

# External rotor motors

Design MK - MW

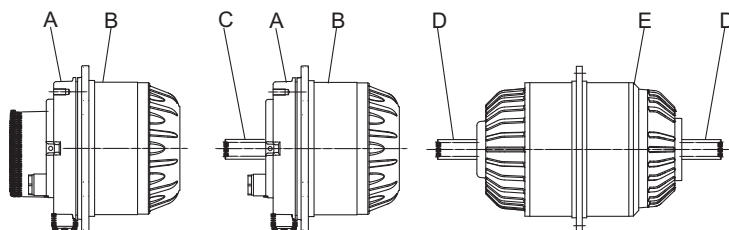
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Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, start-up, maintenance, repair, cleaning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.

Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

## i Operational area




ZIEHL-ABEGG external rotor motors are specialised motors with an external cage rotor. They are subject to the same physical laws as electric motors of conventional construction design.

Design MK: A = stator (stationary housing section)  
B = rotor with mounting flange  
C = model MK with shaft end(s)

Design MW: D = Motor axis (stator, stationary part)  
E = rotor with mounting flange

(type designation see rating plate)

ZIEHL-ABEGG external rotor motors are not ready-to-use products, but designed as components for aerodynamic devices, machines and installations.

 The motors may only be operated when they are installed as intended, and when safety is ensured by safety equipment according to DIN EN 13857 (DIN EN ISO 12 100) or by other protection measures.

- ZIEHL-ABEGG external rotor motors find application as drives for axial- and centrifugal- fans, free-turning centrifugal impellers and as solutions to special problems in drive engineering.
- Specialised motor design permits speed control through voltage reduction

# 外转子马达

MK - MW 型

## 内容摘要

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遵守下列规范也有助于确保产品的安全。尤其是在一般安全、运输、储存、安装、运行条件、调试、维修、维护、清洁和处理/回收等方面，若未注意到所注明的提示，则可能导致产品无法安全运行，并可能会危及用户和第三方的生命安全。

因此，背离以下规范可能导致货物缺欠法定责任权利的丧失，以及由于背离规范而造成不安全产品的买方赔偿责任。

## i 应用

施乐百 (ZIEHL-ABEGG) 外转子马达是配有外置鼠笼式转子的专用马达。此类马达须遵守与普通型号马达相同的物理法规。

MK 型: A = 定子 (静止的壳罩部件)  
B = 带安装法兰的转子  
C = 带轴端件的 MK 型

MW 型: D = 马达轴 (定子, 静止部件)  
E = 带安装法兰的转子

(型号名称参见铭牌)

施乐百 (ZIEHL-ABEGG) 不是最终产品，而是专为空调等通风排风设备设计的部件。



马达只能在所要求的安装状态下，并符合 DIN EN 138 57 (DIN EN ISO 12 100) 标准规定的防护装置或其它保护措施下才能开始运转。

- 施乐百 (ZIEHL-ABEGG) 外转子马达用作轴流和径流风机、自由转动式径流叶轮的驱动装置和作为驱动技术领域的专用解决方案。
- 一种专用的电极设计可以通过降低电压控制转速。



## Safety instructions

- Mounting, commissioning and electrical installation are only to be performed by trained service personnel (DIN EN 50 110, IEC 364)!
- The motor is only to be operated within the ranges specified on the name plate!
- Use the motor only as intended and only for the specified tasks in the purchase order!
- Designer, manufacturers or operators are responsible for proper and safe installation of the motor and the applicable components (e.g. fan impeller) as well as for safe operation!
- Safety features, e.g. guard grilles, are not to be dismantled, circumvented or made inoperative!
- The temperature monitors (TB) or PTC built into the winding serve as the motor protection and must be connected!
- Allowable testing voltage for thermistors max. 2.5 v.
- For motors without temperature monitors a motor protection switch obligatory must be used!
- **Danger due to electric current**
  - The rotor is not protected against indirect contact neither by supplementary or reinforced insulation nor by connection to safety-earth in accordance with EN 60204-1, therefore the motor/fan must be installed so that it is not touchable.
- **Compliance with the EMC Directive 2014/30 / EU relates only to this product if it is directly connected to the conventional power grid . If this product is integrated into another unit or completed with other components ( for example, regulating and control equipment ) and operated , the manufacturer or operator is responsible of the overall system for compliance with the EMC Directive 2014/30 / EU .**
- Pay attention to the notes which concerning maintenance and service.
- These assembly instructions are part of the product and, as such, are to be kept accessible at all times.



