

Direct-driven centrifugal fans in housing with IEC standard motor



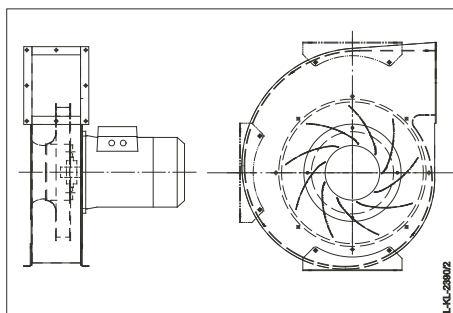
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Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, start-up, 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.

Application



ZIEHL-ABEGG centrifugal fans in housings with IEC standard motors are not ready-to-use products, but rather intended as components for industrial ventilation engineering.



The fans may not be operated until they are installed in line with their intended use. The supplied and certified guard grille of ZIEHL-ABEGG SE fans is designed in accordance with DIN EN ISO 13857 Table 4 (from the age of 14 up). In the event of deviations, further structural protective measures must be taken for safe operation.

ZIEHL-ABEGG centrifugal fans are supplied with IEC standard motors attached directly to the housings. The fan impeller is fastened with the hub directly to the motor shaft

- Designs** (type designation see rating plate):
- RF..P: Drum-type rotors with forward curved blading
 - RG..T/RG..C: Radial impellers with rear-curved blading

直接驱动式离心风机，带外壳和 IEC 标准电机



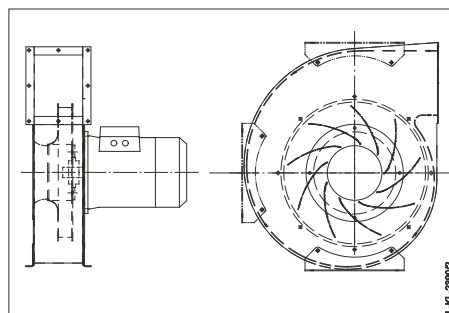
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必须遵守以下指示，以确保功能和安全。尤其是在一般安全、运输、储存、安装、运行条件、调试、维修、维护、清洁和处理/回收等方面，若未注意到所注明的提示，则可能导致产品无法安全运行，并可能会危及用户和第三方的生命安全。

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

应用



带外壳和 IEC 标准电机的 ZIEHL-ABEGG 离心风机不是即用型产品，而是设计用于工业通风设备的组件。



只有在风机按照其相应规定安装后方可对风机进行操作。附带的已获批准的 ZIEHL-ABEGG SE 风机接触防护装置依照 DIN EN ISO 13857 表 4（14 岁以上）设计。当存在偏差时，必须采取进一步的结构防护性措施以确保安全运行。

