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## CONTENTS

**1. SAFETY REGULATIONS AND NOTES 1**
1.1 Levels of hazard warnings 1
1.2 Staff qualification 1
1.3 Basic safety rules 1
1.4 Electrical voltage 1
1.5 Safety and protective functions 2
1.6 Electromagnetic radiation 2
1.7 Mechanical movement 2
1.8 Emission 2
1.9 Hot surface 2
1.10 Transport 2
1.11 Storage 2
1.12 Disposal 2
**2. PROPER USE 3**
**3. TECHNICAL DATA 4**
3.1 Product drawing 4
3.2 Nominal data 5
3.3 Data according to ErP directive 5
3.4 Technical features 5
3.5 Mounting data 5
3.6 Transport and storage conditions 5
**4. CONNECTION AND START-UP 6**
4.1 Connecting the mechanical system 6
4.2 Connecting the electrical system 6
4.3 Connection via plug 6
4.4 Connection screen 7
4.5 Checking the connections 8
4.6 Switch on device 8
4.7 Switching off the device 8
**5. MAINTENANCE, MALFUNCTIONS, POSSIBLE CAUSES AND REMEDIES 8**
5.1 Safety test 9

Translation of the original operating instructions

## 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.
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 5.1 Safety test.

⇒ Replace loose connections and defective cables immediately.

**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 automatically restarts, e.g. after a power failure.**
Danger of injury

→ Keep out of the danger zone of the device.

→ When working on the device, switch off the mains supply voltage and secure the latter from being switched on again.

→ Wait until the device stops.

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

### 1.5 Safety and protective functions



**DANGER**
**Missing safety device and non-functioning safety device**
If there is no safety device, you could be seriously injured, for example if you reach into the running device or your hands are sucked into it.

→ Operate the device only with a fixed and isolating safety protection and a fixed guard grille.
The guard must withstand the kinetic energy of a fan blade detaching at maximum speed.

→ The device is a built-in component. You, the owner/ operator, are responsible for providing adequate protection for the device.

→ Shut down the device immediately if you detect a missing or ineffective protective feature.

### 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, loose items of clothing and jewellery could become entangled and pulled into the device. You could be injured.

→ Do not wear any loose clothing or jewellery while working on rotating parts.

→ Protect long hair by wearing 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 enclosure**
Danger of burn injuries

→ Ensure that sufficient protection against accidental contact is provided.

### 1.10 Transport

**NOTE**
**Transport of device**

→ Transport the device in its original packaging only.

→ Secure the device so that it does not slip, e.g. by using a clamping strap.

### 1.11 Storage

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

⇒ Protect the device from environmental impacts and dirt until the final installation.

⇒ We recommend storing the device for a maximum up to one year to guarantee proper operation and longest possible service life.

⇒ Even devices explicitly suited for outdoor use are to be stored as described prior to being commissioned.

⇒ Maintain the storage temperature, see chapter 3.6 Transport and storage conditions.

### 1.12 Disposal

When disposing of the device, please comply with all relevant requirements and regulations applicable in your country.

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## 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:**

- Use the device in DC power systems only.
- Moving air with a density of 1.2 kg/m³.
- 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.
- 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.

