Explosion proof fans
KTEX/DKEX – Presafe 17 ATEX 9970 X

Operation and Maintenance Instructions

GB

Document in original language | 141815 · A004

systemair

Contents

1 EU Declaration of conformity

Manufacturer

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The manufacturer hereby declares that the following products:

Centrifugal fans DKEX/KTEX		
EU-type Examination Certificate (ATEX)	Presafe 17 ATEX 9970 X	DNV GL Nemko Presafe AS (2460)
Quality Assurance Notification (ATEX)	Presafe 16 ATEX 8871 Q	DNV GL Nemko Presafe AS (2460)

(The declaration applies only to a product in the condition that it was delivered in and that was installed in the facility in accordance with the included installation instructions. The insurance does not cover components that are added or actions carried out subsequently on the product).

Comply with all applicable requirements in the following directives:

- ATEX Directive 2014/34/EU
- Machinery Directive 2006/42/EC
- EMC Directive 2014/30/EU

The following harmonized standards are applied in applicable parts:

EN 60 079-0:2012/A11:2013	Explosive atmospheres — Part 0: Equipment - General requirements.
EN 60 079-7:2015	Explosive atmospheres — Part 7: Equipment protection by increased safety ''e''.
EN 14986:2007	Explosive atmospheres — Design of fans working in potentially explosive atmospheres.
EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction.
EN 13857	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs.
EN 61000-6-2	Electromagnetic compatibility (EMC) – part 6-2: Generic standards - Immunity for industrial environments.
EN 61000-6-3	Electromagnetic compatibility (EMC) – part 6-3: Generic standards - emission standard for residential, commercial and light-industrial environments.

Skinnskattberg 26–04–2018

Mats Sándor

Technical Director

2 Safety information

Danger

- Before maintenance, service or repair cut the power supply (all-pole breaker) and the impeller to stop.
- Mounted safety equipment must not be removed, bypassed or be disabled!
- Cleaning with a damp cloth when the fan is energized can cause electric shock!
- The fans may have sharp edges and corners, which can cause cutting injuries.
- Wear safety shoes and gloves for handling!

The installation instructions are part of the product and should be stored so that it is always available. The manufacturer of the system or the plant is responsible for the installation and that safety instructions are compliant with the applicable regulation.

DKEX/KTEX are certified according to ATEX Directive. Fan Category for fans is BV3 quality grade G6.3 according to ISO 14694. The field of explosion protection is stated on the fan rating plate (for example Exe IIB T3). The fan fulfils the requirement for zone 1 but does not separate zones. Fan may be used in explosive environments for the transport of gas, but not the transport of hot fumes.

The fans are designed for transport of air or explosive atmospheres in Zone 1 and Zone 2. Transport of solids, shares of solids or mixtures of dust/air is not allowed. The transported air must not corrode the fan housing, fan blades or motor (aluminium and steel). Rust particles may not occur in the airflow.

Resonance vibrations can occur due to mounted components and should be checked during commissioning.

The fans must not be installed outdoors.

Installation, electrical connection and commissioning may only be performed by qualified personnel and in accordance with applicable requirements and regulations for electrical installations in areas with explosive atmospheres.

Installation, inspection and maintenance in accordance with EN 60079-14/-17 are considered to meet the requirements. Fan must be installed and protected against foreign objects that come in contact with moving parts and may cause sparks.

No moving parts should be accessible after installation (EN ISO 13857).

Inspection and cleaning should be done regularly, cleaning of deposits will prevent imbalance of the impeller. The panels that holds the fan can be relative heavy. Make sure that all the parts are correctly reassembled after inspection/ cleaning (see chapter 8).

Protective earth (PE) must be connected, the external ground wire connection is placed on the motor. Electrical connections must be made according to the wiring diagram. When the fan is controlled the current can increase at regulated voltage, the power must never exceed the rated power, see table 1. Data provided on the rating plate applies to air with density of 1.2 kg/m^3.

Use of electronic or transformer based control devices is permitted. Motors are equipped with PTC resistors in triple execution. More than two PTC resistor chains may not be connected in series, as this can lead to indefinite suspension. Max. test voltage of PTC resistors are 2.5 V.

Inspection and maintenance of the temperature monitoring unit shall be made according to instructions and according to a time interval specified in the certificate and instruction manual of the temperature monitoring device.

Motors are supplied with open drain holes.

Important

- DKEX/KTEX must be installed with an EX certified temperature monitoring unit.
- Speed control using frequency inverter is not permitted.
- Current dependent protection is not permitted and must not be used as secondary protection either.
- The fan current/power must not exceed the current/power specified on the fan rating plate at rated voltage. By increasing the static back pressure the fan can be throttled up to a lower current/power if a speed control is not in use.