## 安全提示

- 安装、维修和电气安装只能由经过培训的专业人员 (DIN EN 50 110, IEC 364) 完成！
- 只在机型铭牌上指定的范围内运行曳引机！
- 请只遵照说明使用曳引机，并且只将其用于订单中规定的任务！
- 规划商、生产商或操作方须负责确保马达的正确和安全安装与按照规定使用组件（例如风机叶轮）并确保安全运行！
- 禁止拆卸、避开或关闭安全零部件，如防护格栅！
- 在线圈中安装温度限制器 (TB) 和电机热敏电阻保护装置并且必须将两者连接在一起！
- 所允许的低温导体检验电压最高为 2.5 伏
- 不带过热保护器的马达必须使用马达防护开关！
- **由于电流造成的危险**
  - 转子未按 DIN EN 60204-1 保护绝缘或保护接地，故须确保安装的电机/风机不被接触。
- **遵守电磁兼容性条例 2014/30/EU 规定的事宜仅针对当其直接与常规市电网络连接时。如果该产品集成在一个设备内或与其它组件（如调解和控制设备）整合在一起操作，则整体设备的生产厂商或操作方须负责确保遵守电磁兼容性条例 2014/30/EU 的规定。**
- 注意与维护和服务相关的说明。
- 装配说明书是产品的组成部分，放到触手可及的地方妥善保存。



## Transport, storage

- Transport the motor either in the original packaging or by the bored holes in the motor housing intended for screwing in lifting eye bolts. Use suitable lifting equipment.
- **Wear safety shoes for handling!**
- Observe the weight data on the type code
- Do not transport the fan by the connecting cable!
- Avoid impacts and collisions, especially on fans set-up on devices.
- Watch out for possible damage to the packaging or fan.
- Store the motor in the original packaging in a dry area protected from the weather or protect it from dirt and weather until final mounting.
- Avoid exposure to extreme heat and cold.
- Avoid excessive storage periods (we recommend a one year max.) and inspect the motor bearings for proper operation prior to installation.



## 储运

- 在运输马达时请采用原包装货将其固定资阿马达壳罩的钻孔上旋入环形螺栓并使用合适的举升工具。
- **工作时请穿着防护鞋！**
- 请注意铭牌上的重量说明。
- 禁止利用连接的电缆搬运风机。
- 避免击打和碰撞，特别风机安装到设备后。
- 注意避免任何破坏包装或风机的行为。
- 将曳引机原装存放在干燥、耐候的环境中，或在最终安装前注意防尘、防锈。
- 避免过热或过冷环境。
- 避免过期存放（建议最多一年），安装前检验风机的轴承运转状况。



## Mounting

Only have assembly and electrical connection carried out by trained specialist personnel.



- The system manufacturer or the machine builder is responsible that the inherent installation and security information are harmonized with the valid standard and guidelines (DIN EN ISO 12100 / 13857).
- To attach to the fixed motor flange: use property class 8.8 screws and provide with suitable screw locking. Permissible tightening torque: M4 = 2.1 Nm; M6 = 9.5 Nm; M10 = 40 Nm; M12 = 70 Nm; related to friction coefficient according to DIN EN ISO 4014  $\mu_{tot} = 0.12$
- Motor frame size **068**: comply with stated length of thread engagement
- When centrifugal impellers are to be mounted, balance the motor and the impeller together on two planes in accord-





## 安装

安装和电气连接 只能由经过培训的专业人员进行。

- 系统或设备制造商负责设备相关的安装和安全注意事项与现有标准相一致 (DIN EN ISO 12100 / DIN EN 13857)。
- 使用强度等级为 8.8 的螺栓安装固定马达定子法兰，并装配相应的防松装置。允许扭矩：M4 = 2.1 Nm；M6 = 9.5 Nm；M10 = 40 Nm；M12 = 70 Nm；根据 DIN EN ISO 4014 标准的规定，螺栓摩擦系数  $\mu_{ges} = 0.12$
- 马达尺寸 **068** 注意注明的螺栓最大拧入深度。
- 在安装径流叶轮时，请根据 DIN ISO 1940 在两个平面上对马达和叶轮进行动平衡，以防因失衡造成的轴承损坏。
- 在安装径流叶轮或其它组件在马达法兰上时（例如剪切式马达或砂带传动规格），不得施加超出范围的轴向力作用在轴承上。
- 特殊应用时（如带轴端件的电机），请遵守系统生产商或设备制造商的安装说明。

