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CONTENTS

1. SAFETY REGULATIONS AND INFORMATION 1
1.1 Hazard levels for warnings 1
1.2 Staff qualifications 1
1.3 Basic safety rules 1
1.4 Voltage 1
1.5 Safety and protective features 2
1.6 Electromagnetic radiation 2
1.7 Mechanical movement 2
1.8 Emissions 2
1.9 Hot surface 2
1.10 Storage 2
1.11 Disposal 2
2. INTENDED USE 3
3. TECHNICAL DATA 4
3.1 Product drawing 4
3.2 Nominal data 5
3.3 Technical description 5
3.4 Mounting data 5
3.5 Transport and storage conditions 5
3.6 Electromagnetic compatibility 5
4. CONNECTION AND STARTUP 6
4.1 Mechanical connection 6
4.2 Electrical connection 6
4.3 Plug connection 6
4.4 Connection diagram 8
4.5 Checking connections 9
4.6 Switching on the device 9
4.7 Switching off the device 9
5. INTEGRATED PROTECTIVE FEATURES 9
6. MAINTENANCE, MALFUNCTIONS, POSSIBLE CAUSES AND REMEDIES 10
6.1 Cleaning 10
6.2 Safety inspection 10

Translation of the original operating instructions

1. SAFETY REGULATIONS AND INFORMATION

Read these operating instructions carefully before starting work on the device. Observe the following warnings to prevent malfunctions or danger to persons.
These operating instructions are to be regarded as part of the device. The device is only to be sold or passed on together with the operating instructions.
These operating instructions may be duplicated and distributed to inform about potential dangers and their prevention.

1.1 Hazard levels for warnings

These operating instructions use the following hazard levels to indicate potentially hazardous situations and important safety regulations:



DANGER
Indicates an imminently hazardous situation which will result in death or serious injury if the specified actions are not taken. Compliance with the instructions is imperative.

WARNING
Indicates a potentially hazardous situation which can result in death or serious injury if the specified actions are not taken. Exercise extreme caution while working.

CAUTION
Indicates a potentially hazardous situation which can result in minor or moderate injury or damage to property if the specified actions are not taken.

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

1.2 Staff qualifications

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

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 perform any modifications, additions or conversions on the device without the approval of ebm-papst.

1.4 Voltage

⇒ Check the device's electrical equipment at regular intervals; see Chapter 6.2 Safety inspection.

⇒ Replace loose connections and defective cables immediately.



DANGER
Electrically charged device
Risk of electric shock

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

WARNING
Live terminals and connections even with device switched off
Electric shock

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

CAUTION
In the event of a fault, the rotor and the impeller will be energized
The rotor and the impeller have basic insulation.

→ Do not touch the rotor and impeller once installed.

CAUTION
If control voltage or a stored speed set value is applied, the motor will restart automatically, e.g. after a power failure.
Risk of injury

→ Keep out of the device danger zone.# When working on the device, switch off the line voltage and ensure that it cannot be switched back on.

→ After working on the device, remove any tools or other objects from the device.

1.5 Safety and protective features



DANGER
Missing protective device and protective device that is not working
Without a protective device there is a risk of serious injury, for instance if the hands reach or are sucked into the device during operation.

→ Operate the device only with a fixed protective device and guard grille. The fixed protective device must be able to withstand the kinetic energy of a fan blade that becomes detached at maximum speed. There must not be any gaps which it is possible to reach into with the fingers, for example.#The device is a built-in component. As the operator, you are responsible for ensuring that the device is secured adequately.

→ Stop the device immediately if you notice a missing or ineffective protective device.

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 by the user.

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

→ Verify that the entire setup is EMC-compliant.

1.7 Mechanical movement



DANGER
Rotating device
Risk of injury to body parts coming into contact with the rotor or the impeller.

→ Secure the device against accidental contact.

→ Before working on the system/machine, wait until all parts have come to a standstill.

WARNING
Rotating device
Long hair and dangling items of clothing, jewelry and the like can become entangled and be pulled into the device. Injuries can result.