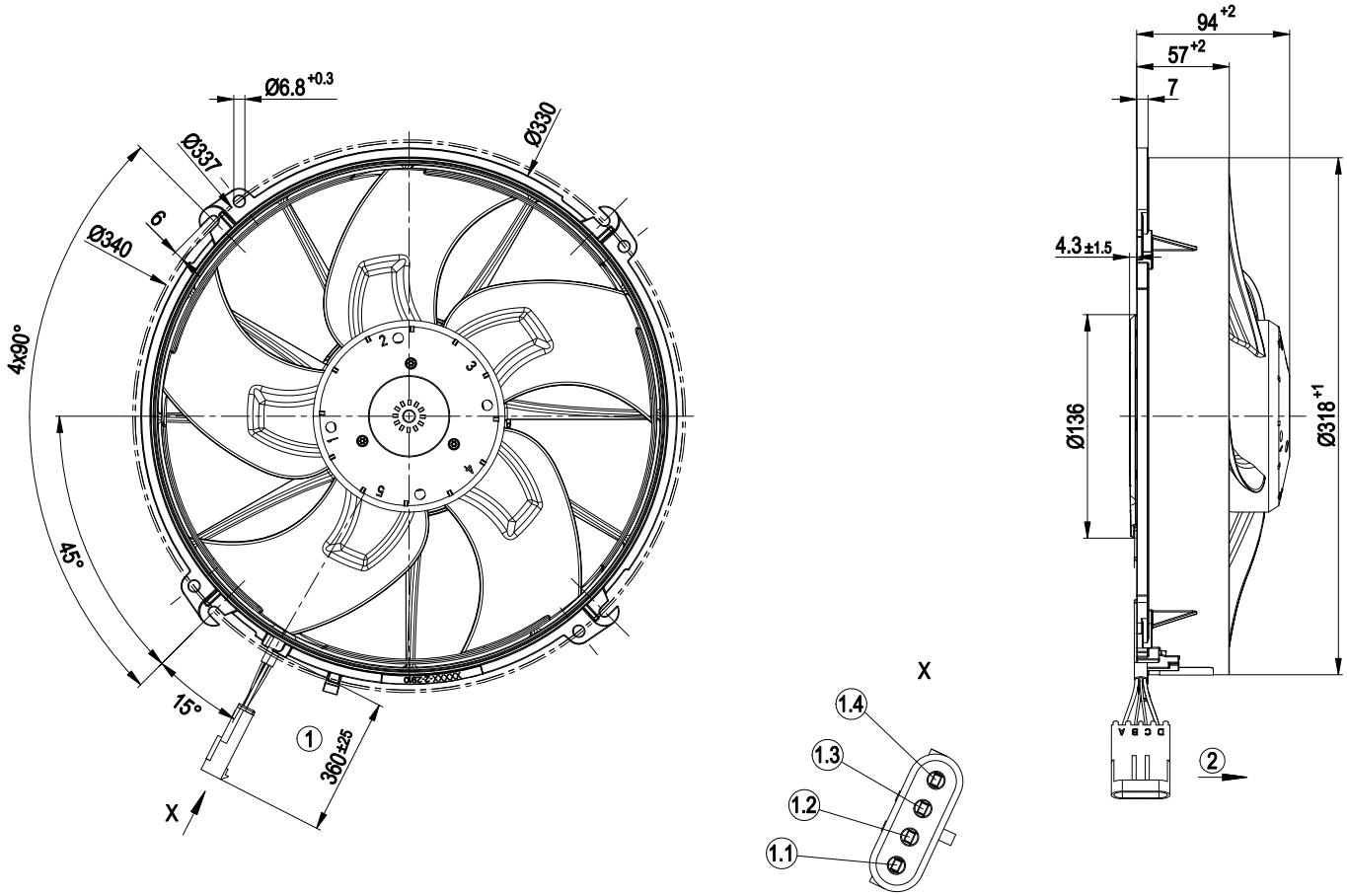
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## 3. TECHNICAL DATA

### 3.1 Product drawing




All measures have the unit mm.

| | |
|---|---|
| **1** | Connection line with 4-pole connector Packard Electric 12010974, coded |
| **1.1** | + UB (red) |
| **1.2** | PWM/LIN (blue) |
| **1.3** | CGND (white) |
| **1.4** | GND (black) |
| | Customer circuit socket: |
| | Housing: Packard 12015797 |
| | Plug contacts: Packard 120 89188 and Packard 121 24580 |
| | Seal: Packard 153 24982 and Packard 153 24983 |

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### 3.2 Nominal data

| | |
|---|---|
| **Motor** | M3G074-CF |

| | |
|---|---|
| **Nominal voltage / VDC** | 27.5 |
| **Nominal voltage range / VDC** | 15 .. 32 |

| | |
|---|---|
| **Type of data definition** | fa/cu |
| **Speed / min-1** | 3320 |
| **Power input / W** | 335 |
| **Current draw / A** | 12.2 |
| **Min. ambient temperature / °C** | -40 |
| **Max. ambient temperature / °C** | 70 |

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

Subject to alterations

### 3.3 Data according to ErP directive

| | |
|---|---|
| **Installation category** | A |
| **Efficiency category** | Static |
| **Variable speed drive** | Yes |
| **Specific ratio*** | 1.00 |

* Specific ratio = 1 + $p_{fs}$ / 100 000 Pa

| | Actual | Request 2013 | Request 2015 |
|---|---|---|---|
| **Overall efficiency $\eta_{es}$ / %** | 41.2 | 26.9 | 30.9 |
| **Efficiency grade N** | 50.3 | 36 | 40 |
| **Power input $P_e$ / kW** | 0.36 | | |
| **Air flow $q_v$ / m³/h** | 2010 | | |
| **Pressure increase total $p_{sf}$ / Pa** | 243 | | |
| **Speed n / min-1** | 3255 | | |

Data definition with optimum efficiency.

The ErP data is determined using a motor-impeller combination in a standardised measurement configuration.

### 3.4 Technical features

| | |
|---|---|
| **Size** | 300 mm |
| **Direction of rotation** | "A" |
| **Type of protection** | IP 24 KM |
| **Insulation class** | "B" |
| **Humidity class** | F3-2 |
| **Cooling bore / aperture** | Rotor-side |
| **Motor bearing** | Ball bearing |
| **Electrical leads** | With plug |
| **Motor protection** | Reverse polarity and locked-rotor protection |
| **Cable exit** | Lateral |
| **Approval** | EAC; E1 |

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.

### 3.5 Mounting data

For depth of screw, see chapter 3.1 Product drawing

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

You can obtain additional mounting data from the product drawing if necessary.

### 3.6 Transport and storage conditions

⇒ Use the device in accordance with its protection type.