- ance with DIN ISO 1940 so as to avoid bearing damage resulting from unbalance.
- When centrifugal impellers or other components are mounted on the motor flange (e.g. knife-edge motor or abrasive belt drive outfitting), any inadmissible axial pressure on the bearings is to avoid.
  - For special applications (e.g. motors with shaft ends) the installation instructions of the system manufacturer or machine builder are to be observed.
  - Fasten to all attachment points using suitable fastening materials!
  - Provide screwed connections with suitable screw locking.
  - Protective measures must be taken against falling parts when mounting with a hanging rotor.
  - In the case of a vertical motor axis, the respective lower condensation drain hole must be open (does not apply to protection class IP55 fans).
  - Motor frame size **068**: The condensation drain-holes are attached dependent on the installation position or application. Please supply information about this in the product-specific ordering texts. Make sure the condensation drain-holes are not blocked!
  - Before making the electrical motor connections, compare the connection specifications with the specifications on the motor identification plate.
  - Connect fan only to electrical circuits that can be disconnected with an all-pole isolating switch.
  - Electrical connection corresponding to connection diagram a) in terminal box b) by cable design connection diagram on cable or on wall ring.
  -  **Do not use metal compression-gland fittings with plastic terminal boxes. - Danger of an electric shock if connection is not made correctly!**
  - Use a dummy plug seal for the compression-gland fitting as well.
  - Only use lines which can guarantee a permanent seal around the cable glands (pressure-resistant, dimensionally-stable, round-centred jacket; e.g. by means of gusset filling)!
  - Depending on the type of cable gland, attach a water drain sleeve or use a sealing compound.
  - Secure motor connection cable in accordance with regulations.
  - Screw on plastic terminal box covers should be sealed with sealant.
  - Starting torque for screw on covers, Plastic version 1.3 Nm, Metal version 2.6 Nm
  - Depending on the model the motors
    - can be equipped with PTC's, internally connected thermal contacts, lead-out thermal contacts or without thermal protection.
  - Connect them as below:
    - PTC on PTC triggering device.
    -  Internally connected thermocontact: no external connection feasible or necessary. **Caution:** Thermost switches switch after triggering by excess temperature and closed independently after cooling off. The fan can start up during this time
    - Lead-out temperature monitors must be integrated in the control circuit in such a way that, if a fault occurs, **the motor cannot switch on again automatically** after it has cooled down. The protection of several motors using one protection device is possible by connecting the temperature monitors of the individual motors in series. It must be remembered that if a temperature fault occurs at one motor, **all** motors will then be switched off. In practice, motors are therefore assembled in groups so that **emergency operation** with reduced performance is still possible if a motor fails.
    - Without thermal protection: Use a motor protection switch!
  - When in motors for 1~ 230V +/-10% the mains voltage is permanently over 240 V, in extreme cases the temperature monitor can trigger. In such cases a capacitor-type with the

- 用合适的固定工具固定在所有固定点上。
- 江螺栓连接位置配上合适的螺栓固定件。
- 在用悬挂的转子安装时，必须采取防护措施防止部件坠落。
- 马达轴垂直安装时，相应下部的冷凝水排水孔必须打开。（不针对防护等级为IP55的风机）
- 马达尺寸 **068**：冷凝水排水孔的位置取决于风机安装位置以及用途。相关信息参阅产品相关的订货信息。请注意不要关闭冷凝水排水孔！
- 在对马达进行接电前请核对接线信息与马达铭牌上的数据信息。
- 设备只能连接到通过全极分离开关可切断的电路。
- 接线应与接线图所示完全一致。接线图附在：a)接线盒内。b)没有接线盒的(电缆直接引出的)，接线图附在电缆或底板上。

