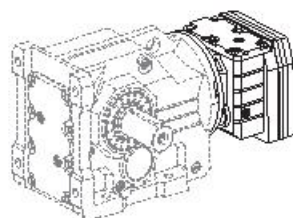
K..Y..



K..AM..

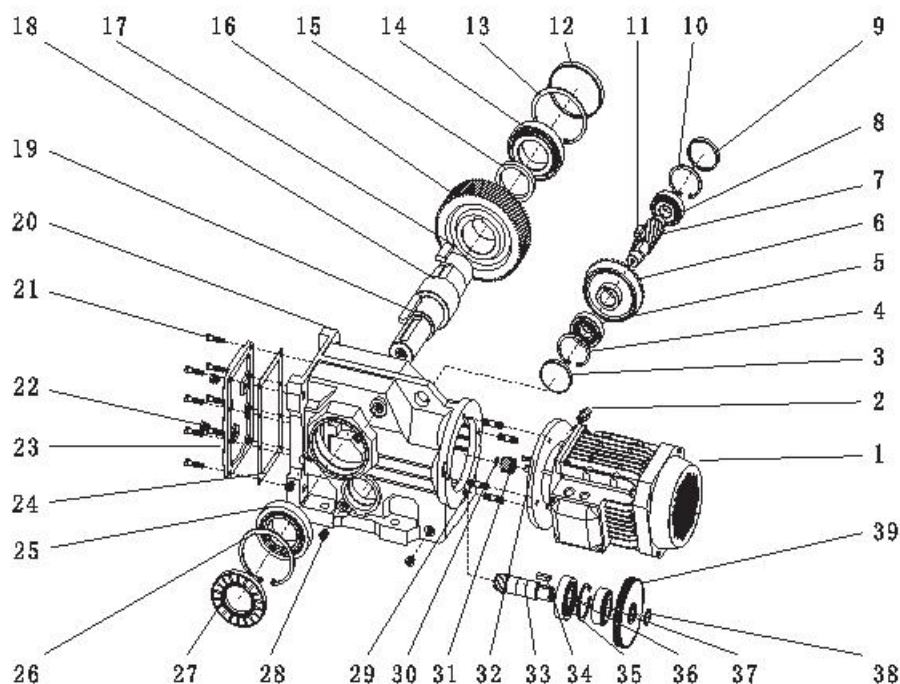


K..AD..



K..RE..

3. 部件分解图 / SPARE PARTS LIST



1 电机/motor

2 透气阀/breather valve

3 平面油封/plane seal

4 孔用挡圈/retaining rings for bores

5 轴承/bearing

6 伞齿轮/bevel gear

7 齿轮轴/gear shaft

8 轴承/bearing

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|-----------------------------------|------------------------------------|
| 9 平面油封/plane seal | 25 轴承/bearing |
| 10 孔用挡圈/retaining rings for bores | 26 孔用挡圈/retaining rings for bores |
| 11 平键/flat key | 27 骨架油封/skeleton oil seal |
| 12 平面油封/plane seal | 28 油塞/oil level plug |
| 13 孔用挡圈/retaining rings for bores | 29 双头螺栓/stud |
| 14 轴承/bearing | 30 轴用挡圈/retaining rings for shafts |
| 15 垫片/spacer tube | 31 齿轮/gear |
| 16 齿轮/gear | 32 平键/flat key |
| 17 平键/flat key | 33 伞齿轮/bevel gear shaft |
| 18 输出轴/output shaft | 34 平键/flat key |
| 19 平键/flat key | 35 轴承/bearing |
| 20 箱体/housing | 36 孔用挡圈/retaining rings for bores |
| 21 外六角螺钉/six angle screw | 37 轴承/bearing |
| 22 油塞/oil level plug | 38 轴用挡圈/retaining rings for shafts |
| 23 盖板/cover plate | 39 齿轮/gear |
| 24 纸垫/gasket | |

4. 安全说明/SAFETY INSTRUCTIONS

- 4.1 遵守使用说明书中的规定是实现产品的正常工作和履行产品质量保证要求的必要条件，请在涉及减速机的任何工作之前认真阅读使用说明书。如有不清楚之处或欲了解更多信息，请联系本公司。
- 4.2 所有与运输、贮存、安装、调试、操作、维护和修理有关工作，只能由具备资质的专业人员根据有关规定进行。
- 4.1 Adhering to the product specification is a prerequisite for faultfree operation and the fulfillment of any right to claim under warranty. Please read the product specification before you start working with the unit. Please contact us if you have any questions or if you require further information.
- 4.2 All work related to transportation, storage, setup/mounting, connection, startup, maintenance and repair can only be carried out by qualified professionals.

4.3 下列情况可能导致严重的人员伤害和财产损失:

- ① 违规使用设备;
- ② 错误安装和操作设备
- ③ 违规拆除和未安装必要的防护盖板和外罩。

4.3 The following condition may result in severe injuries to persons or damage to property.

- ① Improper use.
- ② Incorrect installation or operation.
- ③ Removing covers without authorization.

5. 运输及储存/TRANSPORTATION AND STORAGE

5.1 运输/Transportation

① 收到货后请立即检查有无运输损坏。如有损坏请立即通知运输公司, 并不得对设备进行调试运行。

② 拧紧运输吊环, 由于吊环的设计负载仅针对减速机的重量, 因此不得额外增加负载。

③ 已安装好的吊环螺栓符合 ISO3266/GB825-88 的规定, 原则上要遵守标准中所著名的负载和规定。如果减速机上装有两个吊环, 则运输时必须用两个吊环同时进行吊装。

④ 吊装件的拉力方向不得超过 45 度斜角。

⑤ 必要情况下, 应使用相应的有足够承载力的运输工具, 调试前拆除所有运输紧固件。

① Inspect the shipment immediately upon receipt for any damage that may have occurred during transportation. Inform the shipping company immediately if there is any damage. It is necessary to preclude startup.

② Tighten installed eyebolts. They are only intended for the weight of the motor / gear motor, do not attach any additional loads.

③ The built-in lifting eyebolts comply with ISO3266/GB825-88. Always observe the loads and regulations listed in this standard. If the gear motor is equipped with two suspension eye lugs or lifting eyebolts, both of the suspension eye lugs should be used for transportation.

④ The tension force vector of the slings must not exceed a 45° angle.

⑤ Use suitable, sufficiently rated handling equipment if necessary. Remove any transportation fixtures prior to startup.

5.2 贮存/Storage

- ① 包装于箱内，里面放上薄膜包的干燥剂。
- ② 存放地点带顶棚，防雨雪，无振动。
- ③ 定期检查包装，在检查时应检查表面清洁度和机械损伤，检查防锈层是否完好。
- ① Packed in containers, with desiccant sealed in the plastic wrap.
- ② Underroof, protected against rain and snow; no shock loads
- ③ 2 years or more with regular inspections check for cleanliness and mechanical damage during inspection. Check corrosion protection.

6. 安装及运行/INSTALLATION AND OPERATION

6.1 安装准备/Prerequisites for assembly

- ① 安装前应检查电源是否与减速机铭牌上的要求相符。
- ② 检查驱动装置在运输或者仓储过程中是否遭受损坏。
- ③ 工作环境应无油、酸、碱、有害气体、蒸汽、放射性物质等。环境温度为 $-40^{\circ}\text{C} \sim +50^{\circ}\text{C}$ (0°C 以下启动时润滑油需加热到 0°C 以上，或采用防冻润滑油)，应有防雨、防晒、防风沙设施或措施。
- ④ 在潮湿的使用环境时，应要求提供具有防腐能力的产品。
- ⑤ 请使用常用的溶剂彻底清除输出轴和法兰上的防锈剂、污垢或类似污染，但不得让溶剂进入到骨架油封的密封唇上，否则会损坏油封。
- ① The entries on the name plate of the gear motor match the voltage supply system.
- ② The drive has not been damaged during transportation or storage.
- ③ No harmful oils, acids, gases, vapors, radiation etc. in the vicinity. Ambient temperature is $-40^{\circ}\text{C} \sim +50^{\circ}\text{C}$. (If the ambient temperature is below 0°C , heat the lubricant higher than 0°C or use antifreeze lubricant). Rain, sun, sand prevention facilities or measures.
- ④ In humid ambient conditions, provide anticorrosive product.
- ⑤ You must clean the out put shafts and flange surfaces thoroughly to ensure they are free of anticorrosion agents, contamination or similar. Use a commercially available solvent. Do not expose the sealing lips of the oil seals to the solvent damage to the material.

6.2 减速机的安装基础应为强度、刚度可靠，减震，抗扭的底座、台架等支撑结构。基础必须干燥，且不得有油脂。

6.3 底脚和法兰安装时，允许的最大平面度误差为：

减速机规格 ≤ 67 最大0.4mm

减速机规格 77~107最大0.5mm

减速机规格 137~147最大0.7mm

减速机规格 157~187最大0.8mm

6.4 箱体底脚和法兰安装时不能同时拧紧以免相互较劲。

6.5 基础安装螺栓的最低性能应为 8.8级。

6.6 安装时请检查注油量与安装位置是否相符，润滑油加注量详见润滑油量表。

6.7 当更换安装位置时，润滑油的加注量和透气阀的位置需做相应的调整。

6.8 减速机的透气

为避免减速机运行时产生内部压力，造成漏油等故障。本公司发货时提供的减速器上使用螺纹塞代替透气阀，置于一个塑料袋内。

① 请在减速器启动前拆下透气阀的运输保险（橡胶圈）

6.2 The support structure must have the following characteristics, level, vibration dumping, torsionally rigid, dry, no oil.

6.3 The maximum permitted flatness error for foot and flange mounting.

Gear Unit Size ≤ 67 Max:0.4mm

Gear Unit Size 77~107 Max:0.5mm

Gear Unit Size 137~147 Max:0.7mm

Gear Unit Size 187~187 Max:0.8mm

6.4 Do not tighten the housing legs and mounting flanges against one another.

6.5 Secure gear motors using quality 8.8 screw.

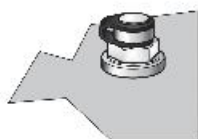
6.6 When installing gear unit, check that the oil fill corresponds to the specifications for the intended mounting position (see section "lubricant fill quantities")

6.7 If you change the mounting position, make sure that you change the lubricant fill quantities and the position of the breather valve accordingly.

6.8 Breather

We supply the gear units with a screw plug on the vent hole. We will supply a breather valve in a plastic bag.

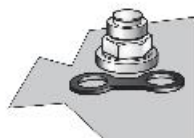
① Please remove the transport fixture from the breath valve before starting up the gear unit.



带运输保险（橡胶圈）的透气阀
Breather valve with transport fixture (rubber ring)



拆下运输保险（橡胶圈）
Removing the transport fixture (rubber ring)



已经开启的透气阀
Activated breather valve

- ② 在给减速器进行全面或者局部喷漆前，请用防护套保护好透气阀和油封，喷完漆后拆除防护套。

- ② Breath valves and oil seals may be damaged during painting or repainting. Please thoroughly cover the breather valves and the sealing lip of the oil seals with strips prior to painting and remove the strips after painting.

6.9 机械安装/Mechanical Installation

① 实心轴减速器

装配不当，可能对轴承、箱体或轴造成损伤，可能造成财产损失：

- A 利用轴端上现有的螺纹并采用装配工具对中孔进行定位装配输入和输出部件；
- B 禁止用锤击的方式将皮带轮、离合器、小齿轮等装入轴端部，这样会损坏轴承、外壳和轴；
- C 安装皮带轮时皮带的正确张力要根据制造商的规定；
- D 装配好的传动件应当进行动平衡，并不允许出现非许可的径向或轴向受力。
- E 给输出部件加润滑油剂或加热到（80~100℃）会有助于装配。

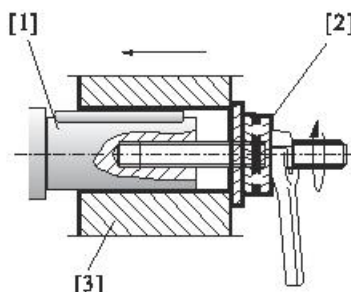
① Gear units with solid shaft

Bearing, housing or shaft may be damaged due to improper assembly. Possible damage to property:

- A Only assemble the input and output components with a mounting device. Use the centre hole and the thread on the shaft end of positioning.
- B Never force belt pulleys, couplings, pinions etc. onto the shaft end by hitting them with a hammer.
- C In the case of belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.
- D Power transmission elements should be balanced after fitting and must not give rise to any impermissible radial or axial forces.
- E Mounting is easier if you first apply lubricant to the output element or heat it up briefly (to 80~100℃).

下图示意了采用装配夹具将联轴器或轴套安装到减速器或电机的轴端上的操作在某些情况下，装配工具中的推力轴承可以省略。

The following figure shows a mounting device for installin couplings or hubs on gear unit or motor shaft ends. Should you be able to tighten the screw without any problems, you may not need the thrust bearing on the mounting device.



[1] 减速器轴端部

[1] gear shaft end

[2] 推力轴承

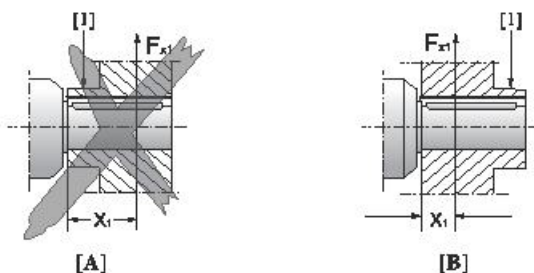
[2] thrust bearing

[3] 输出传动件

[3] coupling hub

为了避免高径向力，请按照图B装配齿轮或链轮。

Avoid high overhung loads by installing the gear or chain sprocket according to figure B if possible.



[1] 轮毂

[1] hub

[A] 不正确

[A] unfavorable

[B] 正确

[B] correct

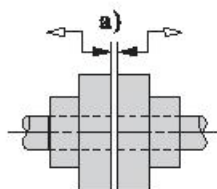
对于皮带轮、联轴器之类的传动和输出部件，应当有防接触的保护！

Input and output components such as belt pulleys, coupling etc.

Should be covered with a touch guard.

