1 General notes

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.

1.1 Validity

This document is valid for type RE..P / RH..M centrifugal motorised impellers in explosion-proof design, hereinafter also referred to as centrifugal fans.

1.2 Meaning of the assembly instructions

Read these assembly instructions carefully before installation and start-up.
Please note that these assembly instructions only apply to a specific product and not to the complete system!
These assembly instructions help you to work safely on and with the device in question.
The document contains safety instructions that must be complied with as well as information that is essential for fault-free operation of the product.
The assembly instructions must be kept on the product. It must be ensured that all persons who have to perform activities on the product can consult the assembly instructions at any time.
Keep the assembly instructions for continued use. They must be passed-on to all successive owners, users and final customers.

1.3 Target group

The assembly instructions address persons entrusted with planning, installation, commissioning and maintenance and servicing and who have the corresponding qualifications and skills for their job.

2 Safety

2.1 Safety instructions

Danger!

- Non-compliance with the information and safety instructions listed in these assembly instructions can cause serious health and safety risks!
- Assembly and electrical connection may only be carried out by skilled personnel in compliance of applicable standards and these assembly instructions.
- Start-up and maintenance of the product may only be carried out by skilled personnel, who have completed training for correct performance of their work.

Be aware of the following Points:

- Only use the product for its intended purpose.
- Pay attention to the marking on the rating plate. Ex products are marked on the rating plate.
- In an explosive atmosphere, use of these fans is only permissible in Zone 1 and Zone 2, see rating plate.
- Operation only in an environment for which the EPL / device category of the fan is suitable.
- Operation is only allowed in compliance with the specified temperature class, see rating plate.
- Conveying abrasive, adherent and liquid media is not allowed.
- The conveyance of solid matter or solids content in the conveying medium is not permissible and can lead to dangerous situations. ZIEHL-ABEGG rejects any liability for damage of any kind as a result of such use.
- The temperature classes of fan and motor are allowed to be different, but they must be defined according to the ignition temperature of conveying media.
- Operation only up to the maximum permissible speed, see rating plate.
- The fans must be operated in the temperature ranges specified on the rating plate.
- Do not operate the product with iced-up impellers. Parts that become detached can cause danger to life.
- Ensure low-vibration operation and avoid system resonance. Increased vibrations can lead to failure.
- Do not use the product including add-on parts (e.g. guard grille) as a repository or climbing aid, as this will cause material damage due to bending.
- Blocking or braking the fan by inserting objects can lead to personal injury and material damage.
- **The motor overheating protection equipment must be connected.**
  - If the connection is not correct, there is a risk of explosion and the manufacturer's warranty will be voided.
- Protect the motor against excessive heating in accordance with EN 60204.
- If the fan is accessible, guard grilles complying with EN 13857 must be installed. These must not be changed and must be adequately secured.
- Objects which can fall onto the fan from a greater height must not be allowed to enter the impeller.
  - Since a residual risk due to falling objects, incorrect behaviour, etc. cannot be completely ruled out, the designer, operator or manufacturer of the installation or system in which the fan is to be installed, must prevent any potentially hazardous situation from arising by means of appropriate safety measures in line with standard EN ISO 12100.
- Pay special attention to material combinations according to EN 14986.
- The operator is responsible for maintenance of the fan.
- Compliance with the EMC Directive only exists if the fan is directly connected to the main power supply. If the fan is installed in a system or combined with other products, the system manufacturer is responsible for compliance with the EMC Directive.

Responsibility of the operator

- The owner or operator must ensure that the equipment (fan and electrical system) is used according to the description in these instructions and kept in good operating condition.
- The operator shall only put the fan into operation after it has been properly installed.
- The fan must be operated in accordance with the assembly instructions.
- To ensure operability, safety devices (especially the overheating protection equipment) must be checked regularly.
- The instructions for installation and use must be complete and available to operators at all times.
- Operators must be trained with regard to the hazards associated with the operation of an installation in an explosive atmosphere and the intended use of the installation.
- No safety and warning instructions on the fan may be removed, and the operator must make sure that they are legible.
- The persons responsible for the installation, start-up, operation and maintenance of the product must be competent and possess sufficient experience to correctly perform their work.
- In addition, they must be familiar with the European standards and guidelines (at national and regional level and where applicable internal regulations) for safety and hazard prevention.
- Technical modification of the product is not allowed.

