

# Centrifugal impeller without scroll / Plenum Fans



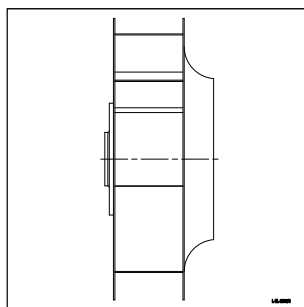
## Contents

Chapter	Page
Application	1
Safety instructions	1
Note on the ErP directive	2
Transport, storage	2
Installing the impeller	3
Electrical connection	4
EMC-compatible installation	4
Setting up the unit	5
Operating conditions	6
Start-up	6
Repairs and maintenance	7
Cleaning	7
Disposal / recycling	8
Manufacturer	8
Service address	8

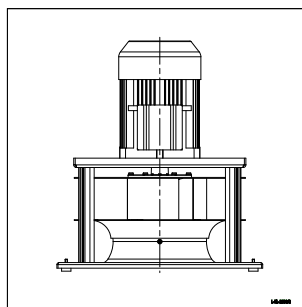


## Application

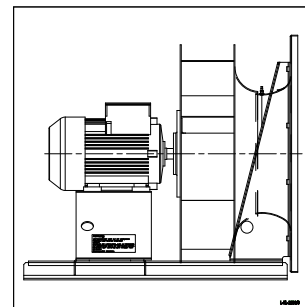
RH..



GR..



ER..



ZIEHL-ABEGG - centrifugal impellers without scroll in the series **RH..** available in sizes **225 to 1120**, and the series **ER..** and **GR..** (type designation see rating plate) are not ready to use products, but designed as components for air-conditioning, air supply and air extraction installations. They may only be operated when they are installed as intended, and when safety is ensured by safety equipment according to DIN EN ISO 13857 (DIN EN ISO 12 100) or by other protection measures.



## 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.
- Only operate the fan according to the intended application, and only up to the **maximum permissible speed** given in the information on the fan/impeller rating plate. Exceeding the maximum permissible speed leads, as a result of the high kinetic energy, to a hazard situation. **The impeller can disintegrate - lethal hazard!** The maximum permissible operating data given on the rating plate are valid from air density  $\rho = 1.2 \text{ kg/m}^3$ .
- 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

# 无蜗壳离心叶轮 / 无蜗壳风机



## 内容摘要

章节	页
应用	1
安全 示	1
关于遵守ErP指令的说明	2
储	2
叶轮安装	3
电气连接	4
符合电磁兼容性的安装	4
风机安装	5
操作条件	6
启用	6
维修和维护	7
清洁	7
废物处理/回收	8
生产商是	8
售后服务地址	8



## 应用

施 百 (ZIEHL-ABEGG) RH.. 系列无蜗壳离心叶轮的直径尺寸从225mm到1120mm, 及ER., GR.. 系列 (型号名称见铭牌) 无蜗壳风机并非为最终产品, 而是专为空调等通风排风设备设计的部件。  
风机只能在所要求的安装状态下, 并符合DIN EN13857 (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转。



## 安全 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动。
- 请务必根据其正确用途进行操作, 且不得超过风机/叶轮铭牌上的最大允许工作转速, 超过最大允许工作转速将会产生很高的动能 (质量乘以转速), 从而造成危险。叶轮有可能破裂 - 生命危险! 铭牌上所标注的允许最大行数据适于  $\rho = 1.2 \text{ kg/m}^3$  的空气密度环境。
- 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。
- 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!

- 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 selecting possible frequency inverter and the mains side fuse protection.
  - 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!**
  - A thermal motor protection device is essential, see Electrical connection chapter.
  - Observe the installation and safety information for the various fan types. Non-observation or misuse can lead to physical injury or damage to the fan or installation.
  - 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.

- 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！
- 请务必使用电机过热保护装置，见电气连接章节。
- 请遵守各种风机的安装和安全注意事项。不遵守或错误使用可能造成身体伤害，以及风机和设备的损坏。
- 若风机安装在自由行的抽风或排风口，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。

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”。

## 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**.

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](http://www.ziehl-abegg.de) search key: "ErP".



## Transport, storage

### Wear safety shoes and gloves for handling!

- Radial impellers or built-in fans type ER../GR.. are generally delivered on europallets, and can be transported using lift trucks.
- When transporting using hoists/cranes: **Construction RH.. without motor:** Fit a sling with adequate strength around two impeller blades. Observe the weight information on the rating plate (back of the impeller baseplate).
- Use only a sling band suitable for carrying sharp-edged loads.
- **Construction ER.. / GR..:** Fan unit may only be lifted and transported when using a suitable hoisting device (load spreader). Ensure sufficient cable or chain length.
- **Caution: Arrange the lifting beam transverse to the motor axis. Ensure that the lifting beam is sufficiently wide. Chain or cable must not touch the fan impeller during lifting! Never stand under the swinging fan, since life can be at risk in the event of a defect in the transporter. Make sure that the weight information on the fan rating plate and the permissible loads of the transporter are always observed.**
- Avoid impacts and collisions, especially on fans set-up on devices.