② 联轴器的安装

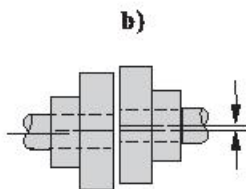
联轴器装配时要根据联轴器制造商的规定进行下列平衡校正。



a) 最大以及最小间距

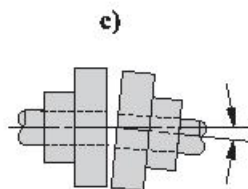
b) 轴向偏移

c) 角偏移



② Mounting of couplings

Adjust the following misalignments according to the coupling manufacturer's specification when mounting couplings.



a) Maximum and minimum clearance.

b) Axial offset.

c) Angular offset.

③ 空心轴减速器的扭力臂

A 安装时扭力臂不能过紧。

B 固定扭力臂时应采用强度为 8.8 级的螺栓。

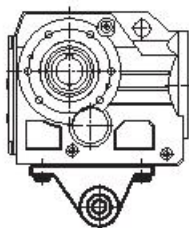
③ Torque arms for shaft-mounted gear unit.

A Do not place torque arms under strain during installation.

B Use bolts of quality 8.8 to fasten to torque arms.

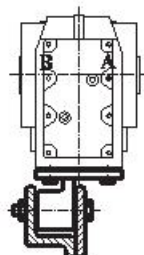
下图为扭力臂的支撑结构

The following figure shows the torque arm



两面均安装衬套[1]

连接面 B 与连接 A 对称安装



Busing[1] with bearings on both ends.

Install connection end B as a mirror image of A

7. 润滑 / LUBRICATION

7.1 润滑油类型 / Types of Lubrication

	环境温度(℃) Ambient Temperature(℃)	ISO粘度 ISO Viscosity Class	 SHELL	 MOBIL	 BP	润滑油类型 Lubrication Type
K	-40 ~ +10	VG 220	Shell Omala 200	Mobilgear 630	BP Energol GRF-XP 220	矿物油 Mineral Oil
	-20 ~ +25	VG 150 VG 100	Shell Omala 100	Mobilgear 627	BP Energol GRF-XP 100	
	-30 ~ +10	VG 68-46 VG 32	Shell Tellus 32	Mobil D.T.E 13M		
	-40 ~ -20	VG 22 VG 15	Shell Tellus 32	Mobil D.T.E 11M	BP Energol HLP-HM 15	
	-40 ~ +80	VG 220	Shell Tellus 32	Mobil SHC 630		合成油 Synthetic Oil
	-40 ~ +10	VG 32		Mobil SHC 624		

7.2 润滑油量表 / Lubricant Fill Quantity

规定的加注量为参考值。精确值的变化与级数和传动比有关。请您在加注润滑油时一定要注意油位螺栓所指示的精确油量。后期调整安装方式时，您必须根据改变后的安装方式相应调整加注润滑剂。下表中列出了安装方式 M1-M6 的减速器相应的标准参考润滑油注入量值。

The specified fill quantities are recommended values. The precise value varies depending on the number of stages and gear ratio. When filling, it is essential to check the oil level plug since it indicates the precise oil capacity. The following tables show guide values For lubricant fill quantities in relation to the mounting position M1 - M6.

K...KA...B,KH...B,KV...B

减速器型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1	M2	M3	M4	M5	M6
K37	0.50	1.00	1.00	1.25	0.95	0.95
K47	0.80	1.30	1.50	2.00	1.60	1.60
K57	1.10	2.20	2.20	2.80	2.30	2.10
K67	1.10	2.40	2.60	3.45	2.60	2.60
K77	2.20	4.10	4.40	5.80	4.20	4.40
K87	3.70	8.00	8.70	10.9	8.00	8.00
K97	7.00	14.0	15.7	20.0	15.7	15.5
K107	10.0	21.0	25.5	33.5	24.0	24.0
K127	21.0	41.5	44.0	54.0	40.0	41.0
K157	31.0	62.0	65.0	90.0	58.0	62.0
K167	33.0	95.0	105.0	123.0	85.0	84.0
K187	53.0	152.0	167.0	200.0	143.0	143.0

KE..

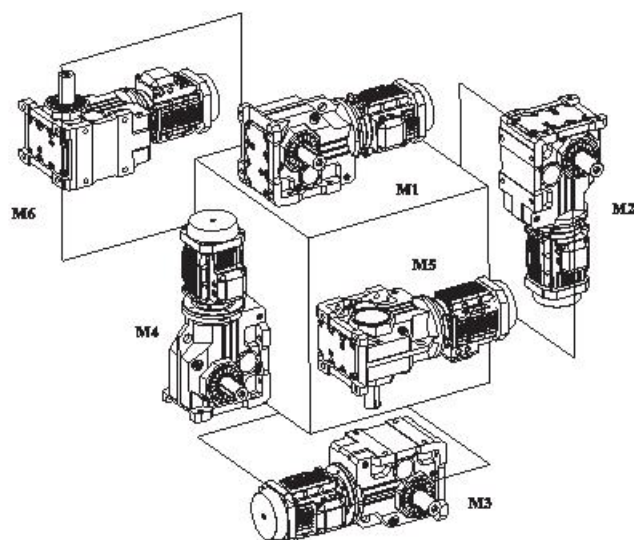
减速器型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1	M2	M3	M4	M5	M6
KE37	0.50	1.10	1.10	1.50	1.00	1.00
KE47	0.80	1.30	1.70	2.20	1.60	1.60
KE57	1.20	2.20	2.40	3.15	2.50	2.30
KE67	1.10	2.40	2.80	3.70	2.70	2.70
KE77	2.10	4.10	4.40	5.90	4.50	4.50
KE87	3.70	8.20	9.00	11.9	8.40	8.40
KE97	7.00	14.7	17.3	21.5	15.7	16.5
KE107	10.0	21.8	25.8	35.1	25.2	25.2
KE127	21.0	41.5	46.0	55.0	41.0	41.0
KE157	31.0	66.0	69.0	92.0	62.0	62.0

KA...KH...KV...KAF...KHF...KVF...KAZ...KHZ...KVZ..

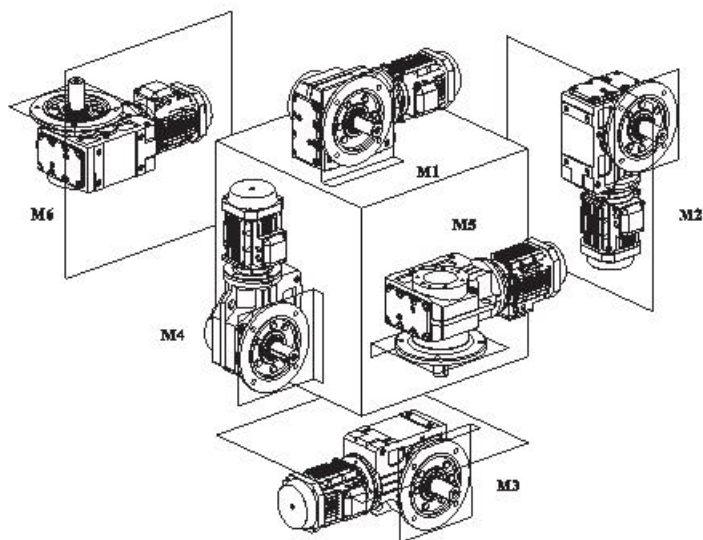
减速器型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1	M2	M3	M4	M5	M6
K37	0.50	1.00	1.00	1.40	1.00	1.00
K47	0.80	1.30	1.60	2.10	1.60	1.60
K57	1.30	2.30	2.70	3.20	2.90	2.70
K67	1.10	2.40	2.70	3.60	2.60	2.60
K77	2.10	4.10	4.60	6.00	4.40	4.40
K87	3.70	8.20	8.80	11.1	8.00	8.00
K97	7.00	14.7	15.7	20.0	15.7	15.7
K107	10.0	20.5	24.0	32.0	24.0	24.0
K127	21.0	41.5	43.0	52.0	40.0	40.0
K157	31.0	66.0	67.0	87.0	62.0	62.0
K167	33.0	95.0	105.0	123.0	85.0	84.0
K187	53.0	152.0	167.0	200.0	143.0	143.0

8. 安装方位图/MOUNTING POSITION DESIGNATION

K..安装位置示意图 / GK.. Mounting Position Designation



K F..安装位置示意图 / K F.. Mounting Position Designation



1. 产品说明 / PRODUCT DESCRIPTION

1.1 性能特点 / Performance Characteristics

- ① 采用了系列化、模块化的设计，传动比覆盖范围广、分级精细；
 - ② 传动效率高，耗能低、性能优越；
 - ③ 齿轮经高精度磨齿机磨削加工，传动平稳、噪音低，承载能力大、寿命长；
 - ④ 设计精巧：体积小，安装简便，用途广泛；
 - ⑤ 安装方式多样，适合全方位的万能安装配置；
 - ⑥ 可实现 F 系列与 RF 系列减速器的联体组合，适用于特殊低速的应用。
- ① Systematic and modular design; Transmission ratio with fine stage covers a wide range.
 - ② High efficiency; Low energy consumption; Superior performance.
 - ③ High Precision gear with teeth grinding; Stable transmission; Low noise; Strong bearing capacity; Long Service life.
 - ④ Deft design: Small volume; Simple Installation; Wide usage.
 - ⑤ Suitable for all kinds of mounting positions.
 - ⑥ F.. and RF.. conjoined combination for special low speed.

1.2 主要材料 / Material

- ① 箱体：HT250 高强度铸铁。射型内腔，有效减少零件磨损；
 - ② 齿轮：20CrMnTi 优质合金钢，碳氮共渗处理（精磨后保持齿面硬度 HRC60）；
 - ③ 平键：45 钢，表面硬度 HB230-270。
- ① Housing: High strength cast iron HT250, die casting lumen, reduce the abrasion of parts. .
 - ② Gears: 20CrMnTi, Carbonitriding, Teeth hardness: HRC 60 after grinding.
 - ③ Flat keys: C45, Surface hardness: HB230 - 270 .

1.3 减速器效率 / Gear Unit Efficiency

- ① 由于采用了高精度齿轮、油封、轴承，有效降低了摩擦，齿轮传动的级间效率可达 97%；
- ① High precision gear; seals; bearings; Effectively reduces friction; Stage efficiency of gear drive reaches 97%.

- ② 在某些安装方式时，输入级齿轮完全浸在润滑油中，对于大机座号和高输入转速的情况，须考虑搅油损失。

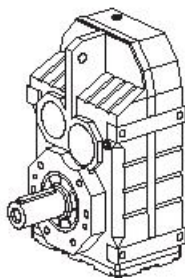
- ② For some ways of mounting, the input gear is completely immersed in the lubricant, please consider the churning loss when it comes to big frame size and high input speed.

1.4 使用条件/Working Condition

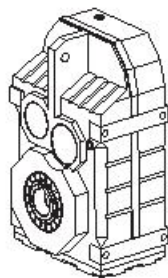
- ① 环境温度-40~50℃（0℃以下启动时润滑油需加热到0℃以上或采用防冻润滑油）；
② 输入转速不大于2800转/分；
③ 可用于正反转；
④ 无行业限制；

- ① Ambient temperature -40~50℃ (if lower than 0℃, need to heat the lubrication higher than 0℃ or use anti freezing lubricant).
② Input rotation speed ≤ 2800 r/min.
③ Both Rotation Direction.
④ No industry limit.

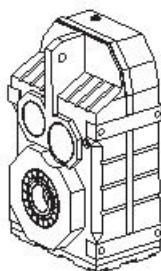
2. 机型版本 / VERSIONS



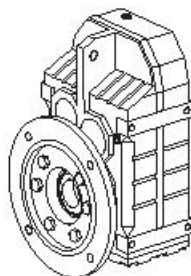
F..



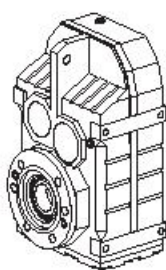
FA..B/FV..B



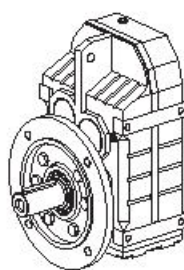
FA../FV..



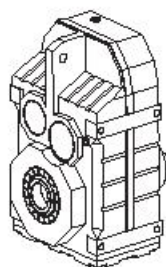
FAK../FVF..



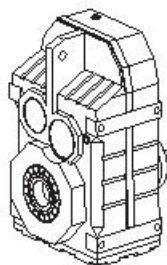
FAZ../FVE..



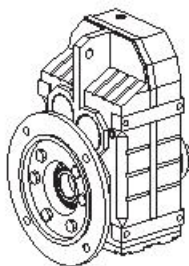
FF..



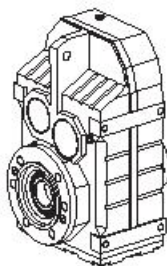
FH..B



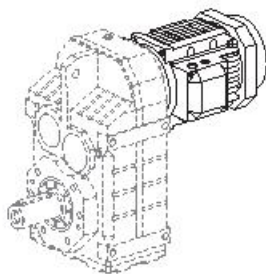
FH..



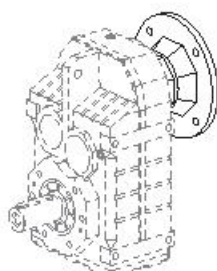
FHE..



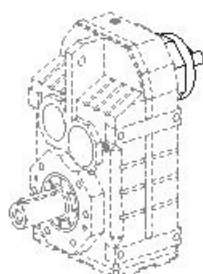
FHZ..



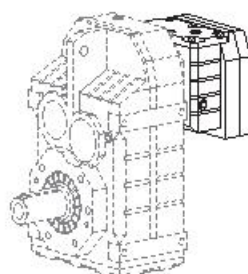
F..Y..



F..AM..