Table 1

Rated data										Min. static back pressure (Pa)				
Fan type	Voltage/Frequency	P (kW)	I A [1]	rpm min-max	Isol. Class	Weight kg	Min. flow m³/h	Max. flow m³/h	Imax Cntrl.(A) [1]	1	2	3	4	5
KTEX 50-25-4	230V(Δ) 3~ 50Hz	0,5	1,52	500–1470	F	17,0	200	1800	1,64	0	0	0	40	110
	380-400V(Y) 3~ 50Hz	0,5	0,88	500–1470	F	17,0	200	1800	0,95	0	0	0	40	110
KTEX 50-30-4	230V(Δ) 3~ 50Hz	0,9	3,1	470 - 1490	F	22,5	200	2560	3,27	0	0	0	0	40
	380-415V(Y) 3~ 50Hz	0,9	1,8	470 - 1490	F	22,5	200	2560	1,9	0	0	0	0	40
KTEX 60-30-4	230V(Δ) 3~ 50Hz	1,3	3,9	415 - 1450	F	30,5	200	3150	4,35	0	0	30	105	250
	380-415V(Y) 3~ 50Hz	1,3	2,25	415 - 1450	F	30,5	200	3150	2,5	0	0	30	105	250
KTEX 60-35-4	230V(Δ) 3~ 50Hz	2,1	6,8	590 - 1480	F	35,5	200	3750	8,0	0	0	0	0	225
	380-415V(Y) 3~ 50Hz	2,1	3,9	590 - 1480	F	35,5	200	3750	4,6	0	0	0	0	225
KTEX 70-40-6	230V(Δ) 3~ 50Hz	1,6	6,2	330 - 985	F	48	200	5100	6,5	0	0	0	0	0
	380-415V(Y) 3~ 50Hz	1,6	3,6	330 - 985	F	48	200	5100	3,76	0	0	0	0	0
DKEX 225-4	230V(Δ) 3~ 50Hz	0,5	1,52	490 - 1470	F	13,0	200	1800	1,64	0	0	0	55	125
	380-400V(Y) 3~ 50Hz	0,5	0,88	490 - 1470	F	13,0	200	1800	0,95	0	0	0	55	125
DKEX 250-4	230V(Δ) 3~ 50Hz	0,9	3,1	460 - 1470	F	17	200	2600	3,27	0	0	0	10	60
	380-415V(Y) 3~ 50Hz	0,9	1,8	460 - 1470	F	17	200	2600	1,9	0	0	0	10	60
DKEX 280-4	230V(Δ) 3~ 50Hz	1,3	3,9	390 - 1475	F	24	200	3150	4,35	0	0	45	155	300
	380-415V(Y) 3~ 50Hz	1,3	2,25	390 - 1475	F	24	200	3150	2,5	0	0	45	155	300
DKEX 315-4	230V(Δ) 3~ 50Hz	2,1	6,8	555 - 1495	F	35,5	200	3850	8,0	0	0	15	40	300
	380-415V(Y) 3~ 50Hz	2,1	3,9	555 - 1495	F	35,5	200	3850	4,6	0	0	15	40	300
DKEX 355-6	230V(Δ) 3~ 50Hz	1,8	6,5	310 - 980	F	39	200	5300	6,5	0	0	0	0	0
	380-415V(Y) 3~ 50Hz	1,8	3,76	310 - 980	F	39	200	5300	3,76	0	0	0	0	0

Step	1	2	3	4	5
Voltages 230V 1~	80V	105V	130V	160V	230V
Voltages 400V (Y) 3~	95V	145V	190V	240V	400V
Voltages 230V 3~(Δ)	55V	85V	110V	140V	230V

[1] *The current may only exceed the rated currents on the rating plate by the ratio (%) given as long as the total power consumption does not exceed the rated power given.*

2.1 Specific conditions for safe use (1-5)

1. The fan's rating plate displays the fan's data at rated voltage. In order for the fan's permitted current and power consumption not to be exceeded the fan may need to be pressurised with a minimum back pressure according to table 1.
2. PTC protective circuits in the motors must be connected to monitoring apparatus certified according to ATEX Directive that isolates the motor from voltage supply immediately when activated.
3. When fans are installed in a duct system, the duct system must meet enclosure classes IP20 at the inlet and outlet. Components that contribute to the enclosure protection must be of suitable material and durability.
4. Fans are only intended for fixed installation. The motors' connection cable on KTEX is secured with cable ties in order to guide the cable correctly in relation to the hinge on the hatch. Attachment must be carried out so that the cable can still be extended after fixing without the cable insulation being damaged.
5. Ambient temperature and temperature of transported air should remain within the range –20 to +40 °C. Fans must not be run at flows below 200 m³/h at ambient temperature of 20 °C. There is otherwise a risk that the exhaust temperatures are higher than the permitted ambient temperature.