施乐百径流风机连同直接安装在机箱上的 IEC 标准马达一起供货。风机叶轮直接固定在马达轴上。

系列（型号名称参见铭牌）：

- RF..P: 带前弯式桨叶的鼓形转子
- RG..T/RG..C: 带回弯桨叶的径流叶轮



Safety instructions

- These assembly instructions are part of the product and, as such, are to be kept accessible at all times.
- The impellers are intended only for the transportation of air or mixtures that are similar to air. Usage in potentially explosive areas for the transportation of gas, mist, vapours or their mixtures is not permissible. The transportation of solid materials or similar materials in a transport media is not permissible.
- Operate the fan only in accordance with its intended use and only up to the **maximum permissible operating speed** according to the specifications on the identification plate. Due to the high kinetic energy exceeding the max. permissible operating speed leads to a hazardous situation. **The impeller can burst – danger of death!** The max. allowed operating specifications on the identification plate apply to an atmospheric density of $\rho = 1.2 \text{ kg/m}^3$.
- In order to approve its centrifugal fans with standard motors, ZIEHL-ABEGG carries out extensive qualification tests. Depending on the installation conditions and the other system components in use (e.g. frequency inverter incl. parameter configuration), in individual cases there may be unusual noises and vibrations (resonance) caused by the electricians.
- If the operating voltage differs, the current may change disproportionately. This must be taken into account when a selecting possible frequency inverter and the mains side fuse protection.
- The EMC guideline is to be observed in connection with our control units. If the fans are completed with components of other manufacturers, the manufacturer or operator of the entire plant is responsible for keeping to the EMC guideline 2014/30/EU.
- In case of speed control through a frequency converter, it must be ensured that the max. permissible speed cannot be exceeded due to any frequency converter malfunction.
- In a fan system consisting of a motor, frequency inverter and impeller, impermissibly high vibrations can occur in narrowly limited speed ranges. Continuous duty is not permissible under these conditions. **The impeller could burst - danger of death!**
- Mounting, electrical connection and commissioning may only be carried out by trained specialized personnel who observe the **relevant regulations!**
- Observe the notes in the motor manufacturer's operating instructions, which form part of the supply.
- A thermal motor protection device is essential, see Electrical connection chapter.
- If the fan is installed for free-running intake or exhaust, please check to see whether the safety standards of **DIN EN ISO 13857** are observed. Objects sucked in can be thrown out by centrifugal force and lead to damage or severe injury.
- Pay special attention that there is sufficiently dimensioned safety clearance on the inlet side, as clothes, limbs, or, in the case of large fans, even people can be sucked in due to the fan's suction power.
- Blocking or braking the fan by, say, pushing objects into it is forbidden. This leads to heated surfaces and damage to the impeller.
- It is not possible to exclude a residual risk due to incorrect use, malfunction or force majeure. The designer or constructor of the installation must take suitable safety measures in accordance with DIN EN 12100, e.g. protection devices, in order to prevent hazardous situations arising.

Note on the ErP directive

ZIEHL-ABEGG SE wishes to point out that, based on the directive (EU) no. 327/2011 of the Commission of 30th of March 2011 for enforcing directive 2009/125/EC (hereinafter referred to as ErP directive), the operational area of certain fans within the EU is bound by certain prerequisites. The fan may only be used within the EU when it meets the requirements of the ErP directive.



安全提示

- 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。
- 风机只能用于输送空气或类似空气的混和气体，不能用于危险区域或易燃，易爆气体，雾气及其混合物的通风，也不能用于有固体成分的介质的流通。
- 请按规定用途操作风机，勿超过风机型号铭牌上规定的**最大允许运行转速**。超过最大允许运行转速将导致由于高动能引起的危险情况。**叶轮可能会断裂——生命危险！**型号铭牌上的最大允许运行数据对空气密度 $\rho = 1.2 \text{ kg/m}^3$ 有效。
- ZIEHL-ABEGG 使用标准电动机进行广泛的资格测试，用于释放其离心风机。取决于安装情况和使用的其它系统组件（例如，包括参数设置的变频器），在个别情况下可能导致声学 and 振动技术的异常（共振），这是电气造成的。
- 在工作电压不同时，电流可能发生比例过大的变化。在选择变频器及电源侧熔断装置时，须考虑到这一点。
- 带有本公司控制器的风机遵循EMC标准。风机与其他部件整合后也应遵循EMC标准2014/30/EU。
- 当采用变频器控制速度时，必须注意确保即使在变频器发生故障时也不超过最大允许转速。
- 对于由电机、变频器和叶轮构成的风机系统，在较窄的转速范围内可能发生未获允许的震动。这将导致不能连续运行的后果。**叶轮可能发生断裂，进而导致人员面临生命危险！**
- 装配，电连接和调试只能由经过培训专业人员完成，此外，这些人员还必须遵守**相关规范！**
- 请注意供货范围内马达生产商使用说明书中的注意事项。
- 请务必使用电机过热保护装置，见电气连接章节。
- 若风机安装在自由运行的抽风或排风口，需遵守 **DIN EN ISO 13857**安全标准，物体吸入被离心力甩出可能会造成破坏或损伤。
- 确保衣物，手臂等离吸风口有足够的安全距离，如果是较大尺寸的风机，整个人都有可能被吸入的危险。
- 禁止向风扇插入异物，阻止其旋转。这会导致叶轮表面发热或受损。
- 由于不正确使用，功能故障或不可预知力造成的风险是无法避免的。设备的规划人员或搭建人员必须根据 **DIN EN 12100**采取合适的措施（例如安装防护装置）确保防止危险情况的发生。

关于遵守ErP指令的说明

施乐百公司特此声明，依据2011年3月30日欧盟委员会关于实施2009/125/EC指令（以下称为ErP指令）第327/201号条例，公司有义务保证使其在欧盟内销售的风扇符合相关的规范。只有满足针对风扇的ErP条例所列要求，才能在欧盟内使用。如果风扇并未贴有CE标记（参见型号铭牌），则该产品不得在欧盟内使用。

If the said fan does not have a CE mark (cf. especially the rating plate), use of this product within the EU is not admissible.