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## 4. CONNECTION AND START-UP

### 4.1 Connecting the mechanical system



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



Blades can be bent

→ Carefully remove the device from its packaging, only touching the wall ring. Make sure to avoid any shock.

→ Wear safety shoes and cut-resistant safety gloves.

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

⇒ Install the undamaged device according to your application.

### 4.2 Connecting the electrical system

**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.



Operate the device with a safely isolated power pack.

#### 4.2.1 Prerequisites

⇒ Check whether the data on the type plate agree with 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.

#### 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.

### 4.3 Connection via plug

#### 4.3.1 Establish supply connections

⇒ Check the PIN assignment of your connector.

⇒ Connect the panel connector and mating connector.

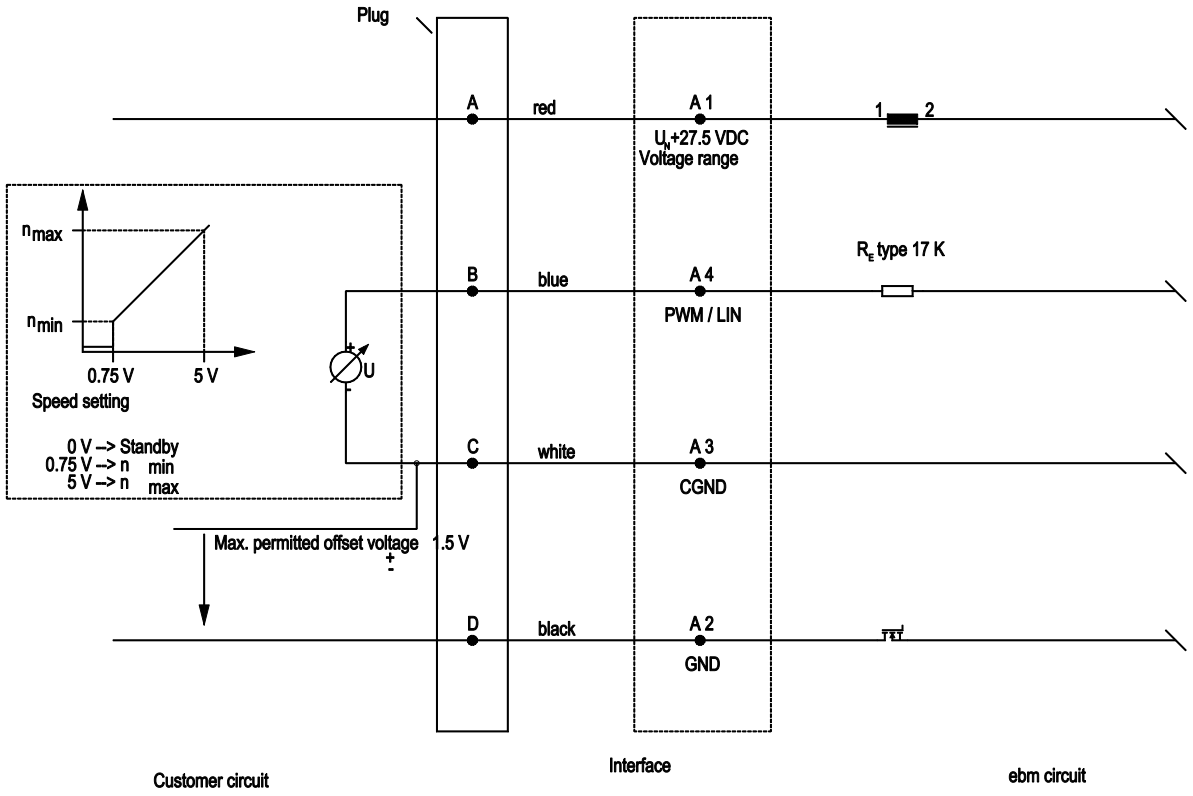
⇒ Ensure that the connector is locked in correctly.

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### 4.4 Connection screen




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### 4.5 Checking the connections

⇒ Make sure that the power is off (all phases).

⇒ Secure it from being switched on again.

⇒ Check that the mating connector is correctly locked into the panel connector.

⇒ Check that the mating connector is correctly crimped to the connection line.

### 4.6 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.

### 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 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.

## 5. 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 automatically restarts, e.g. after a power failure.**
Danger of injury

→ Keep out of the danger zone of the device.

→ When working on the device, switch off the mains supply voltage and secure the latter from being switched on again.

→ Wait until the device stops.

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



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

| Malfunction/error | Possible cause | Possible remedy |
|---|---|---|
| **Impeller running roughly** | 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. |
| **Motor does not turn** | 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. |
| **Overtemperature of electronics/motor** | 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. |

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| | | |
|---|---|---|
| | Ambient temperature too high | Reduce the ambient temperature.<br>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.

### 5.1 Safety test

| 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 |
| Weld seams for crack formation | Visual inspection | At least every 6 months | Replace device |

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