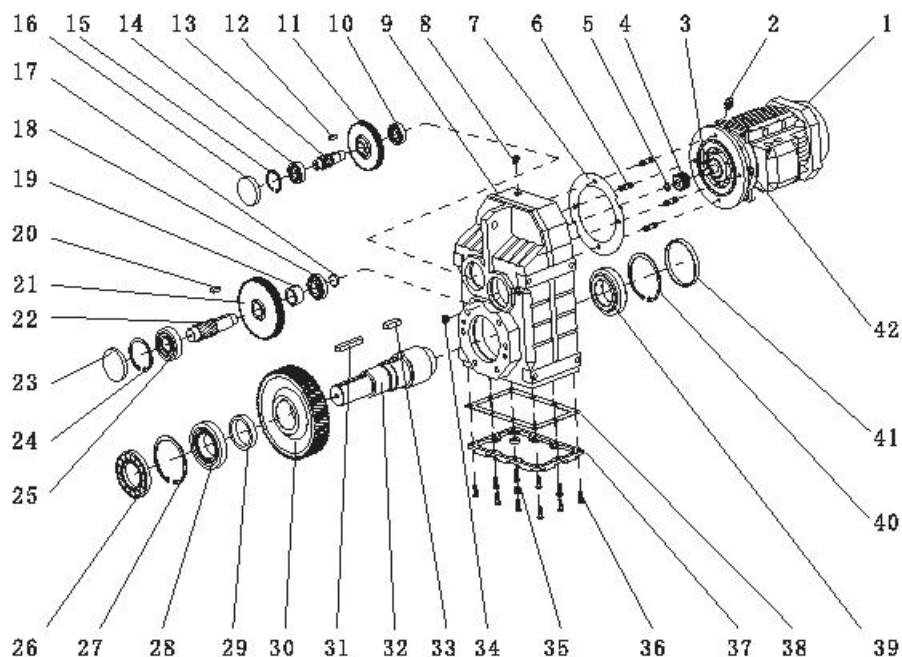


F..AD..



F..RF..

3. 部件分解图 / SPARE PARTS LIST



1 电机/motor

2 透气阀/breather valve

3 平键/flat key

4 齿轮/gear

5 轴用挡圈/retaining rings for shafts

6 双头螺栓/stud

7 纸垫/gasket

8 油塞/oil level plug

- | | |
|-----------------------------------|-----------------------------------|
| 9 箱体/housing | 26 骨架油封/skeleton oil seal |
| 10 轴承/bearing | 27 孔用挡圈/retaining rings for bores |
| 11 齿轮/gear | 28 轴承/bearing |
| 12 平键/flat key | 29 轴套/spacer tube |
| 13 齿轮轴/gear shaft | 30 齿轮/gear |
| 14 轴承/bearing | 31 平键/flat key |
| 15 孔用挡圈/retaining rings for bores | 32 输出轴/output shaft |
| 16 平面油封/plane seal | 33 平键/flat key |
| 17 平面油封/plane seal | 34 油塞/oil level plug |
| 18 轴承/bearing | 35 油塞/oil level plug |
| 19 轴套/spacer tube | 36 外六角螺钉/six angle screw |
| 20 平键/flat key | 37 盖板/cover plate |
| 21 齿轮/gear | 38 纸垫/gasket |
| 22 齿轮轴/gear shaft | 39 轴承/bearing |
| 23 平面油封/plane seal | 40 孔用挡圈/retaining rings for bores |
| 24 孔用挡圈/retaining rings for bores | 41 平面油封/plane seal |
| 25 轴承/bearing | 42 六角螺母/hexagon nut |

4. 安全说明/SAFETY INSTRUCTIONS

- 4.1 遵守使用说明书中的规定是实
现产品的正常工作和履行产品
质量保证要求的必要条件，请
在涉及减速机的任何工作之前
认真阅读使用说明书。如有不
清楚之处或欲了解更多信息，
请联系本公司。
- 4.2 所有与运输、贮存、安装、调
试、操作、维护和修理有关工
作，只能由具备资质的专业人
员根据有关规定进行。
- 4.1 Adhering to the product specifica-
tion is a prerequisite for faultfree
operation and the fulfillment of any
right to claim under warranty.
Please read the product specifica-
tion before you start working with
the unit. Please contact us if you
have any questions or if you require
further information.
- 4.2 All work related to transportation,
storage, setup/mounting, connec-
tion, startup, maintenance and
repair can only be carried out by
qualified professionals.

4.3 下列情况可能导致严重的人员伤害和财产损失:

- ① 违规使用设备;
- ② 错误安装和操作设备
- ③ 违规拆除和未安装必要的防护盖板和外罩。

4.3 The following condition may result in severe injuries to persons or damage to property.

- ① Improper use.
- ② Incorrect installation or operation.
- ③ Removing covers without authorization.

5. 运输及储存/TRANSPORTATION AND STORAGE

5.1 运输/Transportation

① 收到货后请立即检查有无运输损坏。如有损坏请立即通知运输公司,并不得对设备进行调试运行。

② 拧紧运输吊环,由于吊环的设计负载仅针对减速机的重量,因此不得额外增加负载。

③ 已安装好的吊环螺栓符合 ISO3266/GB825-88 的规定,原则上要遵守标准中所著名的负载和规定。如果减速机上装有两个吊环,则运输时必须用两个吊环同时进行吊装。

④ 吊装件的拉力方向不得超过 45 度斜角。

⑤ 必要情况下,应使用相应的有足够承载力的运输工具,调试前拆除所有运输紧固件。

① Inspect the shipment immediately upon receipt for any damage that may have occurred during transportation. Inform the shipping company immediately if there is any damage. It is necessary to preclude startup.

② Tighten installed eyebolts. They are only intended for the weight of the motor / gear motor, do not attach any additional loads.

③ The built-in lifting eyebolts comply with ISO3266/GB825-88. Always observe the loads and regulations listed in this standard. If the gear motor is equipped with two suspension eye lugs or lifting eyebolts, both of the suspension eye lugs should be used for transportation.

④ The tension force vector of the slings must not exceed a 45° angle.

⑤ Use suitable, sufficiently rated handling equipment if necessary. Remove any transportation fixtures prior to startup.

5.2 贮存/Storage

- ① 包装于箱内，里面放上薄膜包的干燥剂。
- ② 存放地点带顶棚，防雨雪，无振动。
- ③ 定期检查包装，在检查时应检查表面清洁度和机械损伤，检查防锈层是否完好。
- ① Packed in containers, with desiccant sealed in the plastic wrap.
- ② Underroof, protected against rain and snow; no shock loads
- ③ 2 years or more with regular inspections check for cleanliness and mechanical damage during inspection. Check corrosion protection.

6. 安装及运行/INSTALLATION AND OPERATION

6.1 安装准备/Prerequisites for assembly

- ① 安装前应检查电源是否与减速机铭牌上的要求相符。
- ② 检查驱动装置在运输或者仓储过程中是否遭受损坏。
- ③ 工作环境应无油、酸、碱、有害气体、蒸汽、放射性物质等。环境温度为 $-10^{\circ}\text{C} \sim +50^{\circ}\text{C}$ (0°C 以下启动时润滑油需加热到 0°C 以上，或采用防冻润滑油)，应有防雨、防晒、防风沙设施或措施。
- ④ 在潮湿的使用环境时，应要求提供具有防腐能力的产品。
- ⑤ 请使用常用的溶剂彻底清除输出轴和法兰上的防锈剂、污垢或类似污染，但不得让溶剂进入到骨架油封的密封唇上，否则会损坏油封。
- ① The entries on the name plate of the gear motor match the voltage supply system.
- ② The drive has not been damaged during transportation or storage.
- ③ No harmful oils, acids, gases, vapors, radiation etc. in the vicinity. Ambient temperature is $-40^{\circ}\text{C} \sim +50^{\circ}\text{C}$. (If the ambient temperature is below 0°C , heat the lubricant higher than 0°C or use antifreeze lubricant). Rain, sun, sand prevention facilities or measures.
- ④ In humid ambient conditions, provide anticorrosive product.
- ⑤ You must clean the out put shafts and flange surfaces thoroughly to ensure they are free of anticorrosion agents, contamination or similar. Use a commercially available solvent. Do not expose the sealing lips of the oil seals to the solvent damage to the material.

6.2 减速机的安装基础应为强度、刚度可靠，减震，抗扭的底座、台架等支撑结构。基础必须干燥，且不得有油脂。

6.3 底脚和法兰安装时，允许的最大平面度误差为：

减速机规格 ≤67 最大0.4mm

减速机规格 77~107 最大0.5mm

减速机规格 137~147 最大0.7mm

减速机规格 157 最大0.8mm

6.4 箱体底脚和法兰安装时不能同时拧紧以免相互较劲。

6.5 基础安装螺栓的最低性能应为 8.8 级。

6.6 安装时请检查注油量与安装位置是否相符，润滑油加注量详见润滑油量表。

6.7 当更换安装位置时，润滑油的加注量和透气阀的位置需做相应的调整。

6.8 减速机的透气

为避免减速机运行时产生内部压力，造成漏油等故障。本公司发货时提供的减速器上使用螺纹塞代替透气阀，置于一个塑料袋内。

① 请在减速器启动前拆下透气阀的运输保险（橡胶圈）

6.2 The support structure must have the following characteristics, level, vibration dumping, torsionally rigid, dry, no oil.

6.3 The maximum permitted flatness error for foot and flange mounting.

Gear Unit Size ≤67 Max:0.4mm

Gear Unit Size 77~107 Max:0.5mm

Gear Unit Size 137~147 Max:0.7mm

Gear Unit Size 157 Max:0.8mm

6.4 Do not tighten the housing legs and mounting flanges against one another.

6.5 Secure gear motors using quality 8.8 screw.

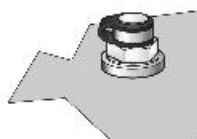
6.6 When installing gear unit, check that the oil fill corresponds to the specifications for the intended mounting position (see section "lubricant fill quantities")

6.7 If you change the mounting position, make sure that you change the lubricant fill quantities and the position of the breather valve accordingly.

6.8 Breather

We supply the gear units with a screw plug on the vent hole. We will supply a breather valve in a plastic bag.

① Please remove the transport fixture from the breath valve before starting up the gear unit.



带运输保险（橡胶圈）的透气阀
Breather valve with transport fixture (rubber ring)



拆下运输保险（橡胶圈）
Removing the transport fixture (rubber ring)



已经开启的透气阀
Activated breather valve

- ② 在给减速器进行全面或者局部喷漆前，请用防护套保护好透气阀和油封，喷完漆后拆除防护套。

- ② Breath valves and oil seals may be damaged during painting or repainting. Please thoroughly cover the breather valves and the sealing lip of the oil seals with strips prior to painting and remove the strips after painting.

6.9 机械安装/Mechanical Installation

① 实心轴减速器

装配不当，可能对轴承、箱体或轴造成损伤，可能造成财产损失：

- A 利用轴端上现有的螺纹并采用装配工具对中孔进行定位装配输入和输出部件；
- B 禁止用锤击的方式将皮带轮、离合器、小齿轮等装入轴端部，这样会损坏轴承、外壳和轴；
- C 安装皮带轮时皮带的正确张力要根据制造商的规定；
- D 装配好的传动件应当进行动平衡，并不允许出现非许可的径向或轴向受力。
- E 给输出部件加润滑油或加热到（80~100℃）会有助于装配。

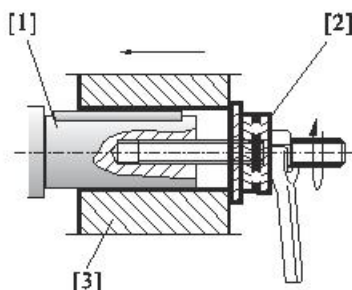
① Gear units with solid shaft

Bearing, housing or shaft may be damaged due to improper assembly. Possible damage to property:

- A Only assemble the input and output components with a mounting device. Use the centre hole and the thread on the shaft end of positioning.
- B Never force belt pulleys, couplings, pinions etc. onto the shaft end by hitting them with a hammer.
- C In the case of belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.
- D Power transmission elements should be balanced after fitting and must not give rise to any impermissible radial or axial forces.
- E Mounting is easier if you first apply lubricant to the output element or heat it up briefly (to 80~100°C).

下图示意了采用装配夹具将联轴器或轴套安装到减速器或电机的轴端上的操作在某些情况下，装配工具中的推力轴承可以省略。

The following figure shows a mounting device for installin couplings or hubs on gear unit or motor shaft ends. Should you be able to tighten the screw without any problems, you may not need the thrust bearing on the mounting device.



[1] 减速器轴端部

[1] gear shaft end

[2] 推力轴承

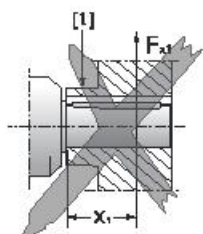
[2] thrust bearing

[3] 输出传动件

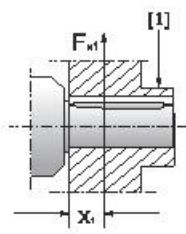
[3] coupling hub

为了避免高径向力，请按照图B装配齿轮或链轮。

Avoid high overhung loads by installing the gear or chain sprocket according to figure B if possible.



[A]



[B]

[1] 轮毂

[1] hub

[A] 不正确

[A] unfavorable

[B] 正确

[B] correct

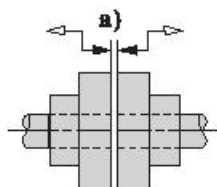
对于皮带轮、联轴器之类的传动和输出部件，应当有防接触的保护！

Input and output components such as belt pulleys, coupling etc.

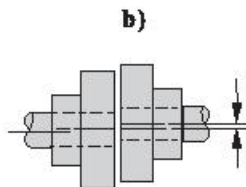
Should be covered with a touch guard.

② 联轴器的安装

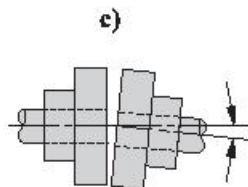
联轴器装配时要根据联轴器制造商的规定进行下列平衡校正。



a) 最大以及最小间距



b) 轴向偏移



c) 角偏移

② Mounting of couplings

Adjust the following misalignments according to the coupling manufacturer's specification when mounting couplings.

a) Maximum and minimum clearance.

b) Axial offset.

c) Angular offset.