Table 2 Table rating and ambient temperature

Model	Phase	Supply voltage	T_{amb}
KTEX 50-25-4	3	230V (Δ) AC 50Hz	–20°C to +40°C
DKEX 225-4		380-400V (Y) AC 50Hz	
KTEX 50-30-4—KTEX 70-40-6		230V (Δ) AC 50Hz	
DKEX 250-4—DKEX 355-6		380-415V (Y) AC 50Hz	

3 Transport and storage

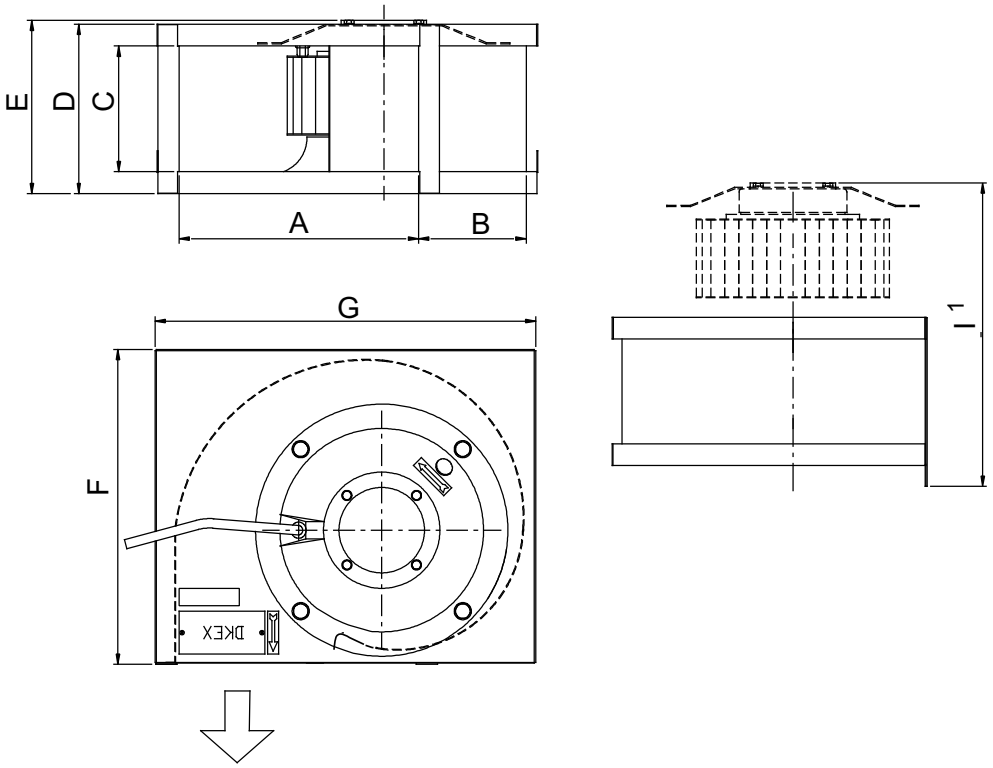
The fan is packed at the factory to withstand normal handling during transit. Avoid blows and shock loads. Store the fan in a dry, dust-free place without damaging vibrations (v eff <0.2 mm/s) to avoid bearing damage. Avoid long storage periods (we recommend max.1 year). Before installing the fan, check the motor bearings for noise (spin the impeller carefully by hand).

Caution

- When handling the goods, use suitable lifting equipment in order to avoid damage to fans and personnel.
- Do not lift the fan in any cable, junction box or the impeller.