-  **切勿使用金属密封塞密封塑料接线盒，接线不当会引起电击！**
- 使用绝缘封塞密封接线盒。
- 必须确保所使用的电缆在电缆接头中具有长久的密封性（压力下形状稳定、中心为圆形的护套；例如通过电缆填料来实现）！
- 根据电缆导入形式使用排水弯管或密封胶。
- 根据规定将马达连接线固定好。
- 塑料接线盒的盖板螺钉应附加使用密封胶密封。
- 端子盒盖固定螺钉的扭矩为：塑料端子盒1.3Nm，金属端子盒2.6Nm
- 根据安装规格的不同，
  - 可以将马达装配PTC电阻器、内置温控开关、外接温控开关或不装配温度防护装置。
- 该部件根据以下方式连接：
  - 将PTC电阻器连接在PTC触发装置。
-  热保护器内接时：无法外接。 **注意：**当马达过热而热保护器动作，风机停转；当温度下降热保护器自动复位，此时风机就自动开始运行。
- 外接过热保护器必须合并并在控制器回路中，以便马达 **出现故障时在冷却后不会自动启动**。通过把多个马达串联起来，可以使用一个防护装置同时保护多个马达。但务必注意：如果一个马达出现温度故障，**所有的**马达都会同时断电。在实际运行中，可将多台马达分成多组，当一台马达发生故障时，其他组马达可在 **紧急模式** 下以低负荷运转。
  - 无热保护装置：使用马达保护开关！
- 如果单相 230V +/-10%的马达长期运转在超过240V的市电电压下，过热保护器在极端情况下会响应。请使用小一号的电容以替代标准电容。



next smaller capacity should be used instead of the stated capacity."



## Operating conditions

- Do not operate motors in an explosive atmosphere.
- Duty type of motor/fan
  - Continuous operation with occasional starts (S1) according to DIN EN 60034-1:2011-02. Occasional starting between -40 °C and -25 °C is permissible. Continuous operation below -25 °C only with special bearings for refrigeration applications on request.
- Permissible minimal and maximal ambient temperature for operation
  - Please refer to the technical documentation of the product for the minimum and maximum ambient temperature valid for the respective ventilator. Operation below -25 °C as well as partial load operation for refrigeration applications is only possible with special bearings for refrigeration applications on request. If special bearings for refrigeration applications are installed in the ventilator, please observe the permissible maximum temperatures in the technical documentation of the product.
- Any use below -10 °C is dependent on not being subjected to unusual, sudden or mechanical loads or stresses on the material (see minimal permissible ambient temperature).
- ZIEHL-ABEGG External rotor motors are suitable for operation with frequency inverters when the following points are complied with:
  - Between the inverter and the motor, sinusoidal filters should be incorporated which are **effective for all phases** (sinusoidal output voltage, phase against phase, phase against protective conductor) as offered by manufacturers. Please ask for our technical information L-TI-0510.
  - **du/dt filters (also called motor or suppression filters) cannot be used in place of sinusoidal filters.**
  - When using sinusoidal filters, screened motor leads, metal terminal boxes and a second earth connection to the motor can, if necessary, be omitted. Check-back by the supplier of the sinusoidal filter.
- If the operational leakage current exceeds 3.5 mA, earthing in compliance with DIN EN 50 178, art. 5.2.11.1 must be provided. For this purpose there is a connection for a second protective earth on the stator flange. Tightening torque 2.7 Nm.
- When speed controlling through electronic voltage reduction (phase control), depending on the installation situation, increased noise formation caused by resonances can occur. In such cases we recommend the use of the Fcontrol frequency changer with integrated sine filter.
- **We cannot guarantee that competitive makers of voltage control devices and frequency converters will function properly and not damage the motor when used for rotational-speed control of our motors**
- A-rated sound power levels of over 80 dB(A) are possible, see product catalogue.
- IP55 motors with a seal which is rubbing may cause additional noise.



## Start-up

- Before first-time start-up, check the following:
  - Installation and electrical connection have been properly completed?
  - Electrical connection carried out in accordance with wiring diagram (wiring diagram in terminal box, for cable version on cable or wall ring)
  - Turning direction corresponds to turning direction arrow on fan blade or fan housing. The airflow direction or turning direction determines the functionality of the fan, not the motor rotation field.
  - Is the protective earth connected?
  - Connection data complies with the specifications on the type plate.