All ErP-relevant information comprises measurements which are determined using a standardised measurement set-up. More details can be obtained from the manufacturer. Further information about the ErP directive (Energy related Products-Directive) can be found on www.ziehl-abegg.de search key: "ErP".



Transport, storage

- ZIEHL-ABEGG centrifugal fans are properly packed in the factory for the agreed to form of transport.
- **Wear safety shoes and gloves for handling!**
- Transport the fan(s) either in the original packaging or, in the case of larger fans, on the dedicated transportation fixtures (housing flange, mounting bracket, holes on the motor housing to attach lifting eye bolts), using a suitable means of transportation.
- Observe the weight data on the type code
- Avoid impacts and collisions, especially on fans set-up on devices.
- Watch out for possible damage to the packaging or fan.
- Store the fan in the original packaging in a dry area protected from the weather or protect it from dirt and weather until final installation.
- Avoid exposure to extreme heat and cold.
- Prevent excessively long storage periods (we recommend a maximum of one year). Before installing, check for the proper functioning of the motor bearing. Comply with the motor manufacturer's specifications concerning this.



Mounting

Installation, electrical connection and commissioning are only to be performed by trained service personnel.

Wear safety shoes and gloves for handling!

- 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).
- The following is applicable to **all** types of centrifugal fans:
 - Avoid structural damage or stress with installation. Make sure the surface is flat and even.
 - Flange and mounting bracket must be level
 - Do not apply force (levering, bending).
 - Fasten using suitable fastening materials
 - Secure all screwed joints (e.g. Loctite, locking plates)
- Observe the safety information!
- In order to prevent transmission of disturbing oscillations, structure-borne noise decoupling of the complete centrifugal fan is recommended. Damping elements are not included in the standard scope of delivery.

Caution: All contact points must be fixed securely to the base. If the fixing is inadequate there is a risk of the fan overturning.

- Ensure adequate clearance on suction and pressure sides.
- Erect in the open air only if this is expressly mentioned and confirmed in the ordering information. There is a risk of damage to the bearings if the fan remains stopped in a moist environment. Avoid corrosion by suitable protective measures. Roofing is required.
- Modifications/conversions to the fan undertaken by the operator are not permissible - safety hazard.



Electrical connection

- May only be undertaken by technically trained personnel (DIN EN 50 110, IEC 364).
- Electrical connection according to the circuit diagram in the terminal boxes.
- 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)!

所有与耗能相关产品指令 (ErP) 相关的数据, 均指在标准化测量装置上进行测量所获得的数据。有关详细信息请向制造商咨询。

关于ErP指令 (耗能产品指令) 的详细信息, 则请登录www.ziehl-abegg.de 检索词: "ErP"。



储运

- 施乐百 (ZIEHL-ABEGG) 径流风机在出厂前按照约定运输方式进行了相应包装。
- **在搬运时请穿戴安全鞋和安全手套!**
- 请使用原包装运输风机。运输较大体积的风机时, 请将风机固定在指定的运输装置 (壳罩法兰、固定弯角、电机壳罩上用于安装环形螺栓的钻孔) 上并使用合适的运输工具。
- 请注意铭牌上的重量说明。
- 避免击打和碰撞, 特别风机安装到设备后。
- 注意避免任何破坏外包装或风机的行为。
- 将原包装的风机存储在干燥、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。请注意马达生产商的注意事项。



安装

安装、接线、调试必须由经过培训的专业人员完成。

在搬运时请穿戴安全鞋和安全手套!