7. 润滑 / LUBRICATION

7.1 润滑油类型 / Types of Lubrication

	环境温度(℃) Ambient Temperature(℃)	ISO粘度 ISO Viscosity Class	 SHELL	Mobil MOBIL	 BP	润滑油类型 Lubrication Type
F	-40 ~ +10	VG 220	Shell Omala 200	Mobilgear 630	BP Energol GR-EP 220	矿物油 Mineral Oil
	-20 ~ +25	VG 150 VG 100	Shell Omala 100	Mobilgear 627	BP Energol GR-EP 100	
	-30 ~ +10	VG 68-46 VG 32	Shell Tellus 32	Mobil D.T.E 13M		
	-40 ~ -20	VG 22 VG 15	Shell Tellus 32	Mobil D.T.E 11M	BP Energol HLP-HM 15	
	-40 ~ +80	VG 220	Shell Tellus 32	Mobil SHC 630		合成油 Synthetic Oil
	-40 ~ +10	VG 32		Mobil SHC 624		

7.2 润滑油量表 / Lubricant Fill Quantity

规定的加注量为参考值。精确值的变化与级数和传动比有关。请您在加注润滑油时一定要注意油位螺栓所指示的精确油量。后期调整安装方式时，您必须根据改变后的安装方式相应调整加注润滑剂。下表中列出了安装方式 M1-M6 的减速器相应的标准参考润滑油注入量值。

The specified fill quantities are recommended values. The precise value varies depending on the number of stages and gear ratio. When filling, it is essential to check the oil level plug since it indicates the precise oil capacity. The following tables show guide values For lubricant fill quantities in relation to the mounting position M1 - M6.

F..FA..R.FH..B.FV..B

减速器型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.70	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.60	3.50	2.10	3.50	2.80	2.90
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.90	7.30	4.30	8.00	6.00	6.30
F..87	10.8	13.0	7.70	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	40.5	55.0	34.0	61.0	46.5	47.0
F..157	69.0	104	63.0	105	86.0	78.0

FF..

减速器型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1	M2	M3	M4	M5	M6
FF27	0.60	0.80	0.70	0.70	0.60	0.60
FF37	1.00	1.25	0.70	1.30	1.00	1.10
FF47	1.60	1.85	1.10	1.90	1.50	1.70
FF57	2.80	3.50	2.10	3.70	2.90	3.00
FF67	2.70	3.80	1.90	3.80	2.90	3.20
FF77	5.90	7.30	4.30	8.10	6.00	6.30
FF87	10.8	13.2	7.80	14.1	11.0	11.2
FF97	19.0	22.5	12.6	25.5	18.9	20.5
FF107	25.5	32.0	19.5	38.5	27.5	28.0
FF127	41.5	56.0	34.0	63.0	46.5	49.0
FF157	72.0	105	64.0	106	87.0	79.0

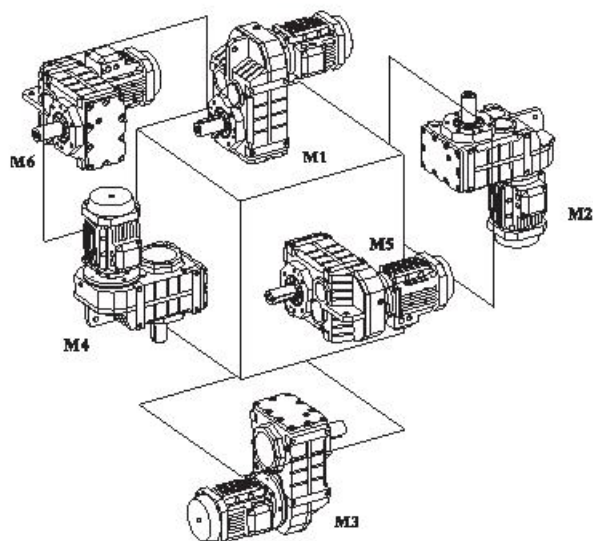
FA..FH..FV..FAF..FHF..FVF..FAZ..FHZ..FVZ..

减速器型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.70	3.50	2.10	3.40	2.90	3.00
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.90	7.30	4.30	8.00	6.00	6.30
F..87	10.8	13.0	7.70	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	39.0	54.5	34.0	61.0	45.0	46.5
F..157	68.0	103	62.0	104	85.0	79.5

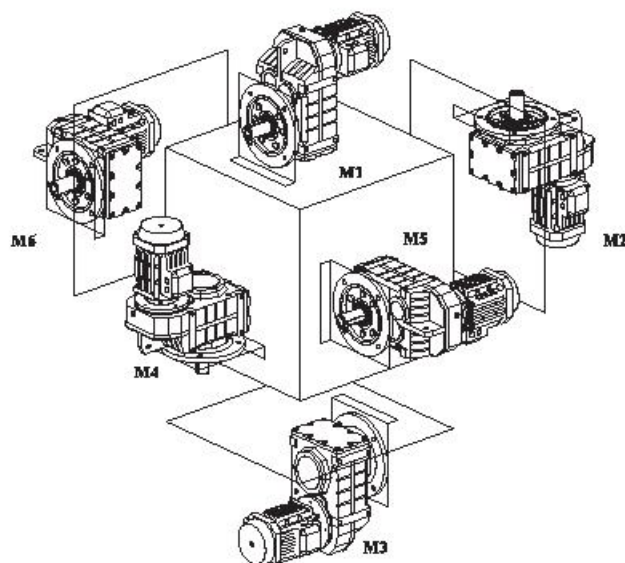
① The larger gear unit of multi-stage gear units must be filled with the larger oil volume

8. 安装方位图/MOUNTING POSITION DESIGNATION

F..安装位置示意图 / F.. Mounting Position Designation



FF..安装位置示意图 / FF.. Mounting Position Designation



1. 产品说明 / PRODUCT DESCRIPTION

1.1 性能特点 / Performance Characteristics

- | | |
|--|---|
| <ul style="list-style-type: none"> ① 采用了系列化、模块化的设计，传动比覆盖范围广、分级精细； ② 传动效率高，耗能低、性能优越； ③ 齿轮经高精度磨齿机磨削加工，传动平稳、噪音低，承载能力大、寿命长； ④ 设计精巧：体积小，安装简便，用途广泛； ⑤ 安装方式多样，适合全方位的万能安装配置； ⑥ 可实现 R 系列与 RF 系列减速器的联体组合，适用于特殊低速的应用。 | <ul style="list-style-type: none"> ① Systematic and modular design; Transmission ratio with fine stage covers a wide range. ② High efficiency; Low energy consumption; Superior performance. ③ High Precision gear with teeth grinding; Stable transmission; Low noise; Strong bearing capacity; Long Service life. ④ Deft design: Small volume; Simple Installation; Wide usage. ⑤ Suitable for all kinds of mounting positions. ⑥ R.. and RF.. conjoined combination for special low speed. |
|--|---|

1.2 主要材料 / Material

- | | |
|--|--|
| <ul style="list-style-type: none"> ① 箱体：HT250 高强度铸铁。射型内腔，有效减少零件磨损； ② 齿轮：20CrMnTi 优质合金钢，碳氮共渗处理（精磨后保持齿面硬度 HRC60）； ③ 平键：45 钢，表面硬度 HB230-270。 | <ul style="list-style-type: none"> ① Housing: High strength cast iron HT250, die casting lumen, reduce the abrasion of parts. ② Gears: 20 CrMnTi, Carbonitriding, Teeth hardness: HRC 60 after grinding. ③ Flat keys: C45, Surface hardness: HB230-270. |
|--|--|

1.3 减速器效率 / Gear Unit Efficiency

- | | |
|---|---|
| <ul style="list-style-type: none"> ① 由于采用了高精度齿轮、油封、轴承，有效降低了摩擦，齿轮传动的级间效率可达 97%； | <ul style="list-style-type: none"> ① High precision gear; seals; bearings; Effectively reduces friction; Stage efficiency of gear drive reaches 97%. |
|---|---|

- ② 在某些安装方式时，输入级齿轮完全浸在润滑油中，对于大机座号和高输入转速的情况，须考虑搅油损失。

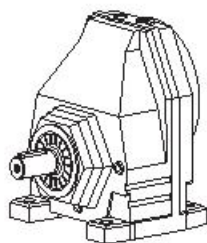
- ② For some ways of mounting, the input gear is completely immersed in the lubricant, please consider the churning loss when it comes to big frame size and high input speed.

1.4 使用条件/Working Condition

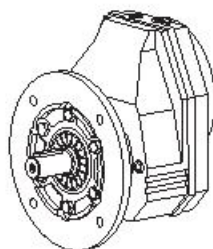
- ① 环境温度 $-40\sim 50^{\circ}\text{C}$ (0°C 以下启动时润滑油需加热到 0°C 以上或采用防冻润滑油)；
② 输入转速不大于2800转/分；
③ 可用于正反转；
④ 无行业限制；

- ① Ambient temperature $-40\sim 50^{\circ}\text{C}$ (if lower than 0°C , need to heat the lubrication higher than 0°C or use anti freezing lubricant).
② Input rotation speed $\leq 2800\text{r/min}$.
③ Both Rotation Direction.
④ No industry limit.

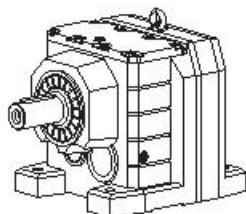
2. 机型版本 / VERSIONS



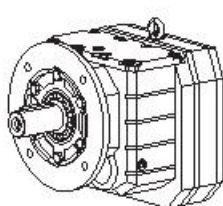
RX..



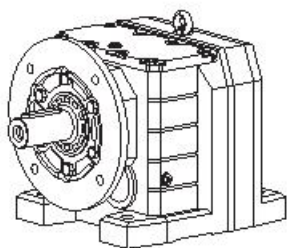
RXF..



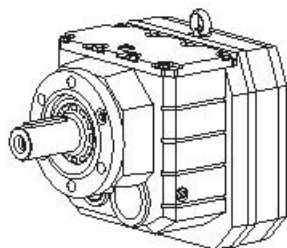
R..



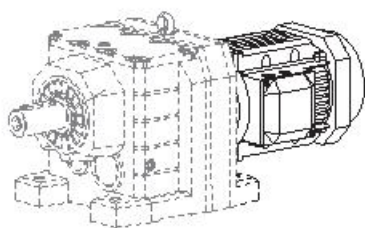
RF..



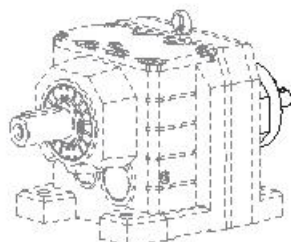
R..F



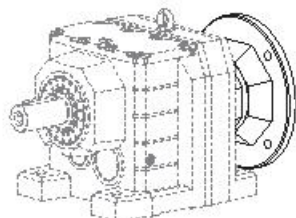
RZ..



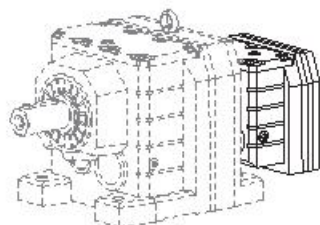
R..Y..



R..AD..



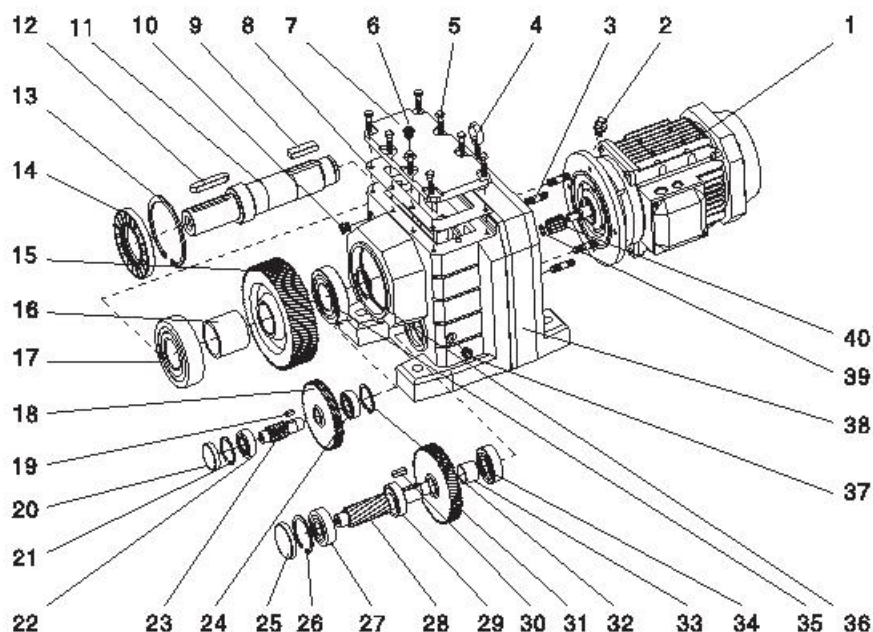
R..AM..



R..RF..

R

3. 部件分解图 / SPARE PARTS LIST



1 电机/motor

2 透气阀/breather valve

3 双头螺栓/stud

4 吊环/lifting eye bolt

5 外六角螺钉/six angle screw

6 油塞/oil level plug

7 盖板/cover plate

8 纸垫/gasket

9 平键/flat key

10 油塞/oil level plug

11 输出轴/output shaft

12 平键/flat key

13 孔用挡圈/retaining rings for bores

14 骨架油封/skeleton oil seal

- | | |
|-----------------------------------|-----------------------------------|
| 15 齿轮/gear | 28 齿轮轴/gear shaft |
| 16 轴套/spacer tube | 29 轴承/bearing |
| 17 轴承/bearing | 30 平键/flat key |
| 18 齿轮/gear | 31 齿轮/gear |
| 19 平键/flat key | 32 孔用挡圈/retaining rings for bores |
| 20 平面油封/plane seal | 33 轴套/spacer tube |
| 21 孔用挡圈/retaining rings for bores | 34 轴承/bearing |
| 22 轴承/bearing | 35 轴承/bearing |
| 23 齿轮轴/gear shaft | 36 孔用挡圈/retaining rings for bores |
| 24 轴承/bearing | 37 油塞/oil level plug |
| 25 平面油封/plane seal | 38 箱体/housing |
| 26 孔用挡圈/retaining rings for bores | 39 轴用挡圈/retaining rings for shaft |
| 27 轴承/bearing | 40 齿轮/gear |

4. 安全说明/SAFETY INSTRUCTIONS

- 4.1 遵守使用说明书中的规定是实现产品的正常工作和履行产品质量保证要求的必要条件，请在涉及减速机的任何工作之前认真阅读使用说明书。如有不清楚之处或欲了解更多信息，请联系本公司。
- 4.2 所有与运输、贮存、安装、调试、操作、维护和修理有关工作，只能由具备资质的专业人员根据有关规定进行。

- 4.1 Adhering to the product specification is a prerequisite for faultfree operation and the fulfillment of any right to claim under warranty. Please read the product specification before you start working with the unit. Please contact us if you have any questions or if you require further information.
- 4.2 All work related to transportation, storage, setup/mounting, connection, startup, maintenance and repair can only be carried out by qualified professionals.