## 储

在搬 时请穿戴安全鞋和安全手套！

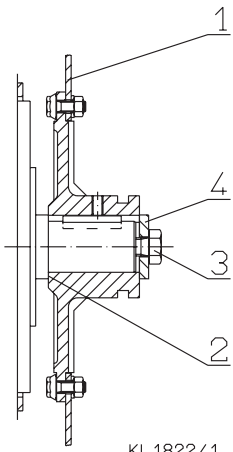
- ER..或GR..型离心叶轮或风机单元通常安装在欧标托盘上供货并可以通过台车 输。
- 采用叉车或起重机 输时：RH..型无马达的离心叶轮，宜采用一定强度的绳索穿过叶轮的两个叶片。遵守铭牌上的重量信息（叶轮背面）。
- 请务必使用合适的吊索起吊边缘锋利的重物。
- ER../GR..型：风机单元只能通过合适的举升工具（支撑横梁）举升并 输。请注意保持绳索和链条的足够长度。
- 注意：将支撑横梁相对电机轴横向安装。请注意保持支撑横梁的足够宽度。在举升时请勿让绳索或链条与风机叶轮触碰。切勿站立在摆动的风机下方，否则如 输工具失灵将产生生命危险。请务必注意风机铭牌上的重量标注信息以及 输工具的允许支撑负载。
- 避免击打和碰撞，特别风机安装到设备后。
- 如损坏请立即通知 输商。
- 请将风机置于干燥，无尘和无振动的环境下存放。
- 防止长时间的存放。请注意电机生产商的注意事项。

- In the event of damage inform the carrying agent immediately.
- Store the fan in a dry, dust- and vibration-free environment.
- Avoid excessive storage times. Please refer to the manufacturer's motor information on this.



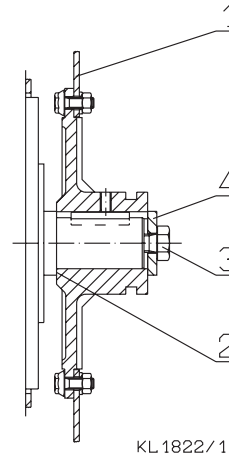
## Installing the impeller

- **Impellers with fixed hub:**
  - The impeller is connected to the shaft end of the drive motor using a fixed hub.
  - Installation: Lightly lubricate all bare surfaces (shaft ends, hub holes). Pull the impeller with the hub (1) up to the shaft shoulder (2) (transitional fit). Secure with the hoisting device with corresponding weight. Secure the axial shaft-locking device using the screw (3) and washer (4) with Loctite. Maintain torques in accordance with table.
  - Disassembly: Release the axial screw connection and pull off the impeller with the hub using a suitable pulling unit (secure with hoisting device at the corresponding weight).



## 叶轮安装

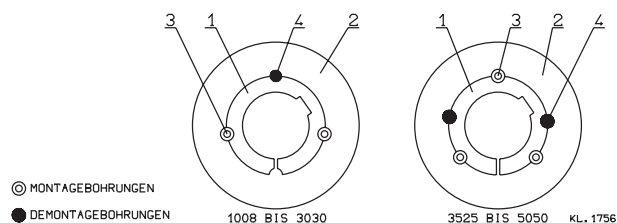
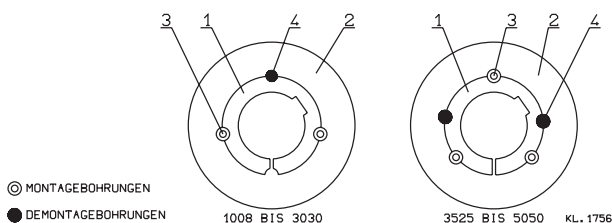
- **带固定轮毂的叶轮:**
  - 叶轮通过固定轮毂与驱动电机的轴端连接。
  - 安装: 对所有裸露的表面(轴端、轮毂孔)进行略微润滑。将轮毂(1)上紧直至轴凸肩(2)(过渡接合)安装时用合适的起吊装置轻轻吊起叶轮。使用轴端螺丝(3)和垫圈(4)及 泰防滑胶锁紧轴端, 相应扭矩参照下面表格。
  - 拆卸: 拧开轴端螺丝, 用适当的拉拔工具从轴上卸下叶轮和轮毂(拆卸时用合适的起吊装置轻轻吊起叶轮)。