4 Technical data

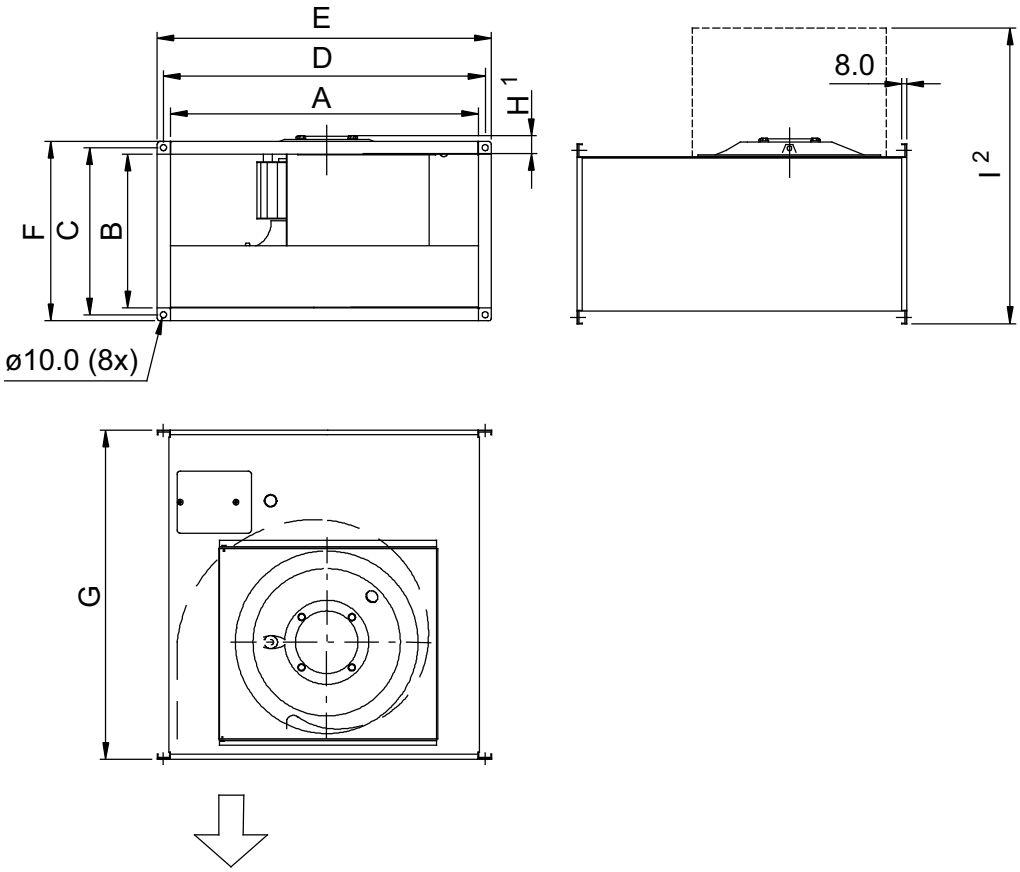
4.1 Dimensions DKEX



Model	A	B	C	D	E	F	G	I [1]
DKEX 225	280	133	145	196	196	367	445	337
DKEX 250	315	154	165	216	243	410	492	375
DKEX 280	357	169	180	230	248	453	547	413
DKEX 315	400	188	203	254	276	515	615	465
DKEX 355	450	213	227	278	320	574	689	489

1 *Minimum dimensions to remove the motor out of casing*

4.2 Dimensions KTEX

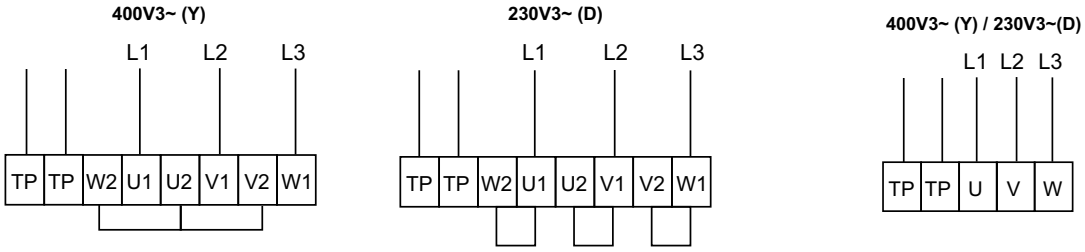


Model	A	B	C	D	E	F	G	H [1]	I [2]
KTEX 50–25	498	248	270	520	540	290	532	34,5	610
KTEX 50–30	498	298	320	520	540	340	562	34,5	695
KTEX 60–30	598	298	320	620	640	340	642	52	715
KTEX 60–35	598	348	370	620	640	390	717	54,5	805
KTEX 70–40	698	398	420	720	740	440	787	50	900

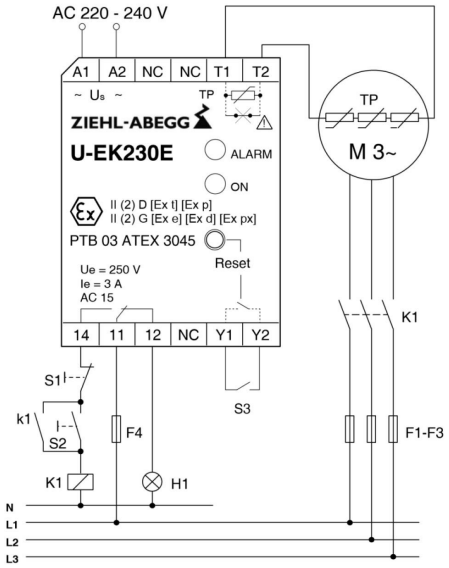
1 *Dimensions from the motor bolts*
2 *Dimensions with fully opened hatch*

4.3 Wiring

4.3.1 Cabling



4.3.2 Sample motor protection



Us = supply voltage

S1 = off switch

S2 = push button on

S3 = push button external reset

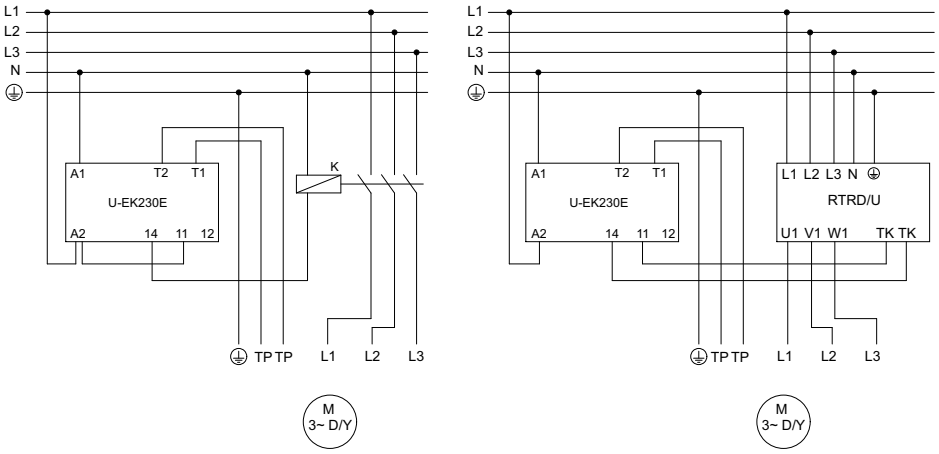
H1 = indicator lamp fault

F1-F4 = fuses

K1 = contactor

TP = PTC thermistor

4.3.3 Sample wiring



5 Installation

Always read the safety information before installation. The fan is intended for fixed installation. Installation requires an inspection of the hazardous area to be done according to applicable regulations and classification standards (within the EU, EN 60079-10).