→ Do not wear any loose-fitting or dangling clothing or jewelry while working on rotating parts.#Protect long hair with a cap.

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 such as hearing protection.

→ Also observe the requirements of local agencies.

1.9 Hot surface



CAUTION
High temperature on electronics housing
Risk of burns

→ Ensure sufficient protection against accidental contact.

→ Explosion-protected motors are designed for safe operation under normal operating conditions and in the event of a fault. In the event of overload, the motor will shut off to avoid inadmissibly high temperatures.

1.10 Storage

⇒ Store the device, partially or fully assembled, in a dry and weatherproof manner in the original packaging in a clean environment.

⇒ Protect the device against environmental effects and dirt until final installation.

⇒ We recommend storing the device for no longer than one year in order to guarantee trouble-free operation and the longest possible service life.

⇒ Even devices explicitly intended for outdoor use are to be stored as described prior to commissioning.

⇒ Maintain the storage temperature, see Chapter 3.5 Transport and storage conditions.

1.11 Disposal

Comply with all relevant local requirements and regulations when disposing of the device.

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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 capable of withstanding the mechanical and thermal stresses that can arise from this product. This applies for the entire service life of the equipment in which this product is installed.

Intended use also includes

- conveying air at an ambient air pressure between 750 mbar and 1050 mbar.
- Using the device within the permitted ambient temperature range; see Chapter 3.5 Transport and storage conditions and Chapter 3.2 Nominal data.
- Operating the device with all protective devices.
- Following the operating instructions.

Improper use

In particular, operating the device in the following ways is prohibited and could be hazardous:

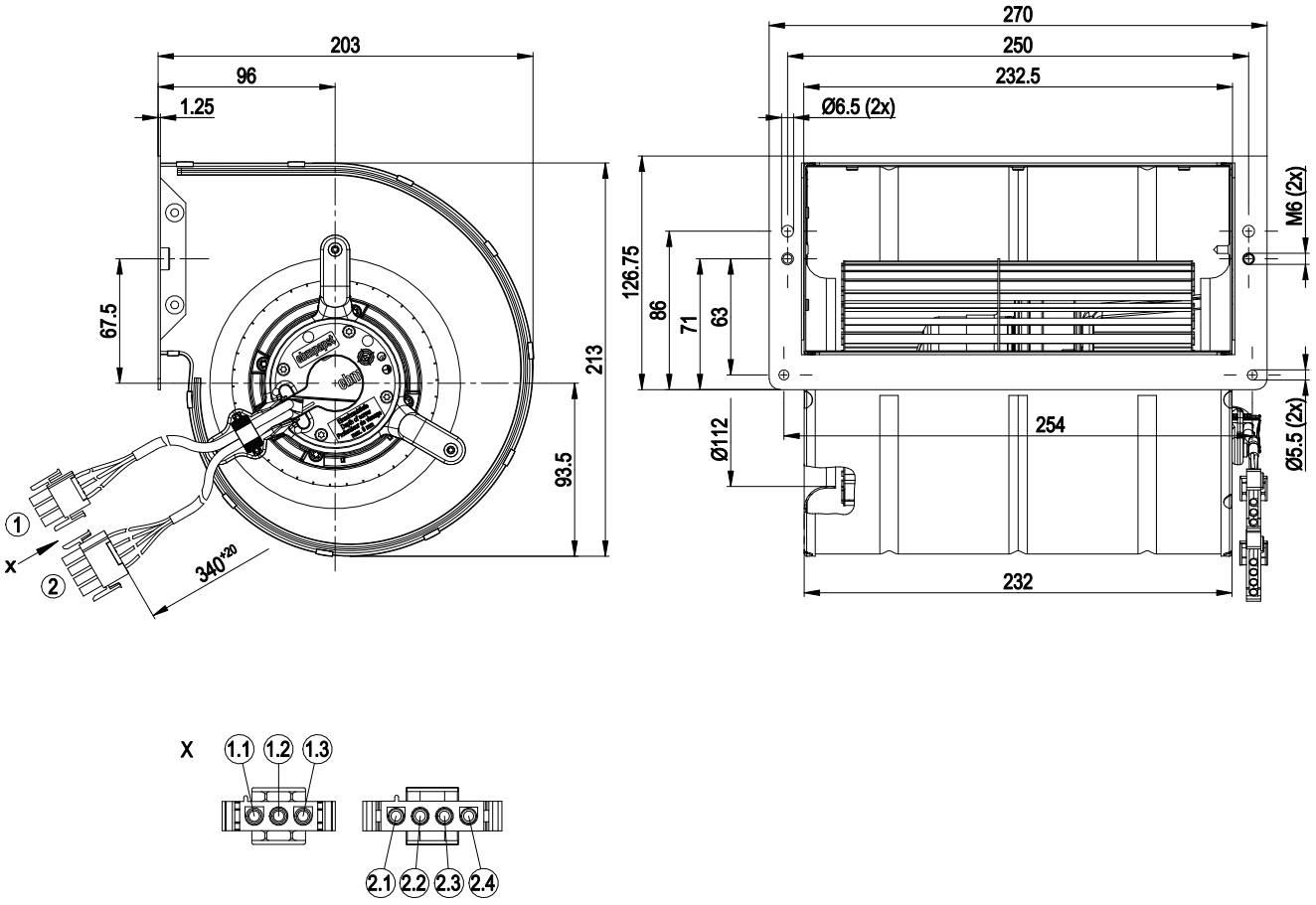
- Operating the device in an unbalanced state, e.g. due to dirt deposits or ice formation.
- Conveying air that contains abrasive particles.
- Conveying highly corrosive air, e.g. salt spray. Exception: devices designed for salt spray and correspondingly protected.
- Conveying air with high dust content, 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.
- Operation with completely or partially disassembled or manipulated protective devices.
- In addition, all applications not listed among the intended uses.

