

Safety notes

For EC and DC built-in fans

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1. CONTENTS

1. SAFETY REGULATIONS AND NOTES

| | |
|---------------------------------------|---|
| 1.1 Hazard levels for warning notices | 1 |
| 1.2 Staff qualification | 1 |
| 1.3 Basic safety rules | 1 |
| 1.4 Voltage and current | 1 |
| 1.5 Safety and protective functions | 2 |
| 1.6 Electromagnetic radiation | 2 |
| 1.7 Mechanical movement | 2 |
| 1.8 Emissions | 2 |
| 1.9 Hot surface | 2 |
| 1.10 Transport | 2 |
| 1.11 Storage | 2 |
| 1.12 Disposal | 2 |

2. INTENDED USE

3. CONNECTION AND START-UP

| | |
|------------------------------|---|
| 3.1 Mechanical connection | 3 |
| 3.2 Electrical connection | 3 |
| 3.3 Checking connections | 4 |
| 3.4 Switching on the device | 4 |
| 3.5 Switching off the device | 4 |

4. MAINTENANCE, PROBLEMS, POSSIBLE CAUSES AND REMEDIES

| | |
|------------------------|---|
| 4.1 Safety inspections | 5 |
|------------------------|---|

1. SAFETY REGULATIONS AND NOTES

Please read this document carefully before starting work with the device. Observe the following warnings to prevent malfunctions or danger to persons. This document is to be regarded as part of the device. The device is only to be sold or passed on together with this document. This document may be duplicated and forwarded for information about potential dangers and their prevention.

1.1 Hazard levels for warning notices

This document uses the following hazard levels to indicate potentially hazardous situations and important safety regulations:



DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. The measures must be strictly observed.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Exercise extreme caution while working.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or damage of property.

NOTE

A potentially harmful situation can occur and, if not avoided, can lead to property damage.

1.2 Staff qualification

Only authorised electricians are permitted to install the device, to carry out a test run and to perform work on the electrical installation. The device may only be transported, unpacked, operated, maintained and otherwise used by trained and authorised technical staff.

1.3 Basic safety rules

The safety hazards associated with the device must be assessed again following installation in the final product. Note the following when working on the device:

→ Do not make any modifications, additions or conversions to the device without the approval of ebm-papst.

1.4 Voltage and current

Check the electrical equipment of the device at regular intervals. Replace loose connections and defective cables immediately



DANGER

Device electrically charged

Electric shock

→ When working on an electrically charged device, stand on a rubber mat.

WARNING

Terminals and connections may be live even with the device switched off

Electric shock

→ Wait five minutes following after disconnecting the voltage at all poles before touching the device.



Safety notes

For EC and DC built-in fans

CAUTION

In the event of a fault, the rotor and the impeller will be energised

The rotor and the impeller have basic insulation.
→ Do not touch the rotor and impeller once installed.

CAUTION

If control voltage is applied or a speed setpoint is stored, the motor will restart automatically, e.g. after power failure.

Risk of injury
→ Keep out of the device's danger zone.
→ When working on the device, switch off the mains power and ensure that it cannot be switched back on.
→ Wait until the device stops.

Leakage current greater than 3.5 mA requires a fixed earth conductor connection. The device can be earthed using two earth conductors, each with a cross-section equal to that of the phase conductor, or one earth conductor with at least 10 mm².

1.5 Safety and protective functions



DANGER

Missing guard and/or non-functioning safety device

Without a protective device there is a risk of serious injury, for instance when reaching into the device during operation.

- Only operate the device with or in a fixed protective device and guard grille. The safety barrier must be capable of withstanding the kinetic energy of a fan blade.
- The device is a built-in component. The operator is responsible for providing adequate protection.
- Stop the device immediately if a safety device is found to be missing or ineffective.

DANGER

Loose objects in flow area

The air flow in the device may lead to loose objects moving and causing injuries.
→ Ensure that there are no loose objects in the flow area.

DANGER

Weight clips may become loose and cause injuries
→ Please take measures to prevent injuries.

NOTE

Increased speed causes the noise level to rise
→ Please wear hearing protection.

1.6 Electromagnetic radiation

Interference from electromagnetic radiation is possible, e.g. in conjunction with open and closed-loop control devices. If impermissible radiation levels occur following installation, appropriate shielding measures have to be taken before being market introduction.



NOTE

Electrical or electromagnetic interference after installing the device in customer equipment.

→ Verify that the entire set-up is EMC-compliant.

1.7 Mechanical movement



DANGER

Rotating device

Risk of injury to any parts of the body coming into contact with the rotor and impeller.

→ Secure the device against accidental contact. Wait until all parts have come to a standstill before starting work on the installation/machine.