Installation according EN 60079-14 deemed to meet the installation requirements in the EU. Compliance with the Directive 2014/30/EU "Electromagnetic Compatibility" applies only when the product is directly connected. Integrated into an electrical system or combined with other components (e.g. controls/control equipment) the installer/plantholders are responsible for compliance.

The installation must be set up at a safe distance to transmitter units or protected with suitable screens.

Before starting installation check for any transport damage and that the impeller do not touch parts of the fan housing (distances must not be less than 3 mm at any point). Ambient temperature and the conveyed air temperature should be between -20°C and +40°C. DKEX/KTEX are intended for continuous operation within the specified temperature range.

The fan can be mounted in any direction. Install DKEX/KTEX in the correct air direction (arrow on housing). The fan must be installed so that service and maintenance can be performed easily and safely. Make sure the fan is firmly fixed and securely anchored. DKEX/KTEX must be installed so that vibrations can not be transmitted to the duct system or building structure.

Disturbing air noise can be avoided by installing silencers (accessory).

Duct installations must be carried out so that ingress protection class IP 20 (mesh width less than 12mm) is fulfilled on the inlet and outlet side. Parts that assure the IP classification must be correctly designed with regard to strength and material.

Rust particles must not be present in the air stream.

Components that are installed before or after the fan or that are in the direct air stream may not have unprotected aluminium or steel surfaces. A surface protection that at least fulfills the crosscut test parameter of 2 / DIN EN ISO 2409 is necessary to prevent an aluminothermic reaction.

Mains circuit breaker must precede the fans. Electrical connection carried out according to wiring diagram, chapter 4.3. Wiring diagram must be available in the workplace. All fans for 3-phase (Δ/Y) are supplied from factory wired for 400V 3-phase (Y). If electrical connections are made inside explosive environment then the used components must be intended for the relevant Ex environment. When the free end of the permanently connected cable terminates in hazardous area, it shall be protected by type of protection listed in clause 1 of EN 60079-0:2012. The mains supply for explosion proof fans must be fixed. Supplied with extended connection cable.

If there is a risk of lightning strikes the installation must be protected with suitable lightning protection.

The connection cable on KTEX is secured with cable ties in order to guide the cable correctly in relation to the hinge on the hatch. Attachment must be carried out so that the cable can still be extended after fixing without the cable insulation being damaged.