- 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)。
 - 以下要求适用于 **所有** 系列的轴流风机:
 - 请勿在安装时施加拉紧力, 安装面必需保持水平。
 - 法兰和固定角件必须放平
 - 请勿使用暴力 (撬、掰)。
 - 使用合适的固定工具固定
 - 上紧螺栓连接 (例如乐泰胶水, 封边垫圈)
 - 请注意安全注意事项
 - 为了防止振动干扰传输, 建议对整个径流风机紧性固体声解耦。阻尼元件不属于批量供货范畴。
- 注意: 所有支撑点必须与地基连接。如果固定措施不足将导致风机倾倒危险。**
- 确保吸风侧和压力侧有足够的空间。
 - 只有在订购单内明确注明和确定的情况下才可露天搭建。在潮湿环境下, 较长时间的停机可导致轴承损坏的危险。采取相应的防护措施以避免腐蚀。必需搭建遮篷。
 - 不得对风机自行进行改装—安全风险。



电气连接

- 只能由经过技术培训的专业人员 (DIN EN 50 110, IEC 364) 完成。
- 根据端子盒中的电路图进行电连接。
- 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) !
- 请务必注意电机生产商的安全和调试注意事项, 以及电机端子盒内的接线图。

- Ensure that attention is paid to the motor manufacturer's safety and commissioning information and the circuit diagrams in the motor terminal box.
 - 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.
- The thermal motor protection is to be implemented depending on the motor design, observing the motor manufacturer's instructions.
 - For a motor with no temperature monitor in the winding, a motor protection switch is required.
 - For a motor with "TP" temperature sensors (PTC thermistor) a PTC thermistor relay is required, e.g. ZIEHL-ABEGG type U-EK230E with disconnection via a contactor.
On the design with PTC thermistor, observe the max. permitted test voltage of 2.5 V.
 - On a motor with KTY or PT100 temperature sensors, a suitable temperature monitoring unit is required.
 - On a motor with "TB" thermostatic switches, a suitable motor contactor is required, e.g. ZIEHL-ABEGG type STDT16/25 or AWE/SK with disconnection via a contactor.
Caution! Thermostatic switches switch on again automatically after cooling. The constructor of the plant must ensure that the fan does not start up automatically, or that an automatic start-up does not result in any hazard. ZIEHL-ABEGG motor contactors prevent an automatic restart after the drive has cooled.

Frequency inverter and EMC

Interference emission and installation of cables

- In order to prevent faults attributable to interference and to ensure compliance with the radio interference level, the connecting leads must be kept as short as possible both in the motor terminal box as well as in the controller. Spacing between supply cables, motor cable and signal cable should thereby be kept as large as possible.
- When laying shielded lines, never use so-called "pigtailed" on shields (twisting of the shielding braid into strands).
- EMC screwed connections must be used on cable entries.
- High-frequency earthing of the complete drive system must be carried out on both sides on the motor and the inverter in a technically correct manner. Implement a contacting process on a large-scale for good discharge of high-frequency currents for a 360° contacting process by means of EMC shield clips on the inverter and an EMC screwed connection on the motor.
- **Make sure that the cable gland has an electro-conductive connection to the terminal box. If necessary, the available coating must be removed on the contact point or a tooth lock washer used on the counter ring.**
- **Maintenance or emergency switches installed between inverter and motor must also be shielded.**
- **Please observe the corresponding installation instructions of the frequency inverter that is used!**

Reducing bearing currents when operating on the inverter

- When operating on the inverter harmful bearing currents can occur in the motor. This depends on many factors which, in many cases, ZIEHL-ABEGG cannot influence. Thus, it comes down to the expert installation in the respective assembly situation. The following points serve as a guideline, but cannot always prevent bearing currents from occurring.
- To systematically reduce and prevent damage by bearing currents, you must take into account the overall system made up of motor and inverter. But further additional measures may be necessary, e.g. use of all-pole sinusoidal filters or use of hybrid bearings.
- **The ZIEHL-ABEGG Fcontrol frequency inverter is already geared to ZIEHL-ABEGG motors and possesses an all-pole sinusoidal filter so that no**

- 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。
- 电机过热保护措施应符合电机实际结构，对此请咨询电机制造商。
 - 若电机线圈中没有温度监控器，则需电机保护开关。
 - 带有温度传感器"TP" (PTC冷导体) 的电机需冷导体触发器，例如带有触点关断开关的 ZIEHL-ABEGG U-E K230E 型。
注意，带冷导体 (PTC) 型号的允许测试电压最大为 2.5 V!
 - 带有温度传感器 KTY 或 PT100 的电机需合适的温度监测设备。
 - 带有温控开关"TB"的电机需合适的电机保护装置，例如带有触点关断开关的 ZIEHL-ABEGG STDT16/25 型或 AWE/SK 型。
注意！恒温开关在冷却后自动接通。设备建造者须确保风机不自动运行，或不致因自动运行导致危险。ZIEHL-ABEGG 电机保护装置用于避免驱动器冷却后自动启动。

