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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 will restart automatically, e.g. after power failure.
Risk of injury

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

→ 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 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 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

WARNING
Transportation of fan
Injuries from tipping or slipping.

→ Wear safety shoes and cut-resistant safety gloves. #Only transport the fan in its original packaging. #Transport the fan lying flat, in other words with the motor axis vertical.

→ Secure the fan(s) so that nothing can slip or tip, e.g. by using a lashing strip.

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.

Translation of the original operating instructions

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.
- Conveying of air at an ambient air pressure of 750 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

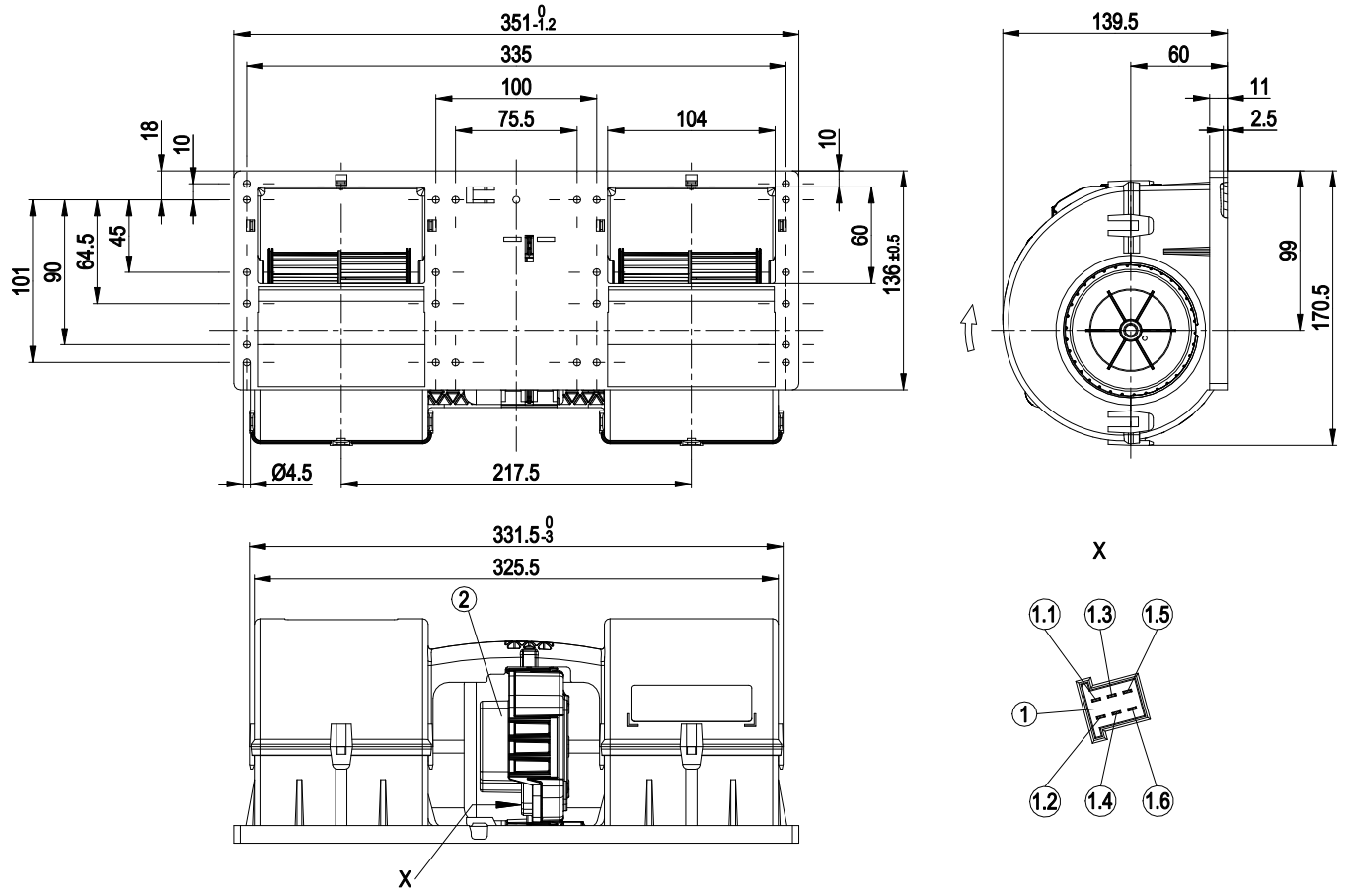
Using the device in the following ways is particularly prohibited and may cause hazards:

