

ebm-papst Mulfingen GmbH & Co. KG

Bachmühle 2

D-74673 Mulfingen

Phone +49 (0) 7938 81-0

Fax +49 (0) 7938 81-110

info1@de.ebmpapst.com

www.ebmpapst.com

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## 1. SAFETY REGULATIONS AND NOTES

Please read these operating instructions carefully before starting to work with the device. Observe the following warnings to prevent malfunctions or physical damage to both property and people.

These operating instructions are to be regarded as part of this device.

If the device is sold or transferred, the operating instructions must accompany it.

These operating instructions may be duplicated and forwarded for information about potential dangers and their prevention.

### 1.1 Levels of hazard 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, if not avoided, will result in death or serious injury. Compliance with the measures is mandatory.

#### 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

The device may only be transported, unpacked, installed, operated, maintained and otherwise used by qualified, trained and authorised technical staff.

Only authorised 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

Any safety hazards stemming from the device must be re-evaluated once it is installed in the end device.

The local industrial safety regulations must always be observed when working on the device.

Keep the workplace clean and tidy. Untidiness in the working area increases the risk of injury.

Observe the following when working on the unit:

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

### 1.4 Electrical voltage

- ⇒ Check the electrical equipment of the device at regular intervals, refer to chapter 6.3 Safety test.

- ⇒ Replace loose connections and defective cables immediately.



#### DANGER

##### Electrical load on the device

Risk of electric shock

→ Stand on a rubber mat if you are working on an electrically charged device.

**WARNING**

**Terminals and connections have voltage even with a unit that is shut off**

Electric shock

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

**CAUTION**

**In the event of failure, there is electric voltage at the rotor and impeller**

The rotor and impeller are base insulated.

- Do not touch the rotor and impeller once they are installed.

**CAUTION**

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

Risk of injury

- Keep out of the device hazard 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.
- After working on the device, remove any tools used or other objects from the device.

## 1.5 Safety and protective functions

**DANGER**

**Protective device missing and protective device not functioning**

Without a protective device there is a risk of serious injury, for instance when reaching 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 a protective device is found to be missing or ineffective.

## 1.6 Electromagnetic radiation

Interference from electromagnetic radiation is possible, e.g. in conjunction with open and closed-loop control devices.

If unacceptable emission intensities occur when the fan is installed, appropriate shielding measures have to be taken by the user.

**NOTE**

**Electrical or electromagnetic interferences after integrating the device in installations on the customer's side.**

- Verify that the entire setup is EMC compliant.

## 1.7 Mechanical movement

**DANGER**

**Rotating device**

Body parts that come into contact with the rotor and impeller can be injured.

- 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, dangling items of clothing, jewellery and similar items 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 rotating parts.
- Protect long hair with a cap.

## 1.8 Emission

**WARNING**

**Depending on the installation and operating conditions, a sound pressure level greater than 70 dB(A) may arise.**

Danger of noise-induced hearing loss

- Take appropriate technical safety measures.
- Protect operating personnel with appropriate safety equipment, e.g. hearing protection.
- Also observe the requirements of local agencies.

## 1.9 Hot surface

**CAUTION**

**High temperature at the electronics housing**

Risk of burns

- Ensure sufficient contact protection.

## 1.10 Transport

**NOTE**

**Transporting the device**

- Transport the device in its original packaging only.

## 1.11 Storage

- ⇒ Store the device, partially or fully assembled, in the original packaging in a clean, dry and weatherproof place free of vibrations.
- ⇒ 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 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 3.6 Transport and storage conditions.
- ⇒ Please make sure that all screwed cable glands are fitted with dummy plugs.

## 2. PROPER 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.

### Proper use also includes:

- The device is only to be used in systems with earthed neutral (TN/TT systems), in phase-to-earth systems or in IT systems.
- Use of the device in stationary systems only.
- Conveying of air at an ambient air pressure of 800 mbar to 1050 mbar.
- Using the device in accordance with the permitted ambient temperature, see chapter 3.6 Transport and storage conditions and chapter 3.2 Nominal data.
- Operating the device with all protective features in place.
- Minding the operating instructions.