2.2 Intended use

Danger!

- The motor impellers are only intended for conveying air or air-like mixtures without solids.
- Only motorised impellers with the ⟨Ex⟩ symbol are allowed for conveying an explosive atmosphere or for installation in an explosive atmosphere.
- Other uses which do not coincide with, or which exceed those specified will be deemed unauthorised unless contractually agreed. Damages resulting from such unauthorised uses will not be the liability of the manufacturer. The user company will assume sole liability.
- Reading these document and complying with all contained instructions -especially the safety notifications contained therein -are considered part of intended use.
- To consider is also the documentation of attached components.
- Observe the permissible temperature classes on the rating plate.
- ZIEHL-ABEGG RE..P/ RH..M centrifugal motorised impellers for categories EPL Gb, Gc for gas with type of protection "h" due to design safety are suitable for conveyance

of explosive atmospheres from groups IIA and IIB.
The following application limits apply:
– maximum pumped medium temperature in the range from -20...+40 °C
– maximum absolute pressure in the range from 0.8 to 1.1 bar
– maximum part by volume, oxygen 21 %
– maximum installation height 2000 m above mean sea level

In addition, a maximum drive motor ambient temperature of +40 °C must not be exceeded. In exceptional cases, motors may also be suitable for operation at ambient temperatures up to 60 °C (see motor rating plate) or installation at altitudes of more than 2000 m above sea level (in some cases with reduced power).

2.3 Special hazards when operating in explosive atmospheres

When operating a fan in an explosive atmosphere and when conveying explosive gases with the fan, comply especially with the following potential hazards and ignition sources stated below:

- Contact between rotating parts (impeller) and stationary parts (inlet nozzle) can result in friction, grinding or impact sparks.
- Development of friction, grinding or impact sparks due to the intake of foreign bodies or through foreign bodies which fall into the fan.
- Development of sparks caused by the discharging or electrostatically charged components. Especially plastic surfaces and surfaces with high layer thickness are a hazard potential due to dust deposits.
- Hot surfaces, e.g. due to an overload or through frictional heat caused by contact of rotating parts with stationary parts.
- Strong vibrations (e.g., due to imbalance) which can lead to parts becoming hot (e.g., due to a bearing defect) or due to rotating and stationary parts touching each other.
- Release of an explosive atmosphere from the inside to the outside or from the outside to the inside, thus resulting in an explosive atmosphere (zone entrainment).

2.4 Explanations of symbols

Safety instructions are highlighted with warning triangles and are depicted according to the degree of hazard as follows.

	**Danger!** General hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!
	**Danger due to electric current** Danger by dangerous, electric voltage! Death or severe injury can occur if the corresponding precautions are not taken!

Information
Important additional information and advice for user.

2.5 Product safety

Only install and operate the product and its accessories in perfect condition and in compliance with the instructions. Operation outside of the technical specifications of the product, see rating plate and appendix/technical data, may lead to a defect and cause further damage!

Information
A separate fault and performance monitoring-system with an alarm signal function is necessary in order to prevent personal injuries and material damages during malfunctions and in case the product fails. Substitute operation must be taken into consideration! The local provisions and regulations must be observed when planning and constructing the system.

2.6 Requirements placed on the personnel / due diligence

Persons entrusted with any planning, installation, start-up, maintenance and servicing in connection with the product must have the corresponding qualifications and skills for their job.
In addition, they must be knowledgeable about the safety rules, directives, accident prevention regulations and the corresponding national, regional and in-house regulations. Personnel undergoing training, instruction, or on apprenticeship may only work on the product under the supervision of an experienced person. This also applies to personnel in general training. The legal minimum age must be observed.

2.7 Working on the product

Information
Mounting, electrical connection, and start-up operation may only be carried out by an electrical specialist in accordance with electrotechnical regulations (e.g. EN 50110 or EN 60204 / IEC 60204!
All work on explosion-proof products may only be carried out by specially qualified persons (e.g. TRBS 1203, section 3.1).