5.1 Installation example

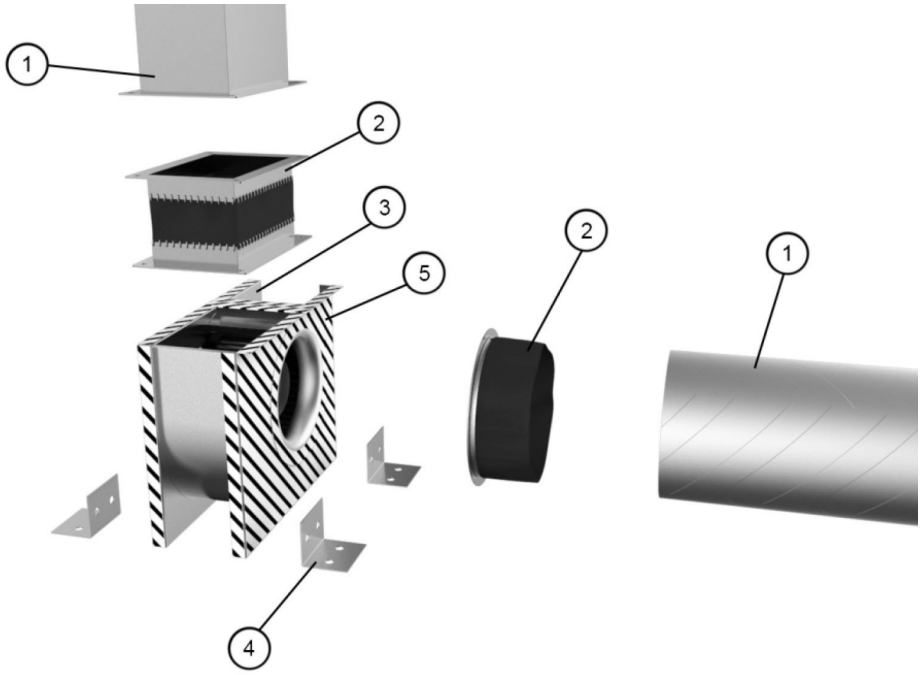


Fig. 1 DKEX

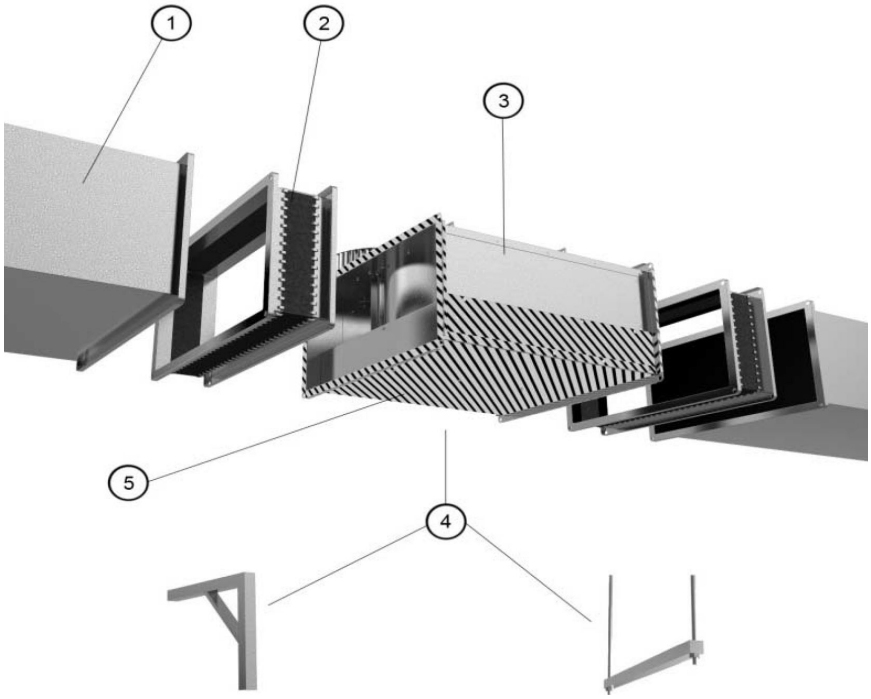


Fig. 2 KTEX

Installation examples (figure 1 , figure 2) only function as a guideline for installation where dimensioning of suspension devices must be carried out by the installer and adapted to the prevailing conditions. Fans (3) can be installed using brackets or suspended mountings (4). If any form of suspension device or bracket is installed on the fans the distance to moving parts must not be less than 25 mm. Screw or rivet joints must be adapted for the purpose and cleaning of the fan must be carried out after completed installation. The dashed areas (5) are suitable for installation of ducts and any suspension devices. Ducts (1) should be connected to fans using collars (2).

6 Checklist

Always read the safety instructions prior to commissioning. Before starting for the first time, ensure that:

- The ambient temperature, humidity, dirt in the environment and the air's corrosive properties have been taken into consideration.
- The impeller do not hit parts of the fan housing (min. 3 mm).
- Installation and electrical wiring are carried out in a professional manner
- Safety equipment is installed
- Any installation debris and foreign objects are removed from the impeller and air intake area.

Warning

Loose objects inside the casing may be flung out!

- Protective conductor and external earth conductor are connected.
- Cable glands are sealed
- PTC resistors and monitoring units are professionally connected and fully functional.
- Connection data corresponds with the data on the rating plate: Max. voltage +6%, -10%, according to IEC 38. Rated current/power must not be exceeded at rated voltage.
- Static back pressure may not be lower than the minimum table 1.
- The voltage of controllable fans is permitted to vary between 15 % and 100 % of nominal voltage with a transformer and between 25 % and 100 % with a thyristor.
- Speed control using a frequency converter is not allowed.
- Motor protection functions.

7 Commissioning

Commissioning may only take place if all safety instructions and controls according the checklist is performed without comment. When putting into operations check that:

- No moving parts is touching the housing (min. 3 mm).
- The impeller direction of rotation is correct (direction arrow on casing).
- The fan runs smoothly without abnormal noise and that the operation is without vibrations. (Strong vibrations due to imbalance, e.g. caused by transport damage or improper handling can lead to damage, check for imbalance as necessary.)
- All electrical conducting components are grounding through contact washers.
- The fan is not controlled by extensive on and off regulation.
- The fan are intended for continuous operation S1. The control must not allow any extreme switching modes!
- A-weighted sound pressure levels above 70 dB(A) can occur, see the product catalogue, www.systemair.com.

Note:

If the fan is stationary for longer than a week in a damp environment it must be in operation for at least 2 hours every week to remove any condensation in the motor.

8 Maintenance

Caution

Always read the safety information before maintenance or service.

Repair or replacement of components is not permitted on DKEX/KTEX. For other questions about the fan, contact technical support. Cleaning interval should be in proportion to how fast the impeller becomes dirty. Disassembly of the impeller is not allowed.

Motors are completely or partly covered by antistatic painting or coating, which is able to derivate electric charges. A repaint may lead to dangerous static charges and is therefore not allowed

Check that:

- The installation is accessible for cleaning and inspection work.
- No Ex atmosphere is present before switching of the fan.
- That the fan is not energized and the current circuit is interrupted and secured against restart.
- The impeller has stopped before any maintenance/cleaning begins.
- Applicable health and safety regulations are followed (EN50 110, IEC 364).