4.3 下列情况可能导致严重的人员伤害和财产损失:

- ① 违规使用设备;
- ② 错误安装和操作设备;
- ③ 违规拆除和未安装必要的防护盖板和外罩。

4.3 The following condition may result in severe injuries to persons or damage to property.

- ① Improper use.
- ② Incorrect installation or operation.
- ③ Removing covers without authorization.

5. 运输及储存/TRANSPORTATION AND STORAGE

5.1 运输/Transportation

- ① 收到货后请立即检查有无运输损坏。如有损坏请立即通知运输公司, 并不得对设备进行调试运行。
- ② 拧紧运输吊环, 由于吊环的设计负载仅针对减速机的重量, 因此不得额外增加负载。
- ③ 已安装好的吊环螺栓符合 ISO3266/GB825-88 的规定, 原则上要遵守标准中所著名的负荷和规定。如果减速机上装有两个吊环, 则运输时必须用两个吊环同时进行吊装。
- ④ 吊装件的拉力方向不得超过 45 度斜角。
- ⑤ 必要情况下, 应使用相应的有足够承载力的运输工具, 调试前拆除所有运输紧固件。

- ① Inspect the shipment immediately upon receipt for any damage that may have occurred during transportation. Inform the shipping company immediately if there is any damage. It is necessary to preclude startup.
- ② Tighten installed eyebolts. They are only intended for the weight of the motor / gear motor, do not attach any additional loads.
- ③ The built-in lifting eyebolts comply with ISO3266/GB825-88. Always observe the loads and regulations listed in this standard. If the gear motor is equipped with two suspension eye lugs or lifting eyebolts, both of the suspension eye lugs should be used for transportation.
- ④ The tension forcerector of the slings must not exceed a 45° angle.
- ⑤ Use suitable, sufficiently rated handling equipment if necessary. Remove any transportation fixtures prior to startup.

5.2 贮存/Storage

- ① 包装于箱内，里面放上薄膜包的干燥剂。
- ② 存放地点带顶棚，防雨雪，无振动。
- ③ 定期检查包装，在检查时应检查表面清洁度和机械损伤，检查防锈层是否完好。
- ① Packed in containers, with desiccant sealed in the plastic wrap.
- ② Underroof, protected against rain and snow; no shock loads.
- ③ 2 years or more with regular inspections check for cleanliness and mechanical damage during inspection. Check corrosion protection.

6. 安装及运行/INSTALLATION AND OPERATION

6.1 安装准备/Prerequisites for assembly

- ① 安装前应检查电源是否与减速机铭牌上的要求相符。
- ② 检查驱动装置在运输或者仓储过程中是否遭受损坏。
- ③ 工作环境应无油、酸、碱、有害气体、蒸汽、放射性物质等。环境温度为 $-40^{\circ}\text{C} \sim +50^{\circ}\text{C}$ (0°C 以下启动时润滑油需加热到 0°C 以上，或采用防冻润滑油)，应有防雨、防晒、防风沙设施或措施。
- ④ 在潮湿的使用环境时，应要求提供具有防腐能力的产品。
- ⑤ 请使用常用的溶剂彻底清除输出轴和法兰上的防锈剂、污垢或类似污染，但不得让溶剂进入到骨架油封的密封唇上，否则会损坏油封。
- ① The entries on the name plate of the gear motor match the voltage supply system.
- ② The drive has not been damaged during transportation or storage.
- ③ No harmful oils, acids, gases, vapors, radiation etc. in the vicinity. Ambient temperature is $-40^{\circ}\text{C} \sim +50^{\circ}\text{C}$. (If the ambient temperature is below 0°C , heat the lubricant higher than 0°C or use antifreeze lubricant). Rain, sun, sand prevention facilities or measures.
- ④ In humid ambient conditions, provide anticorrosive product.
- ⑤ You must clean the out put shafts and flange surfaces thoroughly to ensure they are free of anticorrosion agents, contamination or similar. Use a commercially available solvent. Do not expose the sealing lips of the oil seals to the solvent damage to the material.

6.2 减速机的安装基础应为强度、刚度可靠，减震，抗扭的底座、台架等支撑结构。基础必须干燥，且不得有油脂。

6.3 底脚和法兰安装时，允许的最大平面度误差为：

减速机规格≤67 最大0.4mm

减速机规格77~107 最大0.5mm

减速机规格137~147 最大0.7mm

减速机规格157~187 最大0.8mm

6.4 箱体底脚和法兰安装时不能同时拧紧以免相互较劲。

6.5 基础安装螺栓的最低性能应为8.8级。

6.6 安装时请检查注油量与安装位置是否相符，润滑油加注量详见润滑油量表。

6.7 当更换安装位置时，润滑油的加注量和透气阀的位置需做相应的调整。

6.8 减速机的透气

为避免减速机运行时产生内部压力，造成漏油等故障。本公司发货时提供的减速器上使用螺纹塞代替透气阀，置于一个塑料袋内。

① 请在减速器启动前拆下透气阀的运输保险（橡胶圈）

6.2 The support structure must have the following characteristics, level, vibration dumping, torsionally rigid, dry, no oil.

6.3 The maximum permitted flatness error for foot and flange mounting.

Gear Unit Size ≤67 Max: 0.4mm

Gear Unit Size 77~107 Max: 0.5mm

Gear Unit Size 137~147 Max: 0.7mm

Gear Unit Size 157~187 Max: 0.8mm

6.4 Do not tighten the housing legs and mounting flanges against one another.

6.5 Secure gear motors using quality 8.8 screw.

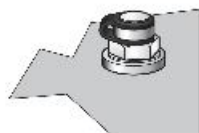
6.6 When installing gear unit, check that the oil fill corresponds to the specifications for the intended mounting position (see section "lubricant fill quantities") .

6.7 If you change the mounting position, make sure that you change the lubricant fill quantities and the position of the breather valve accordingly.

6.8 Breather

We supply the gear units with a screw plug on the vent hole. We will supply a breather valve in a plastic bag.

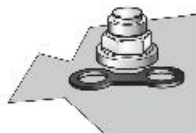
① Please remove the transport fixture from the breath valve before starting up the gear unit.



带运输保险（橡胶圈）的透气阀
Breather valve with transport fixture (rubber ring)



拆下运输保险（橡胶圈）
Removing the transport fixture (rubber ring)



已经开启的透气阀
Activated breather valve

② 在给减速机进行全面或者局部喷漆前，请用防护套保护好透气阀和油封，喷完漆后拆除防护套。

② Breath valves and oil seals may be damaged during painting or repainting. Please thoroughly cover the breather valves and the sealing lip of the oil seals with strips prior to painting and remove the strips after painting.

6.9 机械安装/Mechanical Installation

① 实心轴减速机

装配不当，可能对轴承、箱体或轴造成损伤，可能造成财产损失：

- A 利用轴端上现有的螺纹并采用装配工具对中孔进行定位装配输入和输出部件；
- B 禁止用锤击的方式将皮带轮、离合器、小齿轮等装入轴端部，这样会损坏轴承、外壳和轴；
- C 安装皮带轮时皮带的正确张力要根据制造商的规定；
- D 装配好的传动件应当进行动平衡，并不允许出现非许可的径向或轴向受力；
- E 给输出部件加润滑剂或加热到（80~100℃）会有助于装配。

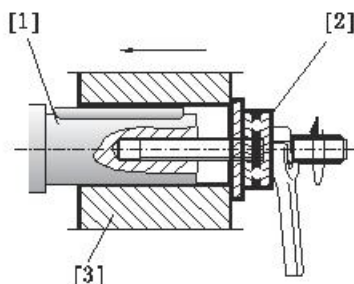
① Gear units with solid shaft

Bearing, housing or shaft may be damaged due to improper assembly. Possible damage to property:

- A Only assemble the input and output components with a mounting device. Use the centre hole and the thread on the shaft end of positioning.
- B Never force belt pulleys, couplings, pinions etc. onto the shaft end by hitting them with a hammer.
- C In the case of belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.
- D Power transmission elements should be balanced after fitting and must not give rise to any impermissible radial or axial forces.
- E Mounting is easier if you first apply lubricant to the output element or heat it up briefly (to 80~100℃).

下图示意了采用装配夹具将联轴器或轴套安装到减速器或电机的轴端上的操作在某些情况下，装配工具中的推力轴承可以省略。

The following figure shows a mounting device for installin couplings or hubs on gear unit or motor shaft ends. Should you be able to tighten the screw without any problems, you may not need the thrust bearing on the mounting device.



[1] 减速器轴端部

[1] gear shaft end

[2] 推力轴承

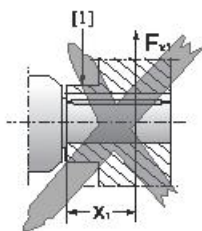
[2] thrust bearing

[3] 输出传动件

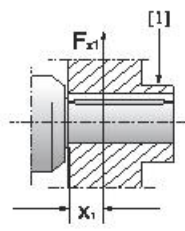
[3] coupling hub

为了避免高径向力，请按照图B装配齿轮或链轮。

Avoid high overhung loads by installing the gear or chain sprocket according to figure B if possible.



[A]



[B]

[1] 轮毂

[1] hub

[A] 不正确

[A] unfavorable

[B] 正确

[B] correct

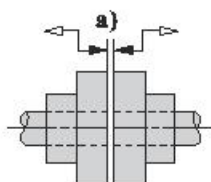
对于皮带轮、联轴器之类的传动和输出部件，应当有防接触的保护！

Input and output components such as belt pulleys, coupling etc.

Should be covered with a touch guard.

② 联轴器的安装

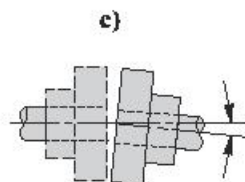
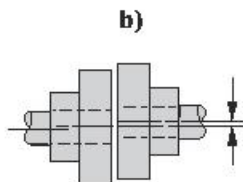
联轴器装配时要根据联轴器制造商的规定进行下列平衡校正。



a) 最大以及最小间距

b) 轴向偏移

c) 角偏移



② Mounting of couplings

Adjust the following misalignments according to the coupling manufacturer's specification when mounting couplings.

a) Maximum and minimum clearance.

b) Axial offset.

c) Angular offset.

③ 空心轴减速器的扭力臂

A 安装时扭力臂不能过紧。

B 固定扭力臂时应采用强度为8.8级的螺栓。

3) Torque arms for shaft-mounted gear unit.

A Do not place torque arms under strain during installation.

B Use bolts of quality 8.8 to fasten torque arms.

7. 润滑 / LUBRICANT

7.1 润滑油类型 / Types of Lubricant

	环境温度(℃) Ambient Temperature(℃)	ISO粘度 ISO Viscosity Class	 SHELL	Mobil MOBIL	 BP	润滑油类型 Lubrication Type
R	-40~+10	VG 220	Shell Omala 200	Mobilgear 630	BP Energol GRP-XP 220	矿物油 Mineral Oil
	-20~+25	VG 150 VG 100	Shell Omala 100	Mobilgear 627	BP Energol GRP-XP 100	
	-30~+10	VG 68-46 VG 32	Shell Tellus 32	Mobil D.T.E 13M		
	-40~-20	VG 22 VG 15	Shell Tellus 32	Mobil D.T.E 11M	BP Energol HLP-HM 15	
	-40~+80	VG 220	Shell Tellus 32	Mobil SHC 630		合成油 Synthetic Oil
	-40~+10	VG 32		Mobil SHC 624		

7.2 润滑油量表 / Lubricant Fill Quantity

规定的加注量为参考值。精确值的变化与级数和传动比有关。请您在加注润滑油时一定要注意油位螺栓所指示的精确油量。后期调整安装方式时，您必须根据改变后的安装方式相应调整加注润滑剂。下表列出了安装方式 M1-M6 的减速机相应的标准参考润滑油注入量值。

The specified fill quantities are recommended values. The precise value varies depending on the number of stages and gear ratio. When filling, it is essential to check the oil level plug since it indicates the precise oil capacity. The following tables show guide values For lubricant fill quantities in relation to the mounting position M1 - M6.

RX..

减速机型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1	M2	M3	M4	M5	M6
RX57	0.60	0.80	1.30	1.30	0.90	0.90
RX67	0.80	0.80	1.70	1.90	1.10	1.10
RX77	1.10	1.50	2.60	2.70	1.60	1.60
RX87	1.70	2.50	4.80	4.80	2.90	2.90
RX97	2.10	3.40	7.40	7.00	4.80	4.80
RX107	3.90	5.60	11.6	11.9	7.70	7.70

RXF..

减速机型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1	M2	M3	M4	M5	M6
RXF57	0.50	0.80	1.10	1.10	0.70	0.70
RXF67	0.70	0.80	1.50	1.40	1.00	1.00
RXF77	0.90	1.30	2.40	2.00	1.60	1.60
RXF87	1.60	1.95	4.90	3.95	2.90	2.90
RXF97	2.10	3.70	7.10	6.30	4.80	4.80
RXF107	3.10	5.70	11.2	9.30	7.20	7.20

R./R.F

减速器型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1①	M2②	M3	M4	M5	M6
R07	0.12	0.20	0.20	0.20	0.20	0.20
R17	0.25	0.25	0.35	0.55	0.35	0.40
R17	0.25/0.40	0.70	0.50	0.70	0.50	0.50
R37	0.30/0.95	0.85	0.95	1.05	0.75	0.95
R47	0.70/1.50	1.60	1.50	1.65	1.50	1.50
R57	0.80/1.70	1.90	1.70	2.10	1.70	1.70
R67	1.10/2.30	2.40/3.20	2.80	2.90	1.80	2.00
R77	1.20/3.00	3.30/4.20	3.60	3.80	2.50	3.40
R87	2.30/6.00	6.40/8.10	7.20	7.20	6.30	6.50
R97	4.60/9.80	11.7/14.0	11.7	13.4	11.3	11.7
R107	8.00/13.7	16.3	16.9	19.2	13.2	15.9
R137	10.0/25.0	28.0	29.5	31.5	25.0	26.0
R147	15.4/40.0	46.5	48.0	52.0	39.5	41.0
R167	27.0/70.0	82.0	78.0	88.0	66.0	69.0

① The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

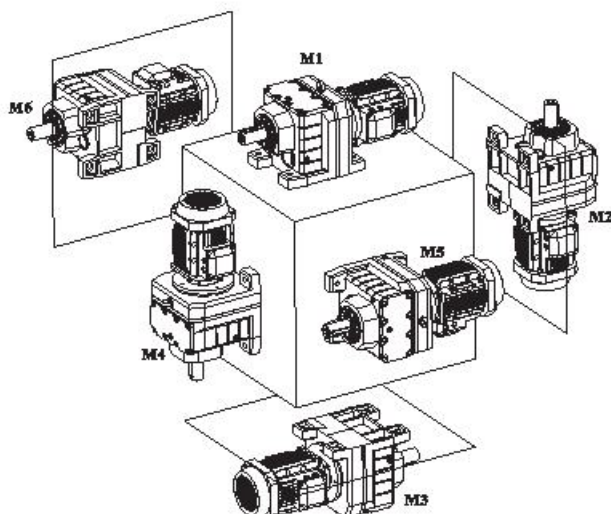
R.F.