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3. TECHNICAL DATA

3.1 Product drawing



All dimensions in mm.

1	Cable PVC 3G 0.5 mm², 3-pole connector housing tyco 1-480700-0, 3x crimped plug pin tyco 926885-3
1.1	L (brown)
1.2	N (blue)
1.3	PE (green/yellow)
2	Cable PVC 4x 0.25 mm², 4-pole connector housing tyco 1-480702-0, 4x crimped plug pin tyco 926885-3
2.1	+10 V (red)
2.2	0-10 V PWM (yellow)
2.3	GND (blue)
2.4	Tach (white)

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3.2 Nominal data

Motor	M3G055-CF

Phase	1~
Nominal voltage / VAC	230
Nominal voltage range / VAC	200 .. 240
Frequency / Hz	50/60

Method of obtaining data	fa
Speed / min-1	1270
Power consumption / W	85
Current draw / A	0.7
Min. ambient temperature / °C	-25
Max. ambient temperature / °C	40

ml = Max. load · me = Max. efficiency · fa = Free air
cs = Customer specification · ce = Customer equipment

Subject to change

3.3 Technical description

Weight	3.2 kg
Fan size	133 mm
Rotor surface	Thick-film passivated
Electronics housing material	Die-cast aluminum
Impeller material	Sheet steel, galvanized
Housing material	Sheet steel, galvanized
Motor suspension	Motor mounted with brackets on one side
Direction of rotation	Clockwise, viewed toward rotor
Degree of protection	IP54
Insulation class	"B"
Moisture (F) / Environmental (H) protection class	F3-1
Installation position	Any
Condensation drainage holes	On rotor side
Mode	S1
Motor storage	Ball bearing
Technical features	- Output 10 VDC, max. 1.1 mA - Power limiter - Motor current limitation - Soft start - Control input 0-10 VDC / PWM - Control interface with SELV potential safely disconnected from the mains - Overvoltage detection - Thermal overload protection for electronics/motor - Line undervoltage detection
Touch current according to IEC 60990 (measuring circuit Fig. 4, TN system)	<= 3.5 mA
Electrical hookup	With plug
Motor protection	Locked-rotor protection
with cable	Lateral
Protection class	I (with customer connection of protective earth)
Conformity with standards	EN 60335-1

With regard to cyclic speed loads, note that the rotating parts of the device are designed for a maximum of one million load cycles. If you have special questions, consult ebm-papst for support.