Danger

Cleaning with fluids when the fan is connected to voltage can cause an electric shock – danger to life!

- Under no circumstances may a high pressure cleaner or water jet be used.
- No aggressive solvents may be used as cleaning agents
- The cleaning should be carried out in the air flow and in the in and outlet area.
- Loose screws must be attached
- If the motor protection has tripped, check that the fan is not blocked. Contact the manufacturer if the fan does not start after you have checked and reset motor protection.
- After cleaning the fan must run for 30 min. at 80–100 % of it's rated voltage to fully dry out. This allows that any water that has entered to evaporate.

After maintenance or servicing, check that:

- There is no abnormal noise and that the operation is without vibrations.
- The impeller balance weights have not been moved and that the impeller blades have not been bent.

9 Other

The fan should be inspected and cleaned when necessary but at least once a year so that imbalance and excessive wear on the bearings is avoided. At any sign of wear or latest after 40,000 h, a bearing exchange is required, contact technical support. A filter before the fan inlet can extend the fan cleaning interval. At other damages (eg, cable and cable glands), please contact technical support.

If the screws need to be changed then the strength class of new screws must be at least 8.8 and with suitable screw locking. Required tightening torques M6=9,5 Nm, M8=23 Nm and M10=46 Nm.

Should fans be on stock or put into operation after a long period, or if they have been exposed to condensation during an extended period, the motor winding insulation resistance must be measured before the fan is put into operation. If the values are equal to/less than 1.5 Mohm, the motor winding must be dried. Contact technical support for instructions.

The fan mainly consist of recycled materials that can be recycled again when the service life of the product has ended. Check and follow the relevant legislation for recycling.

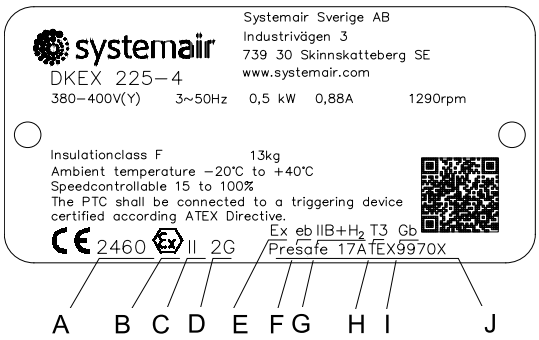
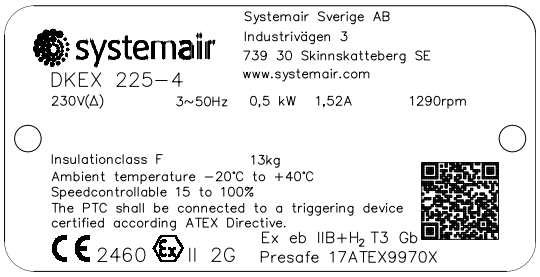
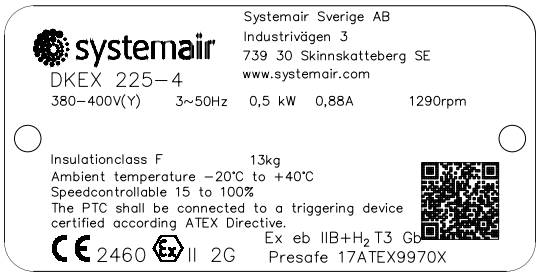


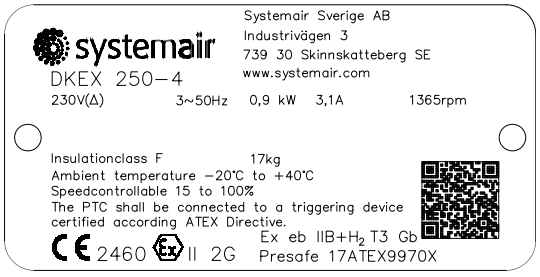
Fig. 3 Name plate

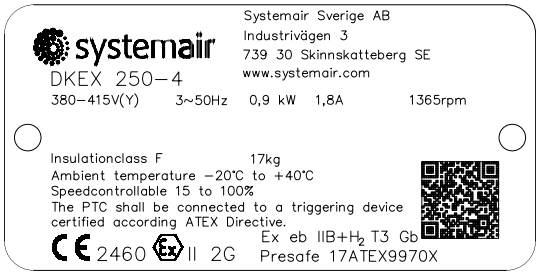
A	Id. nr. of Notified Body
B	The Epsilon-X mark indicates that the equipment comes under ATEX
C	Equipment group II is intended for use in areas with explosive gas, except mining gas
D	Category 2, zone 1, G = potentially explosive gas mixture can be occasionally expected to during normal operation.
E	Explosion-protected material
F	Type of protection e = increased protection against sparks
G	Apparatus group IIB (also applies to IIA)+H_2 also applies to hydrogen
I	EPL Equipment Protection Level
H	Temperature class T3, max. surface temperature for fan casing and motor is 200 °C, can be used for gas mixtures with ignition temperature exceeding 200 °C
J	Certificate Number