- Operating the device with an imbalance, e.g. caused by dirt deposits or icing.
- 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	Strip tyco Junior Power Timer, 6-pole, coded
	Connection line (460 mm) with mating connector part no. 02001-4-1021 not included in scope of delivery
1.1	+ UB
1.2	GND
1.3	PWM/LIN, 100% speed
1.4	80% speed
1.5	60% speed
1.6	not used / no function
2	Electronics cover blue (RAL 5015)

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3.2 Nominal data

Motor	M3G074-CF

Nominal voltage / VDC	26
Nominal voltage range / VDC	16 .. 32

Type of data definition	ml
Speed / min-1	3830
Power input / W	394
Current draw / A	15.2
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

	Actual	Request 2015
01 Overall efficiency η_{es} / %	45.5	33.9
02 Measurement category	A	
03 Efficiency category	Static	
04 Efficiency grade N	55.6	44
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 County court Stuttgart · HRA 590344 D-74673 Mulfingen	
08 Type	K3G097-AK34-65	
09 Power input P_e / kW	0.25	
09 Air flow q_v / m³/h	705	
09 Pressure increase total p_{sf} / Pa	526	
10 Speed n / min-1	4505	
11 Specific ratio*	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.	

* Specific ratio = 1 + p_{fs} / 100 000 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	2 kg
Size	97 mm
Material of impeller	Plastic, PA UL94 HB (black)
Housing material	Plastic, PP (black)
Balance quality according to DIN ISO 1940-1	G 2.5
Direction of rotation	Clockwise, seen on rotor
Type of protection	IP 24 KM
Insulation class	"B"
Humidity (F)/ environmental protection class (H)	F3-2
Mounting position	Any
Condensate discharge holes	None, open rotor
Cooling bore / aperture	Rotor-side
Operation mode	S1
Motor bearing	Ball bearing
Life expectancies	40,000 h (typical)
Technical features	- Start at 85 °C (2 min.) permitted -Load dump (58 V) - Motor current limit - Soft start - Control input 0-10 VDC / PWM - Overvoltage detection - Over-temperature protected electronics - Line undervoltage detection
Electrical leads	With plug; Standby current less than 500 µA
Motor protection	Reverse polarity and locked-rotor protection
Approval	E1; EAC
Remark	Not approved at maximum back pressure for continuous operation at 85°C; type approval number - 036432

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).

Strength class for mounting screws	8.8

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.

Max. permissible ambient motor temp. (transp./ storage)	+70 °C
Min. permissible ambient motor temp. (transp./storage)	-40 °C

3.7 Electromagnetic compatibility

EMC directives	according to ECE R10 Rev. 3

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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.

⇒ 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.