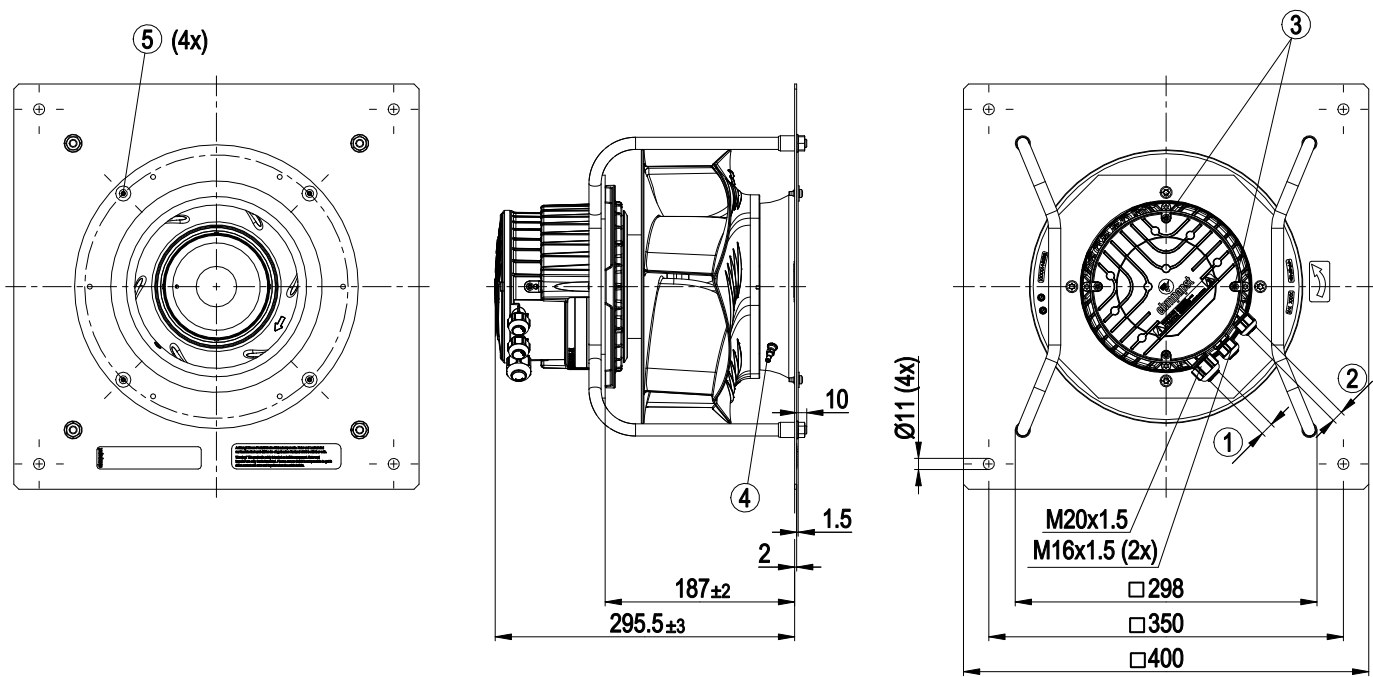
### Improper use

Using the device in the following ways is particularly prohibited and may cause hazards:

- Operating the device with an imbalance, e.g. caused by dirt deposits or icing.
- Resonance mode, operation with heavy vibrations. These also include vibrations that are transmitted from the customer system to the fan.
- Operation in medical equipment with a life-sustaining or lifesaving function.
- Moving solids content in flow medium.
- Painting the device
- Connections (e.g. screws) coming loose during operation.
- Opening the terminal box during operation.
- Moving air that contains abrasive particles.
- Moving highly corrosive air, e.g. salt spray mist. Exceptions are devices that are intended for salt spray mist and protected accordingly.
- Moving air that contains dust pollution, e.g. suctioning off saw dust.
- Operating the device close to flammable materials or components.
- Operating the device in an explosive atmosphere.
- Using the device as a safety component or for taking on safety-related functions.
- Operation with completely or partially disassembled or modified protective features.
- In addition, all application options that are not listed under proper use.