## 操作条件

- 马达不能运行于易爆环境。
- 电机/风机的工作制类型
  - 按照 DIN EN 60034-1:2011-02 连续运行及偶尔启动 (S1)。允许在 -40 °C 至 -25 °C 下偶尔启动。仅在根据要求配备有适用低温环境的特殊轴承时，才可在 -25 °C 以下长期运行。
- 运行所允许的最小和最大环境温度
  - 最小和最大数量«1»
  - 环境温度可在产品的技术文档中找到。低于 -25 «2» °C 的操作，以及制冷应用的部分负载操作，仅可应要求提供用于制冷应用的特殊轴承。如果风扇中安装了特殊的冷存储设备，请在产品技术文档中注明允许的最高温度。
- 应用环境温度低于 -10 °C 时，须预防材料受到异常的冲击或机械应力及材料应变。(见所允许的最低环境温度)。
- 在满足以下条件的情况下，施乐百外转子马达适于变频运转：
  - 在变频器和马达之间必须如某些变频器制造商的说明安装 **多条** 正弦滤波器 (正弦输出电压！相间，相与线间)。请索取我们的技术信息 L-TI-0510。
  - **du/dt 滤波器 (也称马达/阻尼滤波器) 不能用来替代正弦滤波器。**
  - 使用正弦滤波器时，马达可以不使用屏蔽电缆、金属接线盒，也无须通过另外一根地线连接马达，需与正弦滤波器供应商协调。
- 如果超过了 3.5 mA 的运行漏电电流，则须满足 DIN EN 50 178, 第 5.2.11.1 款规定的接地条件。为此，在定子法兰上有用于第二保护导体的连接。压紧扭矩 2.7 Nm。
- 对于以电子方式降低电压 (相位角控制) 的转速控制装置，可能会因安装位置不同产生共振并且进而导致噪音增大。因此，我们推荐使用集成有正弦滤波器的 Fcontrol 变频器。
- **如果使用其它制造商生产的电压控制器或变频器进行马达的转速控制，我们将不负责对马达的正常功能与损坏进行质量担保。**
- A 计权声功率级可大至 80 dB(A)，详见产品目录。
- 带有摩擦密封装置的 IP55- 马达可能会产生附加噪音。



## 试运行

- 初次试运行前请检查：
  - 机械和电气安装是否按照专业方式正确完成？
  - 已根据电路图进行电气连接 (接线箱中的电路图，在电缆布线时连接至电缆或壁环)
  - 转向对应于风机扇叶或风机壳罩上的转向箭头。对于风机的功能性起决定性作用的是气流方向或转向，而不是电机旋转磁场。
  - 接地线被连接。
  - 接线数据与铭牌上的说明是否相符
  - 马达运行电容参数 (单相电机) 与铭牌上的数据是否一致。
  - 安全装置是否已安装到位 (→ 触摸防护装置)。
  - 过热保护器/马达防护开关安装正确，运行良好。

- Motor operating capacitor data (1~ motors) complies with the specifications on the type plate.
- Safety equipment is in place (→ Contact protection).
- Temperature monitor/motor protection switch are professionally connected and operating properly.
- All leftover installation materials and other foreign materials have been removed from the fan cavity.
- Cable gland is sealed (see "Installation").
- Do the installation position and the arrangement of the condensation drain holes in the motor (if available) correspond to each other (does not apply to protection class IP55 fans)?
- Pay attention to the direction of rotation.
- Change rotary direction based on the schematic diagram in the terminal boxes.
- Start-up may only begin when all safety instructions have been verified and any hazards have been ruled out.
- Check for low vibration operation. Strong vibrations due to erratic operation (unbalanced), e.g. caused by transportation damage or improper use, can lead to failure.



## Maintenance, repair, cleaning

- **During all work on Motor in the hazardous area:**
  - Maintenance operation is only to be performed by trained service personnel.
  - Observe the safety and labour regulations (DIN EN 50 110, IEC 364).
  - No maintenance work on running Motor!
  - Open the electrical circuit and secure against being switched back on.
  - Verify the absence of voltage.
  - The rotor must be standing still!
- Regular inspection, if necessary with cleaning, is necessary to prevent imbalance due to ingress of dirt.
- **Wet cleaning under voltage may lead to an electric shock - danger to life!**
- Do not use any aggressive, paint solvent cleaning agents when cleaning.
- **Never use a high-pressure cleaner or spray jet to clean.**
- Avoid letting water permeate into the motor and the electrical installation.
- After cleaning, the motor must be operated for 30 minutes at 80-100% of the max. rpm to let it dry out. This will allow any possibly penetrated water to evaporate.
- Ball-bearings service life
  - The according to standard calculation methods determined bearing service life expectation of the motor-integrated ball bearings is mainly determined by the grease service life F10h and amounts for standard application to approx. 30.000 - 40.000 operating hours. The fan or motor is maintenance-free due to the use of ball bearings with "lifetime lubrication". Once the grease operating life F10h has been reached, it may be necessary to replace the bearing. The bearing service life expectation may change compared to the specified value, if operating conditions such as increased vibrations or shocks, increased or too low temperatures, humidity, dirt in the ball bearing or unfavourable control modes are present. A service life calculation for special applications can be provided on request.
- Take note of abnormal operating noise!
- Watch out for vibration free motion!
- Please consult our service department with regard to changing the bearing as for all other damage (e.g. to the coil).
- On 1~ motors, condenser rating can decrease with time, life expectancy approx. 30,000 hrs. per DIN EN 60252.
- **Outdoor motors: If a motor is stationary for long periods in a humid atmosphere, it should be switched ON for minimum of two hours every month to remove any moisture that may have condensed within the motor.**
- Motors with IP55 degree of protection or higher: open the existing sealed condensation bores at least every six months.