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

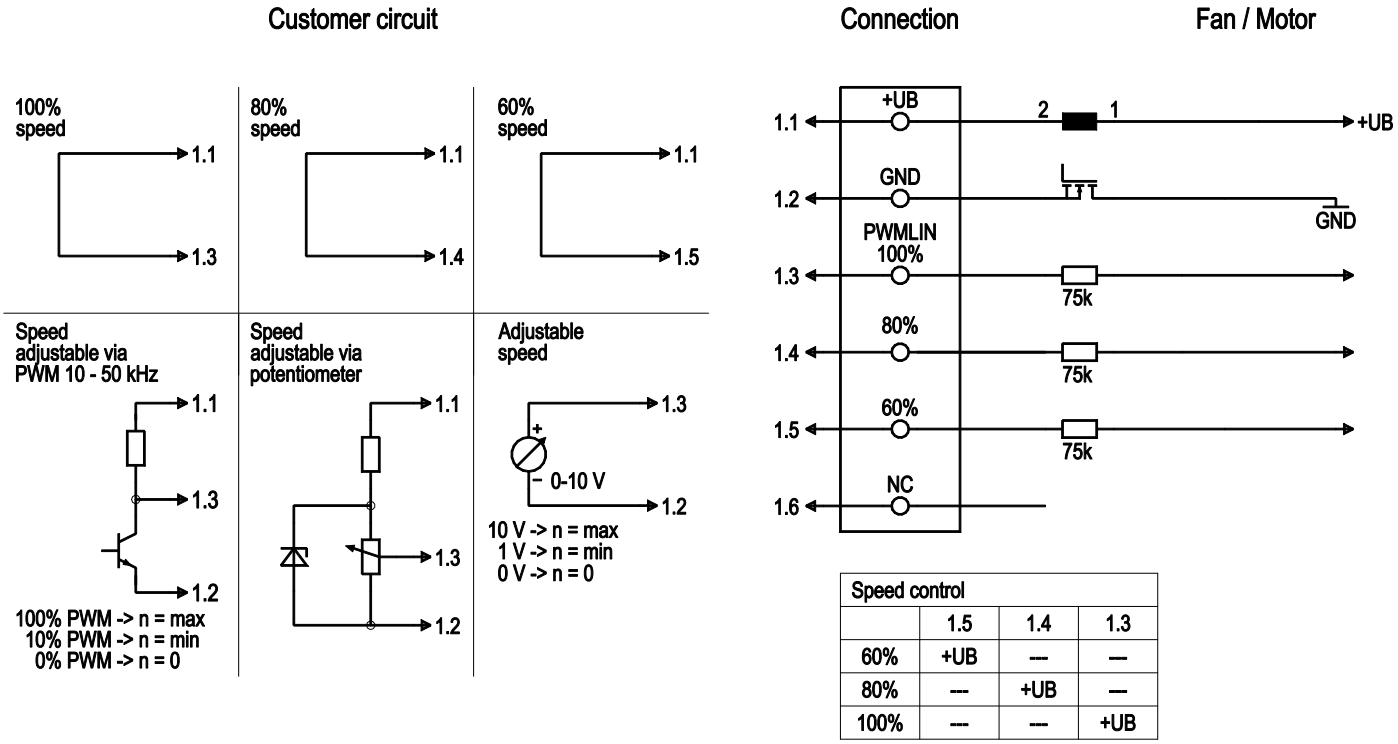
⇒ Check the PIN assignment of your connector.

⇒ Connect the panel connector and mating connector.

⇒ Ensure that the connector is locked in correctly.

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4.4 Connection screen



Speed control			
	1.5	1.4	1.3
60%	+UB	---	---
80%	---	+UB	---
100%	---	---	+UB

No.	Conn.	Designation	Function / assignment
	1.1	+UB	Power supply
	1.2	GND	Power supply GND, reference earth
	1.3	100%, PWM/LIN	100% speed, control input 0-10 V analogue voltage or PWM
	1.4	80%	80% speed
	1.5	60%	60% speed
	1.6	NC	Not used / no function

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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 will restart automatically, e.g. after power failure.
Risk of injury

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

→ After working on the device, remove any tools used 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.
	Ambient temperature too high	Reduce the ambient temperature. Reset by reducing control input to 0.

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	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
Impeller for wear/deposits/ corrosion and damage	Visual inspection	At least every 6 months	Clean or replace impeller

5.2 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.

5.2.1 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.

5.2.2 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.

5.2.3 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.

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