Danger due to electric current
- It is forbidden to carry out work on live device parts. The degree of protection for the open device is IP00! Potentially fatal voltages can be touched directly.
- Do not insert any objects or limbs through openings.
- The safe isolation from the supply must be checked using a **two-pole** voltage detector.
- Maintenance work may only be carried out by suitably qualified personnel.

Danger due to automatic restart!
- The fan/motor may switch on and off automatically for functional reasons.
- After mains failure or mains disconnection an automatic restart of the fan takes place

after voltage return! The fan must therefore be disconnected from voltage before doing any work.
- Wait for the fan to come to a complete standstill before approaching it!

Danger of being sucked in!
Do not wear loose or hanging clothing, jewellery, etc., tie together long hair and cover it.

Danger!
A-rated sound power levels of over 80 dB(A) are possible, see product catalogue.

2.8 Modifications/interventions on the product

Danger!
For safety reasons, no unauthorised interventions or modifications may be made to the product. All planned modifications must be authorised by the manufacturer in writing.

Use only genuine spare parts/ genuine wearing parts and genuine accessories from ZIEHL-ABEGG. These parts are designed especially for the product. Parts acquired from other sources are not guaranteed to be designed and produced in accordance with the load and safety specifications.
Parts and optional equipment not supplied by ZIEHL-ABEGG are not approved by ZIEHL-ABEGG for use.

2.9 Operator's obligation of diligence

- The contractor or owner must also ensure that the electric systems and equipment are operated and maintained in accordance with electro-technical regulations.
- The owner is obliged to ensure that the product is operated in perfect working order only.
- The product may only be used for the intended purpose.
- You must periodically examine the safety equipment for their properly functioning condition.
- The assembly instructions and/or operating instructions must always be kept available at the place of use of the product in a legible condition.
- These persons are regularly instructed in all applicable questions regarding occupational safety and environmental protection and are knowledgeable regarding the assembly instructions and/or operating instructions and, especially, are familiar with the safety instructions contained therein.
- No safety and warning notices attached to the product may be removed and must remain legible.

3 Product overview

3.1 Application

ZIEHL-ABEGG centrifugal motorised impellers from the RE..P/RH..M model range (for type designation see rating plate) in explosion-proof design are not ready-to-use products, but are designed as components for ventilation devices, machines and systems. The motorised impellers are rated S1 for continuous service.

Prerequisites for operation

- Operation is only permissible when the products have been installed in accordance with their intended use.
- Safety must be ensured by protective devices according to DIN EN ISO 13857 / EN 60529.
- The required structural explosion protection measures must be in place according to EN 14986 and IEC 80079-36, -37.

3.1.1 Scope of application

The motorised impellers satisfy the requirements for device group II IIB explosion-proof fans and therefore are not suitable for device group I applications (underground or mining, cooling/ventilation of rotating electrical machinery and combustion engines) and may not be used in these areas. The device group is specified on the rating plate of the relevant motorised impeller.

3.1.2 Explosion protection zone

The RE..P, RH..M2, motor impellers are only intended for conveyance of air or zone 1, EPL Gb and zone 2, EPL Gc explosive atmospheres. Conveyance of solids, solid parts or dust/air mixtures is not permitted.

3.1.3 Equipment class

The RE..P, RH..M motorised impellers for EPL Gb and Gc are approved for use in or for conveying explosive atmospheres in explosion groups IIA and IIB in accordance with EN 60079-20. Use in or with other explosive atmospheres of Group IIC is not permitted. The gas explosion group is specified on the rating plate of the relevant motorised impeller.

3.1.4 Temperature class

Operation of RE..P, RH..M motorised impellers for EPL Gb and Gc is not allowed in environments with ignitable or explosive gases whose ignition temperature is lower than the maximum surface temperature of the relevant motorised impeller.
The maximum surface temperature is determined by the temperature classes T3 or T4 specified on the rating plate.

Plant manufacturers and operators must ensure the following:

- The surface temperature of the motorised impeller and attached devices does not exceed temperature class T3 or T4.
- The ambient air through the air flow around the motor does not rise above 60 % of the maximum permissible ignition temperature.

The motors used be in temperature class T3 or T4.