变频器 and EMC

排放和管道铺设

- 为了避免干扰和干扰，以确保符合射频干扰，引线必须在电机的接线盒和所述控制器被保持尽可能短。的供给线，电机电缆和信号电缆之间的距离应尽可能大。
- 当敷设屏蔽线时，需避免屏蔽层的“猪尾巴效应”（屏蔽编织层成股缠绕）。
- 在电缆出线口处请务必使用 EMC 螺旋接头。
- 在电机和变频器双侧按照专业技术要求进行整个传动系统的高频接地。为保证高频电流的畅通，请在变频器上使用 EMC 屏蔽夹及在电机上使用 EMC 螺旋接头实现大接触面积的 360° 触点连接。
- **请注意，电缆螺旋接头与接线箱之间存在导电连接。必要时需清除接触点上的现有涂层，或者使用对接环上的齿盘。**
- **安装在变频器和电机之间的维护开关或紧急停机开关也必须隔离防护。**
- **请遵守所应用变频器的相关安装说明！**

在变频器运行时降低轴承电流

- 当变频器运行时，可能会在电机上出现破坏性的轴承电流。其发生因素有很多，而 ZIEHL-ABEGG 在许多情况下无法干涉。因此，在各安装环境下按照专业意见进行装配尤为重要。下列要点作为指导，但无法保证在所有情况下均可避免轴承电流的产生。
- 为了有针对性地降低并避免轴承电流造成的损害，必须考虑到包括电机和变频器在内的整个系统。而在必要时需采取其他附加措施，例如使用全极正弦滤波器或混合轴承。
- **ZIEHL-ABEGG 变频器 Fcontrol 已根据 ZIEHL-ABEGG 电机调谐，同时配有全极正弦滤波器，因此，在正确安装时不会产生任何破坏性轴承电流。**

第三方变频器

以下措施有助于减少破坏性轴承电流：

- 必须遵守和执行所列示的符合 EMC 规范的安装措施。
- 进行减震器电桥接时，请使用适合高频的由扁铜线编织而成的电位补偿导线，其横截面至少为 16mm²。
- 应尽量增大接触面积。
- 最好使用对称结构的屏蔽连接线。
- 将屏蔽层双侧连接到电机和变频器上。
- 如果由于特殊的边界条件，无法或无法足够地接触到电缆屏蔽层，则需在电机壳和变频器保护接地导轨之间使用一条单独的高频电位补偿导线。

harmful bearing currents at all can be expected with the correct installation.

Frequency inverter, external brand

The following measures support the reduction of harmful bearing currents:

- The specified measures with regard to EMC-compatible installation must be observed and implemented.
- For electrical bridging of vibration dampers, use high-frequency equipotential bonding conductors made of braided flat copper strips with a minimum cross-section of 16mm².
- Design the contacting process on a large-scale.
- Use shielded connecting cables with as symmetrical a design as possible.
- Connect the screen on both sides on the motor and inverter.
- If the cable shield cannot be contacted or not contacted sufficiently due to special framework conditions, use a separate high-frequency equipotential bonding conductor between the motor housing and the protective earth bar of the inverter.
 - Install the separate high-frequency equipotential bonding conductor using braided flat copper strips or high-frequency stranded conductors. Solid copper lines are not suitable for high-frequency earthing due to the current displacement effect.
- Use suitable common mode filters at the inverter output.
- Limit the voltage increase by using suitable output filters (du/dt filters).
- We recommend the use of all-pole sinusoidal filters.
- When using all-pole sinusoidal filters, screened motor leads, metal terminal boxes and a second earth connection to the motor can be omitted.
- **General recommendation: Continuous operation of the fan / motor below 15 % of the nominal speed is not economically and technically reasonable.**