3.4 Mounting data

For screw clearance, see Chapter 3.1 Product drawing

⇒ Secure the screws against unintentional loosening (e.g. use self-locking screws).

Strength class of screws	8.8

Any further mounting data required can be taken from the product drawing.

3.5 Transport and storage conditions

⇒ Use the device in accordance with its degree of protection.

Max. permitted ambient temp. for motor (transport/ storage)	+ 80 °C
Min. permitted ambient temp. for motor (transport/ storage)	- 40 °C

3.6 Electromagnetic compatibility

EMC immunity to interference	According to EN 61000-6-2 (industrial environment)
EMC circuit feedback	According to EN 61000-3-2/3
EMC interference emission	According to EN 61000-6-3 (household environment)

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4. CONNECTION AND STARTUP

4.1 Mechanical connection



CAUTION
Cutting and crushing hazard when removing blower from packaging



→ Carefully remove the blower from its packaging, touching only the housing. Strictly avoid shocks.

→ Wear safety shoes and cut-resistant safety gloves.

⇒ Check the device for transport damage. Damaged devices are not to be installed.

⇒ Install the undamaged device in accordance with your application.

4.2 Electrical connection



DANGER
Voltage on the device
Electric shock

→ Always connect a protective earth first.

→ Check the protective earth.



DANGER
Faulty insulation
Risk of fatal injury from electric shock

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

→ Route cables so that they cannot be touched by any rotating parts.



DANGER
Electrical charge (>50 µC) between phase conductor and protective earth connection after switching off supply with multiple devices connected in parallel.
Electric shock, risk of injury

→ Ensure sufficient protection against accidental contact. Before working on the electrical hookup, short the supply and PE connections.

CAUTION
Voltage
The device is a built-in component and has no disconnecting switch.

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

→ When working on the device, secure the system/ machine in which the device is installed so as to prevent it from being switched back on.

NOTE
Water ingress into wires or cables
Water ingress at the customer end of the cable can damage the device.

→ Make sure the end of the cable is connected in a dry environment.



Only connect the device to circuits that can be switched off with an all-pole disconnection switch.

4.2.1 Requirements

⇒ Check whether the data on the nameplate match the connection data.

⇒ Before connecting the device, make sure the power supply matches the device voltage.

⇒ Only use cables designed for the current level indicated on the nameplate.
For determining the cross-section, note the sizing criteria according to EN 61800-5-1. The protective earth must have a cross-section equal to or greater than that of the phase conductor.
We recommend the use of 105 °C cables. Ensure that the minimum cable cross-section is at least
AWG 26 / 0.13 mm².

Ground conductor contact resistance according to EN 60335

Compliance with the impedance specifications according to EN 60335 for the protective earth connection circuit must be verified in the end application.
Depending on the circumstances of installation, it may be necessary to connect an additional protective earth conductor to the extra protective earth terminal on the device.

4.2.2 Reactive currents



Because of the EMC filter integrated for compliance with EMC limits (interference emission and immunity to interference), reactive currents can be measured in the supply line even when the motor is at a standstill and the line voltage is switched on.

- The values are typically less than 50 mA.
- At the same time, the effective power in this operating state (operational readiness) is typically < 2 W.

4.2.3 Residual current circuit breaker (RCCB)



Only pulse-current sensitive and/or universal residual current devices (type A or B) are permitted. As with variable frequency drives, residual current devices cannot provide personal safety while operating the device. When the device's power supply is switched on, pulsed charging currents from the capacitors in the integrated EMC filter can lead to the residual current devices tripping without delay. We recommend the use of residual current circuit breakers with a trip threshold of 300 mA and delayed tripping (super-resistant, characteristic K).

4.2.4 Locked-rotor protection



Due to the locked-rotor protection, the starting current (LRA) is equal to or less than the nominal current (FLA).