减速器型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1①	M2②	M3	M4	M5	M6
RF07	0.12	0.20	0.20	0.20	0.20	0.20
RF17	0.25	0.55	0.35	0.55	0.35	0.40
RF27	0.25/0.40	0.70	0.50	0.70	0.50	0.50
RF37	0.35/0.95	0.90	0.95	1.05	0.75	0.95
RF47	0.65/1.50	1.60	1.50	1.65	1.50	1.50
RF57	0.80/1.70	1.80	1.70	2.00	1.70	1.70
RF67	1.20/2.50	2.50/3.20	2.70	2.80	1.90	2.10
RF77	1.20/2.60	3.10/4.10	3.30	3.60	2.40	3.00
RF87	2.40/6.00	6.40/8.20	7.10	7.20	6.30	6.40
RF97	5.10/10.2	11.9/14.0	11.2	14.0	11.2	11.8
RF107	6.30/14.9	15.9	17.0	19.2	13.1	15.9
RF137	9.50/25.0	27.0	29.0	32.5	25.0	26.0
RF147	16.4/42.0	47.0	48.0	52.0	42.0	42.0
RF167	26.0/70.0	82.0	78.0	88.0	65.0	71.0

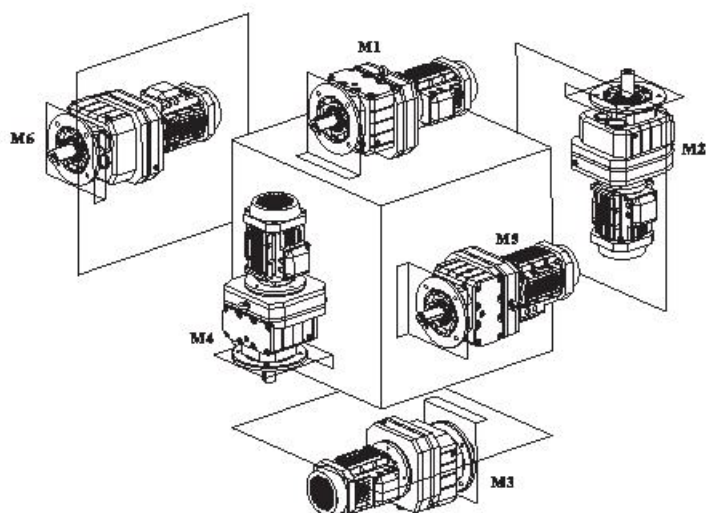
① The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

8. 安装方位图/MOUNTING POSITION DESIGNATION

R..安装位置示意图 / R..Mounting Position Designation



R F..安装位置示意图 / R F.. Mounting Position Designation



R

1. 产品说明 / PRODUCT DESCRIPTION

1.1 性能特点 / Performance Characteristics

- ① 采用了系列化、模块化的设计，传动比覆盖范围广、分级精细；
 - ② 传动效率高，耗能低、性能优越；
 - ③ 齿轮经高精度磨齿机磨削加工，传动平稳、噪音低，承载能力大、寿命长；
 - ④ 设计精巧：体积小，安装简便，用途广泛；
 - ⑤ 安装方式多样，适合全方位的万能安装配置；
 - ⑥ 可实现 S 系列与 RF 系列减速器的联体组合，适用于特殊低速的应用。
- ① Systematic and modular design; Transmission ratio with fine stage covers a wide range.
 - ② High efficiency; Low energy consumption; Superior performance.
 - ③ High Precision gear with teeth grinding; Stable transmission; Low noise; Strong bearing capacity; Long Service life.
 - ④ Deft design: Small volume; Simple Installation; Wide usage.
 - ⑤ Suitable for all kinds of mounting positions.
 - ⑥ S.. and RF.. conjoined combination for special low speed.

1.2 主要材料 / Material

- ① 箱体：HT250 高强度铸铁。射型内腔，有效减少零件磨损；
 - ② 齿轮：20CrMnTi 优质合金钢，碳氮共渗处理（精磨后保持齿面硬度 HRC60）；
 - ③ 平键：45 钢，表面硬度 HB230-270。
- ① Housing: High strength cast iron HT250, die casting lumen, reduce the abrasion of parts. .
 - ② Gears: 20 CrMnTi, Carbonitriding, Teeth hardness: HRC 60 after grinding.
 - ③ Flat keys: C45, Surface hardness: HB230 - 270 .

1.3 减速器效率 / Gear Unit Efficiency

- ① 由于采用了高精度齿轮、油封、轴承，有效降低了摩擦，齿轮传动的级间效率可达 97%；
- ① High precision gear; seals; bearings; Effectively reduces friction; Stage efficiency of gear drive reaches 97%.

- ② 在某些安装方式时，输入级齿轮完全浸在润滑油中，对于大机座号和高输入转速的情况，须考虑搅油损失。

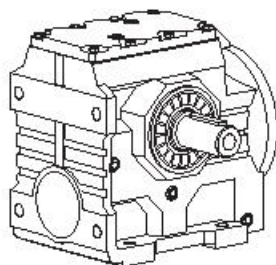
- ② For some ways of mounting, the input gear is completely immersed in the lubricant, please consider the churning loss when it comes to big frame size and high input speed.

1.4 使用条件/Working Condition

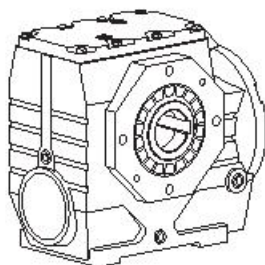
- ① 环境温度 $-40 \sim 50^{\circ}\text{C}$ (0°C 以下启动时润滑油需加热到 0°C 以上或采用防冻润滑油)；
 ② 输入转速不大于 2800 转/分；
 ③ 可用于正反转；
 ④ 无行业限制；

- ① Ambient temperature $-40 \sim 50^{\circ}\text{C}$ (if lower than 0°C , need to heat the lubrication higher than 0°C or use anti freezing lubricant).
 ② Input rotation speed $\leq 2800\text{r/min}$.
 ③ Both Rotation Direction.
 ④ No industry limit.

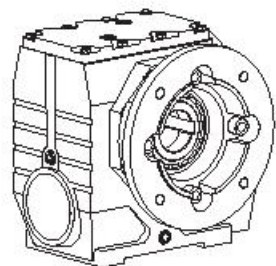
2. 机型版本 / VERSIONS



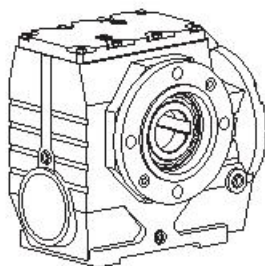
S..



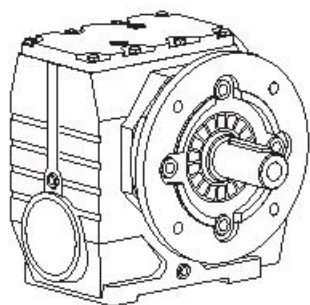
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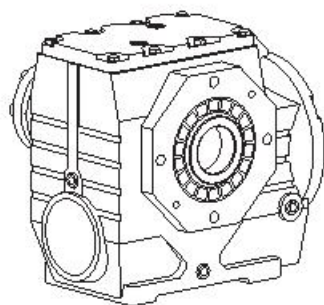
SAF..



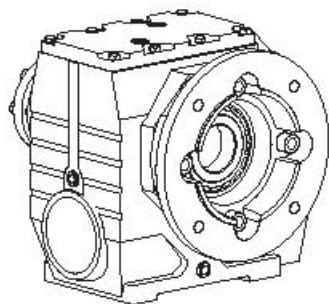
SAZ..



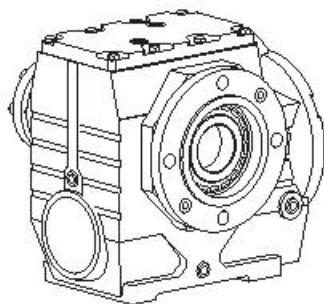
SF..



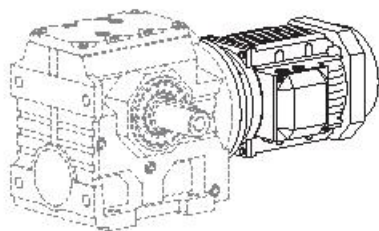
SH..



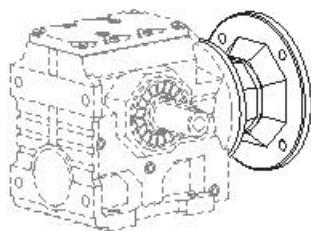
SHF..



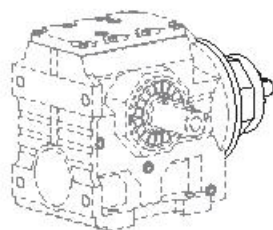
SHZ..



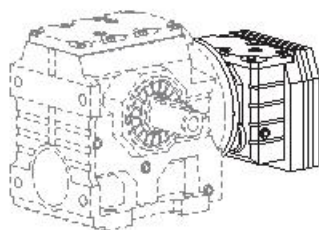
S..Y..



S..AM..

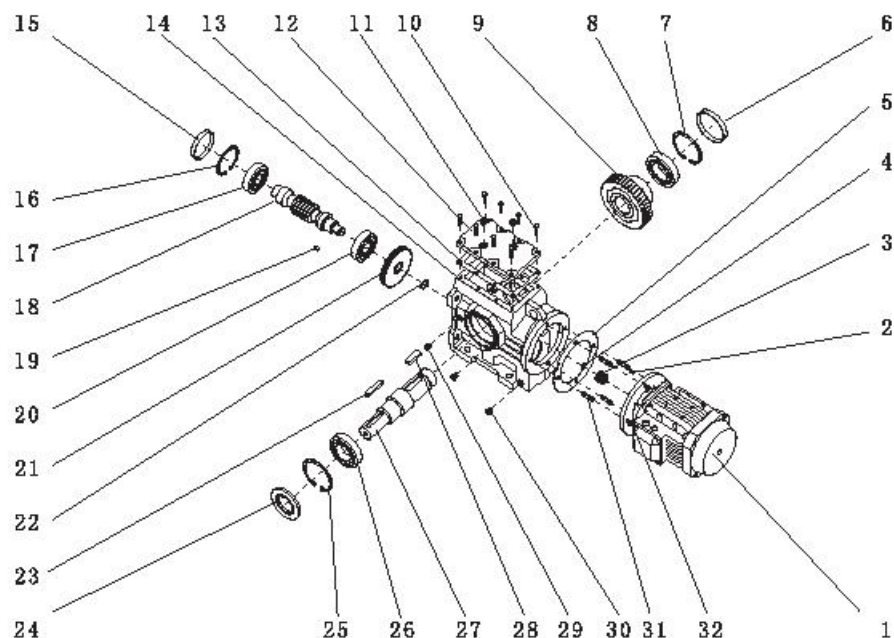


S..AD..



S..RF..

3. 部件分解图 / SPARE PARTS LIST



1 电机/motor

2 平键/flat key

3 齿轮/gear

4 轴用挡圈/retaining rings for shaft

5 纸垫/gasket

6 平面油封/plan seal

- | | |
|-----------------------------------|-----------------------------------|
| 7 孔用挡圈/retaining rings for bores | 20 轴承/bearing |
| 8 轴承/bearing | 21 齿轮/gear |
| 9 蜗轮/worm gear | 22 轴用挡圈/retaining rings for shaft |
| 10 外六角螺钉/six angle screw | 23 平键/flat key |
| 11 油塞/oil level plug | 24 骨架油封/skeleton oil seal |
| 12 盖板/cover plate | 25 孔用挡圈/retaining rings for bores |
| 13 纸垫/gasket | 26 轴承/bearing |
| 14 箱体/housing | 27 输出轴/output shaft |
| 15 平面油封/plan seal | 28 平键/flat key |
| 16 孔用挡圈/retaining rings for bores | 29 油塞/oil level plug |
| 17 轴承/bearing | 30 油塞/oil level plug |
| 18 蜗杆/worm | 31 双头螺柱/stud |
| 19 平键/flat key | 32 六角螺母/hexagon nut |

4. 安全说明/SAFETY INSTRUCTIONS

4.1 遵守使用说明书中的规定是实现产品的正常工作和履行产品质量保证要求的必要条件，请在涉及减速机的任何工作之前认真阅读使用说明书。如有不清楚之处或欲了解更多信息，请联系本公司。

4.2 所有与运输、贮存、安装、调试、操作、维护和修理有关工作，只能由具备资质的专业人员根据有关规定进行。

4.1 Adhering to the product specification is a prerequisite for faultfree operation and the fulfillment of any right to claim under warranty. Please read the product specification before you start working with the unit. Please contact us if you have any questions or if you require further information.

4.2 All work related to transportation, storage, setup/mounting, connection, startup, maintenance and repair can only be carried out by qualified professionals.

4.3 下列情况可能导致严重的人员伤害和财产损失:

- ① 违规使用设备;
- ② 错误安装和操作设备
- ③ 违规拆除和未安装必要的防护盖板和外罩。

4.3 The following condition may result in severe injuries to persons or damage to property.

- ① Improper use.
- ② Incorrect installation or operation.
- ③ Removing covers without authorization.