3. TECHNICAL DATA

3.1 Product drawing



All measures have the unit mm.

|   |  |
|---|--|
| 1 | Cable diameter min. 8 mm, max. 12 mm, tightening torque 1.8±0.3 Nm (use the provided seal)<br>Cable diameter min. 4 mm, max. 10 mm, tightening torque 1.8±0.3 Nm |
| 2 | Cable diameter min. 6 mm, max. 10 mm, tightening torque 1.8±0.3 Nm (use the provided seal)<br>Cable diameter min. 4 mm, max. 7 mm, tightening torque 1.8±0.3 Nm  |
| 3 | Tightening torque 1.5±0.2 Nm   |
| 4 | Inlet nozzle with pressure tap (k-factor: 76)  |
| 5 | Mounting for inlet nozzle and FlowGrid   |



## 3.2 Nominal data

|                                 |            |
|---------------------------------|------------|
| Motor                           | M3G084-DF  |
| Phase                           | 1~         |
| Nominal voltage / VAC           | 230        |
| Nominal voltage range / VAC     | 200 .. 277 |
| Frequency / Hz                  | 50/60      |
| Type of data definition         | ml         |
| Speed (rpm) / min <sup>-1</sup> | 3450       |
| Power input / W                 | 750        |
| Current draw / A                | 3.3        |
| Min. ambient temperature / °C   | -40        |
| Max. ambient temperature / °C   | 45         |

ml = Max. load · me = Max. efficiency · fa = Running at free air  
 cs = Customer specs · cu = Customer unit

Subject to alterations

## 3.3 Data in accordance with ecodesign regulation EU 327/2011

|  | Actual   | Request 2015 |
|--|--|--------------|
| 01 Overall efficiency $\eta_{es}$ / %    | 67   | 49.9         |
| 02 Measurement category                  | A  |              |
| 03 Efficiency category                   | Static   |              |
| 04 Efficiency grade N                    | 79.1   | 62           |
| 05 Variable speed drive                  | Yes  |              |
| 06 Year of manufacture                   | The year of manufacture is specified on the rating plate on the product.   |              |
| 07 Manufacturer                          | ebm-papst Mulfingen GmbH & Co. KG<br>County court Stuttgart · HRA 590344<br>D-74673 Mulfingen  |              |
| 08 Type                                  | K3G250-PR17-I5   |              |
| 09 Power input $P_{ed}$ / kW             | 0.71   |              |
| 09 Air flow $q_v$ / m <sup>3</sup> /h    | 2110   |              |
| 09 Pressure increase total $p_{st}$ / Pa | 749  |              |
| 10 Speed (rpm) $n$ / min <sup>-1</sup>   | 3395   |              |
| 11 Specific ratio <sup>*</sup>           | 1.01   |              |
| 12 Recycling/disposal                    | Information on recycling and disposal is provided in the operating instructions.   |              |
| 13 Maintenance                           | Information on installation, operation and maintenance is provided in the operating instructions.  |              |
| 14 Additional components                 | Components used to calculate the energy efficiency that are not apparent from the measurement category are detailed in the CE declaration. |              |

<sup>\*</sup> Specific ratio =  $1 + p_{st} / 100\,000\text{ Pa}$

Data definition with optimum efficiency. The ErP data is determined using a motor-impeller combination in a standardised measurement configuration.

## 3.4 Technical features

|  |   |
|--|---|
| Mass   | 9.2 kg  |
| Size   | 250 mm  |
| Motor size   | 84  |
| Surface of rotor   | Coated in black   |
| Material of terminal box   | PP plastic  |
| Material of electronics housing                                    | Die-cast aluminium  |
| Material of impeller   | PP plastic  |
| Material of mounting plate   | Sheet steel, galvanised   |
| Material of support bracket  | Steel, coated in black  |
| Material of inlet nozzle   | Sheet steel, galvanised   |
| Number of blades   | 6   |
| Direction of rotation  | Clockwise, seen on rotor  |
| Type of protection   | IP55  |
| Insulation class   | "F"   |
| Humidity (F) / environmental protection class (H)                  | H1  |
| Note ambient temperature   | Occasional start-up between -40 °C and -25 °C is permissible. For continuous operation at ambient temperatures below -25 °C (e.g. refrigeration applications), a fan version with special low-temperature bearings must be used.  |
| Mounting position  | Shaft horizontal or rotor on bottom; rotor on top on request  |
| Condensation drainage holes  | Rotor-side  |
| Operation mode   | S1  |
| Motor bearing  | Ball bearing  |
| Technical features   | <ul style="list-style-type: none"> <li>- Output 10 VDC, max. 10 mA</li> <li>- Operation and alarm display</li> <li>- Alarm relay</li> <li>- Integrated PID controller</li> <li>- Output limit</li> <li>- Motor current limit</li> <li>- PFC, active</li> <li>- RS485 MODBUS RTU</li> <li>- Soft start</li> <li>- Control input 0-10 VDC / PWM</li> <li>- Control interface with SELV potential safely disconnected from the mains</li> <li>- Over-temperature protected electronics / motor</li> <li>- Line undervoltage / phase failure detection</li> </ul> |
| Touch current acc. IEC 60990 (measuring network Fig. 4, TN system) | ≤ 3.5 mA  |
| Electrical connection  | Terminal box  |
| Motor protection   | Thermal overload protector (TOP) wired internally   |
| Cable exit   | Variable  |
| Protection class   | I (if protective earth is connected by customer)  |