4.3 Plug connection

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4.3.1 Making supply connections

⇒ Check your connector's pin assignment.

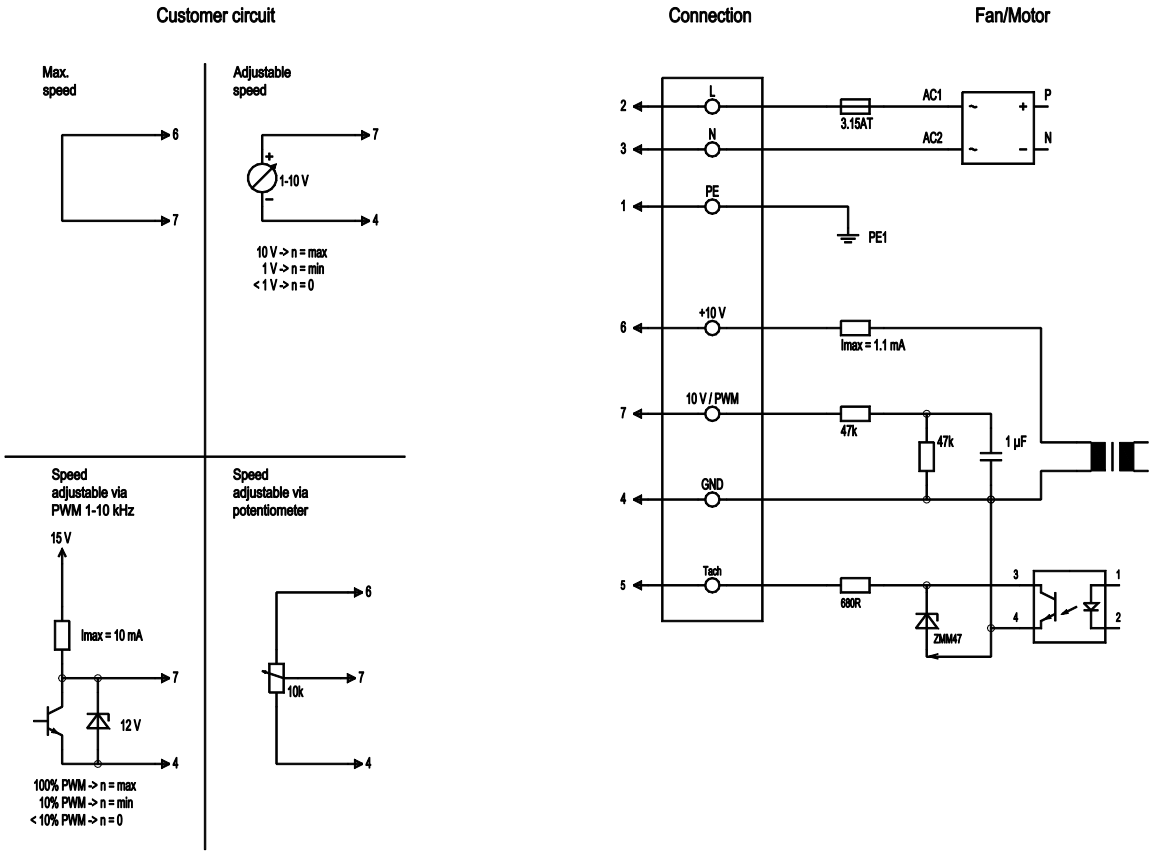
⇒ Connect the built-in connector with the mating connector.

⇒ Ensure that the connector is properly engaged.

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4.4 Connection diagram



Drawing preliminary!

No.	Conn.	Designation	Color	Function/assignment
	2	L	brown	Power supply 230 VAC, 50-60 Hz, see nameplate for voltage range
	3	N	blue	Neutral conductor
	1	PE	green/ yellow	Protective earth
	7	0-10V PWM	yellow	Control input 0-10 V or PWM, electrically isolated
	5	Tacho	white	Tach output: Open collector, 1 pulse per revolution, electrically isolated, Isink_max = 10 mA
	6	10 V / max. 1,1 mA	red	Voltage output 10 V, 1.1 mA, electrically isolated
	4	GND	blue	GND connection for control interface

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4.5 Checking connections

⇒ Ensure isolation from supply (all phases).