According to DIN EN ISO 80079-36 the following correlation exists between the temperature class and the maximum surface temperature:

Temperature class	Max. surface temperature
T1	450 °C
T2	300 °C
T3	200 °C
T4	135 °C
T5	100 °C
T6	85 °C

3.1.5 Motor impeller marking

Example for marking an RE..P, RH..M motorised impeller:
Ⓔx II 2G Ex h IIB T4 Gb
A motor impeller marked in this manner would meet the following requirements.

Ⓔx: General Ex marking

- **II:**Group II requirements compliant with Directive 2014/34/EU, not suitable for underground applications
- **2G:** Category 2, gas explosion protection outdoors
- **h**: General marking previously “c” for constructional safety
- **IIB:** Gas explosion group
- **T4:** Temperature class
- **Gb:** EPL = Equipment protection level

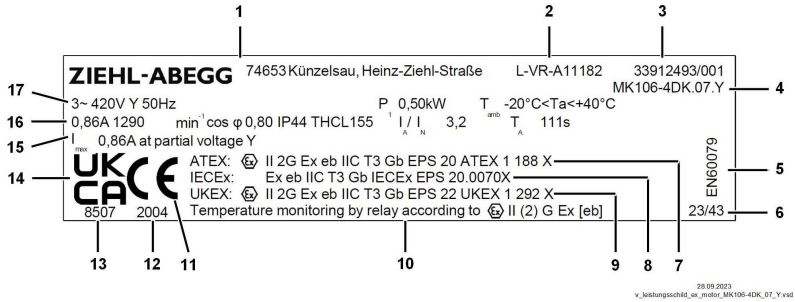
The local process parameters should be compared with the specifications for intended use and the data on the rating plate.
Other uses which do not coincide with, or which exceed those specified will be deemed unauthorised unless contractually agreed. Damages resulting from such unauthorised uses will not be the liability of the manufacturer. The user company will assume sole liability.

3.2 Rating plate

There are two rating plates on the product:

1. The rating plate for the motor contains the maximum permissible data certified by the notified body.
2. The rating plate for the centrifugal motorised impeller applies to the fan final product. These specifications are decisive for installation and operation. Operation is only allowed in compliance with these specifications.

example rating plate motor (2014/34/EU)

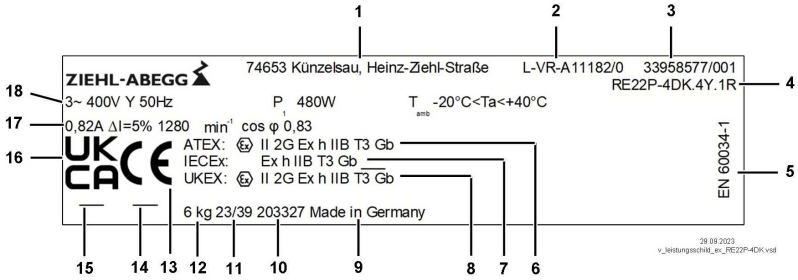


1	Manufacturer with Address	10	Requirements for the motor monitoring device: temperature monitoring via relay according Ex II(2)G
2	article number motor	11	European mark of conformity
3	serial number motor	12	European accreditation number
4	Motor type	13	UK accreditation number
5	Product standard	14	UK mark of conformity
6	Year and calendar week of production	15	Maximum current in partial voltage range
7	ATEX marking and test certificate	16	Rated current Rated speed Power factor cos phi Protection class IP Thermal class THCL Starting current to rated current ratio Switch-off time TA
8	IECEx marking and test certificate		
9	UKEX marking and test certificate	17	Type of current Rated voltage Rated frequency rated power P1 Operating temperature range

Information

The voltage on the motor rating plate may be significantly higher with the same circuit than the voltage specified on the fan rating plate.
The advantage of this design can be explained using an example:
If the fan loads the motor with a significantly lower power input than the stamped motor power input, we can make use of the voltage reduction.
The motor is designed for a higher voltage than the 400 V line voltage, e.g. for 500 V. This improves the electrical properties at 400 V and results in optimum fan control properties. All electrical values in the fan and motor rating plate data thus necessarily differ.