WARNING

Rotating device

Long hair and dangling items of clothing and jewellery can become entangled and be pulled into the device. Risk of injury.

- Do not wear any loose-fitting or dangling clothing or jewellery while working on moving parts.
- Protect long hair with a cap.

NOTE

Operating an imbalanced device can lead to unwanted vibrations. This can damage the device. Remove any imbalances or consult ebm-papst.

1.8 Emissions

WARNING

Depending on the installation and operating conditions, the sound pressure level may exceed 70 dB(A).

Risk of noise-induced hearing loss

- Take appropriate technical safety measures.
- Protect operating personnel with appropriate safety equipment, e.g. hearing protection.

1.9 Hot surface



CAUTION

High temperature at the electronics enclosure

Risk of burns

→ Ensure sufficient protection against accidental contact.

1.10 Transport



CAUTION

Transporting the device

- Transport the device in its original packaging only.
- Use a lashing strap, for example, to stop the device slipping.

1.11 Storage

Store the device in the original packaging in a clean and dry environment that offers protection from the weather. Protect the device against environmental effects and dirt until final installation. We recommend storing the device no longer than one year. Maintain the storage temperature.

1.12 Disposal

Observe all the relevant local requirements and regulations with regard to disposal of the device.



Safety notes

For EC and DC built-in fans

2. INTENDED USE

The device is exclusively designed as a built-in device for conveying air according to its technical data. Any other usage above and beyond this does not conform with the intended purpose and constitutes misuse of the device. Customer equipment must be suited to the mechanical, thermal and service life demands involved.

Intended use also includes

- Using the device in neutral-earthed power systems only (applies only to three-phase devices).
- Conveying air with a density of 1.2 kg/m³.
- The device is only to be used at the permissible ambient temperature.
- Operating the device with all protective devices.
- Compliance with all safety instructions.

Non-intended use

Operating the device in the following ways in particular is prohibited and could be hazardous:

- Conveying air that contains abrasive particles.
- Conveying highly corrosive air, such as salt spray. Exception: Devices designed for salt spray with corresponding protection.
- Conveying air with high dust pollution, e.g. suctioning off sawdust.
- Operating the device close to flammable materials or components.
- Operating the device in an explosive atmosphere.
- Using the device as a safety component or to perform safety-related functions.
- In addition, all applications not listed among the intended uses.

If you have special questions, consult ebm-papst for support.

Electromagnetic compatibility



If several fans are switched in parallel on the mains side so that the line current of the arrangement is in the range of 16-75 A, then this arrangement conforms to IEC 61000-3-12 provided that the short-circuit power S_{sc} at the connection point of the customer system to the public power system is greater than or equal to 120 times the rated output of the arrangement. It is the responsibility of the installation engineer or operator/owner of the device to ensure, if necessary after consultation with the network operator, that this device is only connected to a connection point with a S_{sc} value that is greater than or equal to 120 times the rated output of the arrangement.

3. CONNECTION AND START-UP

3.1 Mechanical connection



CAUTION

Cutting and crushing hazard when removing device from packaging

→ Lift the device out of its packaging carefully, taking care to avoid any impact.

→ Wear safety shoes and cut-resistant safety gloves.



CAUTION

Heavy load when unpacking device

Risk of physical injury, such as back injuries.

→ Two people are required to lift the device out of its packaging if it weighs more than 10 kg. Use a suitable lifting system if the device weighs more than 50 kg.

→ Install the device in a way that is suitable for the respective application.

→ Make use of suitable fasteners for installation.

3.2 Electrical connection



DANGER

Voltage at the device

Electric shock

→ A protective earth must always be connected first for devices that are not supplied with SELV. Alternatively, install the device in the application in a way that prevents brush contact. When removing the device, ensure that the protective earth is always disconnected last.



DANGER

Faulty insulation

Risk of fatal injury from electric shock.

Check the insulation for damage before commissioning the device.

→ Use only cables that meet the specified installation requirements for voltage, current, insulation material, load etc.



DANGER

Electrical load (>50 µC) between mains wire and protective earth connection after switching off supply when switching multiple devices in parallel.

Electric shock, risk of injury

→ Make sure that sufficient protection against accidental contact is provided.

Before working on the electrical connection, the connections to the mains supply and PE must be shorted. (Does not apply to DC-supplied devices).

CAUTION

Voltage

The device is a built-in component and has no isolating switch.

→ Only connect the device to circuits that can be de-energised with an all-pole disconnection switch.

→ When working on the motor, you must switch off the system/machine in which the motor is installed and secure it from being switched on again.

CAUTION

Electric shock

Electric voltage on the metal part

→ Only use the device with the intended cable guard (applies



Safety notes

For EC and DC built-in fans

only to devices with terminal box).