|                                |  |
|--------------------------------|--|
| Product conforming to standard | EN 61800-5-1; CE   |
| Approval                       | UL 1004-7 + 60730-1; CCC; CSA<br>C22.2 no. 77 + CAN/CSA-E60730-1 |



For cyclic speed loads, note that the rotating parts of the device are designed for maximum one million load cycles. If you have specific questions, contact ebm-papst for support.

⇒ Use the device in accordance with its protection type.

#### Notes on surface quality

The surfaces of the products conform to the generally applicable industrial standard. The surface quality may vary during the production period. Strength, dimensional stability and dimensional accuracy are not affected by this.

The colour pigments of the paints used react perceptibly to UV light over the course of time. This does not however have any influence on the technical properties of the products. To prevent the formation of patches and fading, the product is to be protected against UV radiation. Changes in colour are not a reason for complaint and are not covered by the warranty.

#### 3.5 Mounting data

⇒ Secure the mounting screws against accidentally coming loose (e.g. by using self-locking screws).

|                                    |     |
|------------------------------------|-----|
| Strength class for mounting screws | 8.8 |
|------------------------------------|-----|

Any further mounting data required can be taken from the product drawing or Section chapter 4.1 Connecting the mechanical system.

#### 3.6 Transport and storage conditions

|   |        |
|---|--------|
| Max. permissible ambient motor temp. (transp./ storage) | +80 °C |
| Min. permissible ambient motor temp. (transp./storage)  | -40 °C |

## 4. CONNECTION AND START-UP

### 4.1 Connecting the mechanical system



#### CAUTION

**Cutting and crushing hazard when removing device from packaging**

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

→ Wear safety shoes and cut-resistant safety gloves.



#### NOTE

**Damage to device from vibration**

Bearing damage, reduced service life

→ Forces or impermissibly high vibration levels must not be transmitted to the fan from system components.

→ If the fan is connected to air ducts, it should be isolated from vibrations, for example using compensators or similar elements.

→ Fasten the fan to the substructure without distorting it.

⇒ The fan may not be handled in the area around the inlet nozzle during transport and installation.

There is a risk of damage to the impeller.

⇒ Check the device for transport damage. Damaged devices must no longer be installed.

⇒ Install the undamaged device according to your application.



#### CAUTION

**Possibility of damage to the device**

Serious damage may result if the device slips during assembly.

→ Keep the device fixed in position at the installation location until all attachment screws have been tightened.

• The fan must not be strained on fastening.

### 4.2 Connecting the electrical system



#### DANGER

**Electric voltage on the device**

Electric shock

→ Always install a protective earth first.

→ Check the protective earth.



#### DANGER

**Incorrect insulation**

Risk of fatal injury from electric shock

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

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



#### DANGER

**Electrical load (>50 µC) between mains wire and protective earth connection after switching of the 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.



**CAUTION****Electrical voltage**

The fan is a built-in component and features no electrically isolating switch.

- Only connect the fan to circuits that can be switched off with an all-pole separating switch.
- When working on the fan, you must switch off the installation/machine in which the fan is installed and secure it from being switched on again.

**NOTE****Water penetration into leads or wires**

Water enters at the cable end on the customers side and can damage the device.

- Make sure that the cable end is connected in a dry environment.



Connect the device only to circuits that can be switched off using an all-pole disconnecting switch.