Example rating plate for centrifugal motorised impeller



1	Manufacturer with Address	13	European mark of conformity
2	Motorised impeller article number	14	European accreditation number, if available
3	Motorised impeller serial number	15	UK accreditation number, if available
4	fan type	16	UK conformity symbol, if available (place-holder)
5	Product standard	17	Rated current Current increase Rated speed Power factor cos phi
6	ATEX marking		
7	IECEx marking and test certificate, if avail-able (placeholder)		
8	UKEX marking, if available (placeholder)	18	Type of current Rated voltage Rated frequency rated power P1 Operating temperature range
9	Country of manufacture		
10	Customer article number (if available)		
11	Year and calendar week of production		
12	Product weight		

Information
A fan rating plate and a motor rating plate are located on the product. Another identical fan rating plate and motor rating plate are stuck onto the title page of the enclosed assembly instructions during production.

3.3 Transport, storage

Danger!
- Observe the weight specifications (see rating plate) and the permissible carrying loads of the means of transport.
- Wear safety clothing / shoes and cut-resistant safety gloves when handling!
- Do not transport the fan by the connecting cable!
- Avoid shocks and impacts to the device during the transport.
- Avoid extreme humidity, heat or exposure to cold (see technical data).
- Improper storage can result in preliminary damage to the motor, which may lead to premature failure. Only after correct installation do the motors comply with the specified degree of protection.
- Watch out for possible damage to the packaging or fan.

- Secure pallets during transport.
- Do not stack pallets.
- Only handle with suitable hoisting gear.
- Never stand underneath the suspended fan because defective transport equipment could cause death.
- Store the fan / motor in the original packaging in a dry area protected from the weather and protect it from dirt and weather until final installation.
- Avoid prolonged storage; we recommend a maximum of one year (consult the manufacturer before starting if stored for longer).
- Inspect the bearing for proper operation prior to installation.
  – Recommendation: Turn the impeller evenly by hand to avoid jamming and damaging the bearing.

3.4 Disposal

Disposal must be carried out professionally and in an environmentally friendly way in accordance with the respective national legal stipulations.
▷ Separate the materials by type and in an environmentally-friendly way.
▷ If necessary, commission a specialist company with the waste disposal.

4 Mounting

4.1 General notes

Danger!
- Check the fan for damage, e.g. cracks, dents or damage to the electric cables, before assembly. Start-up is not allowed in the case of transport damage!
- Mounting is only to be undertaken by trained service personnel. The system manufacturer or the machine builder and/or the user is responsible that the inherent installation and security information are harmonized with the valid standard and guidelines (EN ISO12100 / 13857).
- Wear safety clothing / shoes and cut-resistant safety gloves when handling!
- If necessary, lift the fan out of the packing with a hoisting unit.
- At a weight greater than 25 kg for men / 10 kg for women, the fan should be lifted out by two persons (according to REFA). The values may differ from country to country.
- If the fan is located in danger zone, then the manufacturer or operator shall ensure that hazards shall be prevented by appropriare protective constuctions which meet the requirements to EN ISO 13857.
- The custom designs must suit the prevailing conditions.
- Tighten the fastenings with the specified torques.
- Do not allow drilling chips, screws and other foreign bodies to reach the device interior!

- Any use in ambient temperatures below -10 °C is dependent on not being subjected to unusual, sudden or mechanical loads or stresses on the material (for the min. permissible ambient temperature please see the technical data).
- Before the first switch-on, remove any items that may be present (borings, screws and other foreign objects) from the intake area - risk of injury from any objects that may fly out!

⚠ WARNING

Parts of the rotor or the entire rotor coming loose in case of a fault (e.g. excessive vibrations)

can result in personal injury and material damage.

▷ Use guard grilles or suitable design measures for critical applications (e.g. refrigerating systems with refrigerant subject to the ordinance on hazardous substances).

4.2 Special installation features for explosion-protected motor impellers

In terms of material selection, due to special protective measures relating to possible contact surfaces between rotating and stationary components (impeller end plate, cover disk / inlet nozzle), ZIEHL-ABEGG centrifugal motor impellers satisfy the requirements of the EN 14986. standard.
Galvanised steel plate is used as the material for the rotating component of the motor impeller (impeller end plate, cover disk). If the motor impeller is purchased without a ZIEHL-ABEGG inlet nozzle, the system manufacturer is responsible for selecting the material for the stationary peripheral parts. Only material pairs complying with EN 14986 may be used.