5. 运输及储存/TRANSPORTATION AND STORAGE

5.1 运输/Transportation

- ① 收到货后请立即检查有无运输损坏。如有损坏请立即通知运输公司,并不得对设备进行调试运行。
- ② 拧紧运输吊环,由于吊环的设计负载仅针对减速机的重量,因此不得额外增加负载。
- ③ 已安装好的吊环螺栓符合 ISO3266/GB825-88 的规定,原则上要遵守标准中所著名的负荷和规定。如果减速机上装有两个吊环,则运输时必须用两个吊环同时进行吊装。
- ④ 吊装件的拉力方向不得超过 45 度斜角。
- ⑤ 必要情况下,应使用相应的有足够承载力的运输工具,调试前拆除所有运输紧固件。

- ① Inspect the shipment immediately upon receipt for any damage that may have occurred during transportation. Inform the shipping company immediately if there is any damage. It is necessary to preclude startup.
- ② Tighten installed eyebolts. They are only intended for the weight of the motor / gear motor, do not attach any additional loads.
- ③ The built-in lifting eyebolts comply with ISO3266/GB825-88. Always observe the loads and regulations listed in this standard. If the gear motor is equipped with two suspension eye lugs or lifting eyebolts, both of the suspension eye lugs should be used for transportation.
- ④ The tension forcevector of the slings must not exceed a 45° angle.
- ⑤ Use suitable, sufficiently rated handling equipment if necessary. Remove any transportation fixtures prior to startup.

5.2 贮存/Storage

- ① 包装于箱内，里面放上薄膜包的干燥剂。
- ② 存放地点带顶棚，防雨雪，无振动。
- ③ 定期检查包装，在检查时应检查表面清洁度和机械损伤，检查防锈层是否完好。
- ① Packed in containers, with desiccant sealed in the plastic wrap.
- ② Underroof, protected against rain and snow; no shock loads
- ③ 2 years or more with regular inspections check for cleanliness and mechanical damage during inspection. Check corrosion protection.

6. 安装及运行/INSTALLATION AND OPERATION

6.1 安装准备/Prerequisites for assembly

- ① 安装前应检查电源是否与减速机铭牌上的要求相符。
- ② 检查驱动装置在运输或者仓储过程中是否遭受损坏。
- ③ 工作环境应无油、酸、碱、有害气体、蒸汽、放射性物质等。环境温度为 $-40^{\circ}\text{C} \sim +50^{\circ}\text{C}$ (0°C 以下启动时润滑油需加热到 0°C 以上，或采用防冻润滑油)，应有防雨、防晒、防风沙设施或措施。
- ④ 在潮湿的使用环境时，应要求提供具有防腐能力的产品。
- ⑤ 请使用常用的溶剂彻底清除输出轴和法兰上的防锈剂、污垢或类似污染，但不得让溶剂进入到骨架油封的密封唇上，否则会损坏油封。
- ① The entries on the name plate of the gear motor match the voltage supply system.
- ② The drive has not been damaged during transportation or storage.
- ③ No harmful oils, acids, gases, vapors, radiation etc. in the vicinity. Ambient temperature is $-40^{\circ}\text{C} \sim +50^{\circ}\text{C}$. (If the ambient temperature is below 0°C , heat the lubricant higher than 0°C or use antifreeze lubricant). Rain, sun, sand prevention facilities or measures.
- ④ In humid ambient conditions, provide anticorrosive product.
- ⑤ You must clean the out put shafts and flange surfaces thoroughly to ensure they are free of anticorrosion agents, contamination or similar. Use a commercially available solvent. Do not expose the sealing lips of the oil seals to the solvent damage to the material.

6.2 减速机的安装基础应为强度、刚度可靠，减震，抗扭的底座、台架等支撑结构。基础必须干燥，且不得有油脂。

6.3 底脚和法兰安装时，允许的最大平面度误差为：

减速机规格 ≤67 最大0.4mm

减速机规格 77~97 最大0.5mm

6.4 箱体底脚和法兰安装时不能同时拧紧以免相互较劲。

6.5 基础安装螺栓的最低性能应为 8.8 级。

6.6 安装时请检查注油量与安装位置是否相符，润滑油加注量详见润滑油量表。

6.7 当更换安装位置时，润滑油的加注量和透气阀的位置需做相应的调整。

6.8 减速机的透气

为避免减速机运行时产生内部压力，造成漏油等故障。本公司发货时提供的减速器上使用螺纹塞代替透气阀，置于一个塑料袋内。

① 请在减速器启动前拆下透气阀的运输保险（橡胶圈）

6.2 The support structure must have the following characteristics, level, vibration dumping, torsionally rigid, dry, no oil.

6.3 The maximum permitted flatness error for foot and flange mounting.

Gear Unit Size ≤67 Max:0.4mm

Gear Unit Size 77~97 Max:0.5mm

6.4 Do not tighten the housing legs and mounting flanges against one another.

6.5 Secure gear motors using quality 8.8 screw.

6.6 When installing gear unit, check that the oil fill corresponds to the specifications for the intended mounting position (see section "lubricant fill quantities")

6.7 If you change the mounting position, make sure that you change the lubricant fill quantities and the position of the breather valve accordingly.

6.8 Breather

We supply the gear units with a screw plug on the vent hole. We will supply a breather valve in a plastic bag.

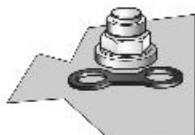
① Please remove the transport fixture from the breath valve before starting up the gear unit.



带运输保险（橡胶圈）的透气阀
Breather valve with transport
fixture (rubber ring)



拆下运输保险（橡胶圈）
Removing the transport fixture
(rubber ring)



已经开启的透气阀
Activated breather valve

- ② 在给减速器进行全面或者局部喷漆前，请用防护套保护好透气阀和油封，喷完漆后拆除防护套。

- ② Breath valves and oil seals may be damaged during painting or repainting. Please thoroughly cover the breather valves and the sealing lip of the oil seals with strips prior to painting and remove the strips after painting.

6.9 机械安装/Mechanical Installation

① 实心轴减速器

装配不当，可能对轴承、箱体或轴造成损伤，可能造成财产损失：

- A 利用轴端上现有的螺纹并采用装配工具对中孔进行定位装配输入和输出部件；
- B 禁止用锤击的方式将皮带轮、离合器、小齿轮等装入轴端部，这样会损坏轴承、外壳和轴；
- C 安装皮带轮时皮带的正确张力要根据制造商的规定；
- D 装配好的传动件应当进行动平衡，并不允许出现非许可的径向或轴向受力。
- E 给输出部件加润滑剂或加热到（80~100℃）会有助于装配。

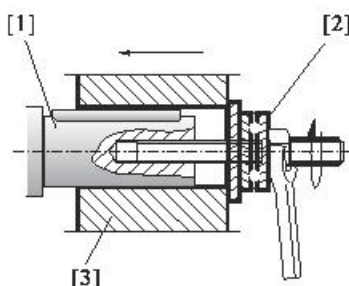
① Gear units with solid shaft

Bearing, housing or shaft may be damaged due to improper assembly. Possible damage to property:

- A Only assemble the input and output components with a mounting device. Use the centre hole and the thread on the shaft end of positioning.
- B Never force belt pulleys, couplings, pinions etc. onto the shaft end by hitting them with a hammer.
- C In the case of belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.
- D Power transmission elements should be balanced after fitting and must not give rise to any impermissible radial or axial forces.
- E Mounting is easier if you first apply lubricant to the output element or heat it up briefly (to 80~100°C).

下图示意了采用装配夹具将联轴器或轴套安装到减速器或电机的轴端上的操作在某些情况下，装配工具中的推力轴承可以省略。

The following figure shows a mounting device for installin couplings or hubs on gear unit or motor shaft ends. Should you be able to tighten the screw without any problems, you may not need the thrust bearing on the mounting device.



[1] 减速器轴端部

[1] gear shaft end

[2] 推力轴承

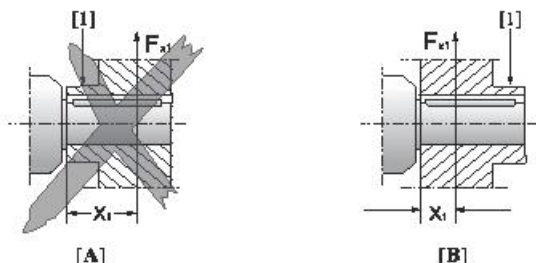
[2] thrust bearing

[3] 输出传动件

[3] coupling hub

为了避免高径向力，请按照图B装配齿轮或链轮。

Avoid high overhung loads by installing the gear or chain sprocket according to figure B if possible.



[1] 轮毂

[1] hub

[A] 不正确

[A] unfavorable

[B] 正确

[B] correct

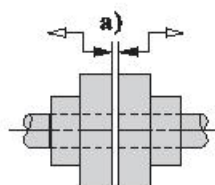
对于皮带轮、联轴器之类的传动和输出部件，应当有防接触的保护！

Input and output components such as belt pulleys, coupling etc.

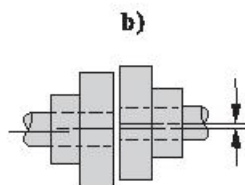
Should be covered with a touch guard.

② 联轴器的安装

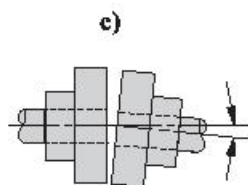
联轴器装配时要根据联轴器制造商的规定进行下列平衡校正。



a) 最大以及最小间距



b) 轴向偏移



c) 角偏移

② Mounting of couplings

Adjust the following misalignments according to the coupling manufacturer's specification when mounting couplings.

a) Maximum and minimum clearance.

b) Axial offset.

c) Angular offset.

③ 空心轴减速器的扭力臂

A 安装时扭力臂不能过紧。

B 固定扭力臂时应采用强度为8.8级的螺栓。

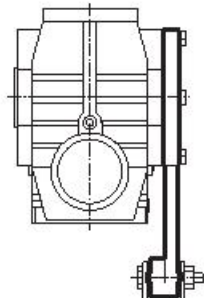
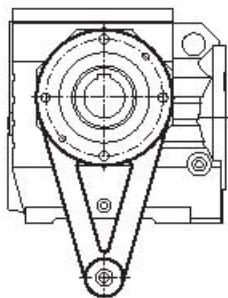
③ Torque arms for shaft-mounted gear unit.

A Do not place torque arms under strain during installation.

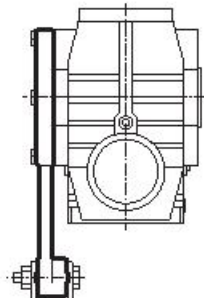
B Use bolts of quality 8.8 to fasten torque arms.

下图为扭力臂的支撑结构

The following figure shows the torque arm



S-T-A



S-T-B

7. 润滑 / LUBRICATION

7.1 润滑油类型 / Types of Lubrication

	环境温度(℃) Ambient Temperature(℃)	ISO粘度 ISO Viscosity Class	 SHELL	Mobil MOBIL	 BP	润滑油类型 Lubrication Type
S	-40 ~ +10	VG 220	Shell Omala 200	Mobilgear 630	BP Energol GR-XP 220	矿物油 Mineral Oil
	-20 ~ +25	VG 150 VG 100	Shell Omala 100	Mobilgear 627	BP Energol GR-EP 100	
	-30 ~ +10	VG 68-46 VG 32	Shell Tellus 32	Mobil D.T.E 13M		
	-40 ~ -20	VG 22 VG 15	Shell Tellus 32	Mobil D.T.E 11M	BP Energol HLP-HM 15	
	-40 ~ +80	VG 220	Shell Tellus 32	Mobil SHC 630		合成油 Synthetic Oil
	-40 ~ +10	VG 32		Mobil SHC 624		

7.2 润滑油量表 / Lubricant Fill Quantity

规定的加注量为参考值。精确值的变化与级数和传动比有关。请您在加注润滑油时一定要注意油位螺栓所指示的精确油量。后期调整安装方式时，您必须根据改变后的安装方式相应调整加注润滑剂。下表中列出了安装方式 M1-M6 的减速器相应的标准参考润滑油注入量值。

The specified fill quantities are recommended values. The precise value varies depending on the number of stages and gear ratio. When filling, it is essential to check the oil level plug since it indicates the precise oil capacity. The following tables show guide values For lubricant fill quantities in relation to the mounting position M1 - M6.

S...SA...B,SH...B,SV...B

减速器型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1	M2	M3	M4	M5	M6
S37	0.25	0.40	0.50	0.55	0.40	0.40
S47	0.35	0.80	0.70/0.90	1.00	0.80	0.80
S57	0.50	1.20	1.00/1.20	1.45	1.30	1.30
S67	1.00	2.00	2.20/3.10	3.10	2.60	2.60
S77	1.90	4.20	3.70/5.40	5.90	4.40	4.40
S87	3.30	8.10	6.90/10.4	11.3	8.40	8.40
S97	6.80	15.0	13.4/18.0	21.8	17.0	17.0

SF...

减速器型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1	M2	M3	M4	M5	M6
SF37	0.25	0.40	0.50	0.55	0.40	0.40
SF47	0.40	0.90	0.90/1.05	1.05	1.00	1.00
SF57	0.50	1.20	1.00/1.50	1.55	1.40	1.40
SF67	1.00	2.20	2.30/3.00	3.20	2.70	2.70
SF77	1.90	4.10	3.90/5.80	6.50	4.90	4.90
SF87	3.80	8.00	7.10/10.1	12.0	9.10	9.10
SF97	7.40	15.0	13.8/18.8	22.6	18.0	18.0

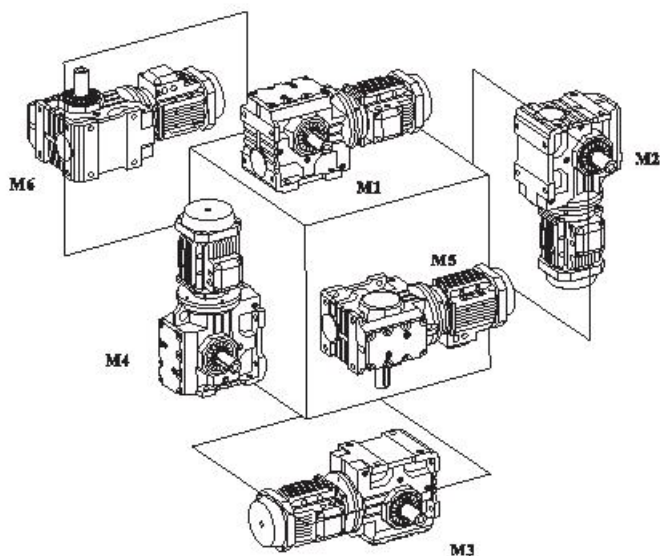
SA...,SH...,SV...,SAF...,SHF...,SVF...,SAZ...,SHZ...,SVZ...