Operating conditions

- Do not operate the fan in an explosive atmosphere.
 - Danger of sparking - danger of explosion!
- Observe the motor manufacturer's instructions.
- Do not exceed the maximum operating speed (fan/impeller rating plate), see the safety notes. The maximum permissible operational revolution speed applies for sustained operation S1. Increased switching repetitions only permissible with gentle step-up by means of frequency converter or with operation without frequency converter by means of Y/D circuit. Do not operate the fan in the resonance range of the impeller - risk of fatigue fracture. When changing the speed, pass rapidly through the resonance range.
- When operating with a frequency inverter, ensure that the function "over-modulation" on the frequency inverter does not lead to an increase in the resonance oscillations. It is mandatory that the overmodulation is switched off.
- A-rated sound power levels of over 80 dB(A) are possible, see product catalogue.
- Corrosion is possible at the cutting edges on sendzimir galvanised parts.



Start-up

- Before first-time start-up, check the following:
 - Account has been taken of the motor manufacturer's information?
 - Installation and electrical connection have been properly completed?
 - All leftover installation materials and other foreign materials have been removed from the fan cavity.
 - When using a motor protection switch, check that it is adjusted correctly. For Y/D activation, the setting should be 58 % of the nominal current if the phase current is flowing via the motor contactor. In other words, do not place the motor contactor before the switch in the power line; it should be between the motor terminals U1, V1, W1.

- 应采用单独的由编织扁铜线或高频绞合线制成的高频电位补偿导线。由于趋肤效应，实心铜导线不适于高频接地。
- 请在变频器输出端使用合适的共模滤波器。
- 请使用适当的输出滤波器 (du/dt 滤波器) 限制电压增加。
- 我们建议采用全极正弦滤波器。
- 使用全极正弦滤波器可以免除电机供电屏蔽电缆、金属接线箱和电机上的第二个地线接头。
- **一般性建议：从经济和技术角度来看，风机/电机在低于额定转速 15% 的情况下持续运行并不合理。**



操作条件

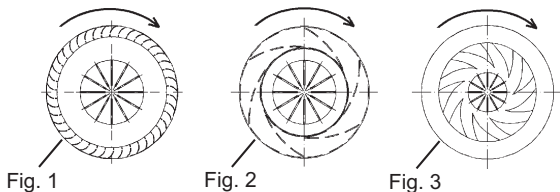
- 不得在爆炸性环境运行风机
 - 由于火花形成造成的危险—爆炸危险。
- 请注意电机生产商的使用说明。
- 不得超过最大允许运行转速 (风机/叶轮铭牌)，参见安全注意事项。最大允许工作转速适于S1长期运行模式。只允许通过变频器的稳步升频或没有变频器时通过星-三角Y/D电路来增加风机的起停频率。不要运行在叶轮的共振频率范围内—会引起疲劳断裂的危险，当调速时要快速通过共振频率范围。
- 在使用变频器时应确定变频器的“过调制”功能不会使共振增强。对过调制功能应可进行强制关闭。
- A计权声功率级可大至80dB(A)，详见产品目录。
- 对于经过森氏镀锌的零部件，其切边可能出现腐蚀。



试运行

- 初次试运行前请检查：
 - 是否遵守了电机生产商调试注意事项？
 - 机械和电气安装是否按照专业方式正确完成？
 - 清除风机段中的安装剩余材料和其他异物。
 - 使用电机保护开关时，请检查开关设置是否正确。星形/三角接线中，若相间电流流经电机保护装置，应调节为额定电流的 58 %。也就是说，电机保护装置不应接在开关装置上游，而应该接在电机接线夹 U1、V1、W1 之间。
- 只有当检查了所有安全注意事项 (DIN EN 50 110, IEC 364) 后方可进行调试，风机根据 (DIN EN ISO 13857) 处于安全运行半径范围，并且排除了危险。
 - 检查运行电流！如果运行电流大于电机性能标牌上的值，则必须立即切断电源。

- Start-up operation may be carried out only if all safety instructions (DIN EN 50 110, IEC 364) have been verified, the fan is outside of the operational range (DIN EN ISO 13857) and all hazards have been excluded.
 - Check the current consumption! If the current consumption is higher than that stated on the motor rating plate, the fan must be disconnected immediately.
 - Verify the rotational direction/direction (rotary direction arrow on the suction side of the fan housing)