**4.2.1 Prerequisites**

- ⇒ Check that the data on the type plate match the connection data.
- ⇒ Before connecting the device, ensure that the supply voltage matches the operating voltage of the device.
- ⇒ Only use cables designed for current according to the type plate. For determining the cross-section, follow the basic principles in accordance with EN 61800-5-1. The protective earth must have a cross-section equal to or greater than the outer conductor cross-section. We recommend the use of 105°C cables. Ensure that the minimum cable cross-section is at least AWG26/0.13 mm².
- ⇒ Note the following when routing the connection lines:
  - For permanently installed lines, the bending radius must be at least four times the outside diameter of the cable.
  - For movable lines, the bending radius must be at least 15 times the outside diameter of the cable.

**Protective earth contact resistance as per EN 61800-5-1**

Compliance with the resistance specifications as per EN 61800-5-1 for the protective earth connection circuit must be verified in the application. Depending on the installation situation, it may be necessary to connect an additional protective earth conductor by way of the extra protective earth terminal provided on the device. The protective earth terminal is located on the housing and provided with a protective earth symbol and a hole.

**4.2.2 Idle current**

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

- The values are typically in the range < 250 mA
- At the same time, the effective power in this operating state (operational readiness) is typically < 4 W.

**4.2.3 Residual current operated device**

If the use of a residual current device (RCD) is required in your installation, only universal residual current devices (type B or B+) are permissible. Residual current devices (RCD) cannot provide personal safety while operating the device, as is also the case with frequency converters. When the device power supply is switched on, charging current pulses from the capacitors in the integrated EMC filter can lead to the instant triggering of residual current devices. We recommend residual current circuit breakers (RCCB) with an activation threshold of 300 mA and delayed tripping (super-resistant, characteristic K).

**4.2.4 Locked-rotor protection**

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

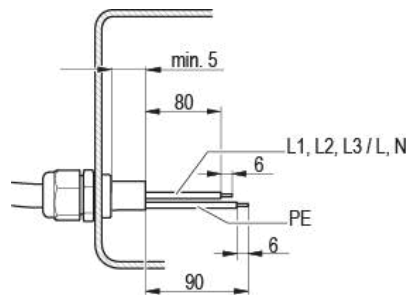
**4.3 Connection in terminal box****4.3.1 Preparing connection lines for the connection**

Fig. 1: Recommended stripping lengths in mm (inside terminal box)

Strip the cable just enough so that the screwed cable gland is tight and the terminals are relieved of strain. Tightening torque, see chapter 3.1 Product drawing.

**NOTE**

**Tightness and strain relief depend on the cable used.**

- The user must check this.

**4.3.2 Connecting cables with terminals****WARNING**

**Terminals and connections have voltage even with a unit that is shut off**

Electric shock

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

- ⇒ Remove the cap from the screwed cable gland.

Remove the cap only in those places where cables are inserted.

- ⇒ Insert the line(s) (not included in the standard scope of delivery) into the terminal box.
- ⇒ First connect the "PE" (protective earth) connection.
- ⇒ Connect the lines to the corresponding terminals.

Use a screwdriver to do so.

During the connection work, ensure that no cables splice off.

- ⇒ Seal the terminal box.

#### 4.3.3 Cable routing

No water may penetrate along the cable in the direction of the cable gland.



##### NOTE

##### Damage caused by moisture penetration.

Moisture can penetrate into the terminal box if water is constantly present at the cable glands.

- To prevent the constant accumulation of water at the cable glands, the cable should be routed in a U-shaped loop (siphon) wherever possible.
- If this is not possible, a drip edge can be produced by fitting a cable tie directly in front of the cable gland for example.

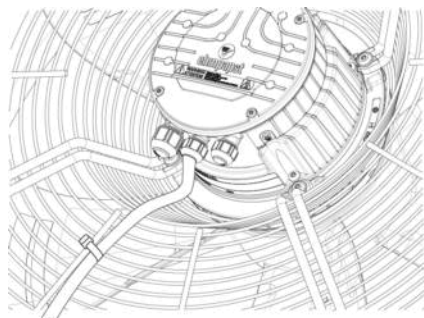


Fig. 2: Fan installed lying flat, cable routed in a U-shaped loop.

When routing the cable, ensure that the screwed cable glands are arranged at the bottom. The cables must always be routed downwards.