⇒ Make sure a restart is impossible

⇒ Check whether the mating connector is properly engaged with the built-in connector.

⇒ Check that the mating connector is correctly attached to the cable.

4.6 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 hookup. This also applies for devices which have already been equipped with plugs and terminals or similar connectors by the customer.



WARNING
Hot motor housing
Risk of fire

→ Ensure that no combustible or flammable materials are located close to the blower.

⇒ 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.

⇒ Start the device by changing the input signal.

4.7 Switching off the device

Switching off the device during operation:

⇒ Switch off the device via the control input.

⇒ Do not switch the motor (e.g. in cyclic operation) on and off via power supply.

Switching off the device for maintenance:

⇒ Switch off the device via the control input.

⇒ Do not switch the motor (e.g. in cyclic operation) on and off via power supply.

⇒ Disconnect the device from the power supply.

⇒ When disconnecting, be sure to disconnect the ground connection last.

5. INTEGRATED PROTECTIVE FEATURES

The integrated protective functions cause the motor to switch off automatically in the event of the faults described in the table.

Fault	Safety feature description/ function
Rotor position detection error	An automatic restart follows.
Blocked rotor	⇒ After the blockage is removed, the motor restarts automatically.

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6. MAINTENANCE, MALFUNCTIONS, POSSIBLE CAUSES AND REMEDIES

Do not perform any repairs on your device. Send the device to ebm-papst for repair or replacement.

WARNING
Live terminals and connections even with device switched off
Electric shock

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

CAUTION
If control voltage or a stored speed set value is applied, the motor will restart automatically, e.g. after a power failure.
Risk of injury

→ Keep out of the device danger zone.# When working on the device, switch off the line voltage and ensure that it cannot be switched back on.

→ After working on the device, remove any tools or other objects from the device.

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
Impeller not running smoothly	Imbalance in rotating parts	Clean the device; replace it if imbalance persists after cleaning. Make sure no weight clips are removed during cleaning.
Motor not turning	Mechanical blockage	Switch off, isolate from supply and remove mechanical blockage.
	Line voltage faulty	Check line voltage, restore power supply, apply control signal.
	Faulty connection	Isolate from supply, correct connection; see connection diagram.
Motor/electronics overtemperature	Deficient cooling	Improve cooling. Let the device cool down. To reset the error message, switch off the line voltage for at least 25 s and then switch it on again.
	Ambient temperature too high	Reduce the ambient temperature. Reset by reducing control input to 0.
	Impermissible point of operation	Correct the operating point. Let the device cool down.

In the event of further malfunctions, contact ebm-papst.

6.1 Cleaning

NOTE
Damage to the device during cleaning
Malfunction possible

→ Do not clean the device using a water jet or high-pressure cleaner.

→ Do not use cleaning agents containing acids, bases or solvents.

→ Do not use any pointed or sharp-edged objects for cleaning

6.2 Safety inspection

NOTE
High-voltage test
The integrated EMC filter has Y capacitors. The tripping current is exceeded when AC testing voltage is applied.

→ Test the device with DC voltage when you perform the legally required high-voltage test. The voltage to be used corresponds to the peak value of the AC voltage required by the standard.

What to check	How to check	How often	What action?
Contact protection cover for intactness or damage	Visual inspection	At least every 6 months	Repair or replacement of device
Device for damage to blades and housing	Visual inspection	At least every 6 months	Replacement of device
Fastening the cables	Visual inspection	At least every 6 months	Fasten
Fastening the protective earth terminal	Visual inspection	At least every 6 months	Fasten
Insulation of cables for damage	Visual inspection	At least every 6 months	Replace cables
Impeller for wear/deposits/ corrosion and damage	Visual inspection	At least every 6 months	Clean or replace impeller
Condensation drainage holes for clogging, where necessary	Visual inspection	At least every 6 months	Open holes

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