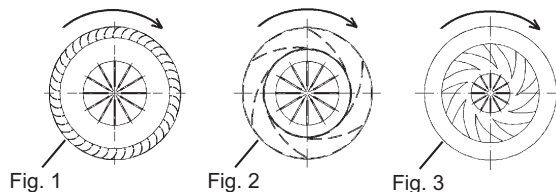
- Watch out for smooth, vibration free motion.
- Find the impeller resonance range. If the resonance range is within the working range, set the frequency converter in such a way that the resonance range will be passed through rapidly. Strong vibrations resulting from irregular running (imbalance), due, for example, to damage in transport, in correct handling or operation within the resonance range can lead to failure.
- Do not operate in the stall range. Operation in an instable range leads to damage of the fan (danger of fatigue fracture).
- Frequently start-up a shutdown of the impeller must be avoided (please ask the supplier).



Repairs and maintenance

- The system constructor must enable easy access for cleaning and inspection work.
- **Wear safety shoes and gloves for handling!**
- Check the fan at regular intervals (recommendation: every 6 months) for mechanical oscillations. Observe the limits specified in ISO 14694 and, if they are exceeded, implement remedial measures (e.g. rebalancing by specialist staff).
- Depending on the use and the medium in which it operates, the impeller and housing are subject to normal wear. Deposits on the impeller can lead to imbalance and hence to damage (risk of fatigue fracture)
 - The impeller can disintegrate - lethal hazard!
 - Observe the motor manufacturer's instructions concerning maintenance and service.
- Allow maintenance work to be carried out by trained specialists only.
- **For all repair and maintenance work:**
 - Observe the safety and labour regulations (DIN EN 50 110, IEC 364).
 - The fan impeller stopped!
 - Open the electrical circuit and secure against being switched back on.
 - When operating by means of frequency converter, ensure that the waiting time is maintained after safety disconnection - see manufacturer's operating instructions regarding capacitor discharge time.
 - Verify the absence of voltage.
 - No maintenance work at running fan!
 - Keep the airways of the fan free- danger because of objects dropping out!
 - Do not deform the blades - out-of balance!
 - Take note of abnormal operating noise!
- Replacement of bearings in accordance with the motor manufacturer's instructions. If required ask for our operating instructions.
- After dismantling and reinstalling an impeller, the entire rotating unit must be rebalanced in accordance with DIN ISO 21940-11
- Please contact our service department about any other damage (e.g. winding damage).

- 旋转方向是否与风机机箱上的旋转方向一致。



- 留意机组的振动情况。
- 找出共振频率范围。如果共振频率在运行范围内，设置变频器使其运行时能迅速跳过共振频率范围。非正常运行（不平衡），例如，由于在运输过程中损坏，不正确操作或在共振区内运行，会引起强烈振动而造成故障。
- 切勿在临界范围内运转风机。在不稳定范围内运转将造成风机损坏（疲劳断裂）。
- 避免频繁起停风机（向生产商咨询）。



维修和维护

- 设备制造商必须确保清洁和检验工作的便利。
- **在搬运时请穿戴安全鞋和安全手套！**
- 请定期检查风机（建议：每六个月一次）的机械振动情况。请注意在 ISO 14694 中规定的极限值，并且在超过极限值时采取矫正措施（例如通过专业人员进行平衡校准）。
- 根据使用范围和传送介质的不同，叶轮和外壳将产生自然磨损。叶轮上的沉积物将造成叶轮不平衡并引起损坏（疲劳断裂危险）。
 - 叶轮可能破裂 — 生命危险！
 - 请注意电机生产商有关维修和维护的数据信息。
- 维修作业只能由经过专业培训的专业人员进行。
- **对于所有维修和维护作业而言：**
 - 遵守安全及工作规范（DIN EN 50 110, IEC 364）。
 - 风机叶轮必须静止！
 - 在断开电路后的防重启保护。
 - 采用变频器运行时请注意维护时间 — 见生产商有关电容器放电时间的操作说明。
 - 确定无电操作。
 - 切勿在风机转动的情况下进行维护作业！
 - 请保持风机风路畅通 — 避免由于飞出物体造成的危险！
 - 防止叶片变形 — 不平衡！
 - 留意异常运行噪声！
- 根据电机生产商的说明书更换轴承。如有必要请向我们索要使用说明书。
- 在叶轮拆卸和重新安装后，必须根据 DIN ISO 21940, T11 标准的规定对旋转单元重新进行平衡校准。
- 出现其它损坏（例如线圈损坏）时请与我们的维修部门联系。