4.2.1 Installation, protection from external influences

Install the motor impeller in a housing or in the system with no distortion or tension and protect it against the effects of external forces and vibrations (e.g. transfer of vibrations from other system components through the foundations or through the connected pipes and ductwork).
To attach the motor impeller to the stationary motor flange, use screws with strength class 8.8 and fit with suitable screw locks.
Permitted torques: for M6 = 9.5 Nm; for M10 = 46 Nm.
Certain operating points/speeds may not be used if resonances occur due to add-on parts. The system manufacturer must carry out a check for resonances during commissioning.
In the case of a vertical motor axis, the respective lower condensation hole must be open. The motor impeller should be installed in such a way that easy inspection and cleaning are possible (good accessibility of inspection hatches).
Upstream or downstream components, or those directly in the air flow, must not have any unprotected aluminium or steel surfaces.

4.2.2 Protect from the penetration of foreign bodies

Fans that take in air from or blow out air to the outside must be protected against ingress of foreign bodies by a guard grille.
Guard grilles must also be installed if intake or falling in of foreign bodies cannot be ruled out despite pipes and ductwork being connected.
At least protection class IP20 in compliance with EN 60529 must be guaranteed for the entire system at all times.
It must be ensured that no rust particles or rust flakes are deposited on surfaces.

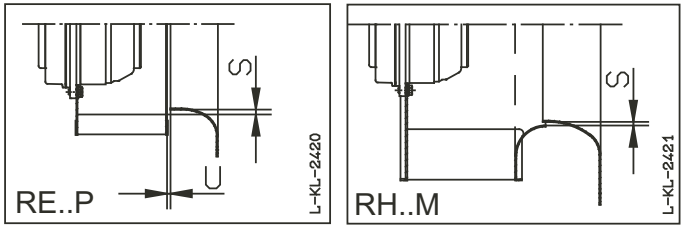
4.2.3 Protection against contact with rotating and stationary parts

Ensure that the gap “U” or “S” (see following figures) is uniform.
To comply with the material pair stipulated in EN 14986, the following minimum gaps must be maintained:

- The minimum gap between rotating and stationary parts may not be less than 0.5 % of the relevant contact diameter (diameter of a rotating part at the point where it can come into contact with a stationary part), but not less than 2 mm in an axial or radial direction, and it must not be more than 13 mm.
- **RE..P**: To achieve optimum power, the axial gap “U” should be max. 1-2 % of the nominal diameter of the impeller. Larger axial gap dimensions have a negative impact on the power of the motor impeller. The system manufacturer must ensure that the minimum and maximum gap “U” are adhered to.
- Surrounding housing or system parts must also maintain the required minimum clearance to the rotating fan parts!
- Comply with the permissible material combinations of rotating and stationary housing) parts according to DIN EN 14986.

A **copper** inlet nozzle can be ordered from ZIEHL-ABEGG SE as an accessory. This complies with the specified material pair.

Danger!
The following principle applies in general:Fans that do not comply with the required minimum gap dimensions must not be put into operation under any circumstances!



The following minimum gap dimensions between the impeller and the inlet nozzle must be maintained, depending on the relevant contact diameter

Series/-Frame size	Relevant impeller contact diameter	Required minimum gap 0.5 % of contact diameter, but a minimum of 2 mm
	DSI in mm	S in mm
RE20P	163	2
RE22P	186	2
RE25P	205	2
RE28P	233	2
RE31P	258	2
RE35P	297	2
RE40P	327	2
	DE in mm	S in mm
RH31M	200.5	2
RH35M	236.5	2
RH40M	265.5	2
RH45M	298	2
RH50M	334.5	2
RH56M	375	2
RH63M	418	2.1
The possible contact diameter corresponds to the internal diameter at the aspirating hole in the impeller, which is specified on ZIEHL-ABEGG SE dimension sheets as “DSI” (RE..P) or “DE” (RH..M).		

Danger!
Always check the gap dimension with a feeler gauge before start-up. Safe operation is only guaranteed if it is compliant.

4.2.4 Sealing

To keep the possible overflow of explosive atmosphere from inside to outside to a minimum, the housing, the inspection hatches or doors and the suction and pressure side air duct connections must be suitably sealed. The system manufacturer is responsible for sealing of the housing and the system.