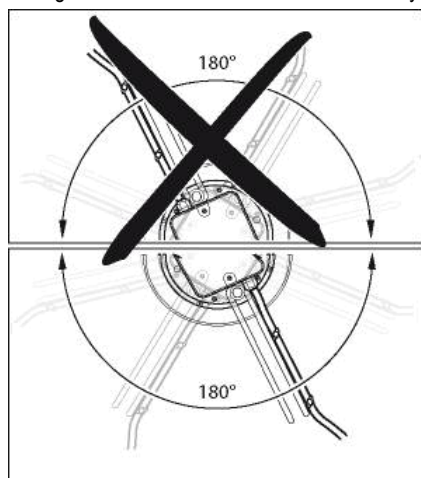


Fig. 3: Cable routing for fans installed upright.

#### 4.4 Factory settings

Factory settings with which the device is pre-set by ebm-papst.

|                                     |                    |
|-------------------------------------|--------------------|
| Control mode<br>parameter set 1     | PWM controlling    |
| Control mode<br>parameter set 2     | PWM controlling    |
| Fan / device adress                 | 1                  |
| Max. PWM / %                        | 100                |
| Min. PWM / %                        | 10                 |
| Save set value to<br>EEPROM         | No                 |
| Set value control                   | Analogue (linear)  |
| Control function<br>parameter set 1 | Positive (heating) |

|                                     |                    |
|-------------------------------------|--------------------|
| Control function<br>parameter set 2 | Positive (heating) |
|-------------------------------------|--------------------|



## 4.5 Connection screen

|    |    |   |   |   |    |     |     |     |     |        |       |  |
|----|----|---|---|---|----|-----|-----|-----|-----|--------|-------|--|
|    |    |   |   |   |    |     |     |     |     |        |       |  |
| PE | PE | N |   | L | NC | COM | GND | RSA | RSB | 0-10 V | +10 V |  |
| 1  | 2  | 3 | 4 | 5 | 6  | 7   | 8   | 9   | 10  | 11     | 12    |  |

| No. | Conn.  | Designation | Function / assignment   |
|-----|--------|-------------|---|
| 1   | PE     | PE          | Protective earth  |
| 2   | PE     | PE          | Protective earth  |
| 3   | N      | N           | Power supply, neutral conductor   |
| 4   | -      | -           | not used  |
| 5   | L      | L           | Power supply, phase   |
| 6   | NC     | NC          | Status relay, floating status contact, break for failure, contact rating 250 VAC / 2 A (AC1) min. 10 mA, basic insulation on mains side and reinforced insulation on control interface side   |
| 7   | COM    | COM         | Status relay, floating status contact, common connection, contact rating 250 VAC / 2 A (AC1) / min. 10 mA, basic insulation on mains side and reinforced insulation on control interface side |
| 8   | GND    | GND         | Signal ground for control interface, SELV   |
| 9   | RSA    | RSA         | RS-485 interface for MODBUS, RSA; SELV  |
| 10  | RSB    | RSB         | RS-485 interface for MODBUS, RSB; SELV  |
| 11  | 0-10 V | 0-10 V      | Analogue input (set value) SELV, 0-10 V, Ri=100kΩ, parametrisable curve   |
| 12  | +10 V  | +10 V       | Fixed voltage output 10 VDC, SELV, +10 V ±3%, max. 10 mA, short-circuit-proof, power supply for external devices (e.g. potentiometer)   |

#### 4.6 Checking the connections

- ⇒ Make sure that the power is off (all phases).
- ⇒ Secure it from being switched on again.
- ⇒ Check the correct fit of the connection lines.
- ⇒ Screw the terminal box cover closed again. Terminal box tightening torque, see chapter 3.1 Product drawing.
- ⇒ Route the connecting cables in the terminal box so that the terminal box cover closes without resistance.
- ⇒ Use all plug screws (the entire number). In doing so, insert the screws manually to avoid damage to the thread.
- ⇒ Make sure that the terminal box is correctly closed and sealed and that all screws and screwed cable glands are properly tightened.

#### 4.7 Switch on device

The device is not to be switched on until it has been installed properly and in accordance with its intended use, including the required protective devices and professional electrical connection. This also applies to devices which have already been equipped with plugs and terminals or similar connectors by the customer.