NOTE

Risk of subjecting devices to interference

→ Maintain a distance to the power supply line when routing the control lines of the device. Maintain the greatest possible clearance.

Recommendation: Distance > 10 cm (separate cable routing) (does not apply to DC-supplied devices).



Leakage current greater than 3.5 mA requires a fixed earth conductor connection. The device can be earthed using two earth conductors, each with a cross-section equal to that of the phase conductor, or one earth conductor with at least 10 mm² (does not apply to DC-supplied devices).

Prerequisites

- Check whether the data on the type plate match the connection data.
- Ensure that the power supply matches the device voltage before connecting the device.
- Only use cables designed for the current level indicated on the type plate.

Residual current circuit breakers



Three-phase types and types with active PFC may only be used with universal residual current devices (type B). Single-phase types without PFC may use a pulse current-sensitive residual current devices (type A). Like frequency inverters, residual current devices cannot provide personal safety while operating the device.

Motor protection for devices without overheating protection



WARNING

Device without overheating protection

The device is delivered without any automatic overheating protection. The device can become hot and catch fire.
→ Please take measures to prevent overheating!

Connect wires to terminals (only applies to devices with terminal connection)



WARNING

Live terminals and connections even with device switched off

Electric shock

→ Wait five minutes following after disconnecting the voltage at all poles before touching the device.

WARNING

Voltage at cable gland

Electric shock

→ Do not use metal cable glands with plastic terminal boxes.

3.3 Checking connections

- Ensure isolation from supply.
- Secure against renewed switch-on.
- Check the connection lines for proper fit.

3.4 Switching on the device

The device may only be switched on if it has been installed properly and in accordance with its intended use, including the required safety mechanisms and professional electrical connection. This also applies for devices which have already been equipped with plugs and terminals or similar connectors by the customer.

- Before switching on, check the device for visible external damage and make sure the protective devices are functional.
- Check the fan's air flow paths for foreign matter and remove any foreign matter found.
- Apply the nominal supply voltage.



WARNING

Hot motor housing

Risk of fire

- Make sure there are no combustible and flammable substances in the vicinity of the device.
- Before switching on, check the device for visible external damage and make sure the protective devices are functional.
- Apply the nominal supply voltage.
- Start the device by changing the input signal.

3.5 Switching off the device

- Switching off the device during operation:
 - Switch off the device via the control input, in order to protect the device.
 - Do not switch the motor (e.g. in cyclic operation) on and off via power supply.
- Device switch-off for maintenance:
 - Disconnect the device from the power supply.



Safety notes

For EC and DC built-in fans

4. MAINTENANCE, PROBLEMS, POSSIBLE CAUSES AND REMEDIES

Do not perform any repairs on the device. Send the device to ebm-papst for repair or replacement. Ensure that all safety measures are retaken after maintenance.



WARNING

Live terminals and connections even with device switched off

Electric shock

Wait five minutes following after disconnecting the voltage at all poles before touching the device.

CAUTION

Risk of injury

If control voltage is applied or a speed setpoint is stored, the motor will restart automatically, e.g. after power failure.

Keep out of the device's danger zone.

→ When working on the device, switch off the mains power and ensure that it cannot be switched back on.

→ Wait until the device stops.



If the device is out of use for some time, e.g. when in storage, we recommend switching it on for at least two hours to allow any condensation to evaporate and to move the bearings.

| Malfunction/fault | Possible cause | Possible remedy |
|---------------------------------|--|--|
| Motor does not turn | <ul style="list-style-type: none">- Mechanical blockage- Mains power faulty- Control signal faulty | <ul style="list-style-type: none">- Switch off and remove mechanical blockage- Check mains power, restore power supply- Apply control signal |
| Impeller not running smoothly | <ul style="list-style-type: none">- Imbalance in rotating parts | <ul style="list-style-type: none">- Clean the device; if imbalance persists, replace it |
| Over-temperature of electronics | <ul style="list-style-type: none">- Ambient temperature too high- Deficient cooling- Impermissible operating point | <ul style="list-style-type: none">- If possible, reduce ambient temperature.- Reset by reducing control input to 0. |
| Motor overtemperature | | |
| Rotor bearing socket fault | | |



NOTE

In the event of any other malfunctions, contact ebm-papst.

4.1 Safety inspections

| What to check | How to check | How often |
|--------------------------------------|-------------------|-------------------------|
| Shock protection enclosure | Visual inspection | At least every 6 months |
| Device for damage | Visual inspection | At least every 6 months |
| Fan mounting | Visual inspection | At least every 6 months |
| Connection lines mounting | Visual inspection | At least every 6 months |
| Protective earth connection mounting | Visual inspection | At least every 6 months |
| Cable insulation | Visual inspection | At least every 6 months |



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