Cleaning

- Regular inspection, if necessary with cleaning, is necessary to prevent imbalance due to ingress of dirt.
 - Clean the fans' s flow area.
- Watch out for vibration free motion.
- Maintenance interval in accordance with the degree of contamination of the impeller!
- You can clean the entire fan with a moist cloth.
- Do not use any aggressive, paint solvent cleaning agents when cleaning.
- **Never use a high-pressure cleaner or water-spray for cleaning - particularly when the ventilator is running.**
- If water enters the motor:
 - Dry off the motor winding before using it again.
 - Replace motor ball bearings.
- **Wet cleaning under voltage may lead to an electric shock - danger to life!**



Disposal / recycling

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

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 for a list of our subsidiaries worldwide.

清洁

- 定期检查，并在必要时进行清洁，以免因污物造成不平衡。
 - 清洁风机的风流通过区域。
- 注意运转振动是否正常。
- 根据叶轮的污染程度不同选择维护周期！
- 可以用湿抹布清洁整个风机。
- 禁止使用侵蚀性、腐蚀油漆的清洁剂。
- **切勿使用高压清洁器或喷射水进行清洁 — 切勿在风机转动的情况下清洁。**
- 如果水进入电机：
 - 在使用之前请对电机的线圈进行干燥处理。
 - 更换电机滚珠轴承。
- **带电情况下进行湿式清洁时可能造成电击 — 生命危险！**



废物处理/回收

废物处理必须专业、环保，并按照法规执行。

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
 Heinz-Ziehl-Strasse
 D-74653 Kuenzelsau
 Tel. 07940/16-0
 Fax 07940/16-300
 info@ziehl-abegg.de

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

EC Declaration of Incorporation

- Translation -
(english)

ZA87-GB 1836 Index 008

as defined by the EC Machinery Directive 2006/42/EC, Annex II B

The design of the incomplete machine:

- Axial fan FA.., FB.., FC.., FE.., FF.., FG.., FS.., FT.., FH.., FL.., FN.., FV.., DN.., VR.., VN.., ZC.., ZF.., ZG.., ZN..
- Centrifugal fan RA.., RD.., RE.., RF.., RG.., RH.., RK.., RM.., RR.., RZ.., GR.., ER.., WR..
- Cross-flow fan QK.., QR.., QT.., QD.., QG..

Motor type:

- Induction internal or external rotor motor (also with integrated frequency inverter)
- Electronically commutated internal or external rotor motor (also with integrated EC controller)

complies with the requirements in Appendix I, Articles 1.1.2, 1.1.5, 1.4.1, 1.5.1 in EG Machinery Directive 2006/42/EG.

The manufacturer is the

ZIEHL-ABEGG SE
Heinz-Ziehl-Strasse
D-74653 Künzelsau

The following harmonised standards have been used:

EN 60204-1:2006+A1:2009+AC:2010	Safety of machinery; electrical equipment of machines; Part 1: General requirements
EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN ISO 13857:2008	Safety of machinery; safety distances to prevent danger zones being reached by the upper limbs
Note:	The maintenance of the EN ISO 13857:2008 relates only to the installed accidental contact protection, provided that it is part of the scope of delivery.

The specific technical documentation in accordance with Appendix VII B has been written and is available in its entirety.

The person authorised for compiling the specific technical documentation is: Dr. W. Angelis, address see above.

The specific documentation will be transmitted to the official authorities on justified request. The transmission can be electronic, on data carriers or on paper. All industrial property rights remain with the above-mentioned manufacturer.

It is prohibited to commission this incomplete machine until it has been secured that the machine into which it was incorporated complies with the stipulations of the EC Machinery Directive.

Künzelsau, 03.09.2018
(location, date of issue)

ZIEHL-ABEGG SE
Dr. W. Angelis
Technical Director Air Movement Division
(name, function)

ZIEHL-ABEGG SE
Dr. D. Kappel
Deputy Head of Electrical Systems
(name, function)

(Signature)

(Signature)