**WARNING**  
**Hot motor housing**  
Fire hazard

- Ensure that no combustible or flammable materials are located close to the fan.

- ⇒ Inspect the device for visible external damage and the proper function of the protective features before switching it on.
- ⇒ Check the air flow paths of the fan for foreign objects and remove any that are found.
- ⇒ Apply the nominal voltage to the voltage supply.
- ⇒ Start the device by changing the input signal.



**NOTE**  
**Damage to device by vibrations**  
Bearing damage, reduced service life

- The fan must operate free of vibrations throughout its speed control range.
- Strong vibrations can result from improper handling, imbalance resulting from damage during transport, or component-induced or structural resonances.
- When putting the fan into service, determine the speed ranges with excessive vibration levels and also any resonance frequencies that may be present.
- When regulating the speed, pass through resonance ranges as quickly as possible or find another remedy.
- Operation at excessive vibration levels can lead to premature failure.

#### 4.8 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 work:

- ⇒ 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 supply voltage.

- ⇒ When disconnecting, be sure to disconnect the earth wire connection last.

### 5. INTEGRATED PROTECTIVE FUNCTIONS

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

| Malfunctions  | Description / Function of safety feature   |
|---|--|
| Rotor position detection error  | An automatic restart occurs.   |
| Locked rotor  | ⇒ After the blockage is removed, the motor restarts automatically.                           |
| Line under-voltage (mains input voltage outside of permitted nominal voltage) | ⇒ If the mains supply voltage returns to permitted values, the motor restarts automatically. |

### 6. MAINTENANCE, MALFUNCTIONS, POSSIBLE CAUSES AND REMEDIES

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



**WARNING**  
**Terminals and connections have voltage even with a unit that is shut off**  
Electric shock

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

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

Risk of injury

- Keep out of the device hazard 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.
- After working on the device, remove any tools used or other objects from the device.



**NOTE**  
If the device is not operated for a lengthy period in installed condition in a dry environment, it is to be started up and operated at full speed for one hour at least every four months. If the device is not operated for a lengthy period in installed condition in a damp environment (e.g. outdoors), it is to be started up and operated at full speed for at least two hours once a month to move the bearings and allow any condensate that may have ingressed to evaporate.

| Malfunction/error | Possible cause | Possible remedy |
|-------------------|----------------|-----------------|
|-------------------|----------------|-----------------|

|   |                                      |   |
|---|--------------------------------------|---|
| <b>Impeller running roughly</b>             | Imbalance in rotating parts          | Clean the device; if imbalance is still evident after cleaning, replace the device. If you have attached any weight clips during cleaning, make sure to remove them afterwards. |
| <b>Motor does not turn</b>                  | Mechanical blockage                  | Switch off, de-energise, and remove mechanical blockage.  |
|   | Mains supply voltage faulty          | Check mains supply voltage, restore power supply, apply control signal.   |
|   | Faulty connection                    | De-energise, correct connection, see connection diagram.  |
| <b>Overtemperature of electronics/motor</b> | Insufficient cooling                 | Improve cooling. Let the device cool down. To reset the error message, switch off the mains supply voltage for a min. of 25 s and switch it on again.                           |
|   | Thermal overload protector responded | Allow motor to cool off, locate and rectify cause of error, if necessary cancel restart lock-out  |
|   | Ambient temperature too high         | Reduce the ambient temperature. Reset by reducing control input to 0.   |
|   | Unacceptable operating point         | Correct the operating point. Let the device cool down.  |



If you have any other problems, contact ebm-papst.

### 6.1 Vibration test

Checking the fan for mechanical vibrations based on ISO 14694. Recommendation: every 6 months. Maximum vibration severity is 3.5 mm/s measured at the motor's fastening diameter on the motor support plate towards and perpendicular to the motor's axis of rotation.