减速器型号 Gear units	加注量 Fill quantity in liters			单位:升(L) Unit: L		
	M1	M2	M3	M4	M5	M6
S...37	0.25	0.40	0.50	0.50	0.40	0.40
S...47	0.40	0.80	0.70/0.90	1.00	0.80	0.80
S...57	0.50	1.10	1.00/1.50	1.50	1.20	1.20
S...67	1.00	2.00	1.80/2.60	2.90	2.50	2.50
S...77	1.80	3.90	3.60/5.00	5.80	4.50	4.50
S...87	3.80	7.40	6.00/8.70	10.8	8.00	8.00
S...97	7.00	14.0	11.4/16.0	20.5	15.7	15.7

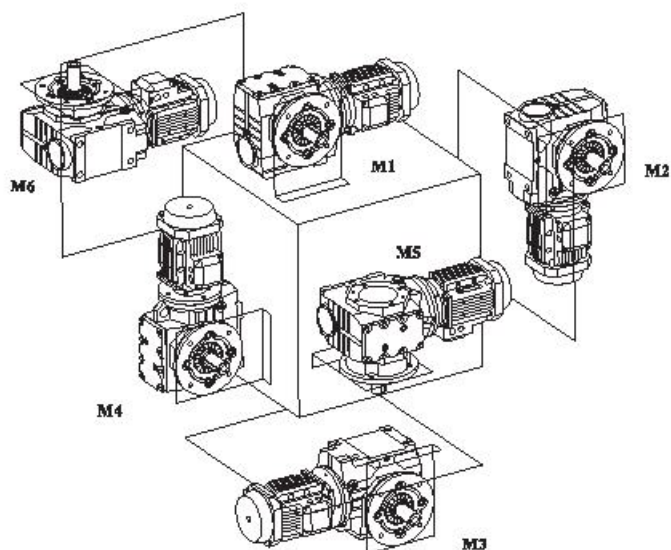
① The larger gear unit of multi-stage gear units must be filled with the larger oil volume

10. 安装方位图/MOUNTING POSITION DESIGNATION

S..安装位置示意图 / S.. Mounting Position Designation



S F..安装位置示意图 / S F.. Mounting Position Designation



S

9. 维护与保养/MAINTENANCE

9.1 在对减速机进行检查和维护的 注意事项

- ① 进行检查和维护前，请务必断开减速器的电源，防止触电！
- ② 对减速器进行冷却，防止烫伤！
- ③ 在松开轴连接件之前要确保无扭矩作用（在设备上存在应力）。
- ④ 进行检修和维护工作时要防止异物进入减速器。
- ⑤ 不要采用高压清洁设备对减速器进行清洁。因为存在水渗入减速器和损坏油封的风险。

9.1 Observe the following notes before you start with the maintenance work.

- ① Disconnect the gear motor from the power supply before starting work and protect it against unintentional restart.
- ② Let the gear unit cool down before you begin with your work.
- ③ Before releasing shaft connections, be sure that there are not active torsional moments present (tensions within the system).
- ④ Prevent foreign bodies from entering into the gear unit during maintenance and inspection work.
- ⑤ Do not clean the gear unit with a high pressure cleaning system as water might enter the gear unit and the seals might be damaged.

9.2 检查维护周期/ Inspection maintenance intervals

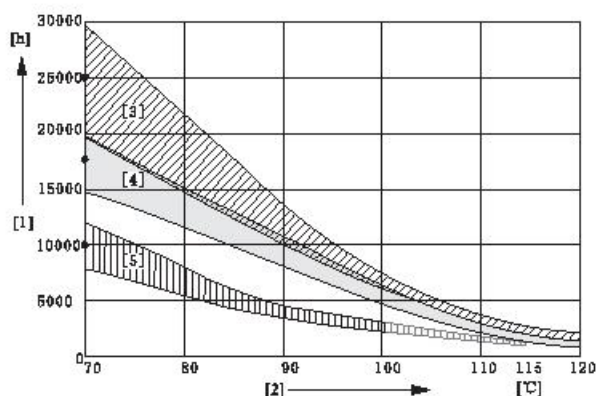
周期/ Time intervals	具体操作内容/ What do I do.
1. 每6个月或者工作3000小时。 1. Every 3000 operating hours, at least 6 months.	① 检查润滑油的质量和油位。 1) Check oil and oil level. ② 检查油封处是否漏油。 2) Visually check the seals for leakage. ③ 对于带扭力臂的减速机：检测橡胶缓冲块，必要时进行更换。 3) For gear units with a torque arm: check the rubber and change it if necessary.
1. 根据不同的工作条件（见下图）而定，最长每三年检测一次 1. Depending on the operating conditions, at the latest every 3 years. 2. 根据油温决定。 2. According to oil temperature.	① 更换矿物油。 1) Change the mineral oil. ② 更换轴承润滑油脂。 1) Replace anti-friction bearing grease. ② 更换油封。 2) Replace oil seal.

1. 根据不同的工作条件（见下图）而定，最长五年检测一次。 1. Depending on the operating conditions(see illustration blow), at the latest every 5 years. 2. 根据油温决。 2. According to the oil temperature.	① 更换人工合成油。 1) Change synthetic oil. ① 更换轴承润滑油。 1) Replace anti-friction bearing grease. ② 更换油封。 2) Replace oil seal.
1. 不定期检查（取决于外部环境因素）。 1. Varying (depend on the external factors).	① 改善或者更换表面防护漆/防锈漆。 1) Touch up or renew the surfaces / anticorrosion coating.

9.3 润滑油的更换周期/ Lubricant change intervals

下图为在一般环境条件下标准减速器的更换周期。对于恶劣环境条件下使用特殊规格的要经常换油。

The following figure shows the change intervals for standard gear units under normal environmental conditions. Change the oil more frequently when using special versions subject to more severe / aggressive environmental conditions!



[1] 工时

[2] 油池稳态温度

[3] 聚二醇类

[4] 碳氢化合物类/碳氢化合物+二脂油

[5] 矿物油/液压油/二脂油

[1] Operating hours

[2] Sustained oil bath temperature

[3] CLP PG

[4] CLP HC/HCE

[5] CLP/HLP/E

9.4 AM、AD的检查和维护/Inspection maintenance for the AM/AD adapter

	周期/Interval	具体操作内容/What do I do
AM	1. 每半年或者运行3000小时。 1. Every 3000 operating hours, at least every 6 months.	① 检查是否可能因轴承损坏产生运转噪音。 1) Checking running noise for possible bearing damage. ② 目检法兰连接面是否漏油。 2) Visually check the adapter for leakage.
	2. 运行时间超过10000小时。 2. After 10000 operating hours.	① 检测扭曲。 1) Check torsional play. ② 目检弹性齿环或平键。 2) Visually check the elastic annular gear or flat key.
	3. 运行时间超过25000小时 3. After 25000 hours of operation	① 更换轴承润滑脂。 1) Renew the anti-friction bearing grease. ② 更换油封。 2) Replace oil seal. ③ 更换弹性齿环或平键。 3) Visually check the adapter for leakage.
AD	1. 每半年或者运行3000小时。 1. Every 3000 operating hours, at least every 6 months.	① 检查是否可能因轴承损坏产生运转噪音。 1) Checking running noise for possible bearing damage. ② 目检法兰连接面是否漏油。 2) Replace the oil seal.
	2. 运行时间超过25000小时。 2. After 25000 hours of operating.	① 更换轴承润滑脂。 1) Renew the anti-friction bearing grease. ② 更换油封。 2) Replace the oil seal.

9.5 油位的检测/Checking the oil level

通过油位检查螺栓检查油位

Checking the oil level via the oil level plug

- ① 请注意8.5.1章节的说明。
- ② 将容器置于油位检查螺栓的下。
- ③ 慢旋出油位检查螺栓，由于最大许可灌油高度超过了油位孔的下缘，因此在旋出螺栓时可能有少量油漏出。
- ④ 检查油位高度，必要时补充润滑油，并旋入油位检查螺栓。
- ① Observe the notes in section 8.5.1.
- ② Put a container underneath the oil level plug.
- ③ Slowly remove the oil level plug. Small amount of oil may leak out as the permitted max. oil level is higher than the lower edge of the oil level bore.
- ④ Check the oil level, supplement the lubricant if necessary, reinsert the oil level plug.

9.6 润滑油质量的检查/Checking the oil

通过放油螺栓检测润滑油/Checking the oil via the oil drain plug

- ① 请注意8.5.1章节的说明。
- ② 从放油螺塞处提取一些润滑。
- ③ 检查润滑油状。
- A 粘度
- B 如果润滑油看起来很脏, 建议立即更换润滑。
- ④ 对于配有油位螺栓的减速器, 拧开油位螺栓, 检查油位高度, 必要时补充润滑油并旋入油位螺栓。

- ① Observe the notes in section 8.5.1.
- ② Remove a little oil from the oil drain plug.
- ③ Check the oil consistency.
- A Viscosity.
- B If you can see that the oil is heavily contaminated, we recommend that you change the oil.
- ④ Check the oil level. See previous section.

9.7 润滑油的更换/Changing the oil

通过放油螺栓和透气阀进行换油。减速器必须仍有余温, 因为过冷的高粘度润滑油流动性差, 会影响其正常排放。

Changing the oil via the oil drain plug and the breather. The gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil properly.

- ① 请注意8.5.1章节的说明
- ② 将容器置于放油螺栓的下方, 卸下油位检查螺栓、放油螺栓、透气阀, 将润滑油排完。
- ③ 重新拧回放油螺栓, 通过透气阀注入同类润滑油。禁止混用不同种类的合成润滑油。
- ④ 从油位检查螺栓上检查油位, 拧回油位检查螺栓和透气阀。

- ① Observe the notes in section 8.5.1.
- ② Put a container underneath the oil drain plug, remove the oil drain plug, oil level plug and the breather, completely drain the oil.
- ③ Re-insert the oil drain plug. Fill in new oil of the same type via the breather. Do not mix different synthetic lubricants.
- ④ Check the oil level via the oil level plug, reinsert the oil level plug and the breather.

9.8 油封的更换/Replacing the oil seal

0℃以下安装油封, 可能造成油封的损坏。油封要在室温高于0℃的环境下储存, 必要时在安装前对油封加热。

Oil seals with temperature below 0℃ may get damaged during installation. Please store oil seals at ambient temperatures over 0℃. Warm up the oil seals prior to installation if required.

- ① 在更换油封时要注意，根据不同设计，密封唇与挡尘唇之间必须储存充足的密封脂。
- ② 对于双唇油封，所加的密封脂为空腔的三分之一。

- ① When changing the oil seal, ensure that there is a sufficient grease reservoir between the dust lip and protective lip, depending on the type of gear unit.
- ② If you use double oil seals, fill one-third of the gap with grease.

10. 故障及排除/MALFUNCTION AND REMEDY

故障	可能的原因	解决办法
异常、均匀的运转噪声。	1. 滚动/碾压噪声：轴承损坏。 2. 冲击型噪声：齿轮啮合不均匀。	1. 检查润滑油，更换轴承。 2. 请向客户服务部咨询。
异常、不均匀的运转噪声。	润滑油中有异物。	1. 停机向客户服务部咨询。 2. 检查润滑油。
机油泄漏 * 1. 在减速机盖板上。 2. 在电机法兰上。 3. 在电机轴密封圈上。 4. 在减速机法兰上。 5. 在输出轴密封圈上。	1. 减速机密封垫发生泄漏。 2. 轴上的油封损坏。 3. 减速机没有排气。	1. 在密封垫上涂密封胶并拧紧螺栓。 2. 更换油封。 3. 给减速机排气（参见“安装方式”）。
机油从排气阀旁渗出。	1. 机油太多。 2. 传动装置安装方式错误。 3. 频繁冷启动（润滑油起泡沫）。	1. 修正油量（参见“润滑油”）。 2. 正确安装排气阀并且纠正油位（参见“安装方式”）。
减速机输入端驱动正常，但是输出轴不转动。	减速机中的轴与轮毂联接失效。	请向客户服务部咨询。
AM (IEC) 连接器弹性体过早磨损或失效。	1. 接触腐蚀性物质（液体或气体）。 2. 过高的环境温度。最大的环境温度允许-20℃到+80℃。 3. 过大的负载。	请向客户服务部咨询。

*：在磨合试运转阶段（24小时的运转时间内），轴密封圈有可能出现短暂、少量的泄漏现象。

Problem	Possible Cause	Remedy
Unusual, regular running noise.	1. Meshing/grinding noise; Bearing damage. 2. Knocking noise; Irregularity in the gearings.	1. Check the oil, change bearings. 2. Contact customer service.
Unusual, irregular running noise.	Foreign bodies in the oil.	1. Check the oil. 2. Stop the drive and contact customer service.
Oil leaking: 1. from the gear cover plate. 2. from the motor flange. 3. from the motor oil seal. 4. from the gear unit flange. 5. from the output end oil seal.	1. Rubber seal on the gear cover leaking. 2. Seal defective. 3. Gear unit not vented.	1. Tighten the bolts on the gear cover plate and observe the gear unit. 2. Change the seals. 3. Vent the gear unit (see "Mounting Positions"). 4. Contact customer service.
Oil leaking from breathing valve.	1. Too much oil. 2. Drive operated in incorrect mounting position. 3. Frequent cold starts (oil foams) and/or high oil level.	1. Correct the oil level (see sec. "Inspection and maintenance"). 2. Mount the breather valve correctly (see sec. "Mounting Positions") and correct the oil level (see "Lubricants").
Output shaft does not turn although the motor is running or the input shaft is rotated.	Connection between shaft and hub in gear unit interrupted.	Contact customer service.
Premature wear or failure in AM(IEC) coupling elastomer	1. Contacted with aggressive fluids/oil; 2. Impermissibly high ambient/contact temperature. Maximum permitted temperature -20°C to +80°C.	Contact customer service.

Note: Short-term oil/grease leakage at the oil seal is possible in the run-in phase (24 hour running time).

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