SC 8.8	M4	M5	M6	M8	M10	M12
MA	2,8 Nm	5,5 Nm	9.5 Nm	23 Nm	45 Nm	79 Nm

- **Impellers with clamping bush hub:**
  - The impeller is fitted to the end of the motor shaft using bushings.
  - Mounting: Clean and grease all bare surfaces (fitting surfaces of clamping sleeves and motor shaft). Insert clamping sleeve (1) into the hub (2) and line up the holes as shown in the fig. (pg. 3). Lightly oil and screw in the set screws (3) - do not tighten yet.
  - Push the impeller with clamping sleeve (1) load-free (with lifting gear if the impeller is heavy) onto the shaft, align in axial position and tighten the set screws (3) evenly, **tighten with torque according to the table**. Fill empty bore holes with grease to prevent penetration by foreign bodies. After an **operating time of approx. 1 hour**, **re-check the tightening torque** of the screwed connection with the necessary torque.
  - Removal: Loosen all set-screws (3), depending on the size of the bushing, unscrew one or two set-screws completely, oil them and screw them into the removal holes (4). Pull on one or both set-screws, until the bushing (1) comes free of the hub (2). The impeller can now be taken off.

- **带锥形联轴器的轮毂叶轮:**
  - 叶轮通过锥形联轴器与驱动电机的轴端连接。
  - 安装: 清洁所有裸露表面并去除油脂(锥形联轴器内外安装面和电机轴的接合面)。推锥形轴套(1)到轮毂(2)使上面的孔按如图所示(第3页)对, 锁紧螺丝(3)加少量润滑油并部分拧入—不要拧紧。
  - 将带锥形联轴器的叶轮推入轴端, (如果叶轮较重用起吊装置轻轻吊起叶轮), 轴向对中并同时拧紧锁紧螺丝(3), 按照表格中的扭矩拧紧锁紧螺丝。用润滑油填充空孔, 防止外部物体的进入。行接近1小时后, 再次检查锁紧螺丝的拧紧扭矩以达到要求值。
  - 拆卸: 松开所有的锁紧螺丝(3), 根据锥形联轴器的类型, 完全拧下一个或两个锁紧螺丝, 润滑并旋入拆卸孔(4)。拧动锁紧螺丝, 直到锥形轴套(1)与轮毂(2)分开。这时便可以将叶轮拆下。



3 mounting holes, 4 removal holes

3 安装孔, 4 拆卸孔

*1	1008	1108	1210	1610	1615	2012	2517	3020	3030	3525	3535	4030	4040	4535	4545	5040	5050
*2	5.6	5.6	20	20	20	30	50	90	90	115	115	170	170	190	190	270	270

\*1 clamping sleeve, \*2 tightening torque in Nm

\*1 锥形联轴器型号, \*2 拧紧扭矩 Nm



## Electrical connection

- May only be undertaken by technically trained personnel (DIN EN 50 110, IEC 364).
- 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)!
- 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 STD16/25 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.



## 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。
- 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, 以及电机端盒内的接线图。
  - 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 STD16/25 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。

## EMC-compatible installation

### 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.

## 符合电磁兼容性的安装

### 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

- **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 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 16mm<sup>2</sup>.
- 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.**

### Setting up the unit

#### Wear safety shoes and gloves for handling!

- Observe the safety information!
- Structure-borne noise decoupling of the complete built-in fan is recommended to avoid transmission of disturbing vibrations. (Spring or shock-absorbing elements are not usually part of the standard scope of supply). The assignment of the spacing dimensions and the vibration dampers can be found in the associated product documentation (e.g. see catalogue and design software at [www.ziehl-abegg.com](http://www.ziehl-abegg.com)).
- **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.
- ER only permissible with horizontal motor shaft.
- GR installation position depends on the design ordered (H = horizontal, Vu = vertical with intake from below, Vo = vertical with intake from above).

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 16mm<sup>2</sup>。
- 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。
  - 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）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。

### 风机安装

在搬 时请穿戴安全鞋和安全手套！

- 请注意安全注意事项
- 为避免传导干扰性振动，建议对安装风机整体进行隔振。（弹簧元件和阻尼元件不属于标准供货范围内的组分）。间距尺寸和振动阻尼器的分配可参见相应的产品资料（例如产品目录和 [www.ziehl-abegg.com](http://www.ziehl-abegg.com) 上的设计软件）。
- **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覆危险。**
- 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，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 蚀。必需搭建遮篷。
- 不得对风机自行进行改装—安全风险。
- ER 仅允许电机轴水平安装。
- 安装位置尺寸取决于订购型号（H = 水平、Vu = 竖直从底部吸入、Vo = 竖直从顶部吸入）。
- 安装柔性接头时需注意，接头在风机停机状态下不应完全拉紧。
- 私自拆除或增加风机或叶轮的部件后公司不负任何保修，例外：由技术培训过的合格人员（DIN EN 50110, IEC 364）打开接线盒，并进行接线。采用相应螺纹的过线密封胶塞与接线盒连接。

- When fitting a flexible connection fitting, make sure that it is not fitted completely tensioned when the fan is idle.
- Dismantling and attaching components to the fan or impeller results in expiration of the warranty! Exception: the terminal-box cover may be opened so that technically trained qualified-persons (DIN EN 50110, IEC 364) can attach the connection cable. Suitable threaded cable-connections may be attached to the terminal box.