- 清除风机段中的安装剩余材料和其他异物。
- 电缆导入处是否密封良好（参阅“安装”）。
- 是否已打开/关闭安装位置相应的冷凝水排放孔(如果有)(不针对防护等级 IP55 的风机)?
- 注意旋转方向是否正确
- 根据端子盒内的电路图更改旋转方向
- 检查完所有的安全注意事项，并在排除所有危险后方可进行调试。
- 检查风机平稳运转。强烈的振动是由不平衡运行造成的（不平衡），例如运输途中损坏或不当处理造成的。



## 维修、维护、清洁

- **在危险区域内对马达进行作业时：**
  - 只能由经过培训的专业人员才能进行相关作业。
  - 遵守安全及工作规范（DIN EN 50 110, IEC 364）。
  - 切勿对运转中的马达进行维护作业！
  - 在断开电路后的防重启保护。
  - 确定无电操作。
  - 转子必须保持静止！
- 定期检查，并在必要时进行清洁，避免因污物造成不平衡。
- **带电情况下进行湿式清洁时可能造成电击 — 生命危险！**
- 禁止使用侵蚀性、腐蚀油漆的清洁剂。
- **切勿使用高压清洗装置或喷射进行清洁。**
- 防止水进入马达或电气设备内。
- 清洁后必须操纵马达以 80-100% 的最大转速运行 30 分钟进行干燥，以便使进入到内部的水挥发。
- 滚珠轴承使用寿命
  - 根据标准计算方法计算出的电机集成滚珠轴承的轴承使用寿命预测主要取决于润滑脂使用有效期 F10h，在标准应用条件下约为 30,000 - 40,000 个工时。风机或电机因使用带有“长效润滑”的滚珠轴承而免维护。润滑脂使用有效期 F10h 到期后可能需要更换轴承。当给出诸如振动增大、晃动增大、温度升高或过低、潮湿、滚珠轴承中有脏污或不利的调节形式等运行条件时，轴承使用寿命预测可能会相比于所述的数值发生变化。可以根据要求针对特殊应用进行使用寿命计算。
- 留意异常运行噪声！
- 注意运转振动是否正常！
- 请联系我们的服务部门，了解证券交易所以及所有其他损失（如绕组）。
- 对于单相电机，电容器容量将会逐渐减小，符合 DIN EN 60252 规定的预期使用寿命大约为 30000 小时。
- **室外放置：如果马达在潮湿的环境中长期不工作，应保证每月至少运行 2 小时以便使马达内的水挥发掉。**
- 防护等级为 IP55 或更高等级的马达：在冷凝水孔封闭的情况下，应至少每半年打开一次。

- After dismantling and reinstalling an impeller, the entire rotating unit must be rebalanced in accordance with DIN ISO 1940,-1.



## Disposal / recycling

Disposal must be carried out professionally and environmentally friendly in accordance with the legal stipulations.

## CE Manufacturer

Our products are manufactured in compliance with valid international standards and regulations.

If you have any questions about how to use our products or if you are planning special applications, please contact:

**ZIEHL-ABEGG SE**  
Heinz-Ziehl-Straße  
D-74653 Künzelsau  
Phone 07940/16-0  
Fax 07940/16-300  
info@ziehl-abegg.de

## Service address

Please refer to the homepage at [www.ziehl-abegg.com](http://www.ziehl-abegg.com) for a list of our subsidiaries worldwide.

- 在叶轮拆卸和重新安装后，必须根据DIN ISO 1940, T1标准的规定对旋转单元重新进行平衡校准。



## 废物处理/回收

废物处理必须专业、环保，并按照法规执行。

## CE 製造商是:

我们的产品生产符合相关的国际标准和规范。如果您对任何与产品使用相关的问题或计划特殊的应用，请联系：

**ZIEHL-ABEGG SE**  
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## 售后服务地址

有关各国家和地区售后服务网点地址的信息请参见公司主页 [www.ziehl-abegg.com](http://www.ziehl-abegg.com)