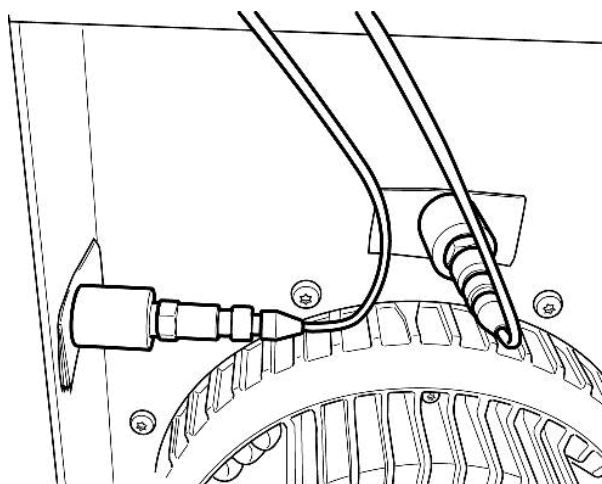


Fig. 4: Example showing vibration measurement. Positioning of the sensors will vary depending on the device and the circumstances of installation.

### 6.2 Cleaning

#### NOTE

#### Damage to the device during cleaning

Malfunction possible

- Do not use a high-pressure cleaner to clean the device. # Do not use any acid, alkali or solvent-based cleaning agents.
- Do not use any pointed or sharp-edged objects for cleaning

### 6.3 Safety test

#### NOTE

#### High-voltage test

The integrated EMC filter contains Y capacitors. Therefore, the trigger current is exceeded when AC testing voltage is applied.

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

| What has to be tested?  | How to test?      | Frequency               | Which measure?                      |
|---|-------------------|-------------------------|-------------------------------------|
| Check the protective casing against accidental contact for damage and to ensure that it is intact | Visual inspection | At least every 6 months | Repair or replacement of the device |
| Check the device for damage to blades and housing   | Visual inspection | At least every 6 months | Replacement of the device           |
| Mounting the connection lines   | Visual inspection | At least every 6 months | Fasten                              |
| Check the insulation of the wires for damage  | Visual inspection | At least every 6 months | Replace wires                       |

|   |                   |                         |                                  |
|---|-------------------|-------------------------|----------------------------------|
| Impeller for wear/deposits/corrosion and damage       | Visual inspection | At least every 6 months | Clean impeller or replace device |
| Tightness of screwed cable gland                      | Visual inspection | At least every 6 months | Retighten, replace if damaged    |
| Condensate discharge holes for clogging, as necessary | Visual inspection | At least every 6 months | Open bore holes                  |
| Abnormal bearing noise                                | acoustic          | At least every 6 months | Replace device                   |

## 6.4 Disposal

For ebm-papst, environmental protection and resource preservation are top priority corporate goals.

ebm-papst operates an environmental management system which is certified in accordance with ISO 14001 and rigorously implemented around the world on the basis of German standards.

Right from the development stage, ecological design, technical safety and health protection are fixed criteria.

The following section contains recommendations for ecological disposal of the product and its components.

### 6.4.1 Country-specific legal requirements



#### NOTE

#### Country-specific legal requirements

Always observe the applicable country-specific legal regulations with regard to the disposal of products or waste occurring in the various phases of the life cycle. The corresponding disposal standards are also to be heeded.

### 6.4.2 Disassembly

Disassembly of the product must be performed or supervised by qualified personnel with the appropriate technical knowledge.

The product is to be disassembled into suitable components for disposal employing standard procedures for motors.



#### WARNING

**Heavy parts of the product may drop off. Some of the product components are heavy. These components could drop off during disassembly.**

This can result in fatal or serious injury and material damage.

→ Secure components before unfastening to stop them falling.

### 6.4.3 Component disposal

The products are mostly made of steel, copper, aluminium and plastic.

Metallic materials are generally considered to be fully recyclable.

Separate the components for recycling into the following categories:

- Steel and iron
- Aluminium
- Non-ferrous metal, e.g. motor windings
- Plastics, particularly with brominated flame retardants, in accordance with marking
- Insulating materials
- Cables and wires
- Electronic scrap, e.g. circuit boards

Only ferrite magnets and not rare earth magnets are used in external rotor motors from ebm-papst Mulfingen GmbH & Co. KG.

⇒ Ferrite magnets can be disposed of in the same way as normal iron and steel.

Electrical insulating materials on the product, in cables and wires are made of similar materials and are therefore to be treated in the same manner.

The materials concerned are as follows:

- Miscellaneous insulators used in the terminal box
- Power lines
- Cables for internal wiring
- Electrolytic capacitors

Dispose of electronic components employing the proper procedures for electronic scrap.



→ Please contact ebm-papst for any other questions on disposal.