## 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

- Check before commissioning:
  - 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.
  - Does the type of rotor balance (of the motor and impeller) DIN ISO 8821 match each other?
- Fans from ZIEHL-ABEGG SE are delivered balanced in accordance with ISO 21940-11 for the appropriate fan category in accordance with ISO 14694. Check the fan for mechanical vibrations after installation. If the limit values of the corresponding fan category are exceeded in start-up, you must have the motor/impeller unit checked by an expert and rebalanced if necessary before continuous operation is permitted.
- Commissioning is only permissible when all the safety instructions (DIN EN 50 110, IEC 364) have been checked, the impeller is outside the radius of operation (DIN EN ISO 13857) (safety distances to prevent hazard zones being reached) and hazards are 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.**
  - Check the direction of rotation (the rotation direction arrow is on the impeller base plate or on the fan housing)
  - Watch out for smooth, vibration free motion.
  - Determine the resonance range of the impeller. If the resonance range lies in the operating range, adjust the frequency inverter so that the resonance range is quickly run through. Strong vibrations caused by irregular running (imbalance; overmodulation frequency inverter), for instance due to shipping damage, improper handling or operation in the resonance range, can lead to failure.
- Frequently start-up a shutdown of the impeller must be avoided (please ask the supplier).
- When operating with a frequency inverter, check to see whether the function "**overmodulation**" on the frequency inverter leads to an impermissible increase of the resonance oscillations in the operating range (speed range). It is mandatory that the overmodulation is switched off.



## 操作条件

- 不得在爆炸性环境 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 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 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 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。
- 在使用变频器时应该确定变频器的 “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 蚀。



## 启用

- 初次 转首次启用前请检查:
  - 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 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。
  - (电机和叶轮) 转 的平衡方式是否根据 DIN ISO 8821 要求进行?
- ZIEHL-ABEGG SE 的风机在根据 DIN ISO 21940-11 进行交货时针对按照 ISO 14694 标准进行的相应的风机分类是经过平衡的。请在安装之后检查风机的机械振动情况。如在调试时超过相应风机分类的极 值, 必须由专业人员检查电机/叶轮单元, 且必要时在允许长期 行之前进行平衡校准。
- 只有当检查了所有安全注意事项 (DIN EN 50 110, IEC 364) 后才可进行调试, 叶轮根据 (DIN EN ISO 13857) 处于安全 行半径范围, 并且排除了危险。
  - 检查 行电流! 如果 行电流大于电机性能标牌上的值, 则必须立即切断电源。
  - 检查旋转方向 (旋转方向箭头在叶轮背面或机架上)
  - 留意机组的振动情况。
  - 确定叶轮的共振频率范围。如果共振频率范围处于工作频率范围之内, 则变频器的设置应使共振频率范围获得快速通过。由于 转不稳定 (不平衡度: 变频器过调制), 例如: 由于 输损坏、不当搬 或操作所产生的强烈振动可能导致故障发生。
- 避免频繁起停风机 (向生产商咨询)。
- 使用变频器时应通过检查确认变频器的 “过调制” 功能不会使工作范围 (转速范围) 内的共振获得未经允许的增强。对过调制应可进行强制关闭。
- 在 行时间约1小时后 根据对应扭矩表检查紧固螺丝的拧紧扭矩。

- After approximately 1 hour of running time, check the tightening torque of the screws for the value required.



## 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).
- Check the impeller, in particular the weld-seams, for possible cracks.



## 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!**



## 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 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 值, 并且在超过极值时采取矫正措施 (例如通过专业人员进行平衡校准)。
- 根据使用范围和传递介质的不同, 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 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 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。
- 请检查叶轮 (特别是焊缝处) 是否存在裂纹。



## 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 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、 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!



## 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.



## 废物处理/回收

废物处理必须专业、环保，并按照法规执行。

## CE 生产商是

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*  
*Te1. 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](http://www.ziehl-abegg.com)



# EC Declaration of Incorporation

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.

## Manufacturer

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

## The following harmonised standards have been used:

EN 60204-1:2006+A1:2009	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, 12.12.2017

Dr. W. Angelis - Technical Director Ventilation Division

*i.v. W. Angelis*