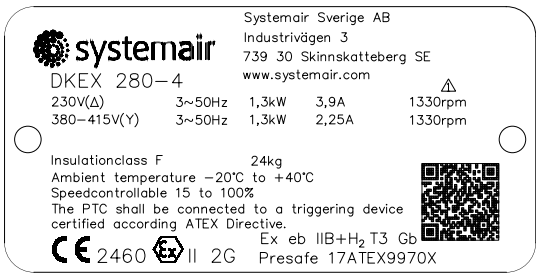
9.1 Name plates DKEX

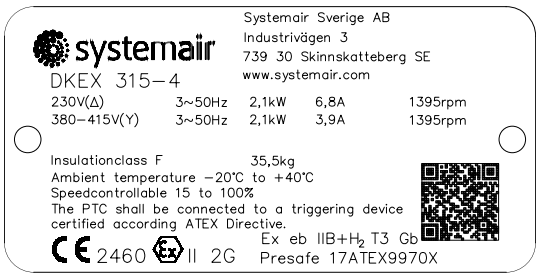


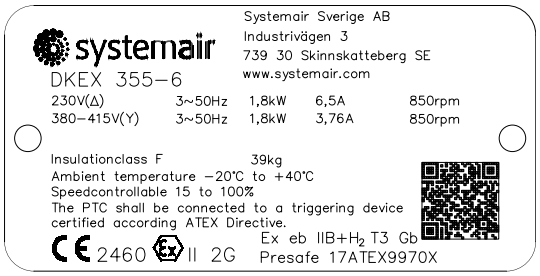




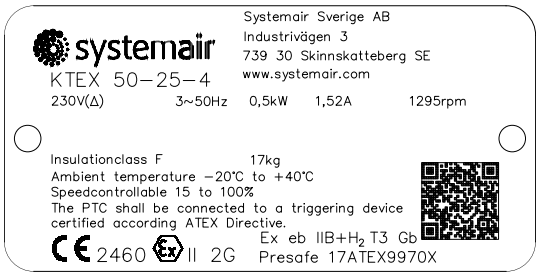


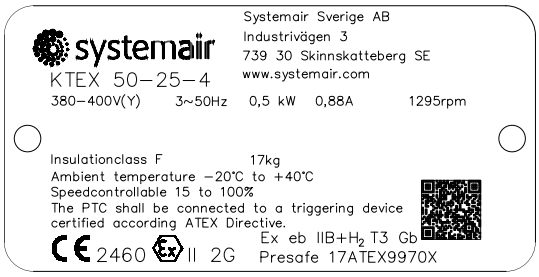


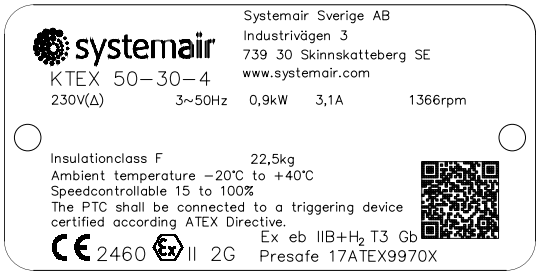


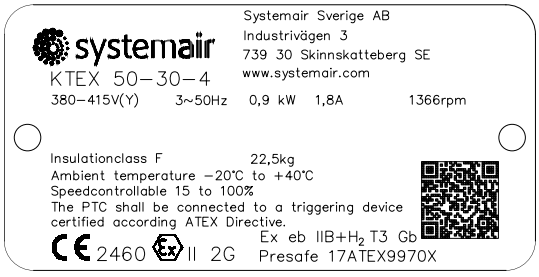


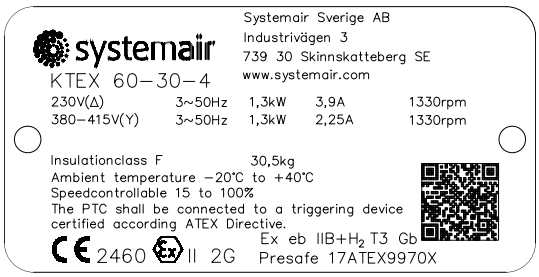
9.2 Name plates KTEX

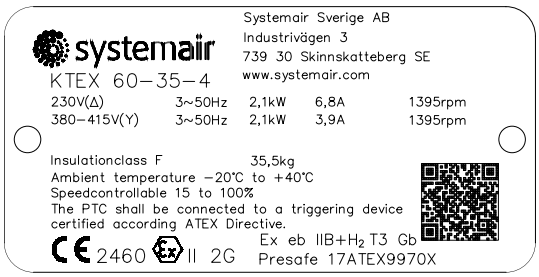


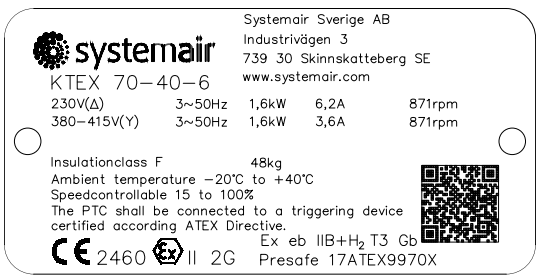












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